

have just testified with reference to your examinations made in the neighborhood of Heber City, same general conditions would exist, would they not?

A You mean as to the --

Q As to the balance of the soil and its requirements of water for necessary irrigation purposes.

A Certainly made on the assumption that the land is as indicated by the observations made in connection with the fact that the general appearance of the surface and what ditches there were would indicate that the soil was in a general way similar to some distance on each side of the point where the actual observation was made.

Q Now, calling your attention again, Mr. Larsen, to the ditch that you say you examined near the mill, I would like to locate that if possible, can you state whether the ditch that you examined was -- so-called ditch was the waste race from the mill?

A I couldn't say. It is a ditch that is located where I described it.

Q Immediately west of the mill?

A Yes sir.

Q At whose instance did you go to Wasatch County to make your examination?

A Why, I believe Mr. Tanner called me up and asked me to go -- to Wasatch county?

Q Yes.

A Why, I think Mr. Murdock asked me to go.

Q J. R. Murdock? A. Yes sir.

Q Do you know what position he holds with reference to the Provo Reservoir Company, or what position he holds in that company?

A I know that he is an official in the company, I could not say just what, I understand he is.

Q Now, the tests that you made, the particular places where you made the test, at whose instance did you make them at those

particular places.

A You mean with reference to here or Wasatch county?

Q No, I mean --

A Why, there was no special -- there was practically nobody exactly directing the work. I remember Mr. Murdock said "We had better take a sample on Mr. Clegg's land; he said "his is pretty rocky".

Q And did he designate the lands on which the examination was made, lying near the cemetery?

A That was made in a ditch.

Q I say, did he designate that as the place to make the examination?

A Yes, I think so.

Q Isn't that true with regard to every place that you made an examination, didn't you lead you to the particular place where the examination was made, or direct you to it?

A Well, in a general way, yes.

Q After you arrived on the ground you may have selected the specific spot, but not the grounds^{up} on which the examination was made, did you?

A Not so much up there as we did down there. There was no special direction connected with it, wasn't anybody particularly in charge. We went along, several times I said "Better take a sample here" and we would stop and take one.

Q Now, designate what particular places you made an examination in accordance with your suggestion "you had better make a test here"?

A Well, that was south of the mill one place.

Q Was there any other place?

A I don't know of any other place under the Wasatch Canal.

Q Do you own lands in the State of Utah, Mr. Larsen?

A Not very much, I own a little.

Q Have you ever made any ~~prx~~ practical tests of irrigation on what you have for the purpose of raising crops such you found

up in Wasatch county?

A I used to irrigate when -- I was raised on a farm, used to irrigate there. Particular piece of land I own now I have never irrigated myself, it don't need much irrigation, and don't get any to speak of.

Q Could you say now from what knowledge you gained in your examination of the particular tracts of land that you did examine in Wasatch county, whether they were or not average lands of Wasatch county?

A The best I could say with reference to that is that is that I believe the samples taken under the Wasatch canal are fairly representative of the lands under that canal.

Q Now, do you base that judgment upon anything that was said to you by those who were there or by ~~the~~ a superficial examination of the remaining parts of the land?

A I base it upon my own opinion as I examined the ground, and went over it, as the general appearance in connection with the actual tests made.

Q Did you make any examination of any of the ground in the vicinity of Heber except that which you examined near the mill by getting out of the vehicle that you were in and going over the ground.

I understood you got out of a vehicle near the mill and examined the ground there, did you do that in any other case?

A In addition to the samples taken?

Q Yes, I mean in addition, other lands than those where you made the --

A No, I don't believe we got out of the rig except the points where the actual tests were made.

Q And of your own knowledge you wouldn't say positively that the lands that you examined were a fair sample of the average lands of Wasatch county, would you?

A Not of the county, no.

Q Well, that part of it that is under irrigation, all those lands

that are covered by the Provo River water system?

A Those tests refer entirely to the lands under the Wasatch Canal.

Q Would you say it is a fair sample, of your own knowledge, that it is as fair an average of the land under the Wasatch Canal?

A In my opinion it represents, about representing the average ground under the canal.

Q Would you be willing if you owned lands under the Wasatch Canal to let some fellow go over and make similar examination such as you did, and designate the requirements of water for your land and be satisfied with it?

MR. JACOB EVANS: Object to that as incompetent.

THE COURT: Objection is sustained.

CROSS EXAMINATION By Mr. Corfman.

Q Mr. Larsen, your knowledge and information of practical irrigation has been gleaned largely from experiments made under the Reclamation Service?

A Yes sir.

Q And in the Mapleton District, what is known as the Mapleton Bench?

A No, it is Mapleton, Spanish Fork, Lake Shore, Benjamin and Salem.

Q Now, you spoke of the Mapleton Bench being in close proximity with the Provo system?

A Little closer than any other part of the Project.

Q You testified as to the needs of the Provo system by reason by reason of the knowledge you obtained largely from the System, Mapleton ~~System~~ did you not?

A Yes sir, that is if the Mapleton system means the Strawberry Project.

Q How long have you been connected with the Mapleton Bench?

A Oh, about eleven years.

Q And during that time you have ~~not~~ been in the service of the Reclamation Service?

A Yes sir.

Q Do you know whether or not those lands were irrigated at all before the Government furnished water for them?

A These experiments were made on water that ~~was~~ that they owned before ever the government furnished any water.

Q And large tracts of land in that vicinity were dry farms, were they not?

A Yes sir, that is scattered around different parts, yes.

Q And that was done before the water was furnished by the government? A. Yes sir.

Q It had been farmed for many years?

A Varying considerably, some of it for maybe fifty years.

Q The soil conditions were such they would produce without irrigation at all, would they not?

A Well no, I wouldn't say they were.

Q They did raise crops there.

A Oh, you mean dry land crops?

Q Yes.

A Yes, they produced some.

Q And there was a soil condition there that permitted that to be done?

A You find that was not special to that locality.

Q Isn't it true that here in the arid region there are tracts of land that will produce without irrigation?

A Why yes.

Q You can dry farm?

A I don't know of any especial features connected with this land.

Q It did produce dry land crops, didn't it?

A Some of the land around there, yes.

Q Now, in close proximity there are other lands that would

not produce such crops, isn't that true?

A No, if you go up the mountain some place, but the general farming land there, the land we had under observation was representative of the whole area covered by the conservation.

Q Now, from your observation of the land in the vicinity of Provo, Provo bench, you say that those lands could be dry farmed?

A Some parts of it.

Q Only some parts and very limited parts?

A Well, you mean of the whole system or just the bench?

Q Yes.

A There is considerable areas under the Provo Bench I should say at least comparable with the same, with the land on the other project that could raise dry land crops.

Q On Provo Bench?

A Under this system, not with especial reference to --

Q Where?

A Under the West Union and the East Union, Fort Field, part of the Dry Creek, and those would be the best adapted.

Q Now, how do you account for the condition that permit of dry farming in one locality in close proximity the lands will not produce dry?

A How do you account for the condition?

Q How do you account for those conditions?

A I don't know just what you mean?

Q You say in certain localities that are lands that will produce dry land crops, in the same locality there are lands that will not produce dry land crops, how do you account for the condition of the land that will produce the dry land crops?

A I don't account for the condition, if the condition exists it is there.

Q Well, what is the condition that prepermits of one piece of land being dry farmed and another not?

A That is a different question, the difference in the soil and

depth to the water table and few other things that might have a bearing.

Q That class of land would not require the same amount of water for irrigation, would they?

A No sir.

Q And still you say that the land here in the vicinity of Provo and on Provo Bench would require about the same quantity of water as the lands in Mapleton?

A What do you mean, as an average?

Q As an average, yes.

Q Did I say that.

Q Well, you gave the duty as being about the same.

A For the same kind of land, I didn't say anything about the percentage of any particular time, because I don't know what the percentage is.

Q Your testimony then was confined at particular points you made these examinations?

A Exactly.

Q And you were taken there by whom?

A You mean in this country here?

Q Yes.

A Man by the name of McCune drove the car.

Q An employe of the plaintiff in this action?

A I don't know.

Q You examined a piece of property at 5th North and 4th East?

A I don't know, I think so.

Q Your No. 18, Provo City.

A 5th North, did you say?

Q 4th North and 4th East, I said 5th North, it is your No. 18.

A Yes, I got that marked No. 21.

Q At what point on those premises did you make the examination?

A At the southeast corner.

Q Southeast corner?

A Yes sir.

Q Did you go over the premisses /

A No sir.

Q Did you observe that 50 feet away from where you made that test that the soil was gravel and rock?

A No sir.

Q Did you notice that 30 feet away in the public street there there was practically no top soil at all?

A I didn't notice that condition.

Q You didn't go over that particular lot at all, did you?

A Didn't go over it except inside of the lot and take the sample.

Q And made the test? A. Yes sir.

Q Now, in answer to Mr. Thurman, you testified that the water necessary for the irrigation of land in this district should be at hand, that is at the place to the lands for use?

A That is one of the assumptions made.

Q By that do you mean, did you mean that it should be placed at each 160 acres or to the lot where you made the test?

A I would say probably on 40 acre tracts.

Q On 40 acre tracts? A. Yes sir.

Q And you didn't have in mind that it should be placed, when you were testifying, your test on 4th East, that it should be placed at that particular lot?

A No, just within a reasonable distance.

Q Now, the conclusions on Mapleton Bench that you have testified to, ~~and~~ did you find there large acreage that was being irrigated or small, when you made your observations?

A Comparatively small.

Q How small?

A That would be an estimate, although I have got information as to the exact number of acres that were irrigated in 1910. I haven't got them here.

Q Do you know about what the average holding is of the farmer

in the Mapleton district, Spanish Fork, and these districts that you have testified to under the Reclamation Service?

A You mean the whole district?

Q Yes, what would be the average holding?

A That would be an estimate.

Q What would be your judgement as to that?

A I should say probably be a little less than twenty acres.

Q And in the Provo District, that you have testified to, have you got any judgment what the acreage would be there held by the individual?

A It would be just a pure guess.

Q Have you got any judgment whether it would be larger or smaller?

A Both larger and smaller, but the matter of average would be just a guess.

Q Isn't it true that the acreage held as a rule in the Provo District is much smaller than in the Mapleton district.

MR. JACOB EVANS: I object to this as incompetent and because the witness has testified he doesn't know anything about it.

THE COURT: Objection is sustained. If I understood Mr. Larsen correctly, he has not sufficient information to have any judgment on it at all.

Q You testified, Mr. Larsen, that in Wasatch county where you made the test, that the duty of water there was about 30 inches per season.

A Did I say uniform throughout?

Q No, I didn't say it was uniform, but as a whole about 30 inches, wasn't it?

A It might average about that.

Q And that was on the assumption that they raised three crops of lucern in that length of time, was it not?

A Yes sir.

Q Do you know how many crops they do raise?

A No sir.

Q And in Utah county the assumption was based on three crops?

A Yes sir.

Q Would you say they required the same quantity of water if the owner raised two crops in Wasatch and Summit county, it would require the same quantity of water to raise those two crops as it would three in Utah county?

A Depends on the length of the season, how long it took them to grow.

CROSS EXAMINATION by Mr. Thomas.

Q Mr. Jarsen, I would like you to explain a little more fully the character of your experiments under the Strawberry Project. First, let me ask you if you conducted any of these experiments to determine the duty of water on tracts of 160 acres?

A No sir.

Q What was the average size of the tracts on which you conducted the experiments?

A I never figured an average, it would be an estimate.

Q That question probably is a little unfair, just state the number and few of the sizes of tracts, ten acres, twenty, thirty, thirty-five, whatever it may be?

A The most of them are under ten.

Q And they run as high as what?

A If any that go over ten, I am not sure there is a ten acre tract. I think there is likely.

Q Then ten acres would be the average size would you be safe in saying?

A No, it would average less than ten.

Q What would be the length of the diverting or irrigating channel.

A What do you mean, between the point of measurement and land?

Q No, I can see my question was somewhat cloudy. What was the length of the irrigating ditches in the Project?

MR. A. C. HATCH: What ditches?

A Mean the length of run, distance irrigated?

Q Yes, length of run?

A They varied considerable.

Q What would be the longest that you now have in mind?

A Well, I would have to estimate it, I don't remember.

Q Give us your best judgment, I don't care for inches, M^r.
Larsen.

A As a rule I don't think that they run much over six hundred feet.

Q What were the shortest ?

A The shortest, I think they would probably average between four and eight hundred, a few cases longer.

Q In the experiments which you conducted, did you determine the duty of water from the point of diversion, or from the beginning of the point of use?

A From the point near the land on which the experiment was conducted.

Q In some instances would those ditches from the main channel to the land experimented on be of any considerable length?

A Distance between the point of measurement and land?

Q Yes.

A Very few cases, nearly always within -- well, it would average less than five hundred feet, some cases closer. We tried to get them as near to the land as practicable.

Q So the loss in transmission would be negligible?

A Yes sir.

Q Were there any places where the loss in transmission was really important?

A No sir.

Q You aimed to obviate that loss as much as possible?

A Yes sir.

Q Did you conduct experiments on some of the tracts to determine

the duty of water to various crops in the same year?

A We had various crops represented. Various cases we would have -- a man would have a little farm, and he would have it divided up part in alfalfa, part in grain and part in sugar beets, and we might take the whole farm.

Q You made no other division of tracts or crops than that that you have just indicated?

A I don't --

Q Let me put it this way then: Did you conduct a series of experiments with the same kind of crops with different volumes of water upon the same land in the same year?

A They were different.

Q That is the crops ~~xxxx~~ would vary?

A And quantity of water vary.

Q Did you take, for instance, a tract of alfalfa and divide it into one or more tracts then apply water in different quantities upon those respective divisions of the same tract of alfalfa in the on year?

A We did not apply the water at all. The farmers handled their farms in their own way.

Q And in the usual way?

A I don't know, they handled it their own way.

Q You don't know then whether, or did you suggest -- let me withdraw that question -- did you make any suggestion as to the method of application of water?

A No sir.

Q Then your ~~ex~~ investigations were not strictly in the experimental way, were they?

A They are the history of what happened.

Q Rather a history than an experiment?

A You can call them that, yes.

Q No, you call it.

A That is what they are. It is a complete history of just what

happened and when it happened and conditions under which it happened.

Q Without attempt on your part to obtain results under the different tracts with the same crops under different conditions in the same year?

A No attempt made by me to anything except record the facts.

Q You are familiar, are you not, with the form of experimentation in determining the duty of water in any one season and the same crop by dividing the crops of land experimented upon, are you not?

A I don't know just what you mean.

Q Have you ever conducted any experiments in the matter of irrigation to determine the duty of water to land other than you have just mentioned under the Strawberry system?

A No sir.

Q Have you ever been associated with any expert in irrigation in determining such duty of water by experimentation?

A No sir.

Q Are you familiar with the system of experimentation adopted by Mr. Bark in Idaho?

A I have read his report, yes.

Q You are familiar with that report?

A I have read it.

Q You know of Mr. Bark's reputation, do you not, as an irrigation engineer?

A I have heard of him in connection with that work.

Q He is regarded, is he not, as one of the nation's experts in matters of irrigation?

A I should think that what he had to say was the fact.

Q And would be worthy of great consideration?

A I should judge so, yes.

Q Are you familiar with the recorded method of his exp experimentation in Idaho?

A. Yes sir.

Q Did you conduct any similar experiments on the Strawberry tract?

A What do you mean by similar?

Q I asked you if you were familiar with the method of experimentation conducted by Mr. Bark in Idaho to determine the duty of water. You said you had his book.

THE COURT: Let me ask a question right here,

MR. THOMAS: Surely.

THE COURT: If I understood Mr. Larsen correctly he said he conducted no experiments whatever. All he did he reported the facts with reference to the irrigation by the farmers, isn't that correct.

MR. THOMAS: He did say that.

THE COURT: What is your object in asking him if he conducted certain specific experiments and he said he conducted none?

MR. THOMAS: At any place -- ~~he~~ he didn't seem to understand my question.

THE COURT: I think he made it very plain.

MR. THOMAS: He did as to that, and I understood that.

Q Have you ever conducted any experiments to determine the duty of water other than what you have mentioned here in the Strawberry tract?

A I answered that, I said no.

Q And so far as the Strawberry Project experiments were concerned, you simply turned the water to the farmers at specified times and they used the water as they desired it?

A We didn't turn the wa-ter at all.

Q Now, I don't want to ~~be~~ be hypocritical or particularly capricious, I am trying to ascertain the facts, Mr. Larsen.

A I am perfectly willing to give you the fact.

MR. JACOB EVANS: Let him explain it then.

MR. THOMAS: We will go at it quietly, Mr. Larsen

and I understand one another, or will before we get through, and get along nicely.

Q When I said you turned the water in I didn't mean to convey the idea you personally did. Let me change the form of the question, and say, used the water turned in to the farmers from the Strawberry P^roject?

A No sir, it was turned in from the Spanish Fork river.

MR. THURMAN: This was before the Project.

MR. JACOB EVANS: This was when the irrigators were using it themselves, taking their turn, before the Project was completed, to ascertain the duty of water.

MR. THOMAS: I see, thank you.

Q In making this record, did you seek to ascertain ~~the~~ whether or not the maximum crops were raised on each tract, Mr. Larsen?

A A study of the results would indicate to you whether or not they were.

Q I am asking you if the maximum crops were raised under the duty of water which you have reported as having been given to that land?

A Yes sir, I wouldn't say absolutely maximum, because anyone stand don't mean anything.

Q Did you keep a record of the tonnage of crops from these respective tracts? A. Yes sir.

Q Have you got that at hand?

A Yes sir.

Q From the water which you have said was used upon the lands, what was the tonnage of beets?

A It varies.

Q Depending upon the character of the soil and the efficiency and management and so forth?

A Yes sir, and on the condition of the -- especially with regard to the beets on the condition of the weather during the early

spring. In 1910 the weather was very dry for quite a while after the beets were first put in, good many of them had to be replanted.

MR. THURMAN: We have a book here and if you desire to use it, you are welcome to it.

MR. JACOB EVANS: Yes, or if the witness desires it for the purpose of refreshing his recollection, I will just hand it to the witness, see if he wants to.

MR. THOMAS: I haven't seen it, don't know a thing about it. I don't care to ask questions about something about which I am entirely ignorant. I have not seen the volume.

Q Based upon your experience there what would you say now was the duty of water sufficient to raise a crop of beets, I am speaking now in ~~six~~ inches?

A That question in the form given it would be impracticable to answer, have to make assumptions as to what conditions you are going to work under.

Q Directing your attentions to the conditions you found in 1910 in that territory, were beets raised there then that season?

A Yes sir.

Q Have you any record, or can you state what quantity of water in inches was sufficient to mature a crop of beets?

A Do you want a few special cases or do you want my estimate of what constituted a proper duty from the study of all this investigation?

Q I am asking you now for the facts, the history as you got it?

A I will have to read that to you.

Q Thank you.

MR. BAGLEY: We object to this as not cross examination. I don't understand this report of any experiments on the Strawberry Project were gone into on the main case.

THE COURT: I think the objection should be sustained. A limited amount of cross examination is of course permissible

because these experiments were gone into merely to qualify this witness to testify as an expert, and any counsel would be entitled to a reasonable time for cross examination on that subject merely as touching upon the qualification of the witness, but beyond that it is immaterial entirely. The objection is sustained.

MR. THOMAS: I will withdraw the question.

Q Can you state from your experience there in the year 1910 whether an increased amount of water upon the land would have increased the tonnage of beets per acre?

A We had a number of experiments with sugar beets and with various quantities of water and the basis of the determination what the duty of water -- correct duty of water to get the best results was based on a study of the result of all these investigation. We did not do as Mr. park did in Idaho. He took a tract and divided it into three parts and let the irrigator put on just the same amount of water on one piece that he had been in the habit of doing, and put less on this and more on that. We had no authority to do anything of the kind and we had no money to buy the ~~quantity~~ authority with, but if one man here has a tract of beets that he is irrigating and he uses certain amount of water on it, and another man to the side of him uses more or less, you get the same result as though they both belonged to the same man, and was handled in the way of giving one more and the other less.

Q If the soil were the same?

A Yes.

Q But you made no experiment upon any one tract to determine whether or not an increase of water would have increased the tonnage?

A The soil is only one element in determination of the duty of water,

Q Would you read my last question.

(Question read)

A As I have just explained it is not the same thing as one tract--
Q Just answer the question yes or no.

MR. JACOB EVANS: Object to it if the court please
on the ground he has testified --

THE COURT: Objection sustained.

MR. THOMAS: Note an exception.

Q With reference to your investigation of the soil here in
Utah Valley under the Provo system, you made no other investi-
gation than that which you have specifically described?

A No sir.

Q You made no investigation to determine what proportion of the
general tracts investigated your immediate investigations would
cover?

A No sir, ~~exps~~ except just an examination of the ground,
driving over it, observing ditch banks and what appeared to
be the condition.

Q But you were not able to make -- you cannot make at this time
any statement as to the proportion of the ratio this particular
tract investigated by you would bear to the whole of that
similar tract irrigated?

A No sir.

Q Do you know whether or not the soil varied much in character
in each of these particular places of investigation?

A You mean in any particular field?

Q No, all of the fields?

A Yes, it varied considerably, as indicated by the observations
recorded.

Q Would you say there was an equal variance in the individual
fields?

A Equal to what?

Q Let me withdraw that question and frame another. Would you say
that -- I think from your general question that would be answered,

so I will not frame it -- in your direct examination you said you had seen soil here under this system quite unlike any other soil with which you had been familiar, that is true, is it?

A With reference to some part, yes.

Q Do you know whether or the parts that you thus described were of any large area?

A I could not state as to the extent of the area.

Q In giving your answers then as to these particular tracts it was largely guess work, was it not, as to the duty of water upon those particular tracts?

A It was just my opinion, yes.

Q Not supported with any experience of your own?

A Supported by all the experience I have had.

Q Upon those tracts?

A I had no experience on those tracts .

Q That means then that you are basing it purely on guess work, did you not?

A I wouldn't call it so.

Q Do you recall how many investigations you made in Provo City?

A I don't remember.

Q Who designated the places where you should make the investigations?

A I did.

Q In Provo City ? A. Yes sir.

Q Who designated the places where you should make the investigations in Kamas?

A Why, there was -- we didn't bore any holes there at all; they were all made by examination of ditch banks and wherever there was a deep bank that it exposed the soil, why I would have the car stop and examine it. That was the way the soil was examined in the neighborhood of Kamas.

Q You made no other investigation than merely to determine the soil texture there in Kamas from that that you have indicated?

A Made no other -- I didn't quite understand your question.

Q Did you make any investigation as to the productivity of the soil as to the crops raised, the tonnage?

A No sir.

Q Did you make any investigation as to the use of water there?

A No sir.

Q Did you make any investigation as to the porosity of the soil out in the fields?

A Nothing but the field examination.

Q Just as you have described?

A Yes sir.

Q And that was mainly along the highway?

A Along the ditch banks, yes sir.

Q Did you make any determination as to the drainage of that land into the Provo River or to the Weber system?

A No especial determination, no sir.

Q Was it pointed out to you that some of the land which you had investigated was irrigated from the Weber system and not from the Provo system?

A No sir.

Q Did you make the designations yourself in Kamas?

A In the town?

Q Up in Summit County?

A I just stated that it was all done by investigating, examining the condition of the ditch banks. Whenever we would drive along where the bank was deep I would have the car stop and examine the soil by digging into the bank with a shovel.

CROSS EXAMINATION By Mr. John E. Booth .

Q Mr. Larsen, in your direct testimony this morning I failed to hear of any investigations made on the upper part of the West Union Canal. I think I heard all of them that you made. Didn't you make any?

A No sir.

Q Why did you not investigate there?

A I didn't have time. It was five o'clock when we got through down at the lower end.

Q Do you don't know anything as to those conditions, of course you could not tell? A. No sir.

Q I want to ask you about the first item that you mentioned this morning. The Irwin Jones tract.

A I didn't quite understand you.

Q I wanted to ask you a little about the Irwin Jones tract. I think that was the first one you went into this morning, a few questions about that, that is on the west side of Provo River?

A Yes sir, it is on the west side of the river.

Q You give it there, as I remember, of 36 inches?

A I think so, yes.

Q And for four months?

A Yes sir.

Q Commencing, what would you say was the first irrigation, when did you begin?

A About the first of May.

Q About the first of May?

A Yes sir.

Q Suppose there should be a good rain about the last of April, say an inch deep, how long would that probably last until an irrigation should be required?

MR. RAY: Object to it upon the ground that the witness is not competent to testify as to the lands, or the question how long as inches of rain would last up there.

MR. A. C. HATCH: He didn't say an inch of rain, a good rain.

MR. JOHN E. BOOTH: I said an inch of rain.

Q Have you any judgment about it, I will ask you that, on that soil how long would it be until an irrigation was required along in April?

A I don't know. I don't think I want to say just how long.
Q All right, if you can't tell. The soil, generally, conditions generally in that vicinity are about the same, or similar, are they not?

MR. RAY: Object to that upon the ground it appears the witness is not competent to testify to the similarity of conditions there.

Q So far as you examined in the vicinity of Mr. Jones land was it about similar in that farm?

A Didn't appear to be.

Q Don't appear to be?

A Don,t appez to be?

A 400 feet west of there it is entirely different soil.

Q Then you can't tell, I suppose, I will ask you if you can tell how soon we would have to commence irrigation up there, can you tell that?

A It depends somewhat on the season, Mr. Booth.

Q Assuming then we should begin irrigation on the first of May, say that, now in these several examination that you made, would it require another irrigation about the same time?

A Same time as what?

Q Would all of them require it at the same time? Suppose we commenced irrigation on the first of May and irrigated all, now, the next irrigation would come sometime, wouldn't it?

A What are you talking about, alfalfa?

Q I am talking about the ground up there?

A Depends on what you had growing on it.

Q I think you give your testimony about alfalfa crops?

A Not wholly.

Q Generally?

A That was the basis, yes.

Q All right, we will keep the same basis then. When would you need to irrigate again?

A Depends on the soil.

Q But you fix it at 36 inches during the year? Now, that soil is what I am asking.

A Talking about that one tract, are you?

Q Yes sir, I told you that when I started in, that is what I am talking about, when would you need to irrigate again after the first of May?

A Well, you ought to irrigate ^{that} about every twelve to thirteen days.

Q About every twelve or thirteen days during the season?

A Yes.

Q Now, I think you said you required about six inches, in your direct testimony, did you not?

A For what?

Q For the season?

A Six inches.

Q To each application, about six inches, did you not say that this morning?

A That would be variable.

Q That is what I want to find out, how much variation from what you said this morning when you said six inches for an irrigation.

A Well, I think that would figure, somebody asked me how many irrigations would be required to raise the crops.

Q All right, what did you say?

A If you put on thirty-six inches use six inches for each irrigation you will get six irrigations.

Q Are six inches required?

A Depends on the nature of the soil whether --

Q I am talking about that soil, remember we are talking about the Irwin Jones ~~xxxx~~ piece, let us not get off that, it is not very big.

A Stay right on that piece then?

Q Yes sir.

A Depends on how you handle the water, how much water you had.

Q We have got 36 inches of water.

A How wide is it?

Q How do you divide it? do you ~~may~~ see that is what I am trying to find out how you divide, that is what I am trying to find out.

MR. THURMAN: How wide is it?

MR. JOHN E. BOOTH: I don't know, I didn't go there.

Q It is as wide as you estimated it, it is as narrow as you estimated it, it is as deep as you estimated it and as broad and as thick, just as you estimated it, that is what I am dealing in now.

A I don't know what your question is.

Q I will put it again. How much of this 36 inches of water that you have referred to on the Irwin Jones piece would you put on at one irrigation?

A Just as little as possible.

Q In that case you would take a spoon, would you, and put it on?

A You might, I wouldn't.

Q I am asking what you would do.

A No, I wouldn't use a spoon.

Q How would you get it less than that?

A I would get it by properly preparing the land.

Q You have 36 inches of water to apply on Irwin Jones land during the season. Now, we will assume you commence irrigation on the first of May, I want to know how much water you would use at that irrigation?

A How much I would use, or how much someone else?

Q How much ought to be used, I think that is the way you gave it before.

A The first irrigation would probably require about six inches.

Q All right, the next would require about how much?

A You can probably put the rest of them on about five inches.

Q About five inches, all right. Now, the first is six and the

next five. When would you put the five, the six comes on the first of May, when would you put the five?

A Twelve or thirteen days apart.

Q Twelve or thirteen days apart, that would be about the 12th of May, 13th of May. Now then, the next would be when?

A You can figure by adding 13 days.

Q About thirteen days, five inches at each one?

A Yes sir.

Q That would be five on the 25th and five more twelve days ~~after~~ after that, be five on the 12th of June and five more about twelve days after that would be the 19th of June, if I figure rightly, and if I don't you correct me, will you?

A I am not figuring.

Q Well, I am and asking you about it.

A I think it is right then.

Q All right then, if I am not corrected. On the 19th and five more then twelve days afterwards would be July 1st and then five days more about the 13th of July, am I right, so as to be with your qualification?

A Did you say five days?

Q No, five inches.

A Oh.

Q Five inches more about the 13th of July?

MR. COLEMAN: That is all of them, isn't it?

MR. JOHN E. BOOTH: Nevermind about that, want to see where we are coming out.

MR. COLEMAN: You would get your water shut off.

MR. JOHN E. BOOTH: Not in his theory of it.

THE WITNESS: You would get seven irrigations, wouldn't you, well, I think you are asking me. I see I think that would get more in four months at twelve days apart. We would have one at the beginning and one at the end and then in four months would be 120 days, twelve days apart seems to

me like you would get about eleven of them.

Q You get your seven around three --

A Well, I don't like to crowd it that way, twelve into seventy.

Q Bursts out at the sides when you do that?

A You get the crop just the same.

Q That runs it up then to about sixty inches, don't it, right on the series you have given?

A No sir, it runs it six or seven irrigations is sufficient to raise three crops of alfalfa.

Q Well, that may be true. Now then, when will you give it to us.

A You will get about two irrigations on each crop.

Q At twelve days apart?

A It should be practically uniform over the season. Might be a little more than twelve days.

Q All right, put it twelve and a half.

A Twelve days and thirteen hours.

Q All right, and can you crowd your space of time in that amount of water that you gave in that way?

A I don't understand you.

Q Well, maybe it is my dullness, I understand it, however, but I don't understand how you can get thirteen day periods and only seven of them in 120 days?

A You don't have to irrigate after you get the crop off.

Q When do you get the last crop off?

A When it is ready to take off.

Q When is it ready to take off?

A It varies quite a little.

Q All right, varies when and how? When is your estimate when the last crop ought to come off?

A Oh, latter part of August.

Q Last crop latter prt of August?

A August or September.

Q That wouldn't be in accordance with my theory. I believe that

is all, I feel a little like Harry Bolinbroke said "Only a penny worth of bread in this intolerable deal of sack."

RECROSE EXAMINATION by Mr. Thomas.

Q May I ask one question, did you make any investigation to determine the water content of the soil here in Provo City?

A No sir.

Q Did you make any similar experiments on the -- or rather similar investigations over under the Strawberry Project as you did here in digging the holes and ascertaining the character of the soil and so forth?

A Yes sir.

Q The same number or more?

A Wherever -- I couldn't say the exact number. What is deemed sufficient to cover the ground. Sometimes two tracts right close together. Similar ground, here we dug one pit and called it the same ground, where there is nothing to indicate there is anything different.

CROSS EXAMINATION by Mr. Ray.

Q Mr. Larsen, assume that on Provo Bench it is necessary because of the character of the soil upon which the crop grows, to irrigate your alfalfa first in early April and last in October, and that the crop requires watering every fourteen days as a minimum, or it will dry up, then would you say that 36 inches of water is sufficient for that period and that crop?

A No, I don't think you could irrigate it often enough under those requirements for that length of time.

Q And if you found a soil of that character you would raise your duty to meet the necessities of the crop, wouldn't you?

A Yes.

Q Spanish Fork Canyon is a canyon just above the Mapleton Bench, is it not?

A Yes sir, comes out of the mountains on the southeast.

Q Mapleton bench is made from the wash from Spanish Fork Canyon, isn't it ?

A Probably is, largely.

Q Spanish Fork canyon is largely shale, isn't it?

A No I don't think so.

Q Isn't there a good deal of shale in it?

A I could not say, I don't think there is.

Q Where do you get your clays on Mapleton Bench then?

A The clays are over toward the north side of the bench. The south side of the bench is more gravelly than the north side, the side nearest the Spanish Fork, the bench close to the edge of the bench is quite sandy and clayey, and there is a space that is more gravelly and then farther north there is a debris soil, and right at the mouth of Hobble Creek Canyon it is rocky.

Q But that comes out of another canyon, doesn't it?

A It is right at the mouth of Hobble Creek, yes.

Q You don't know whether Spanish Fork canyon is largely shales?

A I could not say. I never noticed any large -- the canyon is pretty well covered with soil except in places where the rock is -- I don't believe there is much shale there. It seems to me like mostly limestone.

Q If it is largely shale its wash would then be a clay loam, wouldn't it?

MR THOMAS: Object to that as not proper cross examination, and an assumption.

THE COURT: What is the object?

MR. RAY: Goes to the question of the class of land he has had his experience on, your honor. I want to determine the character of those lands and if they are entirely different from the character of the lands in question in this case then it affects his experience as applied to those lands.

THE COURT: Mr. Ray, the court doesn't feel we have

time to go into detail the character of any land outside of this system we are investigating now. Of course, so far as it may throw light on his competency as an expert witness the court is disposed to give you every latitude.

MR. RAY: That is my only purpose.

THE COURT: But I am of the opinion this would throw no light whatever -- the character of the rock in Spanish Fork Canyon and resultant sediment that is washed down and composes the land below.

MR. RAY: Does your honor hold the soils of Mapleton bench are not material in this case?

THE COURT: Yes; absolutely immaterial. In a general way the character of the soil which he has experience with might be enquired into merely for the purpose of determining the extent of his experience and nature of his experience.

MR. RAY: That is my only purpose in this, and want to get the character of the soil. If this is not material as to that, then I won't press the inquiry. I was through with it as far as that is concerned.

THE COURT: He may answer this question, I wouldn't take any further time, because it opens up a matter and field of inquiry that we cannot take the time, of course, to go into, contradiction of anything he might state of course. You may answer this question.

MR. JACOB EVANS: I might suggest one other thing. ^{actually} That is he has dug into the soils himself in these various localities and can determine from the soils themselves what they are irrespective of what is up the canyon.

THE COURT: He may answer this question.

A Yes sir, to the extent that the shale supplied the material.

Q Have you ever determined the water level on Mapleton Bench?

A I know about what it is.

Q Can you state what it is?

- A I will state from memory it is approximately twenty feet.
- Q Matter of fact, aren't there swales on Mapleton bench that stand full of water parts of the irrigation season?
- A Not in the neighborhood of any of these investigations. There is one low place in the center of the valley -- center of the bench, that has no outlet. All drainage runs to that low place from irrigation and whatever other water goes in there and people there have laid a drain along the road ~~xxxxx~~ north, and off into a large gulch which drains this low place.
- Q Who is your superior officer?
- A Mr. Lyten.
was
- Q Who ~~is~~ at the head of the Reclamation Service at the time you began your investigations in 1910?
- A At the head of the Reclamation Service?
- Q Yes.
- A F. H. Newall, I think.
- Q Is Mr. Newall recognized as one of the great irrigation experts of the United States?
- A I think so.
- Q How many tracts did you select in this district in toto, you said this morning there were some overlapping. Have you any idea of the total number of tracts that you investigated?
- A The last year we had, I think, one hundred and ~~ix~~ twenty seven.
- Q Did that include all the tracts you had had in former years?
- A That included the total number we had under investigation during that year.
- Q I want to get the total tracts you investigated in the three years.
- A No, that is only for the one year.
- Q What is the total for the three years of separate tracts?
- A The investigations were carried on largely on the same tracts year after year.
- Q Yes, but you say largely, what was the total separate

tracts?

A I could not give you that exactly.

Q You watched them during the entire irrigation season?

A Yes sir.

Q You continued the experiments for three years, didn't you?

A Yes sir.

Q How many soil borings did you make, approximately?

A Oh, probably sixty or seventy per cent of the number of tracts.

Q Any other determinations besides soil boring and the observations during the period of three years?

A What do you mean by the observations?

Q Well, your record?

A The record shows everything that was done.

Q And this was done all for the purpose of determining the duty of water under the Strawberry Project?

A Yes sir.

Q Did you consider it reasonably necessary to go to this amount of work to make that determination?

A If we had not done so, it would not have been done.

Q Why does it take less time to determining the duty of water by you say over on this side of the canyon say than it did over there?

A I am not determining it, I am simply giving my opinion.

Q Why didn't you take some samples, Mr. Larsen, along the center of the Bench east and west of the ridge on the Provo Bench?

A Along the center?

Q In the center of Provo bench and on the west of the road?

A You mean on the west of the state road?

Q East and West of the state road?

A We did take some both east and west of it.

Q Which ones?

A I described them this morning. One was after you get west a

short distance you get into a different kind of soil, the main road there you are in this comparatively rocky and gravelly material these. To the west of that you soon get into a kind of a sandy clay loam that goes off toward the bench and to the east, it is rocky for part of the time and then get up near that orchard of Swab's, and as indicated by these observations the soil varies. Just what the percentage of this rocky and gravelly soil is on the bench, I don't know.

Q I understand you don't pretend to know any of the areas of the different character ~~of~~ of soil on Provo Bench?

A No.

Q Not even in the remotest way?

A Well, I wouldn't say that, that is a little too far to carry it, I have some idea of the areas.

Q How many acres of soil are there of the character of the Dixon soil on Provo Bench?

A I wouldn't want to give you any figures on it.

Q Of the Irwin Jones soil?

A I wouldn't give you any figures on any kind of soil.

Q Now, you don't know whether you were making your experiments in the soil on Provo Bench which was most favorable to a high duty or a low duty, do you?

A They are just taken apparently at random.

Q Who directed you where to take them?

A Those that had to be dug were already dug. I had nothing to do with setting or ~~designating~~ designating the points at which these holes were dug. It takes some considerable time to dig a hole in that kind of soil, and there was no attempt made at digging the hole while I was on the ground.

Q So you were taken to certain prepared pits and examined them?

A As far as that part of the soil is concerned, yes.

Q Now, will you describe the general character of the soil and sub-soil on the Kamas Bench?

A What do you mean by the bench?

Q The delta there, Kamas bench which you gave a duty of 40 inches.

MR. A. C. HATCH: I will ask what you call the Kamas bench, Mr. Ray?

MR. RAY: He referred to it as the bench, I don't know.

Q You mean the portion in the town?

A Yes.

MR. A. C. HATCH: I didn't hear you.

THE WITNESS: He is referring to the portion at the mouth of Beaver Creek, where the town is located.

MR. A. C. HATCH: We object to that as being wholly outside of the area irrigated from the Provo River and I cannot understand it would have any relation whatever to any of the issues in this case in the town of Kamas.

THE COURT: I understood you were referring to some portions of the lands upon which these tests were made or observations, at least, were carried on.

MR. RAY: That portion of the observations where he observed the water trenches.

MR. A. C. HATCH: That is within the town of Kamas according to his testimony and it is irrigated from Beaver Creek which the evidence shows so far in this case is a tributary of the Weber river.

THE COURT: Judge Hatch, if you withdraw that evidence, then, strike it out, I will not permit him to be cross examined upon it. If it remains in he may be cross examined upon it.

MR. THURMAN: We ask that be withdrawn of course. I didn't ask Mr. Larsen about it I let him give it from his book.

THE COURT: Can you indicate?

MR. THURMAN: It is that where they were putting in water works.

MR. A. G. HATCH: Within the town of Kamas.

MR. THOMAS: May it please the court there was one other, the one just west of Kamas which was the first investigation made.

THE COURT: That was of a ditch bank.

MR. THOMAS: Yes, your honor, and the trenches.

THE COURT: The second one is the trenches.

MR. A. G. HATCH: The trenches are within the town.

THE COURT: That may go out then with your consent and you will not cross examine upon it.

MR. RAY: I would like very much to put it back in as part of my cross examination. I think I am entitled to.

THE COURT: If you will ask the question the court will determine whether you are entitled to or not.

MR. A. G. HATCH: The examination made just west of Kamas may possibly be upon lands that are irrigated from the Provo River.

THE COURT: Nothing was done with reference to that, but I understand you withdraw and ask to have stricken out the evidence with relation to the experiment made in the second test testified about by this witness at Kamas. That is, the examination made of the soil in the trenches made for the water works in the town?

MR. THOMAS: In the town of Kamas.

THE COURT: That may go out, and of course, if it is material for anyone else they may offer it.

Q Have you made any examination, Mr. Larsen, as to the lands upon which the city of Kamas are located?

A Yes sir.

Q What was the nature and extent of that examination?

A I examined some of the trenches dug by --

MR. THURMAN: Is that Kamas, we ~~are~~ object to that.

THE COURT: What is the ground of the objection?

MR. THURMAN: That it is outside of the area irrigated by Provo River.

THE COURT: If that is true, the objection will be sustained. Do you expect to show it is within this --

MR. RAY: Have no expectation to show that, because I think it is not. My purpose is he has fixed a duty of 40 upon that a net duty of 40 acre inches.

THE COURT: There is no evidence before the court of that.

MR. RAY: I will offer to show by him, that upon exactly similar lands to Provo Bench he fixes a duty of 40 inches and Provo Bench a duty of 27 inches.

THE COURT: For that purpose possibly it should be admitted. The objection is overruled with that suggestion, but I wouldn't go any further than to just show that.

MR. RAY: That is all.

THE COURT: He has answered he made such an investigation.

Q State what it was?

THE COURT: Now, I didn't rule you could show that. You may ask him whether it is similar, exactly similar to the Provo Bench land. If he says no, this is immaterial. If he says yes, it is material.

Q Is it similar to the Provo Bench canal?

A No sir.

Q In what respect does it differ?

A There is more rock and less subsoil.

Q Than any of the lands on the Provo Bench?

A Than any I know of.

Q What lands do you know of on the Provo Bench other than those

'you have testified to this morning, the six experiments?

A None others. I don't know whether it was six or not, but they were all given.

Q Either six or seven. Can they raise beets on Mapleton bench?

A Yes sir.

Q All over it?

A No sir.

Q At all points on it?

A No, there is a tract of land near the mouth of Hobbles Creek that is very stony, and as far as I remember now they never raise anything on it, I believe, though part of it has been planted to trees. I don't remember exactly about that.

Q That is not cultivated land then as far as you know?

A No, not that stony part.

Q Can they raise beets on all the cultivated area of Mapleton Bench?

A Well, I wouldn't hardly be able to say whether all or not.

The upper part of it is good soil. As I say it varies, south side of the bench as you drop into Spanish Fork River, you have a nice sandy clay loam near the edge of the bench for a ways down towards Spanish Fork, and as you come in further there is a strip through there that is gravelly. Then going farther along you get into the deeper clay and black loam soil. Over toward the mouth of Hobbles Creek and right below the mouth of Hobbles creek, you have this stony soil coming to the surface.

Q On all the soils which they cultivate can they raise beets, sugar beets?

A What soil they have planted sugar beets to they have raised them.

Q Successfully?

A Yes sir.

CROSS EXAMINATION by Mr. Bagley.

Q You made an investigation on the lands of Paul Saulier under the Timpanogos Canal?

A I observed the bank there near his place.

Q You say stated you found there a condition such as you had never before encountered. What was the peculiar condition there that you hadn't encountered before in your investigations?

A The condition was the laternate layers of clay and sand. Of course, we have had such soil perhaps before, but this was exposed for a considerable depth, and general appearance of it and alternate layers in there of clay and sand are something different from anytof the soils which you ordinarily encounter. That I have ordinarily run across.

Q How thick were those soils, the depth?

A I didn't measure them.

Q Could you estimate?

A No sir.

Q Haven't any idea of what you saw there?

A Well, no, I wouldn't want to say how thick they are. I think they vary quite a bit. You can see the layers for a little distance like that. It is kind of back -- ~~that kind~~ got kind of a stable there and the bank goes around like that. You can see the soil there for thirty or forty or fifty feet, maybe.

Q You gave the depth of the soil one foot of gravel and clay loam, a foot of gravel mixed with clay and sand, and then these alternating layers. If you could estimate the depth of soil why couldn't you also give the width of these layers, depth of the layers.

A Well, that is far as I estimated in distances.

Q Then it was not exposed to view, you would have to dig down, is that it?

A How is that?

Q Weren't these layers of sand and clay exposed to view?

A Yes.

Q Well now, what -- this was a peculiar formation and would the effect of water on it be peculiar?

A I couldn't say.

Q You wouldn't know whether it would take more or less water to irrigate land of that character.

A I don't pretend to know positively, I gave my opinion on that this morning.

Q Now, what elements were there that caused you to arrive at your opinion, what factors did you take into consideration?

A I will tell you, Mr. Bagley, the slight change in the nature of the soil as long as you have a sufficient soil and sufficient fertility it does not materially affect the quantity of water required.

Q If you had two feet on the top before you came to this unusual condition of layers, what effect would the layers have on your determination; why didn't you classify it as other land of the same kind without respect to these layers underneath?

A It has been classified similar to a good deal of other land.

CROSS EXAMINATION by Mr. McDonald.

Q Mr. Larsen, I first desire to ask a few questions relative to the North Field in Wasatch County. As I understand you you made two tests in what is known as the North Field, one on the land of E. J. Cummings and one on the land of Jeffs, is that right?

A. Yes sir.

Q Do you know whether or not those lands were being sub-irrigated at the time you made your experiment?

A I only know the condition that existed was as described.

Q Do you know whether or not the North Field as a system is irrigated by sub irrigation?

A I have been told that it was, I don't know anything about it.

Q Assume there are twenty-six hundred acres in the North Field,

and out of that twenty-six hundred twenty-four hundred are irrigated by sub irrigation, do you have any judgment as to the duty of water required?

A I don't think I gave any judgment.

THE COURT: He did not. Stated the ground water was within one foot of the surface at the point he observed, and consequently he gave no estimate of the duty of water, as I have it.

MR. A. J. EVANS: That is correct.

MR. McDONALD: Yes, but I am getting at what I consider to be the actual condition as will appear later in evidence.

Q As I understand you have no judgment as to the duty of water for land which is sub irrigated?

A That is rather a broad question. With reference to that special condition existing there, I would say you are right.

Q Well, I will confine it to the North Field then, assuming it has an area of twenty-four hundred acres of land.

A All I know about the North Field is what was given this morning on those two tests.

Q Did those parties who directed you as to the two tracts of land tell you that land was then being sub irrigated from the land above.

A They said in general it was sub irrigated.

Q Now, so that I will understand and the record will be clear, as I understand you can give no judgment as to the duty of water that would be required upon an area the size of the North Field, where say twenty-four hundred of it is irrigated by sub irrigation?

A I can give no judgment as to that particular tract.

Q You could give no judgment as to the duty of water?

A On that particular tract.

Q Assume that there is eight or ten inches soil separate mixed with cobble rock and gravel with a cobblerock sub soil, and that that covers an area of say two thousand acres, can you give any

judgment as to the duty of water upon that character of land?

A I think the description is rather indefinite,

Q Well, read the question.

(Question read)

Q I will state it again. Suppose that ~~an~~ an area of two thousand acres that the surface is composed of a soil eight or ten inches deep on an average, mixed with cobble rock and gravel, and the cobble~~rock~~, gravel and sand, ^{sub} substance, do you have any judgment as to the duty of water on that character of land?

A I never say any such land.

Q You never have seen any, you didn't investigate the North Field proper at all, did you?

A Except as stated.

Q And if you were on the extreme south boundary of the North Field, then you don't know anything about the North Field proper, do you.

A Practically none.

Q Nothing at all. So that if you were on the extreme south boundary line of the north field you don't know whether the experiments which you made were an average compared with the land of the North Field, do you?

A Which experiments?

Q The two experiments which you made.

THE COURT: I may be in error, I haven't any experiments on the North Field.

MR. MCCONNELL: I assume I am getting mixed. There are two separate corporations, one known as the North Field and one as the Wasatch. I am probably mixing it myself. The witness, I believe, did answer under the Wasatch, but this is under the North Field.

THE COURT: I was wondering, you were cross~~in~~ examining the witness upon evidence as to the North Field, when he didn't give any. Now, it is under some other, is it, the

Wasatch?

MR. MCDONALD: He has so designated it as being under the Wasatch.

THE COURT: you may proceed then.

A I don't think I did.

MR. MCDONALD: The court so understands and I so understand.

THE COURT: I am merely taking your word for it, he put it under some other.

MR. MCDONALD: I understood he had made his determination as coming under the Wasatch, am I wrong?

THE WITNESS: Not under the Wasatch, it is mentioned as being under the North Field.

MR. MCDONALD: Very good.

MR. THURMAN: Just one observation under the North Field close to the road or two?

MR. MCDONALD: He made two, one on the land of E. J. Cummings and one on the land of Jeffs.

THE COURT: Yes, and the result of it was he said he would not testify to anything in relation to that because the ground water was too close to the surface. There is nothing to cross examine on that. He gave no evidence of that except the ground water was so near the surface and he could not make any estimate.

MR. MCDONALD: Well, we will pass that then.

Q Now, you made two investigations north of what you designate as the mill in Wasatch county under the Wasatch system?

A Yes sir.

Q And on each of those north of the mill, if I remember your evidence, the character of the soil was clay with still a clay subsoil?

A I believe that is practically correct.

Q Yes, then you went from there, if I remember your evidence,

south distance of a mile or more to the land of Clegg and there you observed a soil clay loam interspersed with gravel and cobble, if I remember you correctly?

A I don't think there was any cobble rock in that.

Q All right, how did you investigate on the Clegg land?

A Dug a hole with a shovel.

Q Dug a hole with a shovel?

A Yes sir.

Q And you are sure you were on Clegg's land?

A No, they told me it was Clegg's land, that is all I know about it.

Q He is here, he would like to find the spot where you could dig a hole without running into cobblerock, if you could tell him?

A If he wants me to go back with him --

MR. A. C. HATCH: We object to that kind of a question, and move to strike it out.

MR. McDONALD: It may go out.

Q You say you dug a hole?

A I didn't dig the hole, I examined it.

Q What kind of a hole, post hole?

A It was not intended for a post because no post was put in it.

Q About what was the size of it?

A At the top it was probably two and a half and going down to just the size of the shovel at the bottom.

Q And could you give us any idea as to where we could find that hole on the land?

A Why, it wouldn't be very hard to find, it is near the south -- near the northwest corner of the tract, back into the tract a short distance. I didn't reference it out by making measurements. It is just a short distance into the tract.

Q If I remember your evidence, Mr. Larsen, you stated that you had never before seen land of this same character?

A I think you are mistaken.

Q Maybe I am , if I am I want to be set right.

A That is with reference to the tract that was examined subsequent

Q At some other point?

A Yes sir.

Q All right, well then, what did you discover as to the Clegg land?

A About one half mile southwest of the mill, southeast of Heber City, land belonging to John Clegg, heavy clay loam, with a small percentage of sand and gravel.

Q You found no cobble then?

A No sir.

Q How deep was the hole?

A About three and ^{a half} ~~six~~ feet, I haven't got the depth marked here.

Q I see.

A But as I remember it was about three and a half feet.

Q Now, you think that is a clay loam with a mixture of sand and gravel?

A I think that is the way I read it.

Q Would that character of land require any greater quantity or duty of water than the loam which you have spoken of as being north of the grist mill?

A I should say that it was about the same class.

Q About the same class. ^{Does} ~~ixix~~ land which is composed to some gery great extent of gravel require more water than clay land?

A This land is not composed to a great extent of gravel.

Q I am asking you the question?

A It doesn't require any more, but it generally needs more in order to be able to -- on account of the fact you are more likely to waste by percolation.

Q Yes, that is true, now, assume that Mr. Clegg's land and all the lands south and west of Mr. Clegg for a distance of several

miles under the Grovo River system or Wasatch Canal system is composed of a surface soil mixed with gravel and cobblestone and the subsurface or subsubstance of cobbles, gravel and sand, would that character of land require more water than the land north of the grist mill, that you have described as being compact clay loam?

A Yes sir.

Q How much more?

A Depends on the depth of the soil and the porosity of the sub-soil.

Q I will put it ⁱⁿ another form: Suppose that the surface is composed of a soil mixed with cobble rock and gravel for a depth of fourteen inches, on an average and beneath that is cobblerock, gravel and sand, would that character of land require more water than the land which you have described as north of the mill -- did you say the surface soil was cobblerock and gravel mixed with the soil?

A Cobblerock and gravel mixed with clay .

Q With the soil?

A How deep is the soil?

Q Fourteen inches.

A I should say you would be likely to lose considerable water by deep percolation.

Q Can you give us any judgment as to the difference in quantity that would be required between that character of land and the character of land which you have described as north of the mill?

A That would depend entirely on how it was irrigated.

Q Well, assuming that you have to irrigate when your turn comes, at an intervals of twelve days and apply water as the ordinary farmer would apply it.

A Methods of the ordinary farmer might vary in different localities and it is a ~~ixxx~~ little indefinite, but it gives a

very easy opportunity to waste a large quantity of water with that kind of soil. In fact, it requires a very careful attention to prevent waste.

Q I have given you the facts as best I can; now, can you give me any judgment based upon those facts as to the duty of water upon that character of land?

A Well, we will have to assume the same thing we assumed this morning on the cultivation and efficiency of the methods of irrigation and whether or not the water was available when required and with those assumptions I should say ^{that} ~~with~~ the kind of soil you describe would require -- oh, I might estimate it at at least four feet.

Q Four feet? Mr. Larsen, will you be kind enough to give me in second feet the average of 30 as you gave it to us, 30 inches?

A For what kind of an irrigation period, four months?

Q Period you fixed in Wasatch County.

A I didn't fix an irrigation period in Wasatch county.

Q Well, fix it four months then.

A Four months and for four acre feet?

Q No, I am asking you now on the 30 inches.

A You want to know what the duty would be?

Q In second feet.

A For thirty inches?

Q Yes.

MR. THURMAN: He gave that as 96 this morning.

MR. RAY: Eighty.

MR. McDONALD: There are so many different figures here I wanted the witness's figures, because I was aware of the different figures.

A One hundred and twenty acres.

MR. A. C. HATCH: That a four months period?

A For the four months season, yes sir.

Q As I understand you, Mr. Larsen, you made no actual test by

applying water upon the land, that is, practical tests.

A On the --

Q On the tract I am now speaking of in Wasatch county?

A No sir.

Q Mr. Larsen, assume that land owing to the ~~six~~ climatic condition and condition of the soil is especially adapted to timothy and natural grasses, and nothing else is produced upon it, can you give us a judgment as to the duty of water on that character of land?

A No sir.

Q You can't give that. I think that is all, your honor.

CROSS EXAMINATION by Mr. Huffaker.

Q Mr. Larsen, let me direct your attention now to your examination of the Midway soil. I believe you stated that you made that examination on the 10th of this month?

A I believe that is right.

Q Who was with you at the time?

A Mr. J. R. Murdock and Mr. E. J. Cummings.

Q And were the holes that you examined dug before you made the examination?

A No sir, we dug those holes?

Q You dug them?

A We didn't dig very many, but dug those we did dig.

Q How long were you making that examination of all the lands of Midway ?

A We left Heber in the morning, I don't remember exactly what time, pretty early in the morning and got back, I couldn't say exactly, but late in the afternoon. I remember Mr. Murdock telling somebody he would be back by three o'clock, and he got back a little sooner than that.

Q Got back before three, and Heber is about three or four miles from Midway, is it not?

A Something like that.

Q Now, you made your first examination just as you cross the river bridge? A. Yes sirl

Q And at that place you found about six inches of soil? and under that was this pot rock?

A We didn't dig anything there.

Q You couldn't dig there?

A We didn't try to, we examined, the soil was exposed there.

Q Where it had already been out by the road?and found there was about six inches of soil there?

A Approximately, yes sir.

Q And under that was a very porous rock commonly known as pot rock?

A It looks like it was very porous.

Q As a matter of fact, you know it is very porous? It looks like a sponge, doesn't it?

A I haven't tested it, it looks porous.

Q It looks as though the water would go through it very readily, doesn't it?

A That is what it looks like.

Q You could take one of those pieces of pot rock, the size of your head and hold it up and in some instances you could see clear through it?

A I don't know.

Q It looks like a bees' nest, that is honeycomb, doesn't it?

A Part of it does.

Q Well, after making that first examination at the river bridge, you went about a mile and a half west to Mrl Hamilton's place, didn't you?

A Went down kind of northwest and got into the town and took the road to the south.

Q Yes, and before turning south you went about a mile and a half west?

A Approximately, I guess.

Q And during all that time you were traveling over this same pot rock?

A That is, you can see it on the road.

Q You can see it cropping out there?

A It doesn't look very porous in the road though.

Q Then you went south?

A Yes sir.

Q Bearly a mile to Mr. Brunson's place?

A That wasn't the next place, was it?

Q I think so, according to your testimony?

A I think the second place was little farther east. Mr. Brunson's place was farther on another road.

Q You made an examination at Mr. Hamilton's I think next?

A Yes.

Q Then you went to Mr. Brunson's?

A I think Mr. Brunson's was the last place we were to.

Q Did you go up by the hot pots there and the Dutch Field before you went to Mr. Brunson's place?

A Yes sir.

Q Anyway practically all the territory that you traveled over there was of this same pot rock, wasn't it?

A The Dutch Field is absolutely different.

Q Yes, but excepting the Dutch Field.

A A portion in there in which the town proper appears to be built, and south for some little distance is apparently of the same nature except the depth of soil appears to vary some.

Q Well, with the exception of that Dutch Field now, practically all the territory you went over was this porous pot rock, wasn't it?

A Not to the south. We had two tests that we -- didn't show the pot rock at all.

Q That is down at Mr. Brunson's place?

A One place there and one place in a deep cut on the irrigating ditch.

Q Have you any idea of the amount of water or the land irrigated in Midway that is of this pot rock nature?

A I wouldn't want to make an estimate of it.

Q You haven't any idea, you stated that you were not familiar with that character of land?

A First land of the kind I ever seen.

Q First of the kind, and you wouldn't, Mr. Larsen, want to -- wouldn't want to form an opinion as to the duty on soil of that kind with such a short examination and especially a soil you are not familiar with, would you?

A I explained what I formed my opinion on.

Q You stated that was because you saw some water on the rock on the surface in some places, wasn't it?

A In various places.

Q As a matter of fact, wasn't that in the road?

A No sir, it was ~~x~~ in fields.

Q Did you see any water standing on the surface where they were cultivating the ground?

A There is very little surface that is being cultivated.

Q About what portion of the Midway land is cultivated, do you know?

A Very small.

Q Very small?

A Yes, there is never crops in it, they have a kind of a pasture. I was surprised at the small amount of vegetation that appeared to be raised there.

Q What they do cultivate is a sort of disintegrated pot rock limestone, isn't it?

A I think it is, yes.

Q And porous?

A It looks ~~like~~ like it was porous, yes sir.

Q And that you examined, that pot rock you examined is about the most porous soil that you examined in all your trip, isn't it,

in Wasatch or Summit county?

A I could not say because I never tested ~~it~~ the rock to find how porous it was.

Q Then, Mr. Larsen, not having examined it of course you wouldn't want to base an opinion what the duty of water would be on it, would you?

A As I stated the opinion is based on the fact that is -- that the water -- appears to hold water because the water stands in various places, and various other places, short spaces where the land is boggy, and that evidence would go to --

Q Now, did you examine the surface that was holding that water?

A No sir.

Q You don't know what was underneath that water, do you?

A That is based on the assumption that similar rock is underneath.

Q And wasn't it almost solid rock there, that is, the pot rock, the pores had been filled up by mud or some other soil and in that way would hold it?

A I couldn't say. My judgment was based on the fact the water stood there and it was in the same locality where this pot rock exists near the surface of the ground.

Q But you didn't see any water standing on any soil that had been plowed or they were cultivating, did you?

A I don't believe so.

Q And you didn't examine this pot rock formation any place where they were cultivating it, as you stated a few minutes ago?

A Where they were cultivating?

Q Yes. What I mean by that where it had been plowed, and they were raising alfalfa and grain?

A One place we examined was on a grain field.

Q Was it this pot rock formation there?

A Yes sir.

Q Did you find it porous?

A As I say, I never tested its porosity.

Q Then you do not want to form any opinion whatever on this pot rock soil that is being cultivated, because you have not examined it, and you could not form an opinion what the duty of water will be, could you?

A All the opinion I have got is what I stated, based on those observations, and if those observations represent the general character of the ground my opinion is as given.

Q The only thing to base that on is the fact you saw some water standing.

MR. JACOB EVANS: I object to this continuing further, it seems to me it has been gone over and re-gone over and nothing new is being elicited from the witness.

MR. HUFFAKER: I want to find out, I want to show --

THE COURT: You were not satisfied with his answer to this question, you have asked the same --

MR. HUFFAKER: I want to find out how many places, what he is basing his opinion on.

THE COURT: You may ask that, but you asked this identical question in the same language exactly before, and if you are not satisfied with his answer, of course you may ask it again, but I would not repeat it if you are ~~satis~~ satisfied with it.

MR. HUFFAKER: I will try not to make any repetition.

THE COURT: Very well, objection to this question is sustained then.

Q How many places, Mr. Larsen, did you find water standing on the surface?

A I didn't count them, several places.

Q About how many?

A Oh, I think I noticed it in three or four different places.

Q In three or four different places in the whole area that you went over?

A I think so.

Q And you are basing your opinion solely upon that then?

A On the fact it does hold the water, yes.

Q But you didn't examine the surface underneath the water to find out what it was?

A It doesn't make any difference what it is if it will hold the water.

Q Now, taking that soil there, would it not require about six inches as an irrigation for one application?

A I wouldn't think so.

Q Well, you placed it at thirty inches, and I understood you to say in other similar soils it will take about six inches at the first application.

A Be approximately that.

Q And in arriving at that 30 inch duty, you figure then there would be about five irrigations, do you not?

A You don't need to make all your irrigations the same.

Q I am assuming that they were all the same. Isn't that true they would be about the same?

A Generally the first irrigation is -- takes a little more water than subsequent irrigation.

Q What would the subsequent or second one be?

A Might be four inches, be a big irrigation to get the water over it.

Q I understood you to say a few moments ago to one of the other gentlemen that you would fix the duty 30 inches, you thought the second application should be about five inches and about five inches for each of the subsequent?

A Four inches would be just as good as five, if you could get the water over it.

Q But you are assuming you could get it over?

A Yes.

Q Wouldn't it, with the class of soil, that porous soil at Midway,

wouldn't it take about --

MR. A. C. HATCH: If the court please, counsel is assuming that the witness has testified as to the porosity of that soil and he reiterates it and reiterates it, and we object to the question for that reason, assuming something which is not in evidence here and which has not --

MR HUFFAKER: He testified that soil was very porous.

MR. A. C. HATCH: I didn't so understand the witness.

THE COURT: I don't know whether he did or not.

MR. A. C. HATCH: It is the pot rock that counsel insists is porous, and the witness has testified continuously that the water stood at the surface.

THE COURT: The witness with reference to the pot rock has testified he made no examination of it sufficient to enable him to determine as to the porosity of the rock, but as to the soil, I don't remember, Judge Hatch, if Mr. Larsen testified as to the condition of the soil with reference to the porosity, if he did this question would be proper, if he did not, of course it is an assumption that the evidence would not justify. Did you testify, Mr. Larsen, as to the soil whether porous or not?

A I think it is described, I don't remember.

MR. RAY: He says not extremely porous, is the language he used.

MR. HUFFAKER: I asked him that question.

MR. RAY: Not extremely porous, on his direct.

A The soil above the pot rock is, generally speaking, little more porous than the average.

Q It is more porous than the average?

A Yes.

Q And the pot rock underneath is very porous, isn't it?

A I don't know.

Q When you don't know what the subsoil is at Midway, in the Midway field, do you?

MR. A. C. HATCH: Doesn't seem to be any subsoil.

MR. JACOB EVANS: Object to that on the ground he has reiterated over and over again he did not examine the subsoil at any place other than at the point where the experiments were made.

MR. HUFFAKER: I submit the witness is not competent then.

Q You wouldn't without examining the subsoil on a tract of land, you wouldn't want to express your opinion what the duty of water would be on it, would you?

MR. JACOB EVANS: Object to that as incompetent.

THE COURT: Objection is sustained, what his desire is with reference to the expression.

Q Do you want to be understood that you didn't examine the subsoil on the midway land?

A I think I have told you exactly what I did. We dug down to this pot rock, and pot rock looks very porous. I made no test to find what the actual condition as to porosity is, but I am basing my opinion on the fact it appears to hold water and assuming that is a fact, I have given my opinion.

Q But you don't know that it is?

A If it is porous as you say, it is, there might be a difference in the quantity of water required.

Q And if it should be a porous soil then you would increase the amount of water, wouldn't you, the duty?

A Certainly.

Q Now, how many irrigations, in your opinion, would the 30 inches make?

MR. A. C. HATCH: If the court please, the last question and answer there I didn't understand, the counsel and the witness didn't understand each other. I would like to

have it reread, question and answer.

(Question read)

MR. A. C. HATCH: You would increase the amount and increase the duty?

MR. HUFFAKER: No, you would lower the duty, but increase the amount of water.

A I didn't pay any attention to that last statement, you said increase the water.

Q In other words, it would take more water, wouldn't it?

A That is what I just stated.

Q Now, read that other question.

(Question read)

A Probably half a dozen.

Q About six, so that if it required more than six irrigations to mature the crops up in Wasatch county or Midway, then you would have to allow more water, take more than thirty inches, wouldn't it?

A You can figure it by multiplying the number by the quantity.

Q If it took seven irrigations, for instance, then you would fix the duty at 35 inches?

MR. THURMAN: Is that a question?

MR. A. L. BOOTH: What do you mean by fixing the duty at 35 inches?

MR. HUFFAKER: I mean it would take 35 inches of water to mature the crop.

Q Isn't that correct, Mr. Larsen?

A Yes.

MR. WILLIS: I would like to ask the witness just one question.

THE COURT: Very well.

RE-CROSS EXAMINATION by Mr. Willis.

Q Mr. Larsen, did I understand you in your answer to my counsel

McDonald you didn't know what the duty of water was for the raising of grass such as he described, that is, timothy and mixed grasses in Wasatch county?

MR. McDONALD: Natural grass is the term I used.

Q Timothy and natural grass, what was your answer to that?

A I never made any experiments on that.

RE-CROSS EXAMINATION by Mr. Bagley.

Q Could I ask one question I overlooked. Have you observed orchards, in which clover and orchard grass is planted, and the clover or hay is cut as a crop by the orchard owner, during the season?

A You mean made any experiment on it?

Q Yes.

A No, we didn't have any such, the orchards were clean and cultivated.

Q Well, on the Roylance orchard that you looked at, didn't you find that condition?

A There was grass in there, I don't know whether clover or not.

Q In other places, didn't you notice that grass was growing between the trees?

A I noticed there was considerable grass, I don't know whether it was grown purposely, or left there.

Q You stated you give your opinion in respect to requirements of water for an orchard that was based upon an orchard that had been kept clean?

A Cultivated.

Q Free from other growth, was it.

A Yes, and cultivated.

Q Now, would it require more water for an orchard that was planted down to clover or alfalfa or early grasses between the trees?

A I think probably it would.

Q Have you any opinion as to the amount that would have to be added

on that account. Let me ask you this, would it be approximately the same as would be required for irrigating an alfalfa field?

A It might depend on whether or not you intended to cut the crops off of the --

Q You crop it as often --

A Whether you intended to crop it.

Q -- as it was profitable to crop it?

A Yes.

Q Would it be the same as alfalfa?

A It more than likely would, I don't see why it should not.

Q An orchard of that class would require the same amount of water that would be required by the ordinary alfalfa field?

A I think so.

Q Where you are growing three crops?

A Yes sir.

RE-DIRECT EXAMINATION by Mr. Thurman;

Q Mr. Larsen, are you quite sure you were correct in your calculation as to the duty in second feet for 30 inch acre duty?

A For four months?

Q Yes.

A I suppose so.

THE COURT: One hundred and twenty days.

A One hundred twenty days, two and a half feet, be three hundred acre feet to be delivered by second foot, and use two and a half acre feet per acre dividing three hundred by two and a half gives you one hundred and twenty.

THE COURT: How many do you say would be delivered how many acre feet?

A Three hundred in one hundred and twenty days, two and a half times one hundred and twenty, isn't it?

THE COURT: Yes, but that would not be the number

delivered.

THE WITNESS: 300 acre feet delivered by one second foot during that period, and get as many acres, use two and a half acre feet per acre, use as many acres to the second foot as two and a half is contained in three hundred.

MR. RAY: Is that the method of calculation you have used always in figuring the duty of water?

A I don't use that method at all. We figure our duty of water in acre feet, and the method of stating it in acres per second foot is indefinite.

MR. THURMAN: I wish you would satisfy yourself about that when you go off the stand. I am not clear on it myself. It is contrary to my calculation, I may be wrong, I generally am.

THE COURT: It is different from my calculation, but I might be wrong.

MR. RAY: I will stipulate the record may show it is 96.

THE COURT: I have 95.3.

MR. RAY: That would be about it.

THE COURT: And probably the fraction might be carried further.

MR. A. C. HATCH: I think the witness testified to 96 feet, his testimony before.

MR. THURMAN: I understood this morning he said 96.

THE WITNESS: Let's see, I did make a mistake on that, I guess, 96 is right. I multiplied by 2 instead of by $2\frac{1}{2}$.

THE COURT: You multiplied by 2, you should multiply by 1.93 to be accurate, I take it, instead of 2, and that would make the difference.

A Yes.

MR. A. C. HATCH: There is one question I would like

to ask. If the soil was only six inches deep, how much water would it absorb, how much would the soil retain, if you gave it all that it would retain, the kind of soil that you found covering this pot rock at Midvale.

A All depends on the kind of material you had to hold it up after it got into the soil.

MR. A. C. HATCH: How much would the soil itself retain?

MR. WILLIS: I didn't just catch the question, would like to have it read.

A To be saturated it would hold sufficient to fill the voids in the soil.

MR. A. C. HATCH: To fill the voids, you could not give us an estimate how much that would be?

A Well, average soil varies from about 30 to 60 per cent.

MR. A. C. HATCH: It would not be more than six inches in any event, would it.

A Not very much more.

RE-CROSS EXAMINATION by Mr. Corfman.

Q One other question, you testified to three tests having been made on the lots of Provo City which would require from 30 to 35 inches for the irrigation of those lots in a season, and that you considered that the water was accessible in subdivisions of 40 acre tracts. In testifying, answering as to the duty of water for those lots did you have in mind taking the water as a 40 acre tract or for each particular lot that you examined?

A I just had in mind delivering the water within a short distance of the tracts?

Q That is, to a 40 acre tract?

A Yes, within --

Q Would it make a difference if that 40 acres was divided into

eighty city lots, and the water had to be subdivided and carried by ditches to eighty tracts?

A I think you would have more loss than would ordinarily be --

Q Be considerably more, wouldn't it?

A Consistent on a farm, yes.

Q Did you make any estimate what the duty would be under those conditions?

A No sir.

HYRUM HEISELT, called by the plaintiff, being duly sworn, testifies as follows:

DIRECT EXAMINATION by Mr. A. L. Booth.

Q State your name?

A Hy rum Heiselt.

Q Where do you live?

A Provo Canyon.

Q How long have you lived there?

A About twelve years.

Q Where do you live with reference to the mouth of the canyon?

A Just a mile above the mouth of the canyon.

Q And where is that with reference to the intake of the Provo Reservoir Company's canal?

A Right at the intake.

Q Where is it with reference to the intake of what was the Blue Cliff Canal?

A About little less than a mile below the intake of the Blue Cliff.

Q Where is the Blue Cliff Canal from your house?

A The Blue Cliff?

Q Yes, the old site of the Blue Cliff Canal?

A About fifty feet up the hill from the house.

Q And have you been acquainted with the Blue Cliff Canal since you have been living there?

A Yes sir.

Q Do you know of some springs that used to rise in -- either rise in or flow into the Blue Cliff Canal?

A Yes sir.

Q About how many of them were there from the head of the canal down to the mouth of the canal?

A Well, I don't know the amount, some small springs, about two that are fairly good ones.

Q Did you see the water from those springs running into the Blue Cliff Canal when you first went there to live?

A Yes sir.

Q And for how many years after that did you see it continue to run in that canal?

A I cannot say as to that because I never kept any particular notice of it, but it was running in -- the seasons they were using the Blue Cliff up until the Provo Reservoir Company bought it.

Q What became of this water after the Provo Reservoir Company bought the Blue Cliff interest?

A I cannot say. There was one spring just above my place that they call the Maple Spring, that was run into the river after the Reservoir Company bought it.

Q And did it run into the river above the head of the Provo Reservoir Company's canal?

A Yes sir, I put it in the river.

Q You put it in the river?

A Yes sir.

Q How did you get it into the river?

A I made a ditch from the spring or from the Blue Cliff canal down to the railroad track and made a box and run it across the

railroad track, and it dropped into the river from there.

Q Who was the water commissioner at that time, if you know?

A Mr. Thomas.

Q Who directed you to turn this water into the river?

A Provo Reservoir Company .

Q Were you told why they wanted it to go into the river?

A No.

MR. THOMAS: Object to this as hearsay and incompetent.

THE COURT: Objection is overruled, I take it it is merely to prove the claim or assertion of right.

MR. A. L. BOOTH: Yes.

THE COURT: Nothing else.

Q Do you know whether or not Mr. Thomas issued the same amount of water out to the Provo Reservoir Company below where you turned it into the river?

A I don't know, as far as knowing is concerned, I don't know.

He said he did, and he was there for that purpose.

Q He was acting under the court's order, was he?

A Yes sir, that was what he said.

Q Do you know what is called the Rnyx Pony Steele Farm?

A Yes sir.

Q Where is that with reference to your place?

A It joins me on the west.

Q Are there any springs arising on that farm?

A Yes sir.

Q Who owns the farm now, the Pony Steele?

A The Provo Reservoir Company.

Q Have you known these springs ever since you have lived where you now reside?

A Yes sir.

Q What has been done with the water from the Pony Steele, coming up on the Pony Steele farm since you have lived there?

A Been used on the farm?

Q All of it? A. Yes sir.

Q For what purpose?

A To raise fruit, irrigate fruit.

Q Has any part of it ever gone into the river during the irrigation season? A. No sir.

Q Have you personally used it?

A I have been taking care of it.

Q You have been taking care of the Pony Steele Farm?

A Yes sir.

Q And have used this water personally for the Provo Reservoir Company on that farm? A. Yes sir.

Q There is one spring there you have a half interest in, isn't there? A Yes sir.

Q Where does that come up?

A On the Pony Steele farm.

Q Which part of it?

A On the east part.

Q Right along next to your land? A. Yes sir.

Q How many springs then are there on the Pony Steele farm?

A Three.

Q With the exception of this?

A No, with that one too-- three without that.

Q Three without that? A Yes sir.

Q You say you own a half interest in that? A. Yes.

Q With the exception of this half interest that you own, has the water from all these four springs been used exclusively on the Pony Steele farm since you have lived at your present place of residence?

A There was one year --

Q During the irrigation season?

A There was one year for a short time that the reservoir company put that water in the river, and it was measured in and measured out into the reservoir canal.

Q Did anybody else use it, anybody else but the reservoir company use any portion of this water on the Steele farm since you have been there?

A. No sir.

Q Now, going back to these springs in the Blue Cliff Canal, do you know of a certain spring above your place that has been taken by Provo City into its pipes within the last year or so?

A. Yes sir.

Q Where is that spring with reference to your land?

A It is on my land, but it would be -- I don't know just how far it would be over the east line, cannot hardly say.

Q Previous to the time that Provo City took this water into its pipe about a year ago, what was done with the water from that spring?

A Why, run down the ditch, Blue Cliff ditch and sink, as far as I know.

Q As long as the Blue Cliff canal was being used was that taken as a part of the irrigation water?

A Yes sir. After the Blue Cliff canal was abandoned, why, it -- I don't know what become of the water.

Q Did the Blue Cliff -- do you remember the year it was taken over by the Reservoir Company?

A No, I don't.

Q You remember whether it was about 1911?

A Well, I won't say, because I can't remember exactly.

MR. JACOB EVANS: May I ask whether or not it may be stipulated that the plaintiff owns the Pony Steele springs, with the exception of the one half interest that is owned by Mr. Heiselt? testified to by the witness here, and thereby eliminate that feature of the case. These springs, I understand it, don't flow into the river in the summer time at all, the whole quantity of water springing up in these springs being used by these parties.

THE COURT: You are asking about the pony Steele?

MR. A. L. BOOTH: The springs on the Pony Steele farm, consisting of four.

MR. RAYP The Provo Bench will so stipulate, I think. Of course, that does not affect our claim to the right to have them used at that place, in order that the return water may come, and we have our right to protest a change of the place of use.

THE COURT: No question of change of place of use at this time.

MR. JOHN E. BOOTH: We will join in that stipulation, clients I represent.

MR. COLEMAN: We would want to see Mr. Goddard, the water commissioner before we agreed to that.

THE COURT: Then I take it the stipulation cannot be entered into now.

MR. COLEMAN: We want to consult Mr. Goddard and he is not in the room at this time.

5:00 P. M. Recess to 9:30 A.M., June 14, 1916.

MR. JACOB EVANS: I would like to ask now if the parties are willing to stipulate that the plaintiff owns what is known as the Pony Steele Springs, and that the plaintiff and the defendant Hyrum Heiselt jointly own what is known as the Heiselt Springs?

MR. COLEMAN: No, we will not stipulate that. In fact, Mr. Heiselt claims all the springs on that place.

MR. JACOB EVANS: That is a matter between Mr. Heiselt and us, he only claims half of it to us. The springs, as the evidence shows don't run off the land at all.

THE COURT: I take it none of the other parties would be interested except the plaintiff and Mr. Heiselt, if they

admit the springs belong to the plaintiff and Mr. Heiselt together.

MR. COLEMAN: The Pony Steele springs you ask for a stipulation for?

MR. JACOB EVANS: Yes, as well as the other springs.

MR. JOHN E. BOOTH: If the court please, I represent Mr. Heiselt, and so far as the plaintiff and Mr. Heiselt are concerned they have stipulated what their rights are. Of course that could not bind the people outside of them, but there is no difficulty between the plaintiff and Mr. Heiselt.

MR. JACOB EVANS: I want to call Mr. Wentz for one question.

T. F. WENTZ recalled.

DIRECT EXAMINATION by Mr. Jacob Evans.

Q Mr. Wentz, I believe you said it would be feasible to measure the water at the quarter section corner of each quarter section, or in other words, not more than half a mile from the land where the water was actually to be used?

A Yes.

Q Did you have in mind at that time the fact that a number of the defendants, such as the Provo Bench and others are corporations? A. Yes.

Q Having stock in corporation, and that the users of the water did not necessarily own water in proportion to the number of acres of land? A. Yes sir.

Q Would that make any difference in the feasibility of the distribution of the water?

A No.

Q Isn't it a fact that sometimes a party will own water and own

no land at all but rent that water, first to be used on one part of the bench and another part of the year to another part of the bench, and so on?

A Yes.

MR. THOMAS: Object to this as immaterial, probably it is a fact, but I don't see the materiality.

MR. JACOB EVANS: I was just inquiring whether it would be feasible to use the water as suggested by Mr. Wentz. Q So that the transfers of the water under these various corporations using it, we will say one year on land near the head of the canal and in another year at different places ~~sixty~~ along the canal, you don't think would interfere with the distribution along the line -- the measurement along the line that you have stated?

A Those changes are very small, they don't amount to, I don't think, one tenth of one per cent, and as I stated the other day, in making a determination of the loss ~~insurred~~ curve we would probably make it for each month and take these laterals-- their losses out at each quarter section and get the mean. That loss curve may continue for five or six years or may be for a longer period on an area like Provo Bench, and would need to be checked up with only one or two points on the curve. If it still remained the same, that determination would not ~~be~~ need to be made.

Q I take it any changes that would be made in the use of the water would merely involve a change in the weir measuring the water anyway, would it not?

A If those changes were large why the amount of loss would be changed but the amount of loss would not be materially changed by these small amounts.

Q It is not a question of loss, it is a question of feasibility in measuring the water in the way that you suggest.

A That would be feasible, because, as I tell you, the amount of

loss would be determined and that extra amount would be allowed at the station, at the rating station, and any excess where we have inflow that is available to the land that amount of inflow would be deducted at the rating station.

Q Then your idea in making that change in the distribution of the water would involve the ascertaining in the loss in transit, water would still be measured at the same places.

A Yes, loss or gain, I wouldn't say the loss.

Q Whatever the loss or gain might be?

A If it changes materially -- our changes in the last sixteen years had been practically 101 second feet.

Q That would involve then leaving that matter to the determination of the water commissioner whoever he might be, as to what the loss or gain of transit might be?

A Yes.

Q During the administration of the work?

A Yes.

Q It would not be your idea then to put in a measuring device at each of these places you have mentioned?

A No.

Q But merely to measure the water and ascertain the loss down to these various points?

A Yes.

Q And then measure the water as it has been measured in the past?

A Yes sir.

THE COURT: Now, I would like to ask a question in connection with this examination. Mr. Wentz, under this plan which you have suggested and which has been stated, who would be charged with the determination of the repair of the canal between the intake and the point where you measure the water or determine the quantity, under your plan?

A Who would be ~~is~~ charged with the loss?

THE COURT: No, with the determination what repairs

should be made in the canal, what degree of efficiency should be kept. I ask that merely for this reason, it is apparent at once of course, that the water users, take for instance the Provo Bench Canal Company, if they are not charged with water at the intake but are charged only with the water at the point near the land where it is used, they have but little concern in the efficiency of the canal between the point where it is measured and their intake, because it doesn't make any difference to them what the loss is; that is, makes no more difference to them than it does to anyone else. Now, who would be charged under that plan with the determination as to what repairs should be made in the canal, and what degree of efficiency it should be kept at?

A Well, it should be kept in first class condition and measurements should be made only when it was in first class condition, and any neglect by anyone to keep those canals and laterals in first class condition the loss should be charged against that company.

THE COURT: That don't answer the question. Who is charged with the determination of that fact, the water commissioner?

A Yes.

THE COURT: He determines it?

A Yes, and measurements, as I say, should be made only with the system in first class condition.

THE COURT: In other words, the canal company would have nothing to do with the determination whether their canal was in proper condition or not. In other words, they would be required to keep it in condition as the commissioner determined?

A Yes.

Q I believe I will ask another question or two along that line. About how much of the Provo Bench Canal from the intake does

the Provo Bench Canal Company assume the responsibility of management and control over?

A From the heading of the canal at the mouth of the canyon for a mile and three quarters, about three hundred feet below the point of measurement.

Q And when it gets beyond that three hundred feet below the point of measurement, does the defendant Provo Bench Canal Company assume to pay any portion of the expenses of any portion of the canal beyond that point?

A No.

Q And about how many miles of canals and laterals are there below that point?

A Well, the lateral system leading north is under about a third of the canal, is under the North Union Canal Company and other corporations that distributes that on the north end of the bench, and near the town of Pleasant Grover. The other laterals, the other two-thirds are just kept up by the farmers that are under each lateral and are not corporations.

Q Haven't you found a great deal of difficulty, Mr. Wentz, as commissioner, in getting the canals, where they are owned by a large number of individuals and have no corporation, haven't you had a great deal of difficulty in getting them to keep up proper headgates and proper measuring devices and their canals in repair and such like?

A Yes, some of the individuals and some of the corporations.

Q You have actually yourself, had to spend your own money, haven't you?

A. Yes sir.

Q And in one instance, at least, had to bring a suit to recover that money; you had expended as commissioner of the court to recover the money you had spent for the construction of measuring devices and head gates?

A. Yes sir.

Q Wouldn't you have that same difficulty if this water was

measured as you suggest?

MR. RAY: Your honor please, I object to that as irrelevant and immaterial. If the court orders it done, the presumption is that the order of the court will be complied with through its commissioner.

MR. JACOB EVANS: Of course that is true, I was asking this question purely for the information of the court to see whether or not it was possible to carry it out in this way. Brother Thurman suggests, and that is a matter that has come to my mind also we recognize the fact and law that the court has perfect authority to order any party to this suit to maintain head gates and canals and such like, but here are numerous people that are using these canals that are not party to the suit. Now, the question is, could the court make an order ordering someone who is not a party to the suit to construct or maintain a head gate or repair a certain canal and I fear -- they are small stockholders in this corporation, they are not parties.

THE COURT: The court would have nothing to do with them and the court would not order them under any circumstances. The court would order the corporation and stop the water, the stockholders would not get any water if the corporation did not get any, and if the corporation did not comply with the order of the court -- the water is awarded to the corporation.

MR. JACOB EVANS: Yes, that is true, the water is awarded to the corporation, but take the Plovo Bench canal, for instance, it only claims to have the right to do anything with the water down to three hundred feet below the measuring device. Now, the question ^{is} would this plan be feasible so that the court could require this.

THE COURT: I am inclined to think it would be feasible. My present impression is it would not be equitable

but I want the opinions on it. If it is the desire of the parties to this suit and the water users under this system to have the water measured in that way, of course the court will be glad to ask accommodate them. There are many objections to it in my mind, as to its fairness and justness of it, but I merely suggest that. I don't mean that the court's view at this time is to make any different order than suggested by Mr. Wentz.

MR. JACOB EVANS: With that it might possibly save a great deal of the introduction of testimony with respect to the gain and loss in transit.

THE COURT: Yes, the system might be such it would be advisable to let the loss while upon the entire system rather than the man who has a poor canal. The view I have always had of it, and my experience has lead me to believe that the corporation or individual who maintains a faulting canal, leaky canal, or if he is unfortunate enough to have his canal run through a section of the country where it cannot be made very tight that he ought to stand that misfortune rather than his neighbor who has gone to the expense of having a tight canal and saves all his water, and yet that is only the view I have arrived at from the experience I have had.

MR. RAY: May I ask a question there?

MR. JACOB EVANS: Certainly.

CROSS EXAMINATION by Mr. Ray.

Q Mr. Wentz, what is the condition of the canal of the provo Bench from its intake down to its diversion at the present time?

A It is in good condition.

Q Cemented?

A No, the bottom is cemented, natural cement, bottom is practically

tight.

Q How are the sides?

A The sides are good up to about 90 second feet capacity, very tight.

Q As a matter of fact, there is some cement on the sides.

A There is some new construction.

Q It is being cemented, is it not?

A It is being cemented.

Q With solid cement from the intake down to the measuring weir?

A Yes.

Q And beyond? A. Yes.

Q On the lower side, ^{so} that it will be an unusual canal in that respect when that work is completed, will it not?

A Yes.

Q For a long distance the upper bank is cemented, is it not?

A Yes, it is cemented about the same distance at the lower bank at the present time.

Q And the intention and construction involves the cementing for further distances down the canal?

A Yes.

Q Do you know whether or not the Provo Canal has also made provision that in places of unusual loss the bottom shall be cemented, the Provo Bench?

A I think that is the intention.

RE-DIRECT EXAMINATION by Mr. Jacob Evans.

Q This work has been carried on by the plaintiff, has it not, under an agreement with the Provo Bench Canal?

A Yes, by Mr. Tanner.

Q The plaintiff, Provo Reservoir Company is doing this cement work? A. Yes.

Q And prior to that there was a considerable loss in the canal where this cement work is being done by the plaintiff?

A Yes, above 90 second feet there was a big loss.

Q And this was being done by the plaintiff in order to ~~xxx~~ save that water?

A Yes sir.

Q And with the consent of the Provo Bench?

A Yes.

RE-CROSS EXAMINATION by Mr. Ray.

Q As a matter of fact, do you know what the agreement is as to the salvage of water there?

MR. THOMAS: With whom?

MR. RAY: Between the Provo Bench and Caleb Tanner.

A I have read the agreement, that is all I know about it. That was before it was signed, it may have been changed since I read it.

Q You are familiar with the suit of Caleb Tanner against the Provo Bench Canal Company, are you not?

MR. JACOB EVANS: Object to it as immaterial. It does not have any bearing upon this case, if the court please.

MR. RAY: I thought their cross examination didn't either.

THE COURT: I could hardly see what difference it made, and I don't think you need to cross examine further upon it.

CROSS EXAMINATION by Mr. Corfman.

Q You say there was a considerable loss in the Provo Bench Canal prior to the cementing of the intake?

A Prior to the cementing of the stretch of canal near the head that is cemented now, that is, above the 90 foot stage. When the canal is running at about 140 to 150 the water goes out through the upper bank through the loose material, the undisturbed material.

Q Can you give approximately what that loss was?

A No, I haven't finished calculating the curve since the work was done.

Q Have you ever made any test to ascertain about how much loss there was there?

A Yes, I made a determination of the loss before the work was done.

Q What was it?

A The loss at 48 second feet was 1.76 second feet.

MR. THURMAN: For what distance, within what distance?

A Mile and a half. At 88 second feet it was 2.76 second feet and at 143.3 it was 9.41 second feet. There is one point at 120 on the curve that I don't remember the loss on that point.

Q Where did the seepage from the canal, or loss -- it was seepage?

A Yes.

Q Where did it go?

A There was part of it showed on the lower bank, I think about two or three second feet, the other goes into the upper bank, I don't know where it goes.

Q It came out of the canal in seeps?

A Yes, little seeping through the lower bank.

Q You don't know where this seepage water led to, did it go into any other canal to the water users?

A No, as I explained the other day on the east river bottoms water company there is a point, a line crossing the river bottoms there that above that I don't know where the losses go to.

MR. JACOB EVANS: If the court please, our next witness was to show the acreage, and it will take about an hour to complete it; they have been checking it up now for about a week.

MR. RAY: It will save a good deal of testimony if it is stipulated.

MR. JACOB EVANS: Yes, it will save days and days of taking testimony.

THE COURT: I take it that can be put in at any time if it is to be stipulated and agreed upon.

MR. A. C. HATCH: Much of it will not be stipulated and we will have to put in the acreage, some of it will. Call Mr. Tanner for further cross examination.

MR. COREMAN: We expected to ask Mr. Tanner some further questions on cross examination, and particularly with reference to his report on transmission losses and in order to do so we have submitted it to an engineer who has now got the report under consideration, and we expected to cross examine Mr. Tanner before this time, but owing to the changes made from the time he was absent from court we would like to take that matter up tomorrow.

MR. A. C. HATCH: We expect to rest today.

MR. COREMAN: We had expected to take this examination up on Tuesday, and then Mr. Tanner advised me he would be absent on that day, and I had an understanding that he might be called for cross examination any time. Personally I haven't had this matter in charge. It has been with Mr. Story of the Utah Power & Light Company and their engineer. I understand Mr. Story wanted to make some cross examination, both with respect to those transmission losses and also some cross examination relative to the Blue Cliff Canal.

THE COURT: I understand then you are not prepared to cross examine at this time?

MR. COREMAN: I am not.

MR. TANNER: Your honor, I gave no testimony with reference to the Blue Cliff Canal. It was confined exclusively to transmission losses in Provo River.

MR. COREMAN: I understand Mr. Tanner gave no testimony respecting Blue Cliff.

THE COURT: The cross examination you desire was with reference to loss in the river?

MR. COREMAN: Yes, in respect to the report rendered by Mr. Tanner.

THE COURT: Then that is all for the present.

MR. A. C. HATCH: I will ask a few questions.

CALEB TANNER recalled.

DIRECT EXAMINATION by Mr. A. C. Hatch.

Q MR. Tanner, have you made any investigation to determine the loss of water in the several canals diverting water from the Provo River?

A Yes, not all of them, part of them.

Q What ones?

A Made some observations on the Upper East Union on the West Union and on the Lake Bottom Canal, a statement of the detail of those observations being contained on this paper.

Q You may state it.

A And in conjunction with Mr. Wentz, I assisted him part of the time in making some observations on the Provo Bench Canal, which he has heretofore reported.

Q You may state what you did in that regard?

A The Upper East Union Canal?

Q As to all the canals, taking them in such order as you may be best prepared to take.

A Upper East Union Canal, observation conducted October 27, 1913, gauging station No. 1 at a point 440 yards below the waste way of the said canal.

Q Where is that waste way?

A near the line east and west crossing the center of Section 25, neighborhood of a point where the state road turns east in the northern part of Provo and Pleasant View. The flow in the canal at the time of observation was 3.37 second feet. Lateral No. 1, 118 yards below gauging station No. 1 carried small flow of water, estimated about .15 second feet.

Lateral No. 2 fifteen hundred yards below lateral No. 1 volume of flow was .06 second feet.

Lateral No. 3 twenty four yards below lateral No. 1, volume of flow .056 second feet.

Gauging station No. 2 at point one hundred feet down stream from the east and west road crossing, located one half mile north of the State Mental Hospital, volume of flow 3.06 second feet.

Between gauging stations No. 1 and No. 2, were ten lateral gates each leaking small quantity of flow, the whole generally estimated to be .12 second feet.

Resume. Inflow at gauging station No. 1 3.37 second feet; outflow by way of laterals and station No. 2 3.31 second feet; loss by seepage and percolation .06 second feet. Distance between stations No. 1 and 2, one and one half miles approximately.

Loss per mile .04 second feet, being something more than one per cent per mile.

The same character of determination is made for a second observation on the East Union Canal-- upper east union canal, under date of September 21, 1914; the canal for the purpose being separated into two sections, the upper section being comprised between the measuring weir near the head of the canal and the rating flume about quarter of a mile above the spillway; the second section being from the rating flume above the spillway to a point near the State Mental Hospital.

Section No. 1 had a gain of .96 second feet or three per cent per mile.

The second section showed a gain also of one per cent per mile.

The lower section in this observation runs contiguous to the lower end of the Timpanogog irrigation system. At several points water was entering the section of the Upper East Union Canal, and wherever that water was observed as a superfluous inflow it was measured. Irrigation was taking place in three fields, directly above the canal during the period covered by the observation.

West Union Canal, September 16, 1914, same character of investigation with a stream at the head of 19.80 second feet. The section of observation extending from the rating flume at the head of the canal to a point near the state road that runs from Provo Across Provo Bench, the distance being about three miles plus. Loss here was 1.21 second feet about two per cent per mile.

Lake Bottom Canal under date of September 10, 1914, with an inflow at the rating station at Carey's point of 2.10 second feet. The section of this canal under these observations extended from the rating flume to where the canal enters the slough at the Holdaway farm vineyard. Gain in this canal in that section was 12.77 second feet. The distance was five miles being 2.55 second feet per mile. The details of the investigation are assembled here showing each lateral measurement.

MR. RAY: Does the tabulation contain any observations other than the reproduction of your measurements and your computation?

A That is all. As a matter of fact, it is more the detail, the computations are not here and each lateral is named and its relation to the ~~system~~ system and volume of the flow.

MR. RAY: And the results?

A And the results.

MR. RAY: As far as we are concerned we have no objection to that.

MR. A. C. HATCH: I will ask it be marked and admitted as an exhibit.

MR. JOHN E. BOOTH: Be glad to ask a question or two before.

THE WITNESS: Might add one word of explanation. During the interval these observations were going on the beginning a gauge was set at the upper section; the observations were made in a period of the year when the stream was flowing very constant, very little interruption from any irrigation use, in the several laterals and then an observation on the upper section was made immediately after the conclusion or measurement at the lower station and in none of these cases was there any fluctuation.

MR. JOHN E. BOOTH: I want to ask a question or two .

MR. A. C. HATCH: We offer ^{paper as} the plaintiff's Exhibit No. 51. Judge Booth desires to ask some questions.

CROSS EXAMINATION by Mr. John E. Booth.

Q Mr. Tanner, did this loss include evaporation as well as percolation and seepage?

A Yes.

Q So you don't know how much of each?

A The loss by evaporation in that season of the year is not I think material enough to count, the area of the canal not being very great.

Q Was there any irrigation going on in the West Union at the time you made these observations?

A There was a little, not very much. The laterals were flowing

quite regularly the ones that were taking out. The only ones of any consequence between the two points of observation was the lateral at Carter's and the Smith Ditch lateral.

Q Was there any loss at either of these places that was actually waste through lack of proper devices?

A I did not observe that on the West Union.

Q That is the part I was particular about, to see if it could be corrected by repairs or new head gates?

A I did not observe any such thing in the West Union observation.

Q The only way you could prevent the loss then would be to cement the canal?

A I should say that would be the only way. My judgment is the canal is in good condition. Its location and the physical ~~skxx~~ conditions there --

Q You have some ~~kx~~ actual knowledge of irrigation and the cost of it and so forth, would it be feasible to prevent that loss to go to the extent of cementing?

MR. RAY: Your honor please I object to that as irrelevant and immaterial.

MR. JOHN E. BOOTH: I think it is. They are endeavoring to charge us with loss, now we cannot be expected to spend a hundred dollars to save a ten cent loss.

MR. RAY: The law does not require the cementing of canals, as I understand it, or anything approaching it.

MR. JOHN E. BOOTH: It may not, and yet, as I take it in this country where water is as valuable as it is, that if we could save a hundred dollars water worth by ten cent expenditure, I think the law would require us to do it, and therefore I think this testimony is applicable to know how this is, whether it would be feasible to prevent that loss at anything like a reasonable expense and let us have the benefit of that water.

THE COURT: Objection is overruled. If it is

expected to ask the court in this decree to provide for a measurement of water as suggested by Mr. Wentz at or near the point of use I think these matters the court would like to be informed with reference to such matters as this.

MR. JOHN E. BOOTH: That is the point.

THE COURT: It would be absolutely immaterial, of course, if the court was to decree the water be measured and divided at the point above, because then it would be a matter for each canal to determine.

MR. JOHN E. BOOTH: As I understand it we have been acting under what is known as the Morse decree since its rendition, and I think in that we have had our water measured to us near the head of the canal, and therefore after that we were responsible for the loss. Now, if that is changed it would be somewhat of a radical change.

THE COURT: Yes, very radical.

MR. JOHN E. BOOTH: We want to prepare for it.

MR. A. C. HATCH: If the court please, in regard to that the appropriation of water and the application to a beneficial use is in my mind in regard to this testimony that one may at its canal divert four second feet and by reason of loss in the canal actually apply only two or three second feet upon the land.

THE COURT: Or even one.

MR. A. C. HATCH: Oh one, but he claims as an appropriation sufficient water at the intake of his canal to supply the quantity that he actually loses upon the land, for the purpose of getting that information before the court so that it might equitably determine the amount necessary to be appropriated for the several tracts of land. That would be one purpose of the testimony.

MR. RAY: There is no motion to strike the testimony.

THE COURT: Are you speaking of this objection. The

objection is to the question asked Mr. Tanner as to whether it would be feasible to cement this West Union canal, as I understood it.

MR. JOHN: E. BOOTH: That is the point.

MR. RAY: Withdraw that objection.

MR. A. C. HATCH: I was speaking to the question raised by Judge Booth as to the contemplated distribution of water at the land.

THE COURT: You may answer if you remember it, if not it may be read.

A My judgment of the value of water, is that this water would have a value for agricultural purposes of about five or six thousand dollars. That to save it by a water tight conduit in that location of that length would cost in the neighborhood of twenty thousand dollars. Therefore in my judgment it is not economically feasible.

MR. RAY: May I ask a question?

MR. A. C. HATCH: Do you have any objection to the introduction of this?

MR. RAY: No.

MR. A. C. HATCH: It may be introduced?

THE COURT: Yes, it may be received.

RE-CROSS EXAMINATION by Mr. Ray.

Q Mr. Tanner, your first measurement of the Upper East Union was on the 27th day of October, 1913, according to your schedule? A. Yes.

Q What is the capacity of the Upper East Union about?

A I should say 35 second feet, might be a little more.

MR. RAY: Judge Hatch advises me he was not through with his direct.

THE COURT: you may proceed then.

MR. A. C. HATCH: As to this loss of water I was

through, if you care to examine on that part of it.

MR. RAY: No.

DIRECT EXAMINATION by Mr. A. C. Hatch continued.

Q Mr. Tanner, are you prepared now to take up the question of the correlation of lands in the district?

A Yes.

Q I will ask you if you have made an examination of the lands upon the provo Bench, and under the several canals using water from the Provo River in Utah Valley?

A Yes.

Q With a view of determining their quality?

A Yes.

Q And necessity for the water and the amount and quantity of water to be applied upon the several tracts or under the several canals? A. Yes.

Q I will ask you if you have also examined the lands under the Strawberry Project, Mapleton, Spanish Fork, Salem and other lands using from the Strawberry Project canals?

A Yes.

Q You may state what you have done with relation to the examination of those lands under the Strawberry Project and also under the several canals using water from the Provo River and the relative similarity of the lands under the several canals?

MR. RAY: We object to that so far as it applies to the Strawberry project, as irrelevant and immaterial.

THE COURT: objection is overruled.

MR. RAY: Note an exception.

A This work was carried on in 1913, '14, '15. The soil in the several locations was sampled either by digging an ordinary post hole pit --

Q To what depth?

A Down to the open gravel material where the sub stratum was

gravel. The finer textured soils, the xx samples were taken with an ordinary steel auger, preserved in glass bottles and then subjected to laboratory examination in order to determine --

Q Were the glass jars sealed?

A The bottles were ~~xxxx~~ hermetically sealed, is in the same condition throughout, is sealed for its preservation. The samples were taken to a laboratory and subjected to treatment to determine their relative water holding capacity. The duty -- first, the location of these several samples without any designation of the matter are contained on this paper. They were taken from each canal system in the Provo area and with the exception of the Fort Field tract and the Lake Bottom tract the samples that were subjected to determination of water capacity in the Strawberry area were taken from, what is commonly known as the Mapleton Bench, the Salem field and the Payson bench. In addition to the samples in the Provo River area in Utah, twenty-three samples were obtained from the Heber area in Wasatch county. In connection with this work I also took samples of the Agricultural College farm tract, directly east of the Agricultural College at Logan, upon which for many years the experiments of the Agricultural College were carried on, about which many bulletins of the college are printed. The soils were taken from the surface to their depth, or to a depth limited to six feet generally in foot sections, each foot section receiving independent examination. Some of these samples were made in order to determine -- very many of these samples were made in order to determine the amount of water retained in the soil by an irrigation, the sampling being made directly before and directly after the completion of the irrigation. I have prepared a map practically identical with this map showing the location of the various sampled areas, which I can bring.

Q Have you the map here?

A It is over there on top of the desk, I just omitted to bring it

Q You may proceed to give the data?

A There is a great deal of detail here I don't know just the advisability of going into that in a very complete way.

Q Give us everything that you did which will have a tendency to inform the court in regard to the particular tracts of land in question.

A The first tract of land examined is in Section 25 on Provo Bench, under the ownership of A. L. Turner. Another tract on Provo Bench in the ownership of John Dixon. The third tract on Provo Bench near the northern end of the bench in the ownership of William Knight. The tract owned by Frederick Hanson toward the east from the Knight tract. The area just north of the Orem station.

MR. RAY: What Orem station?

A On Provo Bench.

Q What is the name of the station?

A Orem. The relationship of the surface^{foot} of the Tanner, Dixon and Hanson tracts are in the ratio 15.6 to 20.5 to 24.7.

MR. THURMAN: Just a moment, let me understand that, I don't catch what that means.

A The relative holding water power of the surface foot of the three soils ~~are~~ I have specified here are as the ratios I gave to you.

Q That is assuming 100 as the basis?

A Yes, this is a ratio. Now, I assume, your honor, it would be better to express these things in ratio rather than in more or less confusing absolute quantity. These experiments are made on a grand scale and varying quantity and seems to me like the ratio method would be better. The detail can be had if desired.

Q When the ratio does not in any manner tend to show the quantity of water, as I understand it?

A No.

Q Only the relative quantities as between the several tracts?

A Yes.

Q Very well, proceed.

Q The second foot on the Tanner tract 7.6 ; Dixon 13.6; Hanson 17.5.

MR. THOMAS: Just explain that a little more fully, Mr. Tanner, you say the second foot, is that based --

A The feet are specified from the surface, the first foot down, the second foot down, the third foot down from the surface of the soil.

MR. THOMAS: I got you.

A Now, in these experiments is treated for the first two feet, the Oxem tract for the first two feet, and the Tew tract on the Mapleton Bench for the first two feet, the classification not being reduced to the --

Q Is this the map?

A Yes -- to the minutiae that I gave before now considering --

MR. A. C. HATCH: Just a moment until he marks this.

(Exhibit 52)

Q Now, Mr. Tanner, you will point out on the Exhibit 52 the several places where you made these investigations from which you took the soil testified by you, so that we will understand the testimony.

A I have a map also of the Mapleton area, but it is on a very small scale, could not see it if it were pinned up, but I have no map of the Provo Valley areas that we observed. The round dots on this map are places of observation. The crosses with double cross are -- the ordinary signification written for number are points where the soil was taken for physical -- for determination of its water holding power, but

having the same number upon the map that it has upon the table, and the small crosses without number are localities where observations were made and notations, sealed notices made of what the observations were without giving them specific numbers.

MR. RAY: Mr. Tanner, how does the circle and X's without numbers compare to the treatment at that point?

A The circles without numbers are the location of pits that was actually made in the field. The X and number sign with a number following are the places where the samples were taken that were run through the laboratory.

MR RAY: And the X with no number is what I want to get.

A The X with no number are the places where observation was made and notations of the location and the conditions observed but were not affixed with a particular number.

MR. RAY: Were pits made there?

A Yes.

MR. RAY: How do they differ ~~xxx~~ from the circle then?

MR. A. C. HATCH: Mr. Tanner, just pardon me, the information is printed on the map explaining each of these things at the top of the map, isn't it?

A No, that is not ~~at that~~ there.

Q What is that matter at the upper left hand corner, right hand corner?

A Small tabulation with reference to the ^{quality} ~~quantity~~ of land located in certain particular sections.

Q What is the scale?

A Each section is marked here, the scale is about five inches to the mile, but the dimensions are given here, the sections are marked on, the ~~xxx~~ scale is not very material. The small crosses without numbers were given to avoid confusion. The numbered pits where only the circle alone is present are confined to

Provo Bench. Those are the only numbered ones. The other crosses without numbers here are -- the specific location is given in the locations made in the field. The Knight tract for the first two feet has a ratio of 20.5; the Orem tract for the first two feet ratio of 17; the Tew tract for the first two feet 21.

MR. THURMAN: That is the ratio of water holding capacity?

A Yes sir. From two to three feet Tanner 6.5.

Q Mr. Tanner, does that ratio represent the quantity of water that the soil will hold, taking 100 as the total?

A Yes sir, that is the ratio.

Q Twenty per cent would be one-fifth the cubical contents of the soil?

A No, this is the ratio between these soils without reference to the absolute quantity of water they will contain. If we will just keep our minds on ratio and off quantities you can appreciate this matter better. I think this is the best way to present it. I am endeavoring here to present a type of soil. This type occurs in the several fields I have described, each field varies somewhat from the other field, but it is the same type. It occurs in several places on Provo Bench. I am comparing its occurrence on Provo Bench with its occurrence on Mapleton bench the same soil.

Q Very well, proceed.

MR. RAY: May the record show that the defendants have an objection and exception to all of the testimony as to Mapleton bench and the comparison your honor?

THE COURT: Going back to the Tanner tract in the third foot 6.5, 9.6 for Dixon, Knight 11.7, Hanson and the Orem is mixed; Tew 8.8.

Considering these soils and comparing them for the upper two feet, the ratios are as follows:

Tanner 11.6;

Dixon 17;

Knight 20.5;

Hanson 21.1;

Orem 17;

Tew 21.5.

Considering these soils from the surface to a depth of three feet in comparison using the same systems

Tanner 9.9;

Dixon 14.6;

Knight 17.6;

Hanson 17.4;

Tew 17.3.

These five soils --

MR. RAY: You don't give the Orem, do you in that last?

A The Orem is left out in the last. I didn't have that for the three foot.

MR. JOHN E. BOOTH: If the court please, before he leaves that may I ask one question and save time hereafter. The actual water necessary for irrigation would be universal as these ratios would it not?

A That is my judgment in the matter as the capacity of the soil diminishes.

MR. JOHN E. BOOTH: The Tanner having the lowest ratio, as you have given, I think all the way through, would require more water to mature crops than these with the higher ratio?

A With this exception, Judge, that while it would not take more water absolutely it would take more to treat it so that it would raise crops.

MR. JOHN E. BOOTH: To raise crops?

A Yes.

MR. JOHN E. BOOTH: I mean the whole thing. I want to get my wheat with his, what I am after.

A Yes, the attendant losses on such a soil the added frequency of application would make it a low duty soil.

MR A. L. BOOTH: But, Mr. Tanner, would it require as much to irrigate at one time on this soil that will not absorb so much moisture?

A No, it would not take as much for one application.

MR. A. L. BOOTH: That is what I mean, to apply it to beneficial purpose, each application of the water.

MR COLEMAN: Is this your land you speak of requiring more water than any other land on the bench, Mr. Tanner?

A No, I don't own any land on the bench. These are for the purpose of getting typical soils of what we ordinarily describe as the dark heavy loam of Provo bench, and one of the poorer tracts is in Section 25 where A. L. Tanner happens to own a field.

MR. COLEMAN: That is your brother?

A Yes. Now, all of the Tanner land is not as poor as this. This is a poor place on Mr. Tanner's land. The class of lands -- I might say in passing that these are shallow heavy loam and clay loam soils in the Provo area.

Q Provo bench area?

A Are confined to the Provo Bench and the West Union area, that comes directly under the Provo Bench lying to the east and to the south of the Provo Bench.

MR. JOHN EL BOOTH: That would include under the Smith ditch.

A Yes, the Smith ditch area compares to the ~~poorer~~ poorer, pebbly loam soils that have been given here. There is a soil class varies considerably between the field, but in general is a clay or silty or sandy soil of very considerable depth.

That occurs over considerable area of Provo bench and some adjoining areas. The Long tract which is just south of the A. L. Tanner field --

MR. RAY: Will the court pardon an interruption. Have you a system of keeping the numbers of your experiments here that we may have for crossexamination to call your attention to. If you have a system of numbers and you will have to refer to it now, then we can call your attention to it easily. I mean by that you give the number to us, we will --
A No. 4 to 6.

MR. THOMAS: Are these the numbers you have just given?

A Numbers 4 to 6.

MR. THOMAS: Now, this is different to Mr. Tanner.

A Yes.

Long soil about four and a quarter feet deep, clay soil with sandy contents towards the bottom.

The Stratton soil No. 38 to 40, 4.15 feet deep;

Marriott soil --

MR. RAY: Which Stratton place do you mean?

A That is the north tract, at a point in Section 15 near the center of that section.

MR. BAGLEY: Is that the same soil as the Long soil comparatively?

A That soil is a sandy loam. I am endeavoring to treat these soils from the point of view for water holding power without any relationship to an absolute physical classification, so that I am taking and mixing sandy soils and clay soils here together and treating those soils in this classification that do belong in the same physical category with reference to water treatment and water holding power. This soil is a sandy loam in the Stratton tract. The soil as you go east from the pit is shallower, and as you go west from the pit is somewhat

deeper . Marriott tract, Nos. 41 to 46, located in the north-west corner of Section 10. That is a soil in excess of six feet in depth. The Sumner tract in Section 15 -- in Section 10 and marked on the map in hatched red --

MR. THURMAN: Is that numbered?

A It has got one number in the vicinity, No. 57.

MR. THURMAN: I mean numbered as you have given its number here, ~~is~~ four to six?

A One of the numbers is 57 with reference to the Sumner tract. This is not numbered, its location is given in hatched red, because the Sumner tract was utilized also in connection with a series of irrigation experiments. It was not an isolated, more or less isolated set of observations, but continuous set of observations were maintained upon the Sumner tract. Certain parts of it for quite a period of time. That soil is sandy loam, sometimes without a clay subsoil and sometimes with a clay subsoil ranging from three and a half to four feet in depth -- 4.7.

The Grandall soil, No. 75, also marked with hatched red on the map, being located in the northwest quarter of Section 12, is a clay soil, four feet in depth.

The Taylor & Roberts Field, Nos. 227 and 30, those numbers are duplicated on the map I am satisfied, the ones to the extreme left are in error.

Q Give the section in which the land is situated?

A In Section 11, extreme eastern part.

Q It is in another township, is it not ?

A In the township south of the one, but your reference has heretofore been made 7th South. This soil ranges from three and threequarters to four and a half feet in depth.

In the eastern part of Provo on Mrs. Simons lot, No. 264, three feet in depth. This is a sandy soil.

Allen Brothers farm at the lower end of or near the lower

end of the Heber Valley, three feet in depth.

Q Just a moment, I didn't ask you to go to Wasatch county.

A I beg your pardon.

MR. A. C. HATCH: I move that go out for the present.

THE COURT: Very well.

A The Hanfield field on the Mapleton Bench, sandy clay soil, four feet depth -- or sandy soil.

The Clyde field on the Mapleton Bench, sandy loam, three feet in depth.

The Cedarstrom field in Salem, sandy soil, sandy loam, six feet in depth. The soils vary one with the other, but belong generally under the same classification. They are not heavy soils, some of them contain a fair percentage of clay. They are all, however, relatively deep soils of good water holding power with relative great ease of cultivation and maintenance of cultivation.

Q That is all of those that you have named in the Strawberry Valley Project area and Provo bench area as No 2?

MR. RAY: I don't understand all of No. 2 are in the Provo Bench area.

MR. THOMAS: The Judge didn't indicate that, he said including the Provo Bench.

MR. A. C. HATCH: They are all included within No. 2, as mentioned by Mr. Thomas.

A Yes. There are certain fields where the field itself runs into more than one classification. That might be added to this list as part of the field. These are meant to only be representative soil units of this type. For instance, the Stubbs field just south of Provo, across the railroad track in the lower part would belong in this classification, but its upper part would not; and further these are types of soil without reference to the ground water conditions, and the water duty would be somewhat modified dependent upon the

occurrence of ground water which in some of these locations is present and in some of them is absent. The other type of soil is a clay soil.

Q Is that now another division?

A Yes sir; a clay soil or clay loam rather tight, high water holding power and higher water holding power than the soils that I have named in classification No. 2, and usual retention of the soil beyond the point of availability to the plant is much greater.

Q Retention of water?

A Yes, retention of water beyond the availability to the plant is relatively higher than the classes of soils that I have mentioned in the second class. These occur in the Timpanogos area in the northern Provo bench area.

MR. THURMAN: May I ask a question right here.

Mr. Tanner, when you say a higher water holding power, you mean a given quantity of soil will hold more water than a given quantity of one of the other classes?

A Yes, but it won't all be available to the plant as readily as class 2. For instance clay soil with a water holding power based on the percentage of dry weight of the soil of 40 per cent will when it is as dry as the plant can make it still have 15 or 16 per cent of water remaining in it, and the plant die for lack of water. Soils of the sandy type that I have described can be reduced to four per cent of their dry weight, so that the relative availability of the water in the two types that --

MR. THURMAN: And applied?

A Yes, containing four times as much water and clay soil will have the plants die on it compared with a unit quantity in a sandy soil.

MR. THURMAN: Now, one further question, so that I may grasp this as I go along, does that mean that the sandy

soil or the clay soil will require more water than the sandy soil for the production of the same kind of crops?

A No, the sandy soil is more like a pint cup that you can get all the water out, a clay soil like a quart cup where you can only get part of the water out, plant does not have the power to clean it as completely.

MR. THURMAN: These matters are too big for my capacity, I think I understand it.

A I would like to add a word of explanation, because I don't think the matter is a matter of great difficulty. The soil is made up of particles just as independent as marbles or as pebbles. When those particles are exceedingly small they are spoken of ordinarily as silt or clay. When they are larger they are spoken of as sandy soil, and when they are still larger, as pebbly soil. Each particle is surrounded with a film of water that it holds there in the same way that a very small glass tube raises the water from the surface in a bucket. That of course we call capillarity. Now when a soil is made up of coarse particles there is surrounding each particle a film of this capillary water. We can call it a thickness "A", and the same thickness surrounds a particle with clay or thickness "A". The plant feeds on this capillary water, and reduces a film thickness and as it reduces the film thickness the resistance of capillary arises. Now, there is a point where the pulling power of the plant and the resisting power of the film are correct and neutralize each other and that is where the plant dies. Now, that film thickness is the same whether it is clay or whether it is sand, but you can see if you have a hundred pebbles in a cubic inch and only one pebble in a cubic inch that the total amount of water to make this film is much greater when the soil is fine. That is the whole explanation.

In the northern part of the Provo City acreage --

MR. THOMAS: Pardon me, this is the same division?

A Yes, No. 3. A portion of the Upper East Union acreage both in its upper stretch and in its lower stretch the Lake Bottoms area on the Mapleton Bench, such tracts as that of Jacob Hanson and Henry Gardner. These soils have practically the same water duty in the bench areas as the best of the preceding class, somewhat higher duty than the poorer of the preceding class. In my judgment there is not a great deal of difference. However, these soils are more resistant to cultivation, they don't form mulch so easily, and know that your mulch forms as it does with a sandy soil, so that if they are not cultivated they lose water very rapidly, which is not the case with the -- which is relatively not the case with the sandier soil.

Q As to these Mapleton tracts, that that you have described under the Provo River system, are they practically identical as to water conditions?

A Yes, these are made for the purpose of ~~g~~ giving comparable areas in the two sections which areas, in my judgment, have comparable water duties for the practical operation of agriculture. Now, referring to the question of the absolute water capacity of these several soils after they have been irrigated, take for instance the Dixon soil, the upper foot of the Dixon soil, which is the best soil in these pebbly loam soils, its water holding power with reference to its dry weight is 15 per cent. The gravel that underlies the soil at two feet, or a little more than two feet has its water holding power as low as 3 per cent of its dry weight.

Q The dry weight computation, the relationship of these soils to holding water is very good compared in the same class of soil, but is relatively poor as compared between the several classes of soils; the surface soil of the pebbly loam soil ranging from 13½ to 17 per cent of their dry weight. They

vary a little among themselves, but if we find the specific gravity of those soils they carry a great deal of small pebbles in them, they weigh relatively more than the clay soils weigh, so that if the clay soil contains 30 per cent of water compared to its dry weight it would not contain twice as much water as the pebbly loam soil because the pebbly loam soil weighs more to the foot or to the inch than the clay soil weighs; so it is perfectly fair to compare soils of the same types and their dry weight is the best comparison, but when you pass from one class of soil to another class of soil with this comparison, it is likely to be unfair and for that reason I classified them in these three units.

Now, there is one additional soil type that we don't have in the Mapleton area that I observed -- Strawberry area -- that we do have in the Provo area, and that is the deep silt soils that are in the Fort Field. We don't have an identical comparison in the other area. I observed irrigations on these several types of soils, the pebbly clay loams that have a depth in excess of twenty inches can go with most of the crops that are raised in this vicinity two weeks between irrigations. Those that are shallower than two feet require irrigation in my observation every seven to ten days. Soils like the Orem soil, the Tanner soil, should be irrigated about -- and the Hanson soil should be irrigated about every week, not to exceed ten days. The application measured in the immediate vicinity of the land required to make an irrigation in the summer time, in the months of July and August at the time of maximum evaporation and at maximum consumption of the plant ranges about two inches or a little less.

MR. RAY: You mean the soils retains about that much water?

A No, the application, the application of this application approximately in my determinations from 75 or 80 per cent of the

water is found in the soil after the irrigation has taken place, been completed.

MR. A. L. BOOTH: You mean 75 to 80 per cent of the two inches?

A Yes sir. The soils of the second class measurably dependent upon their location and the character of their sub strata range from two weeks to three weeks, between necessary irrigations. The soils in the Sumner tract that has gravel underlying the three or three and a half feet of sandy loam should be irrigated every two weeks, the same with the Stratton track, towards the eastern side of that tract. The same with the Clyde tract on Mapleton Bench, and those other fields on the Mapleton Bench mentioned in the same category with the Clyde field, where the soil is underlaid with a clay strata.

Q You didn't give us the amount of application.

A I will do that. As for instance, in part of the Sumner field and over considerable part of Section 26 on Provo Bench, the north part of Section 22 on Provo Bench, the application can ^{go} ~~grow~~ with good condition up to 18 to 21 days. The volume or depth of application for this type of sand in my observation is about four inches, sometimes somewhat more, somewhat less, about four inches of which 70 per cent is found in the soil where the soil is underlaid with water plane at depth of four feet or less, which is the case over on considerable areas under the Upper East Union Canal Company or East Union Canal branch of the Provo system acreage in the Dry Creek area.

MR. THOMAS: Is that the Little Dry Creek?

A Little Dry Creek area. In such areas as those lying along the south border of the Provo City lots in the first pasture-- First Ward pasture here and thence eastward from the pasture for quarter of a mile or more and also in the extreme south end of the Tanner Race area of the Provo City acreage, the applications are approximately as I have given them, and these

applications are what the farmer gave. The amount of water retained is very much less running down to as low as 40 per cent of the amount applied.

MR. RAY: That last class is typical, that last answer is typical of your first class, is it?

A Second class.

MR. COLEMAN: How short should the irrigation be, you didn't state.

MR. RAY: He gave it two to three weeks.

Q Now, about the lands in the Strawberry Project?

A The areas in the Strawberry Project have no water plane. They belong in the class, and I specified them in this answer as needing water approximately every two weeks.

MR. A. L. BOOTH: Before you leave that, I don't know whether I got it quite clear, was all of class 2 soil that was underlaid by a water plane four feet or less, or did this exception apply to only that part of Class 2 that was underlaid by this water plane?

A This meant to be partially. I didn't mean that to apply to all of Class 2 where they only retain 40 per cent of the application.

MR. A. L. BOOTH: From Mr. Ray's question, I thought you bunched all of class 2 in that 40 per cent power of retention.

A No, if I didn't answer it, I will answer it by saying that approximately three-fourths of the water on examining the soil after the irrigation was found present in the land, except for those underlaid with water planes.

MR. WILLIS: May I ask you how long after an irrigation before these examinations were made generally speaking?

A From twelve to thirty-six hours, would be about the extreme ranges. A sandy soil drains quite readily, a clay soil drains the excess of water away with relative slowness, and my observations, of course, I threw them away if I found gravitation

of water in holes, that is, water actually run into the holes, I threw that sample away and came back later when only the capillary water, or the maximum capillary water was there.

The third general series to which reference was made at about the same volume of application made to them as far as my observation went, and they retained about threequarters of the water applied, situated where there was no immediate sub-
gugation to water plane. Where the water plane was present within three or four feet of the surface the amount retained was smaller down to as low as to 50 per cent, not quite as low as it was for a the sandy silty soil. The comparison of the actual irrigation on the tracts on the Strawberry Project was not made, but the physical identify and the certainty of their water holding power of those soils that were mentioned in connection with them in this area was made.

Q How many samples of the soils under the Strawberry Project did you test, about how many?

A Individual samples, I should say in the neighborhood of one hundred and twenty-five.

Q Did you make other examinations of the lands under the Strawberry Project with a view to determining their relative qualities compared with the lands under the Provo River system?

A Yes.

Q What did you do, Mr. Tanner?

A In 1913 and '14, during the summer season of both those years.

Q What did you do other than the taking and testing of the samples of the soils?

A Made numerous borings on places in the Mapleton Bench, observed the uts, railroad cuts through the area, there is almost a continuous exposure on that bench of the soil along the new location of the Rio Grande railroad, from the edge of Springville to the mouth of Spanish Fork Canyon.

Q Did you cross the entire area of the Mapleton Bench?

A I traveled on foot and carefully examined that railroad tract. There are a great number of places where water is diverted from the ground on the bench and out deep channels back into the surface of the bench. I observed these in numerous places. Then the soil samples taken in the central area between the natural or artificial exposures were examined,

so a fairly continuous set of information was obtained from the break of the Mapleton Bench at Hobbie Creek over to the Petettnett Creek area south of Payson.

Q What did you find in that Petettnett area and the Salem area in relation to the soil compared with Provo Bench soil?

A One of the Salem areas has been compared with our second division of soil, the Cedarstrom area. The Payson area I did not compare because its identification is not as close as the ones that I made. It is approximately like the black loam, ~~is~~ pebbly loam of Provo Bench and the Smith Ditch area, but it is a deeper soil and the average of those soils and little better soil. It is about midway between that soil and the intermediate system that I mentioned was lower. The Altoff area in the extreme northern ~~part~~ part of the Mapleton Bench a little toward the mouth of the canyon from where the railroad leaves the cut, the new cut, while it is a shallow soil, it is more like the Petettnett bench soil, and is about midway between the black pebbly soils of Provo Bench and the second series that I mentioned, and its duty would be an intermediate duty.

Q What have you to say with regard to the duty of water upon the Mapleton Bench and Salem areas and Petettnett area under the Strawberry Project and the lands under the Provo River Irrigation System in Utah county?

MR. RAY: I object to that as incompetent, irrelevant

and immaterial .

THE COURT: Objection is overruled.

MR. RAY: Note an exception.

A The lands of the first class are present in the Strawberry Valley area, Mapleton Bench, but they are less extensive in their acreage. The lands of the second class are present in that area in about the same proportion as they are in this area, same relative proportion. The lands of the third classification are present in both areas, but more plentiful -- the acreage is more plentiful of that type in the Mapleton Bench Strawberry area than -- Mapleton Bench area that I observed they are more plentiful -- I will withdraw that -- about the same proportion as I have observed lands of the third class restricting that to the area ~~in~~ which I have examined, with great care and which I have heretofore reported the duty of water for ~~it~~ the lands taken as a whole on the Mapleton Bench. In my judgment on account of the scarcity relatively of the poor varieties that occur that fair plenty in this section is higher than ~~the~~ it is here in the Provo area.

Q Could you give us an approximate percentage as to the duty?

MR. RAY: Your honor please, I would like to ask a question or two to predicate an objection upon.

THE COURT: I am inclined to think any objection made to this would be sustained.

MR. RAY: I wanted to renew my objection and renew my objection to the incompetency of the witness to testify to this and to the materiality and relevancy of the testimony.

THE COURT: I see no materiality in this evidence that you are asking for now as to the percentage between the duty of water on the Mapleton Bench and the Provo Bench. I have admitted this evidence merely because of the fact Mr. Larsen's testimony was based very largely upon his experience ~~and~~ under the Strawberry Project, and it was because of the fact that he

stated there was a similarity ~~inxt~~ between the soils and conditions in the two sections. This evidence now of this witness has been admitted so far in so far as it may assist the court in determining the ^{weight} ~~rate~~ that would be given to Mr. Larson's evidence, and also in supporting the proposition that Mr. Larsen was competent and qualified to testify with relation to the duty of water. Now, this ~~xi~~ relative per centage of the duty of water or comparison of the duty of water in the two systems would not aid the court at all in that particular and consequently would not be material for any purpose.

MR. A. C. HATCH: I will withdraw it.

THE COURT: Unless you indicate some other purpose.

MR. A. C. HATCH: We will ask the matter go over until after the noon hour.

THE COURT: Very well.

12:00 Noon, Recess to 2:00 P. M.

CALEB TANNER - - - - -

DIRECT EXAMINATION by Mr. Hatch continued.

MR. A. C. HATCH: If the court please, the last question asked the witness before the noon recess was asked with a view to ascertain the relative duty of water upon the Mapleton ground where Mr. Larsen had made his actual tests with the duty of water upon the Povo Bench, and other lands within this irrigated area so as to admit evidence of those actual tests upon the Mapleton Bench, and it appeared to me that it is a matter that would give to the court positive information as to the duty of water ^{if} ~~for~~ the two tracks of land or sections irrigated are the same, or practically the same, that it would at least be evidence to the court of the necessities

for certain quantities of water to produce like crops upon the land in the Provo River area.

THE COURT: I think that would permit you to go a little too far. If this person has acquired information by reason of experiments made on the Mapleton Bench, or other places where the soil conditions are similar or identical with the soil condition here he may, basing his opinion upon those experiments, state what the duty of water would be and is upon this soil, but to permit -- except on cross examination for the purpose of in some way affecting the weight of his evidence, I don't think you should be permitted to go into those other experiments. The cross examiner may go into them if he desires to find how accurate or to what extent they are similar or identical, but I don't think you can do that.

Q Did you make experiments so as to try to ascertain the duty of water upon the lands irrigated from the Provo River under the several canals of the parties defendant in Utah County.

A Under some of those canals, yes.

Q When were those experiments made, Mr. Tanner?

A In 1914 and 1915.

Q Have you the data of those several experiments?

A Yes.

Q You may state what you did and what determination you made with regard to the duty of water upon those lands?

A The most elaborate set of tests were made upon the --

Q By the way, Mr. Tanner, was anyone with you in making these experiments, any party representing the irrigators or the defendants or the court?

A The irrigator was always there. I don't remember in any of these experiments that there were other parties present, I am not sure, there might have been. The most elaborate set of measurements were made upon tracts that appear upon this map hatched

7 in red. These tracts --
Q This map, that is Exhibit 52?
A Yes. These tracts are members of the thinner and lighter soil. ✓
7 The Dixon tract I have heretofore given was one of these soils and Hanson tract which I have also given was another of these soils, of the poorest grade the lowest duty of any of the soils in the Provo area. The Sumner tract was of the second division of soils and of a poorer grade. The lower duty represented it. Of this second type -- and also it was representative of this second type. The fourth tract, which I don't believe I mentioned specifically but namely the Crandall tract --

MR. RAY: Which Crandall?

A It is written on the map, I think I did mention it in Section 12, northeast quarter. The upper half of that field, or $\frac{3}{5}$ belonging to the type I called the clay type, the lower $\frac{2}{5}$ belonging to the same type as the Hanson and Dixon soils; so that these experiments are compared to the whole on rather inferior types. They were not picked that way. They were simply available tracts. In the beginning of the experiment it was not practicable to obtain any cooperation, and while I should have preferred getting an average more definite than this, taking the classes better, it was too difficult for me to do it. These lands were irrigated, the Hanson tract, the representative of the lighter series and the Crandall tract, partly of the lighter series and partly of the better series, better soils, using an interval of seven days on the Hanson tract and an interval of 14 days on the upper end of the Crandall tract and seven days on the lower end of the Crandall tract with a duty of 70 acres to the second foot. Based upon this determination 70 acres to the second foot, is sufficient for any of the lands in the Provo River area, if the water is used with reasonable care and the land properly prepared, the

ditches properly made for that service.

Q Does that include all the lands irrigated under the canals and ditches of the several defendants in Utah county?

A I made --

Q Including Provo City?

A I made observations but they were isolated because I did not seem to be able to get into proper relationship with the actual conductors of the experiment on fields that were being used for experimental purposes by Provo City, two fields in particular, which I have heretofore referred to. located in the southern part of the city acreage area, the Stubbs field and the Roberts and Taylor field. The determination being made to find out the quantity of water retained in the soil by an irrigation, and the interval that was actually occurring between the irrigations, but those tests were isolated and are open to considerable objection upon which to found the general answer to duty. These other experiments were continuous over a considerable period of time,

Q How long a time?

A July, part of June, July and August, one year, and June and July in another year.

Q What would be the length of the irrigation season for this 70 acre to the second foot business.

A The irrigation season is a variable, ranges in this vicinity on some of the lands to as short a period as a hundred days, and on some other of the land in the same season one hundred and thirty. Then as the season varies on the first class might amount to one hundred and twenty and on the second class to one hundred fifty, but I think that would be the range of the irrigations season.

Q Now, can you classify the lands, from your investigations and give us the duty of water necessary for the second and third divisions as stated by you and the approximate area

of the several classes of the land?

A The total area of the first class of soil is somewhere near two thousand acres under all ditches.

Q What is the class requiring the greatest quantity of water?

A Yes, the thin pebbly loam and sandy loam soils that are underlaid with gravel.

MR. THURMAN: That is the one that requires 70?

A That is the one representative of that under the experiments conducted here showed that a 70 acre duty was sufficient. The second class in the range as I have attempted to make it in the explanation in the early part of the day is in the neighborhood of half the remainder of the Provo River area in Utah county. It might be a little more than half of the remainder or about five thousand acres, and the clay type of soil about five thousand acres.

MR. THURMAN: You call this No. 2, the clay type?

A No. 3.

Q There being approximately twelve thousand acres in all?

A Yes.

Q What would be the duty of the land under the division 2?

A In my judgment there is very little difference in the duty between No. 2 and No. 3, depends upon the relation with reference to the ground water plane.

MR. THURMAN: You haven't given us No. 3, have you?

A Yes.

M. THURMAN: What was that?

MR. A. C. HATCH: I understood you give us the duty on one of 70 acres.

*Read
Hatch's
last*
A Yes, and now I say there isn't much difference in my judgment between No. 2 and No. 3, so far as the soil is concerned in their duty, either of these --

MR. THURMAN: What duty have you given for 3?

A I have not given, I am going to give it though.

Q That is what I was asking.

A Either of these would be modified in its relationship to the duty by the immediate presence of the ground water below. In my judgment a sufficient quantity for those lands would be from 75 to 80 acres to the second foot; some of them would range very near to 70, because they are not in their mechanical composition and relationship to holding water very much better than the lighter type and some of them would reach up to at least 80 acres to the second foot, where the ground water was far beneath the surface. The presence of the ground water would still further increase the quantity of water so that in some of the areas where the ground water was near it would not require any irrigation at all. Some would require irrigation of considerable interval compared -- such soils as the port field, would not require an irrigation oftener than once in three weeks or so. The duty in my judgment would amount to somewhere near a hundred or a hundred and ten acres to the second foot under these divisions. That is all.

MRL THURMAN: May I ask a question?

MR. A. C. HATCH: Yes.

DIRECT EXAMINATION by Mr. Thurman.

Q Mr. Tanner, when you say 70 acres to the second foot, I suppose you mean that quantity of water available throughout the irrigation, that is, if reduced to acre feet covering a four months period, it would take that quantity of water?

A No, I mean that was the observed quantity of water that was sufficient during the months of July and August, the time of maximum evaporation and maximum crop consumption.

Q Then what division would you make in the remaining months of the season?

A The irrigation interval might be lengthened when the evaporation was less severe, and that would raise the duty. If you have a rainy period on type 1 of soil, you don't need to irrigate it every week, and you ordinarily in the month of May in this section you have considerable rainfall, but last May we didn't have much rainfall.

MR. RAY: What about this May?

A I meant the last May.

MR. RAY: What about year ago last May?

A That was a bad month also, as I recall it.

Q Worse than usual, weren't they?

A Yes, May is a month of fair rainfall, two or three inches of rainfall come in the month of May.

Q Now, a further question, this land is not water except a small percentage of it, by drawing from the reservoir? You have got to do it when it goes down; is it profitable, for instance, to the farmers to use more water assuming now that 70 is sufficient during the month of May, if it profitable for him to use more than that when he has it, ^{and} because he has it, for fear of not having that much a little later on?

A Not on this kind of soil.

Q So as the aggregate would make up what you say, for instance, use 40 or 50 because the water is high and plentiful, for fear that later on he will have to take a hundred or something higher, the aggregate making about 70?

A That might be on some types of soil. On that second type you might carry on an application of that kind. On this type of soil you get no advantage particularly out of it, because the land was sampled again and again in the course of these tests, and the land in the upper end that had been super-saturated, over saturated, contained no more water twelve hours after an irrigation than the middle or the lower tract.

Q Did you give any duty of water for lands like the Fort field

land?

A I said they required an irrigation about once every three weeks. They would have a duty ranging from one hundred to a hundred and ten acres. They are the most perfect soil that we have in this area.

MR. RAY: Judge Hatch, do you propose to examine this witness as to Wasatch and Summit County?

MR. A. C. HATCH: I think not on behalf of the plaintiff. The matter, as I understand, we have no dispute with those people, and it is trouble among themselves. If they can agree what their rights ~~resp~~ respectively are among themselves, I think we can agree to it, but I don't know as yet. What is all, your honor.

CROSSEXAMINATION by Mr. Thomas.

Q With reference to Exhibit 51, Mr. Tanner, covering the determinations you made as to the losses on the upper East Union Canal, this investigation which you made, as you stated set out in this exhibit or this report, October 27, 1913?

A Yes, one of them.

Q On the ~~fixx~~ one day only?

A Yes.

Q And the volume of flow in the canal was 3.37 second feet?

A Yes.

Q That is not the normal flow in the canal, is it?

A No.

Q You were determining the loss there of one per cent per mile, merely upon the amount of water which was in the canal at the time? A. Yes.

Q Did you make any determination at any time on the Upper East Union Canal to determine its loss in transmission when the normal flow of water present?

A Yes.

- Q That is the one made on September 21, 1914? A. Yes.
- Q That was virtually at the close of the irrigation season, wasn't it? A. Yes.
- Q Did you make any determination of the losses in transmission on that canal in the early season, any time in the spring of any year?
- A No, but I might explain that those things are very difficult to do because unless you take some part of the season when the farmer is not using the canal you must have his cooperation, and I never could get that cooperation.
- Q Then you don't regard this as an accurate determination, do you?
- A Yes, it is accurate within the limits specified. The thing that colors that and makes it somewhat uncertain in the respect there was the use of water above there, and of course that goes on all the time, and will doubtless color any exact determination on that proposition, -but it is a thing that does occur all the summer long, the irrigation of the upper field, and when that irrigation is going on there are contributions coming into the Upper East Union Canal, and as long as that condition exists the absolute loss in the canal section from there up coming from its head and loss in its transit down is obscured, measured by that feature.
- Q It is also obscured, is it not, by the very small streams which you have, which are so small you merely estimated them?
- A Yes, that was one difficulty. That is not a very great difficulty, because the summation of all the streams estimated is not very great.
- Q What method did you adopt in determining this loss?
- A You mean the matter of measurement or just a description of what I did?
- Q It is the method of measurement?
- A The upper section had weirs. I made the measurement at the

weir, observed the depth, and then using the formulae, the weir was in good condition, the measurement at the lower end of the upper section on the date specified was measured at a rating flume some mile or so, two miles, I presume below the weir, measurement being made with a small Price current meter. Now, from there on down all the measurements were made with a small Price current meter except where the stream was so small that it had to be estimated. As soon as the lower determination was made returned at once to the upper station, and observed the stage of the water. It was running in the same volume as it had when the test was first determined.

Q Did you make the tests alone?

A Yes, the tests were made alone, but I didn't do all the movement alone. I think I had an automobile man with me and he drove me back up from the lower station. I went down with the water and then returned quickly to the head.

Q What method did you adopt to determine the inflow in the various section?

A The upper section was measured at the head and then there are some diversions that are specified there between the weir and the rating flume. Those were measured with a meter in every instance. I took the volume at the weir and subtracted the volume at the rating flume plus the volume of diversion. Now, the total of the diversion and the volume at the rating flume was more than the inflow at the head and you could see some inflow coming in superficially but you could not measure it. It runs along a side hill, and there are little trickles and seeps of water coming down into the canal and also trickles and seeps going into the canal, and might be coming out of the canal, so that it may be and probably is an accumulation channel and a wasting channel at the same time, but the total of the two facts is at the lower section an increase in the stream, so that a determination was made in that manner.

In the lower section the canal runs to a more general sloping country, that is, the slope is general both above and below the canal except in places here and there. Some of those fields in that general sloping section above the canal were being irrigated as they are normally in the irrigation season, and flows were coming in. Wherever those flows were in volume sufficient to measure I measured them, but I had to estimate most of them because they come down in little furrows and so forth. If they had been continuous quantity, the determination would be accurate, but farmer in irrigating his farm turns it off one set of rows and down another set of rows so that the water was practically wasting into the Upper East Union Canal for fifteen or twenty or thirty minutes, until that set of furrows are cut off and then didn't waste into the canal for another half hour until the next set of furrows got down. That feature of the irregularity in the inflow was what clouds that determination daily and since those are more or less compensating there was a number of fields in operation it clearly is not in error as much as the total volume.

Q Would it have been possible to have made a more accurate determination at an earlier season?

A No, it would have been worse.

Q Not from the inflow?

A Yes, those fields are irrigated along there just the same all the season through, there is somebody irrigating in that upper section from the Timpanogos Canal, and everything that gets away from the Timpanogos Canal dumps into the Upper East Union, and when the water is plentiful the dumpage is considerable and when it is short or at the end of the irrigation when not much is being used the dumpage is relatively light and that was the main motive for making the determination in this season of the year, to cut out, as far as I could the irregularity that

the thing is naturally open to.

Q By adopting that you found the seepage condition less than it would have been otherwise, by reason of the lateness of the season, didn't you?

A Might have been somewhat less, the superficial evaporation, or the evaporation from superficial area would be less, but the sections are not very long and the area is not very great, so I don't think that is material. Now, the temperature of the water is a little lower and temperature of course is a function of percolation, but 14th of September it is fairly early and the temperature of the water is still pretty high.

Q Now then, with reference to the Lake Bottom Canal, you found the dumpage condition at its maximum?

A It is not exactly dumpage there, there are springs and seepage inflows that are continuous. They are not periodical and waste like from the other.

Q Isn't it a fact that inflow is largely from drainage waters?

A Oh yes, there are drains cut right into it, practically no water gets past the Lake Bottom Canal from the Carey point down to the place where it dumps into the flume at the Holdaway farm. Whatever goes down to there as waste water, drain water, spring water, discharge from those marshes that lie above there, accumulate in the channel. Now, this was at a time of the year when the determination was made there, there wasn't much waste water running. The amount of water in the West Union Canal which lies directly above was relatively small, and the amount diverted by the Provo Bench was relatively small, not near the quantities they divert in the ~~main~~ main heavy part of the irrigation season.

Q Are you able to state, Mr. Tanner, what proportion of the waters in the Lake Bottom Canal are spring waters and seepage waters and drainage waters, can you at all make any determination, differentiate?

A Might in an isolated example or two. There are some distinct springs that are right close by the canal, and enter the laterals from the canal. Some of those I determined separately, but generally speaking I could not make any distinction, did not attempt to.

Q I want a little more information, Mr. Tanner with reference to the water content of the soil under Division 3. Directing your attention to that part of Division 3 under clay soils, as you refer to as being found in the north part of Provo City acreage, and such other territory as you designate, I want you to explain please how the water content was less after irrigation, smaller percentage at least, than in the other soils, particularly as you found the water plane higher in those districts?

A In those clay soils in the Provo City acreage lying north of Provo City, the soil contain fifteen hours after irrigation about 40 per cent of the dry weight of the soil or about 36 per cent of the volume.

Q The last figure I didn't get.

A About 36 per cent of the volume. In other words, if the water is all taken out after the irrigation it would make about 4 inches deep of water in a foot of that soil.

Q You found the water content, however, in that particular class of soil greater than in the other soils marked in divisions 1 and 2? A. Yes.

Q And when the water was applied you found that the percentages were quite high, within twelve to thirty-six hours after the irrigation in Division, 1, for instance, as high as 70 per cent, didn't you, did I understand you right in that, Mr. Tanner?

A I don't just get the --

Q After you had irrigated lands in Division 1 and made your examination, after the irrigation, I understood you to say

that there was 70 per cent of the application found within the land after the irrigation and within a period of from twelve to thirty-six hours thereafter?

A Yes.

Q Now, please explain why so small a percentage of that water after irrigation was found in these heavy lands?

A Well --

Q Do you attribute to the influence of the gravitation of water?

A No, I can give an ~~expix~~ example that will be better. In this example the ground was irrigated and fifteen hours after the irrigation that ground was sampled. It was sampled again about six days after. The division in the first foot of soil at the time of the two samples was the difference between 444 grams and 371 grams. In the deeper soil below the surface ~~sftxx~~ ^{foot} the ground was as wet practically as it was just after the irrigation. Now, if we apply an ordinary irrigation to that soil of four inches it could not hold but, two, and there would only be half of the irrigation found in the soil. Now a good many of that character of soils are irrigated every week or ten days, and good many of them are irrigated in the Provo City acreage two weeks apart or more. Taking the average of that condition I base my answer upon the average of my observation. Another example in the Taylor and Roberts field -- however, that is an estimate. I estimated from looking at the stream, I didn't have the information and length of time the man used it --- that there was more than four inches applied and there was only about two inches found in the soil. In the Stubbs field I don't know what the application was, but it must have been at least twice as much as the difference between its maximum content and what it had just before the irrigation. I was there a little while before the irrigation a few hours. That is what

I meant, Now, if you have a soil that is exhausted of its moisture, the sources of exhaustion are the evaporation into the air and therefore occur at the surface, and the quantity that goes into the root system, to the root system, is springs near the surface.

Q And that you class as the capillary division of the water?

A It refers to capillary all through.

Q True, but you class that as that which would come to the surface and which might be beyond the root surface or root zone, you class as the hydroscopic division of water, wouldn't you?

A No, if it is beyond the power of the root to get it, why then it is hydroscopic.

Q And that which is within the root zone you call, generally speaking as the capillary division of water?

A Yes.

Q And that which is below the gravitational water or the water plane?

A Yes, if far enough down.

Q Now, what effect did you find the gravitational water had upon the capillary water in reducing the quantity in these heavier lands and withdrawing the amount applied by irrigation?

A Where the gravitational water was close the surface soil was always very near its capillary quantity. Wherever the water was within twenty inches of the surface of the soil, after you went down below the mulch the land was about as wet whether you irrigated it or whether you didn't. If you irrigated it would simply go through to the water plane, because the gravitational water was so close and the texture of the soil was of such a character being fine grained, that it drew a supply sufficient to fill it to its capillary capacity from the ground water plane. No, my answer with reference to

these soils where the water plane was near the surface, I think my answer said in the neighborhood of three or four feet from the surface would have considerable amount of water supplied to the upper four feet that would not get there if the ground water plane laid far beneath, and where the ground water plane was in such condition generally speaking after an interval the water content in that upper part was more than where there was no water plane that near.

Q Do you assume to say Mr. Tanner, from the sample you took of each of these soils that the water distribution here was equal over the tracts irrigated?

A Well, for instance, I would take a sample near the upper end and sample near the lower end before the irrigation and after the irrigation.

Q Did you limit it to two samples to each tract?

A I think I never took in excess of two, one about one-third of the way ^{down} way, and the other about two-thirds of three-fourths of the way down, sometimes at the extreme end.

RE-CROSS EXAMINATION by Mr. Hohn E. Booth.

Q Mr. Tanner, as I understood you, you classed the northern part of the provo acreage the Upper East union and the Lake Bottoms in one class, am I correct in that?

A Yes, that same general clay type class.

Q Now, do you know the farm of ~~xixxx~~ Alfred, S. L. Alfred on the road here?

A Yes, I know it in a general way.

Q Ben Eldredge place? A. Yes.

Q Would you class that in the same class as the Lake Bottoms lands?

A Well, that would be rather toward the stony lands. It is pretty difficult to make these classifications and then specify just the exact limitations, but I do classify that

land that lies below the Eldredge farm around the school house --

Q Near the river.

A And near the river with that land. The Eldredge land doesn't -- it is not sandy and it is not exactly clay and has got a good many stones in it.

Q Be as much difference between the Eldredge and Lake bottom as there would between the bottoms or Tanner land you refer to on Provo Bench and the Lake bottom, wouldn't there?

A The surface soil, but the basal soil is better.

Q Wouldn't find any water plane on the Alred farm?

A No.

Q You would find plenty of it on the Lake Bottom at the Magg farm, you know where that is?

A Yes, I know about where it is.

Q You wouldn't have difficulty in finding a water level there, would you?

A No, very close to the surface.

Q I understood you to say that the seepage from the Timpanogos Canal was all caught by the Upper East union?

A Not all of it, that that rises above the surface, ^{of the} water in the Upper East union goes in there. I am satisfied a good deal of it goes clear below.

Q I was going to call your attention, have you been up that way recently?

A I don't know how recently, but I go up there.

Q This spring at all?

A Not to walk along and observe it, carefully, I have ridden over it once, I think.

Q You know where Will Baum's place is?

A I think I know.

Q Know where the Halleck place is?

A Yes.

Q Place I own now? A Yes.

Q Did you or not notice there is quite a large stream, say second foot of water nearly, running along the east side of that road and below the Upper East Union Canal?

A I noticed that.

Q That come from the East Union Canal?

A No.

Q Upper East Union? A. No.

Q That would seep clear below that?

A Yes, that is my judgment.

Q Now, one other question. In the theoretical statement that you have been making this morning, in arriving at the results that you deduced from those theories would you arrive at a different result in case, in one case where the water was uniform during the entire irrigation season such as it is in the Strawberry Valley Project, and where it varies from year to year, month to month and week to week, say today, and sometimes different parts of the day, would that make any difference in the result that you arrived at as to the duty of water?

A Answering that question in a largeway, it would.

Q It would make a difference?

A Modified in this respect, that where soils are of the character they can store a considerable volume of water and where the natural stream is not sufficiently large to supply all the necessities, then the duty of water in an interval when the natural stream was failing in my judgment would be highly desirable and advantageous to supersaturate the soil wherever it would hold an excessive amount of water, to provide as far as practicable for the draught that was to come; or if a perfect irrigation on such a situation was, we will say for argument sake, three weeks apart and ten days after my irrigation I observed the water was going to fail, and I wouldn't

get a complete irrigation in my interval of twenty days, I would irrigate at the end of ten days. Now, while that is wasteful where you have a dependable stream, in my judgment it is permissible where you have a failing supply. There should be a margin of safety taken by the agriculturist.

Q You wouldn't consider it safe irrigation in the Provo River system to do all your watering during the high watering season and then quit?

A I could not do it in the high water season and raise a crop.

Q And the very best method of irrigation for successful raising of crops is where you can have a uniform system such as they have in this Strawberry Valley Project?

A That is my judgment, that is the perfect system so far as the water supply is concerned.

Q I am speaking of course of the watersupply, and if you haven't that constant supply then you have to vary according to your conditions and meet it the best you can, isn't that the theory of the irrigators?

A Yes, and the system might under other circumstances be reasonably more consuming of water.

RE-CROSS EXAMINATION by Mr. Ray.

Q Mr. Tanner, the investigations which you made you made as an employe of the Provo Reservoir Company?

A Yes.

Q And are you interested otherwise in the Provo Reservoir Company than as an employe?

A No.

Q How long have you been employed by them?

A I have been employed irregularly for about three years, intervals now and then.

Q Now, the wasting of water which to a certain point is justifiable is because of the action of gravity on the water, isn't it?

A Yes, some of it where it runs into deep percolation.

Q That is what I have in mind, where there is deep percolation, percolation down rather than lateral, isn't it?

A Yes.

Q So that that being the case, the slope of land is very material as to the quantity of necessary waste, isn't it?

A Yes, the slope is very material.

Q Now, have you ever investigated with any details the question ~~of~~ of sloped on the Provo Bench? A Yes.

Q There is a good deal of rather flat land there isn't there?

A No, there is nothing like the flatness that would be of very grave difficulty in irrigation.

Q I don't mean to put it that way, because flatness is comparative ad between absolute flatness and perpendicular Plane but there is a good deal of comparatively flat land which is still with enough slope to permit irrigations, isn't there?

A Yes.

Q Is Provo Bench somewhat irregular in its surface contour?

A Some parts of it are.

Q Quite irregular some parts, are they not?

A Yes.

Q And are those parts susceptible of leveling without destroying the top soil?

A Of course, you would destroy the top soil if you leveled in any case.

Q I ~~x~~ mean the available cropping top soil?

A You cannot level without -- where the irregularity is at all material without this^{dis-}placing that soil. However, in some instances the soil is thin and then the subsoil will never be productive. It is gravel and in those circumstances I don't think that you can do any leveling, you will have to get along with what you have.

Q If you leveled you would take all the soil off you have, wouldn't

you/

A Yes, all the soil would go.

Q Now, it is a further fact, is it not, that the high places on Provo bench are the places of thinner soil as a rule, that is I mean in these anti clines and synclines that come there?

A They are pretty well scattered over the bench, it is more in the area that I have described lying within the stony limit, within stony limits toward the central eastern part of the bench.

Q If I may illustrate here without destroying the evidence on the board, the gravels on Provo Bench are in a less exaggerated form laid in many cases like that, are they not, with anti clines and synclines?

A Yes, there are strong corrugation through the country.

Q That is very observable, isn't it, as you ride through the interrurban cut from here?

A Yes.

Q Those were originally stream channels, were they not?

A Yes.

Q And the current was away from Provo Canyon?

A Yes.

Q And in the point of high current there was very little deposition of soil as compared with the point of lower current?

A Or any deposition that had been made there was swept away.

Q So that assuming this was a sort of strong current, the sign "X" here on the syncline and "Y" on the anti cline, if the current was strong against the surface "X" there would be a deposition of soil likely, or the soil left remaining below "Y"?

A Yes.

Q Now, in the matter of a few acres, matter of a very short distance there are these sub jumps in soil?

A Oh yes.

Q You could not take any soil off the point "X" and put it down

in the anti cline there to bring it to a level without making the point "X" absolutely useless, could you?

A I don't think so.

Q For irrigation?

A In a good many -- over a considerable area of the Provo bench I think that is true.

Q Now, that condition to which I have just called your attention obtains, does it not, Mr. Tanner particularly around a line running or east and west with the north boundary of 26, Section 26 clear up three miles north, does it not?

A No.

Q Not even measureably?

A Well, it might be measureably toward three miles. If you draw lines in other directions and take the smaller sinuosities in the northern end of the bench.

Q I am going to contract and expand it in the other way. after we get the north and south boundary. The bench on the very south side has a more even soil blending into a clay loam with the gravel lessening and the thickness of the soil increasing, and on the north end with a greater predominance of clay and somewhat of a thickening of the soil, hasn't it?

A Yes.

Q And there is a section between Section 26, its north boundary, and clear up to Section 3, a distance of about three and a half miles where those great irregularities ~~usxpt~~ exist more or less, do they not?

A Not up to Section 3. I don't recall one that is even within a half mile of -- south of the canyon road, mile south.

Q Well, where is the Dixon land?

A The Dixon land is about a mile south.

Q Are there any irregularities in the Dixon land?

A Oh yes.

Q So that at least you get it as far north as the Dixon land?

- A Yes, and some north of that.
- Q Some north of the Dixon land, so that you could go north of the Dixon land how close to Section 3, the center of Section 3?
- A I don't think there is anything that is severely irregular or approximating irregularities of the Dixon land within more than half a mile north of the Dixon land.
- Q That would carry it, substantially within a mile of Section 3 then? A. Yes.
- Q Now, are there any irregularities at the Sumner land?
- A Yes.
- Q Any irregularities at the Hanson land?
- A No, they are small. They can be made without disturbing much soil.
- Q What about the Crandall land?
- A The same answer with reference to the Crandall.
- Q What is the width as between the ditch of the Provo Bench Canal Company and the West Union where the irregularities extend east and west?
- A Why, the strongest irregularity occurs where the interrurban cuts across the corner of Section 26. Then there is another hollow very strong that crosses in the south half of Section 22. Now, those are the two bad places at the lower end of the bench where the irregularities and sinuosities of the land could not be remedied without destroying the high places taking the soil entirely off. From the center of Section 22 and thence northward on that west side that land that is irregular could almost without exception be leveled without injury to the land.
- Q And even in the north portion beyond Section 22 which would be leveled without destroying it, there are the same sub-surface irregularities in the gravel strata are there not -- I don't mean exactly the same in degree but in character?

A I don't know just what the gravel down there is. It lays not nearly as near the surface as it is here. If you will permit me to explain, I have drawn here a set of lines in which I trace the clay. Now, the clay that lies underneath the surface is a deposit from static water from the lake and it doubtless was placed here when Bonneville was here. Where these hollows or these deep depressions cross the bench that has all been cut away and there is only the accumulations due to wind and surface water and mold that have developed the shallow soil right at the surface, and that is all there is of it. Wherever the clay is the gravel is beneath that, and in Section 22 -- in Section 15, in the southwest quarter, the clay lies three and a half feet below the surface and the surface is a sandy gravelly loam.

Q Whose place is that?

A That is John Pyne.

Q Now, do you know where John Stratton's north ~~piece~~ piece is?

A Yes.

Q From which you took the sample?

A Yes.

Q What part of that field did you take your sample from?

A I took samples from the eastern part of the field, on the west of the railroad and then sampled from the extreme western end of the field?

Q About 40 acres, 35 acres in that field, are there not?

A It is quite a tract, I should say about that.

Q How did you classify that land in your classification of relative duty?

A Well, that is mixed. The extreme east of the Stratton tract belongs to the first class of soil, and the extreme west belongs to the second class of soils. The east soil is very fine, low duty soil, and the west is a deep or high duty soil.

Q Now, how did you distribute the acreage as to the low and high

duty on the John Stratton north farm, how many acres do you figure come as per the sample taken below the track, and how many as per the sample on the east end?

A Coupling the sampling with the observations on the ground and excavation in the railroad, I would put about half of it high duty and about half low duty. That might be a little excessive on the high duty, it might be as much as three-fifths of that that would be low duty, or tending toward low duty.

Q As a matter of fact, Mr. Tanner, out of the thirty-five acres would you say John Stratton had as much as five acres of land in his thirtyfive acres equal or in any way equal to the sample which you have here to the court as to the character of his farm this morning?

A Oh yes.

Q State how much you would say he had like that?

A About two-fifths of his farm.

Q That would be fourteen acres of it?

A I am not positive about the acreage, it is quite a big enclosure and as near as my judgment goes, I didn't measure it, I should say about two-fifths of it.

Q Fourteen acres?

MR. THURMAN: If there is thirty-five acres it would be fourteen acres.

Q With soil three and a half feet deep or four feet deep on it?

A Well, I would little rather limit the matter to what is below the railroad track, I don't know what is below the railroad track. You can separate that from above. There is considerable more than half below the railroad track that is good land.

Q Would you say that John Stratton had three acres of soil on his thirty-five acres or three acres where the soil on it was three feet deep?

A Oh, yes, I have bored,--the borings numbered are more than three acres of extent, and the soil in there for large distances

north and south and west with many borings on them almost with but exception in excess of three feet in depth.

Q How many borings did you make on the west end of John Stratton's farm?

A Well, I don't know just how many, probably four.

Q And how far east of the west end of his land were those borings made?

A It is platted as near as I could plat it here with the information at my command, that is the west boring and No. 35 is the east boring.

Q Now, Mr. Tanner, coming to the areas which you took there for experimentation you took the Sumner tract, the Dixon and the Hanson tract and the Grandall tract, and was that all, four tracts?

A There is another one there that is marked, but I didn't mention it because they were not continuous enough.

Q Now, you say that in 1913, you made your observations during part of the month of June, July and part of the month of August?

A July and August.

Q All of August?

A Well, in those months in every case. Yes, 1915, some of the observations were made in June.

Q And in 1914 they were made in July and August?

A Yes.

Q What was planted on the John Dixon land?

A Well, the Dixon land was planted, the first year of observation to trees, peach trees with furrows between occupying the whole distance between the trees and the next year it was planted to a crop of alfalfa very thin.

Q Very thin?

A Poor stand.

Q Poor stand of alfalfa, did the trees have anything between them.

A In the first year no, but they were not cultivated, they were irrigated and not cultivated, and that is just as wasteful of water as if they were cropped between.

Q They were not cropped between, were they?

A Not the first year.

Q And there was no fruit on them, was there, in '14?

A I don't think there was fruit any year.

Q So they were not irrigated for the purpose of maturing the fruit crops?

A No.

Q It takes a very materially greater quantity of water to mature a fruit crop than it does to merely keep the trees alive, does it not?

A Oh yes, I should say so.

Q Now, what was the Hanson tract planted in ?

A That had practically a variety of all the crops that are grown with an excessive representation of garden stuff.

Q Sugar beets?

A Raspberries . There was no sugar beets on there. There were some common beets, no sugar beets. Alfalf occupied a high percentage of the tract.

Q What was on the Crandall tract?

A Alfalfa.

Q In the Sumner tract?

A Trees with clover between and some strawberries.

Q Any beets?

A No beets. We didn't irrigate on the Crandall tract, there was --

Q Sumner tract I was asking.

A The Sumner tract, the observations were confined to operations.

Q Who did the irrigating?

A Mr. Crandall did the -- Mr. Sumner, Mr. Crandall, Mr. Dixon's hired man and the first year Mr. Sumner's hired man.

Q Were you always present during the period of irrigation?

A Yes.

Q During the entire period? A. Yes.

Q What knowledge have you whether or not it received water at other times than at the times you were there of your own?

A Of course, I didn't camp right on the piece of ground, but I visited them immediately before the irrigation and stayed there during the irrigations, and then ordinarily went back to the tract the interval afterwards to get the samples, after the irrigation.

Q And then visited it later ~~in~~ again when you were notified there was going to be another irrigation?

A I never was notified, I had the schedules in my hand.

Q How often in your opinion would it be necessary to water sugar beets on the area of Provo River, Provo Bench between Section 26 and up to Section 3?

A You mean to include 26?

Q 26, south side of 26 up to 3?

A I didnot experiment with sugar beets in that section.

Q Didn't find any there?

A And I never found sugar beets in any other place ~~except~~ except in Section 26, I think, relatively small patch.

Q As a matter of fact, you know, do you ~~know~~ not, Mr. Tanner, that the soil is so uneven and so think there that the raising of sugar beets is impracticable because the water is not held in the soil for long enough period.

A It is not a matter of water. I have in mind the beet field of a farm in Section 26, Jetmire, on the west side of the Jetmire tract where the soil was more than four feet deep, where it had excellent water holding power and where the soil-- my expxamination was in splendid physical condition so far as water supply is concerned, the beet stand is very poor. I simply attributed that to the lack of humus in the soil,

it was a whitish soil.

MR. A. C. HATCH: Lack of what?

A Lack of humus, lack of fertility.

Q Mr. Tanner, you said that you placed out of the entire area in Utah County irrigated under the Provo River system two thousand acres on a duty of 70?

A Yes.

Q And ten thousand acres on a duty from 75 to 85, some of the lands within this ten thousand acres approaching very nearly the 70 duty?

A Yes.

Q Where is that water measured for the 70 duty?

A Measured at the land.

Q At the land?

A In the vicinity of the land, within half a mile of the land.

Q Within half a mile of the land, how much of that first two thousand acres is on provo bench and under the canals ~~is~~ of the provo bench Canal and Irrigation Company and North Union?

A Be about thirteen hundred acres, something like that. Thirteen of fifteen hundred acres.

Q Thirteen or fourteen hundred?

A Yes.

Q How much of the balance of the lands on Provo Bench approach the 70, out of the ten ~~thousand~~ thousand?

A About ~~five~~ hundred acres more.

Q So that you would have about eighteen hundred acres approaching very nearly the 70?

A Ranging between 70 and 75.

Q How many acres do you figure on Provo bench in those calculations under the irrigable area and irrigated area?

A I figure on a total irrigated area on Provo Bench of approximately fiftyfive hundred acres.

Q Now, you put ten thousand acres in a class below the two thous-

acres, do you not? ten thousand acres, or about, I should say as to its duty of water?

A I see I am getting confused in that answer. Go back to the original estimation. I left out of the consideration as I recall it now anything except defendants' lands that are irrigated by defendants' canal and did not take the whole of the system, and I mean that answer to apply to the Provo Bench canal acreage which I have assumed to have a total of about forty-three hundred acres approximately.

Q Forty-three hundred and thirty-three accurately, isn't it?

A Yes.

Q That is the Provo Bench and North Union?

A Yes.

Q Going to my next question then, you put ten thousand acres as the higher duty, between 70 and 80 really?

A Yes.

Q You later testified that within that ten thousand acres there were some lands that took less water than the 80 acre duty?

A Yes.

Q Depending, as I understood you, to some extent upon the ground water level?

A Yes.

Q On Provo bench there is no ground water level which is available to plant life, is there?

A No.

Q Have you ever made any determination how far the ground water level is below the surface of the soil on Provo Bench?

A It ranges from thirty feet up, in the height of the irrigation season I should say forty feet up to a much greater distance except on the extreme north end of the bench where a restricted and comparatively small area under the North Union Canal has a water plane quite near the surface.

Q Well, when you say from forty feet up on the main part of the

Provo Bench --

A I mean up in figures, up to I suppose a hundred odd feet.

Q You mean where it goes down forty feet and strike it there? and from there to varying depth below?

A Yes, except for this small area in the extreme north end, under the northern irrigation of the North Union Canal.

Q Now, under those ~~xxx~~ circumstances, there is very little capillarity which affects the retention of the water in the soil, isn't there, or the renewal of its water supply from any sub surface soil?

A Practically nothing.

Q There is no such thing on those lands as an early irrigation to make your soil itself a future reservoir for periods of scarcity, is there?

A None except ^{on} those soils that happen to be very deep which are of local extent. Some of the soils in the northern part of the area are very deep, some in the central part of the area are quire deep. When a soil gets up to six feet in depth it can be used very advantageously to hold the water to serve such plants as alfalfa. I recall a case in the Benson district in northern Utah where an irrigation was made in June. I observed the soil in the latter part of August the third crop coming in good condition. The deep soil acted as a storage reservoir because the soil was dry to a depth in excess of four feet.

Q Great many of those areas in Utah too? aren't there, Mr. Tanner?

A Oh yes.

Q Where a good early irrigation will serve the crop throughout the season, crop of alfalfa?

A Yes.

Q But that is not at all common on Provo Bench, is it?

A No sir. ✕

Q As a matter of fact, these areas of deep soil are quite restricted

aren't they?

A. Yes.

Q And upon the same farm you will find such variations that in your same alfalfa patch you might find a small area which could be stored and adjoining it an area which requires frequent irrigation because of the thinness of the soil?

A Where you along the stream line that you speak of that is true, and where you are along the lines where the pebbly soil changes to the deeper sandy loam that is true and there are great extents two miles at a stretch where there isn't any variation to speak of.

Q But those soils are comparatively thin, are they not?

A No, they are deep.

Q Can you tell me two miles in a stretch where your soil would become such a reservoir for alfalfa one watering would suffice for a season on Provo Bench?

A Well, all along in the northern part of the fields up toward the North Union Canal as it goes down towards Pleasant Grove.

Q Two miles wide?

A No, I don't mean any two miles wide, there isn't any such thing as that two miles wide, but two miles in a stretch as you go along over the country the soil being very deep in the eastern border and thinning out in depth toward the west.

Q That is just a soil basin running along there is it not which thins out as it goes west from the channel?

A Well, the soil is continuously deep up there for quite a width and then gets thinner as you go towards the west and gets thinner as you go towards the south. In these marginal fields between what I have designated here as the clay area and the shallower soil and also where these old stream channels run through there is quite a variation in a small distance.

Q What is your opinion whether or not the frost and early cultivation require an excess of water in order to pack the soil in the early irrigation season in comparison with the

quantity required during July and August?

A Practical agriculture, of course, in my view, my opinion I cannot load an excessive burden on the irrigator. He lays out his irrigation system for his general use during the season and there isn't any question that the frost disturbs the ground, and if he makes his irrigation run a thousand feet and that is the economical run, and experience has demonstrated that is satisfactory and he figures upon investigation it to be satisfactory and economical -- it is clearly too far in the first irrigation, half of it would probably be far enough, but ask him to make an independent irrigation system to take care of the first irrigation and then discard that and put another system into use on the same tract in the latter part of the irrigation season I think is asking too much of him, if he outlines one good system of applying the water to the land. In my judgment that will be wasteful in the early part of the season, that is proper in the latter part of the season.

Q It is wasteful, but necessarily ~~x~~ wasteful, isn't it, in order to get the water over the land?

A In the sense I have explained.

Q And he would then require more water in the early season than he would during July and August to give the soil the same saturation?

A Yes, the purpose is in that case to get it over.

Q Now, sandy soil, as you explained this morning, makes somewhat of a mulch itself, does it not, a natural mulch?

A Yes.

Q Any soil in which there is a material amount of coarse gravel at the top doesn't make any such mulch, does it?

A Not if it has a clay filling, it is apt to.

Q In addition to these transmission losses it has a very much

greater evaporation loss than a sandy surface soil would have, has it not?

A Yes.

Q Rocks themselves get hot and contribute to the evaporation?

A Oh, yes, they assist. They have ~~xxxx~~ this advantage, however, that --

Q They don't absorb any water?

A You cannot evaporate from a rock after it is dry, there is no capillarity through that.

Q Also have the disadvantage the roots don't get any water out of them? A. Yes.

Q Any more than the sun does. Now, I want to get just a little more on the question of beets, and then I will be through, I think, Mr. Tanner. Did you ever observe that on lands on Provo Bench to which I specifically call your attention, between the south line of Section 26 and Section 3, that beets planted there will seem to prosper and grow upon irrigation and that within six or seven days they will wilt, and if you apply the water at the end of seven days they will revive again, and at the end of four or five days will begin to wilt because of the lack of water in the soil. Ever observe that?

A No, I never observed it.

Q If that condition could exist, wouldn't it cause you to conclude that perhaps the soil was not being irrigated frequently enough for the requirements of the beet crop?

A Well, that would on first flush, that is what we ordinarily account, put it up to lack of water, but my knowledge of the locality, I think that if it was four or five days, my examination of the soil, am satisfied it could not be lack of water, must attach some other condition to it. I couldn't say ~~xxx~~ what the condition was, I never observed that set of facts.

Q Suppose the beets revive upon receiving more water?

A I would think the water was the trouble and on that tract I

should think it was, it indicated it required frequent irrigation. Under the limitations that you specify there I should think that would be the case.

Q The soil of Provo Bench is ordinarily fertile, isn't it?

A Why no, compared with other lands it is not a fertile soil.

A fertile soil ought to produce forty or fifty bushels of wheat; it ought to produce corresponding crops of other kinds and the Provo Bench soil don't respond as favorably in crop yield except in certain particular crops like alfalfa.

For the first several years on the thinner soil alfalfa grows readily and with fair degree of abundance, and for a year or so after the alfalfa has been plowed up they will grow fair grain crops. Then if you replant your alfalfa you never get the original result again. The soils are then, they are not well supplied with humus like our bottom lands. They are from the point of view of production except for alfalfa and fruit in their poorer parts relatively unfertile soil.

Q They are considered, are they not, very desirable soil for this locality, for farming operations. That is, of course, they won't grow everything but the things they will grow?

A They are desirable lands in many respects to certain restricted crops, they are much more restricted, I should say than the areas on the Timpanogos Bench.

Q As a matter of fact, all the soils within the state are more adapted for some class of crops than for others, are they not?

A Well, outside of the high requirements of fertility in the state of nature they will bear good yields, except for the shallower soils, but compared with the bottom lands they are deficient in humus.

Q Do you know how the market value of the average soils on the bench in comparison with the market value of the average bottom land soils is?

A No, there is probably some difference in favor of the bench

soils, but those are, I think largely favorable locations for residence and being elevated a good deal more sanitary and homes there being more delightful. When you get into the bottom lands there are attendant disadvantages, but the soils are very fertile.

CROSS EXAMINATION by Mr. Bagley.

- Q You have referred to the Timpanogos soils as being better than the Provo bench, is that true of the whole area under the Timpanogos system?
- A Taken as a whole, yes.
- Q But the Timpanogos soil is not uniform throughout the whole system is it?
- A No, but it is much more uniform than Provo Bench.
- Q Where is quite a section opposite the mouth of Rock Canyon this side of there that is not that same soil that you find north of the Rock Canyon wash towards the mouth of Provo Canyon?
- A Well, there are restricted areas in there that are not the same, but the filling, even in that area between the pebbles, is largely clay, even quite close to Rock Canyon the angular pebbles are mixed with it.
- Q I notice that your investigations up there were confined to the northerly section rather than to the southerly section?
- A Those observations are the observations of the physical tests, laboratory tests. The other areas I did not mark everything that I did on the map unfortunately, and my observations on the area south in the Rock Canyon belt I haven't the locations. Generally speaking the surface there is much more irregular than in the place where the pits were built, and also there is a great quantity of angular pebbles mixed with the soil.
- Q A larger quantity of water is required for that section where the pebbles than would be in this section that is more --

- A Yes, and there is a margin close to the bench that is somewhat comparable to the poorer varieties of Provo bench soil shallow pebbly loam with sub strata of gravel.
- Q Now, could you give me about the number of acres under the Provo Canal that you classify as having a duty of 70 and number of acres that you would classify as having a duty of greater than 70?
- A About six hundred acres greater than 70 and the balance about 70.
- Q There is no land under the Timpanogos Canal that is affected by any ground water? A. No.
- Q Do you know what the ground water depth is in that section?
- A I don't recall it, but it is comparable to that on the Provo Bench, or maybe deeper.
- Q So that any advantages that might result from the ground water are not to be had in this section?
- A No.
- Q Mr. Tanner, your testimony today in respect to the duty of water is based upon the observations which you have made and investigations that you have made during the three years that you have mentioned?
- A Yes, they are based upon the actual out and try methods and taking the practice of the farmer in the actual operation of their farms and checking that up with soil moisture determination, showing that without a single exception when a farmer had in his application of water, come to the conclusion he had sufficiently irrigated, I found that in every observation of the case there was a maximum saturation without a single exception.
- Q Your mind was absolutely free from any conclusion as to what the duty of water in this section was when you began this investigation?
- A I had a judgment in the matter, but I didn't let that judgment control what I was running these experiments for. The

purpose of this experiment was to see what the fact was in these tracts and I measured the water without any reference to any prejudice in the matter, took the soil samples and their locations without any prejudice and observed what the farmer did without directing his attention to any modification in his method except as these samples themselves suggest as I took them. I took a suggestion to the farmer in the Grandall tract. Mr. Cranall was in the habit of irrigating that whole stretch from one end to the other at one irrigation. His lower end was giving him trouble in the two weeks interval because it began to burn. He had three feet and better of soil in the upper part and eighteen or twenty inches of soil in the lower part and he irrigated that tract in two runs. I suggested to him that if he would treat his upper end -- and it was suggested by the soil samples -- if he would treat his upper end to an irrigation once in two weeks and his lower end to an irrigation once in eight days it would be a satisfactory solution of the matter, and I am satisfied he will make that modification, because it is in accordance with the physical fact there.

Q Was the water available at those two periods?

A Oh yes, we took the water in that case when he wanted it.

Q You took it.

A When he wanted it.

Q Are the conditions under this river system such that water is available?

A No, some tracts were on schedule, and some the schedules made to fit the farmer's judgment. Mr. Grandall's schedule was made to fit his judgment, it didn't work out quite right, the theory being that he had operated his farm for years and rested largely upon his judgment of the operation of it, and I suggested these modifications afterwards. I think it is practicable to work out with the same schedule that he had, with

the area he had and treat -- even if he had to treat the lower end every week and upper end every two weeks, he would economize in the water and improve his crop.

Q Now, as a matter of fact in nature a crop of lucern or a crop of grain or ~~an~~ an orchard, or any crop in the same locality needs water if it is to be applied according to any correct or perfect rule at the same time, that is, the crop of alfalfa on one hundred and sixty acres requires irrigation at exactly the same time that the crop of alfalfa on the adjoining hundred and sixty acres requires it, if you ^{are} going to apply it perfectly, isn't that true?

A I think, maybe as a theory that might be true, but the wheat starts from the kernal and the alfalfa already has a highly developed root system, and springs up rather quickly.

Q I am speaking about two alfalfa fields, what I mean is if you are going to apply a perfect rule here or rule without any allowance for practical application, you would have to irrigate each tract of alfalfa on the same day and successively every two weeks, or whatever the period was?

A If you had always the same identities between --

Q If you are going to make a perfect irrigation under your system of calculation where you have available all the time the water required as it was required?

A I had no perfect system, I simply took the farmer's schedule or the farmer's theory or the farmer's judgement and carried this through, and even with the inadequacies of that situation the duties that I have given were made.

Q You mean then your conclusion, your conclusions may be make allowances for the actual conditions as they exist in practical irrigation?

A Absolutely these are not my judgments, they are the outcome of the experiments that ~~xxx~~ were made upon the lands with the farmers using the water as they do now.

Q And not on any theory that the water was available whenever it was needed but had to be taken when it could be had according to the system of distribution under this --

A Yes sir.

Q River? A. Yes.

Q But in all your investigations the water was available at just the time when it was needed?

A Oh no, I wouldn't say that the water was always available at the time that it was needed for the whole area involved. I have heretofore said that the character of the irrigation of the Crandall piece was such that the lower end of the crop did not receive the water that it should and as a result the crop suffered when the upper end in the same interval was getting along with excellent growth, lower end was showing a distinct curtailment, it wasn't as high, it wasn't as ~~thix~~ thrifty.

Q Now then, you attribute that wholly to the fact that the water was not applied as evenly at the lower end as it was at the upper end or in the same quantity or as often?

A Yes, it was applied practically in the same quantity, and as often at one end as another, but the lower end was a thin soil and the upper end was a deep soil and there was no distinction made in his irrigation, so that when he began to irrigate the upper end it already had a sufficient water content to have gone another complete week without receiving an irrigation growing with maximum thrift, but the lower end was not that way, and still he irrigated it.

Q Mr. Tanner, after all your investigations did result in the same conclusion which you had before you began these investigations, didn't they?

A My general judgment is a sufficiency of water to ordinary land in this arid country is 70 acres to the second foot at the head of the stream or at the head of the canal and I have as a state officer, insisted where the supply was perennial

and through the irrigation system no applicant should divert more than his total diversion. This did not have any relation to losses, this was the measurement made near the land, and while it reaches the same approximation it is at two different points. This land of the poorer type on Provo bench that I experimented with was irrigated oftener than the ordinary land. I know of very few areas in the State of Utah that require an irrigation every seven days to grow the ordinary crop, but this thin soil on Provo Bench in the hot time of July and August the thinnest of these thin soils require about an irrigation every seven days. The more superior can go a little longer. The ordinary interval of irrigation in the average conditions of this state extend from two weeks to three weeks between the period.

Q So that the only difference between your judgment before you made these investigations and the result and judgment which you formed after having made these investigations is the difference which we might call loss between the quantity of water which would be diverted from the channel of the river and that amount which would be diverted onto the land.

A That is an interpretation that simply involves an arithmetical element in both instances.

RE-CROSS EXAMINATION by Mr. John E. Booth.

Q I have one more question, Mr. Tanner. Does the water level on Provo bench change?

A Yes, very greatly.

Q Do you recall the time Newell Knight dug a well, there many years ago? A. Yes.

Q How far did he have to go down before he got water, do you remember?

A I remember that he had a well there in the neighborhood of a hundred feet deep without any water.

Q And how does the water stand at that same place now?

A I should think along thirty-five or forty feet below the surface.

Q Which slope, if there is a slope, does the seepage follow on Provo bench? generally to the west or the northwest?

A I am not-- I simply got a judgment in my mind in that respect.

The layers of deposit from the lake waters of course spread out as a fan from the mouth of Provo Canyon, and slope from the mouth of Provo Canyon down into the depths of the Old Lake Bonneville, and I am satisfied from my observation all around the bench that the water goes down to and a more or less dense understrata of clay or sandy clay and follow along these until the outcrop on the margins of the bench where the streams cut them and flow as springs and seeps out from the surface of the ground, so they extend in a general southwesterly direction.

Q Southwesterly or northwesterly?

A Well, yes, to the southwest and to the north and to the southeast.

Q Don't you find more signs of seepage along to the north of the Carey point, from that on as you go north following the bench, don't that seepage seem to increase along through there?

A There seems to be zones of quite strong outflow, and then there are intervals where there isn't a great accumulation, and then another strong outflow and that occurs at several point on the extreme western margin of the bench. There is one place about the center of the bench that I should say two feet a second gushes out at one point.

RE-CROSS EXAMINATION by Mr. Ray.

Q Mr. Tanner, did you personally measure the water upon the four farms in question?

A Yes.

Q How did you determine the area of the land?

A Measured it.

Q Surveyed it with a tape?

A Tape.

CROSS EXAMINATION by Mr. Thomas.

Q Mr. Tanner, did you suggest, Mr. Tanner, a separate schedule for each farm?

A No, they had their schedule, except for the Crandall, that the irrigation company gave them. Mr. Dixon had a schedule given him by the Provo bench Company and another schedule given by the Provo Reservoir Company. He handed me that schedule and I was present when the irrigations were made. The same with the others, except the Crandall, and the Crandall being under the canal I was a little anxious to have the farmers judgment in that case if I could get it. I asked Mr. Crandall or Mr. McCune to make out a ticket there that would serve it according to Mr. Crandall's idea of what he needed.

Q One other question, in your estimate of seventy acres duty of water did you include the maximum product of tonnage upon the land, or normal?

A I determined the saturation could be made at the intervals of time. I did not determine -- whatever crop can be raised on these thin soils if they are irrigated much or little, they will hold just so much water. My determination was if they were ~~max~~ saturated each irrigation.

Q You wouldn't say, however, a duty of one second foot for 60 acres would not produce a heavier tonnage?

A No, I wouldn't be certain in that respect.

CROSS EXAMINATION by Mr. Willis.

Q Mr. Tanner, would it be possible for the average farmer to apply the method that you have suggested here, isn't it

essential that he be a scientific agriculturist or an engineer in order to do that?

A Why no, Frederick Hanson is an ordinary man, I think there is not very much difference between him and the ordinary farmer except he has a pretty well prepared place. He had a variety of crops and good ditches and lost none of his water except on one or two irrigations little got over into the road. There is nothing out of the ordinary in these men I could see, and they did the work. The only man I suggested anything to was Mr. Crandall. They saturated the ground, that was all I was after. I watched the crop but that wasn't the main thing. My main object was to see the water condition of the soil as they irrigated it from time to time.

Q Now, calling your attention to Mr. Crandall and the condition that existed there, who except a brother engineer or a scientific agriculturist would be able to say that the lower end of Mr. Crandall's field, the lack of proper crops growing there would be due to the excessive time between irrigations?

A I think probably it is a matter of slothfulness on the part of the farmer. I have observed it in a number of places they just get in the habit of doing a thing one way and don't amend it. If he had dug down in his soil -- when he saw me digging then he was interested -- he he had dug down in his soil he could have seen it was three feet soil and better in the upper end and then shallow soil in the lower end and it would be almost simply self evident to the farmer he would need to irrigate a shallow soil often.

Q What percentage of the average farmer, even if he were to dig down into his farm could make that determination?

MR. JACOB EVANS: Object to that as immaterial and incompetent, a matter on which the witness would have no judgment.

THE COURT: If Mr. Tanner has the information he can

Tanner - 6 848

give it to the court. If he knows what percentage of the farmers have sufficient information to know the kind of soil when they dig down into it, he may state it. If he doesn't know he can state he doesn't.

A I cannot put a thing like that on the percentage basis, I know as I talked to these men they have pretty fair judgment what they have got. They ordinarily have to fix their land, and I never talked with any of these farmers but what appeared to me in conversation to know that shallow soil needed more frequent irrigation than deep soil.

CROSS EXAMINATION by Mr. Corfman.

Q Mr. Tanner, referring to plaintiff's Exhibit 52, your experiments for the determination of losses by seepage and percolation in the Upper West Union Canal -- Upper East Union Canal, as I remember you had three gauging stations to make these determinations? A. Yes.

Q Will you indicate on Exhibit 52 where the lowest gauge, about where the lowest gauging station was, that is about half a mile below the termination of the Timpanogas Canal, is it not?

A Yes, about half a mile I should think.

Q And you testified that canal was a canal of accumulation by reason of the seepages from the Timpanogas Canal and lands that were irrigated above?

A The upper section was an accumulation from seepage. The lower section was probably accumulation from waste.

Q Now, speaking of the lower section, do you mean the lower section you made those experiments with or the lower section of the canal proper?

A The lower section I made the experiments.

Q Now, the lower section of the canal, there are no cultivated lands above it, or irrigated lands above it?

A No.

Q And about what distance does that condition prevail?

A It prevails about two miles and a half.

Q Then there would be no accumulation throughout the course there for two and a half miles? A. No.

Q And you made no examination to determine losses by seepage and percolation below Station No. 1, as you have designated it on Plaintiff's Exhibit 52?

A No, that was due to the interruption. The intention was to go clear down the stream, and I set the gauge for that purpose, and after making measurements the stream began to fluctuate and I waited sometime for the fluctuation to modify and it was still disturbed, still receding, and I stopped.

Q You are familiar with the lands there through those two and a half miles?

A Yes, it is a narrow strip of land from the Upper East Union canal.

Q What would be your judgment as to the losses there by seepage and percolation?

A I should think there would be loss.

Q Would it be heavier or lighter than on that portion of the canal which you experimented on?

A It would, I think, they would be more, I think the losses down there would be more than in the upper section.

Q You testified that the conditions under the Fort Field irrigation canal were ideal for irrigation, soil conditions there?

A Yes, that is as I remember it, soil conditions.

Q And your judgment was that one second foot for one hundred to one hundred and ten acres was all that land would require during the irrigation season?

A Yes.

Q From your examination and experiments made there, when would you say the first water ought to be applied?

A That would depend measurably upon the crop. Alfalfa, if it

was a very dry spring, ought to be irrigated in May or early June, if you had a good rainfall in May I don't think water should be applied there until June.

Q For any purpose?

A Except for probably some garden, something like that.

Q Isn't it a fact, that there is largely used for truck growing gardening, raising of sugar beets, onions and potatoes and vegetables in general?

A Well, so far as the onion, potato, sugar beet are concerned, the irrigation of any of those crops I don't think would require water as soon as the alfalfa would with normal spring conditions.

Q Have you expressed any opinion as to whether or not the water varies plane there, say throughout the season?

A I am not certain about that, my judgment is it varies measurably, but I never carried on a constant set of observations there to determine what the quantity was.

Q In your best judgment when would you say the highest water plane would be ~~the~~ throughout that area, what season of the year?

A Well, I should say the water plane would be higher down there sometime in the month of July.

Q That is after the irrigation season had set in and the water applied to lands above ?

A Yes, and the water applied to that land too.

Q And did you examine, find out where the source of supply for the irrigation of those lands come from ?

A One supply from Provo River, diverted from the river at the lower steel bridge, principal supply.

Q And that supply comes from seepages, springs seeping into the river below the intake of any of the canals at the mouth of the river, isn't that true?

A At the mouth of the canyon.

Q Mouth of the canyon?

- A I think that is very largely true. There have been conditions that I have observed where it was a continuous flowing stream from considerably above the upper steel bridge right down to the heading of the Fort Field canal in the Month of August.
- Q Now, in the early months when they put out the vegetables there in the field, and sugar beets, and up until in July, it would be your judgment those lands required no irrigation?
- A Well, I wouldn't put it as late as July, about June the 10th on a normal year.
- Q And if water is applied every twenty-one days it would be sufficient?
- A For the ordinary crops, those that we -- areas planted to garden might advantageously receive an oftener application,
- Q How often would the garden and sugar beets, onions and potatoes and that class of vegetation require water?
- A Sugar beets about three weeks, potatoes about three weeks, onions the first -- onions probably wouldn't go quite that lone successfully, think it would be advantageous probably to water them every two weeks. The root system is not as highly developed as the other.
- Q And they would raise better crops of onions, won't they?
- A No, I don't think so down there.

MR. A. C. HATCH: If the court please, we now offer in evidence Plaintiff's Exhibits 51 and 52.

THE COURT: They may be received. That is the map.

MR. THOMAS: This is 51, Judge Hatch. This, I understand is in.

MR. A. L. BOOTH: That went in on stipulation.

MR. A. C. HATCH: Then 52, if the court please.

THE COURT: 52 may be received.

RE-DIRECT EXAMINATION by Mr. A. C. Hatch.

- Q I will ask you if you have made a tabulation of your experiments

upon the Provo Bench to which you have testified?

A I made a ~~tabi~~x tabulation in addition to that which I have testified to, covering the crop data on certain areas on Provo Bench in order to arrive at a general estimate of the several crops that were to be found on that area.

Q I now call your attention to Plaintiff's Exhibit 53, and ask you if that is the tabulation to which you refer?

A This is the tabulation.

Q Now, that is made up from your own investigations and experiments?

A Own investigations and measurements.

Q You may state what they are?

A These were made during the year 1914, the basis of the matter is the observation of the crop actually present on all of Section 26, all of Section 15, part of Section 16, and all in Township 6 South Range 2 East, and all of Section 34 in Township 5 South Range 2 East. The crop growing in each of the quarters and sometimes each of the forties, are given here, and the crop was divided into orchard with a subdivision of clean and cultivation and crop between alfalfa, grain -- grain being limited to the small grains, corn, potatoes, strawberries, tomatoes, raspberries. Then tomatoes is a separate subdivision. Pasture, beets, garden and fallow land.

Q What is that fallow land?

A Land that was in the section that was cultivated but not irrigated, lying, however without a crop showing cultivation, but without a crop. The total area of ^{these} several sections and the total crops are given here. Based upon that investigation, I reached this conclusion for that area: that there are of orchard 20.1 per cent in clean cultivation.

20.6 per cent with a crop between;

28.7 per cent of alfalfa;

12.2 per cent of grain;

2.6 per cent of corn;

3.3 per cent of tomatoes;

1.5 per cent of strawberries; and tomatoes;

.7 of one per cent of raspberries;

$\frac{1}{2}$ of one per cent of the separate heading tomatoes.

3.6 per cent of pasture;

4.4 per cent of sugar beets;

.7 of one per cent of garden, and

1 percent of fallow.

MR. RAY: Were those areas actually measured, surveyed

A Those were determined by pacing, they were measured, each tract was measured and computed within the limit of error that comes from an ordinary pacing method. That was frequently checked where the fence line and the crop lines were in agreement or coincident. That plat which established the ownership lines you could read out on the plat at once the dimension element and that was done.

MR. A. C. HATCH: Now offer the exhibit in evidence.

MR. RAY: Just a compilation is it, Judge, I haven't seen it.

MR. THOMAS: Let me look at it please. No objection.

THE COURT: It may be received.

5:00 P.M., Recess to 9:30 A.M., June 15, 1916.

SCOTT P. STEWART, called by the plaintiff, being duly sworn, testifies as follows:

DIRECT EXAMINATION by Mr. Jacob Evans.

Q What is your name, Ms. Stewart?

A Scott P. Stewart.

Q Where do you reside?

A At provo.

Q What is your business?

A Beg pardon?

Q What is your business?

A Civil engineer.

Q How long have you been engaged as a civil engineer?

A About eighteen years.

Q You have done a good deal of public surveying for the government, have you not?

A Yes sir.

MR. RAY: We will admit Mr. Stewart's qualification as far as my clients are concerned.

Q Have you done any work in surveying the lands in Utah County that are irrigated from Provo River in the Utah Valley?

A Yes sir.

Q And for whom have you done that work?

A This work was done for the Provo Reservoir Company.

Q Have you done any work up through Provo Canyon for the same company in surveying lands?

A Yes, sir, I have done some work in Wasatch and Summit counties in addition to the work in this county.

Q In Utah county? A. Yes sir.

Q Have you made a survey of the lands irrigated by Provo City?

A Yes sir.

Q I will ask you to state whether or not you have agreed with Provo City as to the number of acres of land that it irrigated with water from the Provo River which is regulated and distributed by Provo City to the owners of the land?

A Yes sir.

Q I am speaking now of acreage?

A Yes sir, we have come to an agreement of the acreage irrigated under the Provo City.

Q Will you state the number of acres where it has been agreed

upon between yourself and the city that are irrigated as I have stated?

A The total number of acres irrigated in what we call the acre tract, small tracts and lots surrounding the platted portion of Provo City which is included in a certain tabulation we have amounts to 2058.88 acres. Within the platted portion --

Q Just a moment, have you that tabulation that you refer to?

A Yes sir.

Q Let me see that please.

MR. JACOB EVANS: We offer in evidence plaintiff's Exhibit No. 54. You may examine it any of you who desire.

Q You may state how you arrived at this settlement?

A This settlement was arrived at by very careful comparison of the acreage according to the Provo City water schedule and as compared with the map taken from the Utah county records. The comparison was made by myself for the Provo Reservoir Company and Mr. H. W. J. Goddard as a city commissioner and Mr. T. C. Thompson, city water master.

MR. RAY: May it please your honor an interruption here. This has been offered and I don't know whether the court has ruled on it, I don't think we have the slightest objection to it, it is perfectly incompetent on the basis of an agreement, nobody has any right to agree for the city, but we are willing they stipulate that that is the acreage and if for any reason later we desire to show a different acreage we may do that.

MR. JACOB EVANS: I thought possibly it might be well to read this into the record, so that the record may be preserved of the lands the city claims water for at the present time. The lands are shifting all the time, as your honor well knows and if this is admitted and goes into the record in some way it will fix definite and certain just what lands they claim water for at this time.

MR. RAY: Why can't that be a stipulation on the part of the city? The city can't stipulate except between counsel.

THE COURT: If it may be stipulated the tabulation correctly shows the acreage the tabulation may be received in evidence as part of the stipulation.

MR. THOMAS: The city has not passed on this as I understand it. These agreement, or this agreement as to the tabulation was agreed to as a mere matter of convenience, in presenting the evidence, of course, the counsel cannot agree upon the part of Provo City without a formal action of the Provo City. Mr. Goddard has checked this over and says at the present time this is the land that has been irrigated and is the amount of acreage. On the other sheet there is a certain number of acres within the platted area. Now, it can go in for what it is worth, that is the understanding I have of it.

THE COURT: If counsel are willing to stipulate that is the correct --

MR. THOMAS: Tabulation and survey that, as I understand, is all that is asked for.

MR. RAY: We have no objection.

THE COURT: That ~~is~~ merely obviates the necessity of making proof.

MR. THOMAS: Surely. There is another sheet.

MR. JACOB EVANS: I am coming to that. May this go in?

THE COURT: Yes, ^{as} that part of the stipulation.

Q Have you determined the number of city lots that is irrigated by Provo City, or to which they distribute water for the inhabitants of Provo City?

A We determined that as a bulk area not as a lot area, and it is given in another tabulation here, which establish the

block area in various quarter sections in which they are situated. Also the street area and the railroad area within the block area. Of this portion the railroad occupies the street area. That is not considered here, it is considered as street area only. This block area amounts to 701.65 acres; the street area amounts to 341.73 acres; the railroad area within the block area 2.99 acres.

Q When you refer to the street area, I take it that means the number of acres contained in the streets of the city?

A Yes sir, outside of the limits of the block area, of course, that includes sidewalks, the block area only includes the block proper. The street area takes care of the sidewalks and the streets.

Q And the railroad, I take it, refers to ground that is occupied by the railroad tracks?

A Yes sir.

Q Within the city?

A Within the block area.

Q Block area of the city?

A Yes sir.

Q Within the area of the blocks in the city?

A Yes sir.

Q Referring to the city lots of the block area within the city covering 701.65 acres, was anything deducted from that area for houses, barns, sheds, outhouses, lawns, anything of that kind?

A No sir, no deduction is made.

Q Was any deduction made for any portion of any of these blocks which are not irrigated and have not been irrigated for many years?

A No deduction was made for those areas either.

Q The sheet that I have is the one you have referred to showing the detailed data that you have testified to?

A Yes sir.

Q And did you arrive at the correctness of these city lots in the same manner that you arrived at the correctness of the acreage?

A Yes sir, they are taken from the county records.

Q And checked by you and by the city officers with you?

A Yes sir.

MR. JACOB EVANS: We offer plaintiff's Exhibit No. 55.

MR. RAY: No objection.

MR. COREMAN: Just one question, Mr. Stewart, you didn't include the area of the First Ward Pasture?

A No sir.

MR. COREMAN: In this?

A No sir.

Q First Ward Pasture is a separate corporation, is it not?

A Yes sir.

THE COURT: This may be received.

Q Now, I will ask you, Mr. Stewart, if you ever made any survey of the land irrigated under the Timpanogos Canal?

A Yes sir, I made a survey of the lands under the Timpanogos Canal.

Q You may state what the acreage was irrigated by the Timpanogos Canal?

A The irrigated area found under the Timpanogos Canal is 846.98 acres.

Q How did you arrive at that acreage?

A This acreage was arrived at after a survey of the canal upon the ground, a survey of the present location of the upper East Union Canal which lies below and within a then a joint comparison with Mr. T. F. Wentz, with the use of the county records and my data, this total acreage was arrived at.

Q Who did Mr. Wentz represent in that matter?

A Mr. Wentz was representing the Timpanogos Canal Company.

Q Referring now to the West Union, have you made a survey of that?

A Yes sir, I made a survey of the canal line.

Q Just state what you did?

A After making a survey of the canal line and platting it upon the copies of the county records of which I had taken tracings in each quarter section of the area involved, I determined the acreage below this canal and irrigated from it.

Q You may state the number of acres?

A Including the area under the Smith & Carter Ditches the West Union area I found to be 1900 acres.

Q Who, if any one representing either the West Union or the Smith and Carter ditches were represented in any way while this information was being gathered?

A No one was directly represented in determining this, but I had understood that officers of the company and of the Smith and Carter ditches had checked over their area and found it to be substantially the same.

Q Can you separate now the land irrigated under the Smith & Carter ditch from the land irrigated by the West Union and the Smith & Carter ditch combined?

A Only as an approximation, no careful check was ever made of those areas exclusive of the West Union.

Q Have you that information that you can give now?

A Approximation the Smith and Carter ditches irrigate approximately 430 acres which would be deducted from the nineteen hundred acres to give the approximate total of the West Union.

Q What does that leave the West Union, if you have it?

A 1470 acres.

Q You may state whether or not you made a survey of the lands under the Provo Bench Canal and Irrigation Company?

A Yes sir, I made a survey of the lands under the Provo Bench Canal and Irrigation Company including the North Union Irrigation Company's lands.

Q The North Union takes its water from the Provo Bench, and is

in effect the same system as the Provo Bench Canal Company, is it not?

A As I understand it, yes.

Q State how that survey was made and how you arrived at that determination of the number of acres irrigated?

A The survey of the Provo Bench Canal and North Union Canal was made directly on the ground, actual survey. The line of survey was platted on sheets taken from the county records, tracings from the records, and a compilation, a joint compilation with Mr. T. F. Wentz representing the Provo Bench Canal & Irrigation and the North Union Irrigation Company was made. The acreage arrived at was found to be 4332.53 acres.

Q Have you made a survey of the lands under the Upper East Union Canal Company?

A Yes sir.

Q You may state how that was made?

A The survey of the Upper East Union Canal was actually made on the ground, and platted on sheets taken from the county records and the area determined below the Upper East Union Canal and between that and the Faucett Field or the East Union Canal, or at least taking in all the ground under irrigation from the Upper East Union.

Q Including the Faucett field?

A Yes sir, including the Faucett field, but I segregated the Faucett Field.

Q All right, then give it to us separately?

A The area as found under the Upper East Union Canal was found to be 762.18 acres.

Q Was anyone with you representing --

A The irrigated area.

Q Was anyone with you representing the Upper East Union at the time? A. No sir.

Q Have you made any checking or reference to the Upper East

Union since the survey was made?

A I have not, I have attempted to check with them, that is, I have offered to check with them, the company asked me to check with them, but they have never had any definite information, and I have understood they considered the area near their determinations.

Q You may state what the Faucett field was, you say that was connected with this.

MR. A. C. HATCH: Was the Faucett field included in this 762 acres?

MR. JACOB EVANS: No.

Q Mr. Stewart, there seems to be some little misunderstanding with respect to what this 762.18 acres constitute. As I understand it that is the land irrigated under the Upper East Union proper, is that correct?

A Yes sir.

Q Not including --

Q Not including Faucett field lands. Faucett field land was found to be 108.75.

Q Did you speak of some other ditch being surveyed with this, or was the upper East Union and Faucett field the only one you referred to in your testimony?

A Those were the only ones referred to. Well, I referred to the East Union because the East Union Canal is the lower limit of the irrigation under the upper East Union at certain points.

Q But it irrigates land that is not mentioned in that irrigated by the Upper East Union or the Faucett field?

A Yes sir, that is under the city.

Q ~~After~~ Have you made a survey of the land irrigated from Little Dry Creek?

A Yes sir.

Q You may state the number of acres found to be irrigated under

Little Dry Creek and the circumstances of the making of the survey?

A The Little Dry Creek survey was made similar to the other surveys in part only. The Little Dry Creek really does not run into the main canal very far and no attempt was made to ~~find~~ follow out its small laterals, but the land found to be irrigated under the Little Dry Creek system was 506 acres.

Q Has this area ever been checked up by any of the representatives of the Little Dry Creek with you?

A No sir.

Q Do you have any knowledge as to whether or not persons using water from Little Dry Creek admit this is a correct acreage irrigated from Little Dry Creek?

A Not directly. I have made an effort to check this area with the Little Dry Creek officers too, but was unable to get any cooperation. I have understood, however this is some where near the area they are supposed to have under their system.

Q Did you make any survey as to the land irrigated from what has been called the Alfred Young Ditch?

A Well, only in connection with other land.

Q What other lands?

A As I understand it the Alfred Young must be that up in the Upper River bottom.

MR. JACOB EVANS: I suggest Mr. Wentz may give him the names of the persons using water from that ditch.

MR. WENTZ: The Provo Pressed Brick Company, Mr. Amicone--

A I understand where the locality is but I cannot separate that from some other lands at the present time. However, I can do that with a little work.

Q You can do it a little later on?

A I think so.

Q What otherland is it connected with now so far as your survey

survey is concerned?

A I am not positive whether that is included in what I call the river bottoms exclusive of Faucett field. I have a tabulation here that shows the river bottom exclusive of Faucett field, and I am not certain --

MR. THURMAN: Mr. Tanner says that is included in that river bottom land.

A That is my impression too.

Q Well, take the whole acreage then as shown by the survey for the river bottoms and you may make the segregation later if you can?

A Yes sir. My survey of the river bottoms --

Q the East River bottoms, I take it, is it not?

A Yes sir, was an actual survey on the ground along the fringes of what I class the irrigated land, and along the ditches or canals and I found that area to be 516 acres.

MR. COLEMAN: Mr. Stewart, did that include the area covered by the ditches and canals that ran through the land?

A No attempt has been made to separate the ditch area from the other. As a matter of fact the county records or plats are on such a small scale that the width of the canal is very immaterial in relation to the size of the sheet, but in general no allowance is made of course for the width of the canals, that is the survey from one side of the canal, and survey from the other would meet at the center of the canal theoretically.

Q Now, the lands in the river bottoms, does this acreage include all of the lands in the bottoms or only such portion of the lands in the river bottoms as is irrigated?

A The survey included only those portions that appeared to me to have been irrigated.

Q Just describe to the court what the character of that land is in the river bottoms?

A Well, you mean as cultivated area or as separated --

Q Yes, how you separated it and what lands you excluded?

A The survey, as I say, was made along the river in some cases and the canals in other cases and along the fringes between the timber area and the cultivated area. The cultivated areas were attempted to have been irrigated and timber areas in general I had excluded from the irrigated area.

Q Well, has the timber area been irrigated?

A As far as I could determine the timber area has not been irrigated systematically. It is very probable that portions of it have been irrigated, but mainly as a matter of waste water running off the irrigated portions.

Q There is considerable growth of cottonwood timber on some of that land in the river bottoms?

A Yes sir, cottonwood and various other kinds of timber and willows. The river was also excluded where I came in contact with that.

MR. COLEMAN: That was the point I wanted to make.

A Yes, the river was excluded from the area wherever that was come in contact with.

Q Did you make any survey of the land under the Dixon farm ditch?

A Not as separated from the other lands.

Q Is that a portion of the land included within the river bottoms?

A That is my impression.

Q How about the George Baum ditch, does the same apply to that?

A Yes sir.

Q Will you separate ~~that~~ those from your plat so as to show the acreage under these different ditches, and give us the area of each later on?

A I will make that separation if it is possible with my information.

Q Mr. Wentz said he will aid you in doing that.

A I think I can make the separation.

Q Now, let's get this straight --

A If the Dixon farm includes all the Provo Pressed prick ground, there is some portions of that that come within the city area and has already been included in the city estimate, but in general I believe it is not included, unless it is under the river bottom system.

MR. THURMAN: That you can ascertain later?

A Yes sir.

MR. THURMAN: Did you say the Dixon farm and George Baum land was included in this estimate?

A Not positively.

MR. THURMAN: How?

A I didn't say that positively, that was my impression only.

Q Did you make survey of the lands in the First Ward Pasture to determine the use of the water, if so you may state under what circumstances the survey was made and the acreage you found?

A I made some survey in the First Ward pasture, but I would prefer not to give any statement on it at the present time, though I could do so this afternoon.

Q Do so please. Does the First Ward Pasture ever get any water to irrigate its land through the canals directly from the river, which are controlled by the First Ward Pasture Company?

A So far as I know they have no individual canals from the river.

Q Where do they irrigate that land from?

A Their land is irrigated, I think I can say, ~~are~~ principally from what we call the east drain, or at least --

Q The east drain is no part of the water of Provo River, is it?

A Not from the direct Provo, but the First Ward Pasture is also partially irrigated from waters taken from the Factory Race immediately in the upper or northern end of the First Ward Pasture.

Q And that is after the water passes through the various mills on the mill race? A. Yes sir.

Q The Park and Nuttall Ditch, did you make any survey of the lands under that ditch?

A That is also included, partially, I think within the river bottom area, though I am not positive about that at the present time. If you will wait just a moment -- I have some areas under the Park & Nuttall Ditch; they are not, I believe, in with the river bottoms, either, but I have some areas under those which can also be separated, but are not at the present moment.

Q You will make these segregations later?

A Yes sir.

Q The Barton & Young, is that in the same condition?

A Yes sir.

Q Spring Creek ditch, have you made any surveys of lands under the Spring Creek ditch?

A Not separated from the other system.

Q Can you separate it?

A Where is the Spring Creek ditch?

Q On the west side, it is what is known as the Clyde ditch.

A Well, I think that with Mr. Wentz' help I can make separation.

Q Mr. Wentz says he will assist you in making the separations. Fort field, did you make any surveys of land irrigated by the Fort field?

A Yes sir, I made surveys of the land under the Fort Field.

Q You may state the circumstances under which surveys were made and amount of acreage irrigated by the Fort Field?

A The survey was made under the Fort Field system similar to the surveys of the other canals, and the survey was made along the south limit or bank of the Provo River, which is the north limit of the Fort Field Irrigation Company's ground. The total area found under the Fort Field Irrigation Company's

system is 574.28.

Q Did you check that with any of the representatives of the Fort Field?

A No sir, only I made an attempt to check in the field with individuals, and believe it to be -- and after talking with one of the officers of the company, I believe it to be very near to the area they would claim.

Q Now, did you make a survey of the lands irrigated under the Lake Bottom Canal?

A The survey of the Lake Bottom Canal was made similar to the other surveys, but no final estimate was -- final estimate was made, but no exact quantity finally determined, so I can give you my final estimate. My final estimate on it though it is possible it would be subject to some change.

Q Can you give that now? A. Yes sir.

Q You may do so.

A 1275 acres.

Q Why do you say you are not real certain as to the number of acres in that case?

A The Fort Field and the Lake Bottom area as most of you probably are aware, is an area that receives a considerable seepage from above and there are tracts, many tracts which apparently receive water as sub irrigation and at seasons of the year probably receive some surface flow, and it is ~~not~~ difficult to determine in that area just the amount that might receive a surface flow.

Q The 1275 acres then, as I understand it is what you consider from your survey then to be the land requiring irrigation from the river?

A I would rather say it this way, that that is the land which apparently receives water from the canal, not especially from the river, but from Lake Bottom Canal. The lake bottom canal receives a considerable seepage and also a direct flow

from some springs?

Q IN other words, that is an accumulating channel?

A Yes sir.

Q Did you make any survey of the land irrigated by the Sego Irrigation Company ?

A I cannot at this moment separate that from some other company.

Q The Sego Irrigation Company is the company --

MR. BAGLEY: Hasn't it been stipulated the area between that plaintiff and the company?

MR. JACOB EVANS: Mr. Wentz says there is only two tracts under that and he can give those two.

Q You may report on that then this afternoon.

A On the Sego?

Q Yes. Mr. Wentz says there is only two tracts and he can give those to you later on.

MR. JACOB EVANS: I will state, if the court please, that we are just consulting with respect to the acreage under the Provo Reservoir Company. That has already been testified to heretofore by a number of witnesses and the Sego Company, we have concluded there would be no necessity at this time of introducing further testimony as to the acreage irrigated by the plaintiff or the lands that are under their canal systems which are subject to irrigation. We are depending upon appropriations which have been made, or applications which have been made and which have been allowed by the state engineer, and we were simply attempting to show the appropriation of wa-ter that had been made prior to our's.

MR. BAGLEY: Did you state Mr. Jacobs had testified in respect to the area under the Sego Irrigation?

MR. JACOB EVANS: No, so far as we are concerned we don't care about the Sego Irrigation Company.

MR. BAGLEY: Isn't there a stipulation between the

plaintiff and Segó Lily in respect to the acreage?

MR. JACOB EVANS: I couldn't say. Yes, I think there is. There is absolutely no conflict in any way between the plaintiff and Segó company I understand.

MR. BAGLEY: Shouldn't it go in the record if there is no objection, that the area is two hundred acres?

MR. JACOB EVANS. We have no objection to that.

THE COURT: Segó Irrigation Company covers two hundred acres?

MR. JACOB EVANS: Yes.

THE COURT: I know where it is, I was shown the Segó land when I was out with Mr. Wentz the other day.

MR. JACOB EVANS: There is a hundred and sixty acres owned by Mr. Loose and forty acres by Mr. James Clove.

Q Now, what, if any surveys, have you made to determine the acreage of land irrigated from the Grovo River above the Utah valley?

A I have made some --

Q Before I ask that question, I will ask this -- nevermind, that is all right, answer that?

A I made some surveys in Wasatch and Summit counties.

Q Have you a map of the surveys that you made in Wasatch county?

A Yes sir.

Q This paper that I hold in my hand, that map of Wasatch county survey?

A Of various surveys in Wasatch county, yes sir.

MR. JACOB EVANS: So far as the lands in Wasatch and Summit counties are concerned, if it is agreeable to the court. I will ask that judge Hatch make the examination because he is more familiar with those lands there and it might shorten the testimony.

THE COURT: very well.

DIRECT EXAMINATION by Mr. A. C. Hatch.

- Q What did you do in determining the area of land in Wasatch county irrigated from the Provo River?
- A My actual survey was made in Wasatch county in the vicinity of Heber and above Heber of the lands lying below the Wasatch canal, also the land lying below the Spring Creek ditch which extends into the Sage Brush canal, also an area under the Charleston Canal, I believe known as the Upper Charleston canal.
- Q Did you make any survey of the lands lying between the Wasatch and the Timpanogos canals in Wasatch county?
- A One of the officers of the Timpanogos Canal Company furnished me with the official map of their canal and I plotted that canal on my map from theirs and have determined the acreages between the Timpanogos and the Wasatch as surveyed by myself, but did not exclude the irrigated from the non irrigated lands. Simply the areas are indicated.
- Q Did you in making your determinations make any difference or distinction between the Wasatch Irrigation Company land and the Wasatch Extension Irrigation Company land?
- A No direct difference between the two. The Wasatch Extension canal was run out to its limit as it is the same canal that the Wasatch Canal Company only extended, and the areas below that canal were determined below the extension.
- Q Did you in any manner segregate the lands irrigated by the Timpanogos Irrigation Company from the lands irrigated by the Wasatch Irrigation Company?
- A No sir, I did not. I think they irrigate some tracts side by side, but no attempt was made to make the separation.
- Q Are some lands lying below the Wasatch irrigated by the Timpanogos also.
- A I understand they are and the canals appeared to be constructed for that purpose.

Q What is the area lying between the Wasatch and Spring Creek or Sage Brush?

A The total area below the Wasatch or between the Wasatch and Spring Creek or Sage Brush canal amounts to 3562 acres. At the time I made my examination there were certain areas, however, not irrigated under there.

MR. THURMAN: That includes the Wasatch Extension lands whatever they may be?

A Yes sir.

Q You didn't attempt to determine the irrigated land in that area, did you?

A No, not as separated from the non irrigated, that is simply the total area between the canals.

Q What is the area between the Timpanogos and the Wasatch?

A The total area between the Timpanogos and the Wasatch canals down to the east and west road which extends through the center of Section 17 and 18 of Township 4 South Range 5 East, amounts to 3330 acres.

MR THURMAN: Now, is that all under the Timpanogos?

A That is all between those two canals, the Timpanogos probably irrigates some lands below the Extension, the Wasatch Extension.

MR. THURMAN: Give me those figures again.

A 3330.

Q Do you know the quantity of swamp and irrigated land lying between the Wasatch Canal and Spring Creek or Sagebrush Canal.

A The area which is called a swamp area and irrigated area irrigated from the Wasatch Spring between those canals is two hundred acres, but no segregation of the swamp from the irrigated was made.

THE COURT: between what two canals?

A That was below the Wasatch canal and to the north of Heber.

Q Now, did you determine the area between the Wasatch Canal and what is known as the McDonald ditch, or were the McDonald ditch lands included within the area irrigated from the wasatch Canal in your figures?

A The McDonald Ditch land I think is included in that area. Here is the McDonald ditch.

Q You say the lands irrigated from the McDonald ditch are included within this 3562 acres?

A Yes sir.

Q Do you know what quantity of land is so irrigated?

A Under the McDonald?

Q Yes.

A No sir, I don't.

Q Did you include in that estimate any lands lying below the McDonald ditch as being irrigated by the Wasatch Canal?

A I think only a small tract which appears to be less than twenty acres.

Q In whose field is that?

A That is in the field that I have here marked in the names of B. Y. Young, James McDonald and W. H. McDonald and adjoining the Al Cluff land.

Q Did you make any survey of the North lands, what is known as the North Field in Wasatch county?

A Yes sir.

Q What area did you find there?

A In the North Field tract, the area south of the Midway lane.

Q South of the Midway lane?

A South of the Midway lane and north of the road from Heber City to Midway I found to be 2699 acres.

MR. McDONALD: Will you give us that again?

A The area under the North Field system south of the Midway lane and north of the road from Heber City to Midway, I found to be 2699 acres.

Q I understand you south of the midway lane? and north of the road leading from Heber to Midway?

A The midway lane is near the center of Section 14, about an eighth of a mile south of the center of section 13.

Q Does it lead from Heber City to Midway?

A No, it is a lane from the power plant to Midway, up near the power plant.

Q And I understand now -- there is a small area above that Midway lane which I think is an independent right, not irrigated from the North Field right.

MR. McDONALD: How many acres did you say in that area?

A 2699 acres as an irrigated area.

Q Did you include in that area any lands lying south of what is called Spring Creek?

A No, I didn't include any land south of Spring Creek, but I have another small area which is under the North Field system to the south of the --

Q Just a moment there?

A To the south of the Heber-Midway road which amounts to thirty acres, and is in Section 1, Township 4 South Range 4 East, that is an additional area to the 2699, making a total of 2729. This area however, excludes an area which I call a swamp area of 127 acres near the McDonald place.

Q Now, did you include any lands lying west of the Spring Creek Irrigation Company's canal? and north of the Heber-Midway road?

A Yes, that includes some land to the west of Spring Creek, but I think --

Q Not west of Spring Creek, but west of the Spring Creek Irrigation Company's canal?

A Well yes, west of that canal. That is, the canal, I believe, runs separate from Spring Creek at a point directly west of

Heber, and there would only be -- there would be practically nothing to the west of the canal where it is probably called the Sage Brush Canal.

Q Now, you were present there and made these measurements, were you? A. Yes sir.

Q There is a tract of land, is there not between the Spring Creek Canal and Spring Creek of a hundred to one hundred and fifty acres irrigated from the Spring Creek Canal? and north of the Heber-Midway road?

A Yes, I have that area marked here "Swamp and meadow area combined" 237 acres, of which a hundred acres is irrigated meadow and that extends to some extent below the Heber-Midway road.

Q But it is under the Spring Creek ditch?

A Yes, it is south from the Spring Creek ditch.

Q And west of the spring creek ditch.

A West of the Spring Creek or Sage Brush ditch.

Q Now, what I have been trying to get at is whether you included that area north of the Heber-Midway road within this 2699 acres?

A No sir, that is excluded, the 2699 goes to Spring Creek only.

Q But does not come down to the Heber-Midway road?

A Not at that point.

Q Now, you exclude about 127 acres of swamp land lying immediately west of McDonald's, is that right?

A Yes sir, that is excluded from the 2699.

Q That is wholly under the McDonald ditch, is it not?

A Yes sir.

Q Now, is that all of the swamp lands that are excluded in the North Field area?

A Yes sir, 127 acres.

Q It includes the total area, roads and streets, river bottoms, includes all of the superficial area of the North Field except 127 acres of swamp land?

- A No sir, it doesn't include a fringe between what I consider the irrigated land and the river, fringe all the way along the west side of the North field tract, varying in width.
- Q But between that fringe and the county road on the east it includes everything?
- A Yes sir, roads and all.
- Q Now, what if anything did you determine to be the area under the Spring Creek ditch?
- A Do you refer to the portion that I have called swamp and meadow combined? 237 acres, of which a hundred acres is irrigated, that is below the Spring Creek?
- Q The total area between the Spring Creek canal and Spring Creek and the Sage Brush Canal and Charleston canal?
- A The area between the Sage Brush and Charleston canals is eleven hundred acres and considering that a hundred acres of what I have called swamp area is irrigated under there makes a total of twelve hundred acres irrigated between the Sage Brush and the Charleston canals.

MR. THURMAN: Is that Spring Creek.

- Q You didn't understand my question, I guess, I ask you for the total area under the Spring Creek and Sage Brush canals east of Spring Creek and east of the Charleston canal, or above the Charleston canal, total area irrigated from that ditch?
- A The total area between those ditches, the Sage Brush and Charleston canals and below the Spring Creek is 1337 acres, of which I class 137 acres as swamp.
- Q You are attempting to segregate the land irrigated by the Spring Spring Creek ditch company and the Sage Brush canal company, are you?
- A No, I am unable to segregate them. I include the two together.
- Q That is all the land under the Spring Creek ditch, and the

Sage brush canal?

A Yes sir, except that there is a small area in Section 1, which is below the Charleston canal, but I think irrigated from Spring Creek.

Q Spring Creek ditch?

A Yes sir.

Q What is the area you have?

A That area I refer to in Section 1, which is apparently watered from Spring Creek and excluded from the North Field area but referred to is 108½ acres that joins 30 acres irrigated by the North field ditch.

Q I ask you if you would give me the total area irrigated or lying under the Spring Creek and Sage Brush Canals. I asked what the figure was and you answered something else.

A I gave you 1337 acres.

Q What is what I wanted to get.

A But there was another little tract that I considered was irrigated from the Spring Creek I thought probably you wanted included.

Q Yes, I wanted all the total area.

A That doesn't lie between those ditches but is irrigated from the Spring Creek.

Q It is below the Charleston canal ?

A Yes sir

Q How much of that is there?

A That is one hundred eight and one-half acres.

THE COURT: You excluded from the 1300 swamp 137 .

A Yes.

THE COURT Leaving 1200 net?

A Yes sir.

How much is this additional land, 108½?

A One hundred eight and one -half.

Q Did you make a survey of the lands under the Charleston canal?

A Yes sir, I made a survey of the land down to the south side of Section 14.

Q I don't care for the section, just give us the area that you found.

A The area below Charleston canal from a quarter of a mile ~~was~~ north of the south side of Section 14?

Q Mr. Stewart, Pardon me, but if you will just give me the area without going into the detail, that is all I care for.

A The area --

Q Total area under the Charleston Canal.

A I cannot give you the total area under the Charleston canal because it extends below, I think, where I made a determination and down to the south side of Section 14, it is 653 acres.

Q To the north line of Section what ?

A South line of Section 14.

Q That is upper canal, is it, of Charleston?

A That is what I think they call the upper Charleston Canal, marked Charleston canal on my map.

Q Did you make any determination of the land lying under the Charleston Lower canal?

A I have a small area between the lower Charleston Canal and the river which only goes as far as the west side of section 14 and shows 74.90 acres between the Lower Charleston and the river and to the west side of Section 14.

Q There are some lands irrigated from the Charleston Upper Canal still south of the point that you refer as the south line of section 14?

A Yes sir, I think a small tract.

Q Approximately how much?

A It would be only an approximation and I would rather not make it, less than one hundred and sixty acres.

Q When were these surveys made of the Wasatch county lands?

A The surveys were made in December, 1913.

MR. A. C. HATCH: Who represents the Charleston Irrigation Company?

MR. WILLIS: I represent the Lower Canal.

MR. A. C. HATCH: It is all under one corporation.

MR. WILLIS: Yes.

MR. A. C. HATCH: Who represents the Charleston Irrigation Company?

MR. WILLIS: I understand Mr. McDonald the Upper canal. I am not certain though.

MR. A. C. HATCH: It is not the canal. The company as the defendant I am asking about. Who represents the Charleston Canal Company, the defendant in this action?

MR. McDONALD: I think I represent it.

MR. THURMAN: Any doubt about it?

MR. McDONALD: They include that with the North Field and Wasatch Irrigation Company, that is under their system, it is one, as I understand it.

MR. A. C. HATCH: Well, we don't understand it is under one system at all.

MR. WILLIS: May it please the court, as I understand this matter the Lower Canal comes under a different condition from the other and I was employed by the Charleston Irrigation Company as to its lower canal interests.

THE COURT: Not as to the other

MR. WILLIS: Not as to the other.

THE COURT: Are they in default?

MR. McDONALD: No, I represent them.

MR. JACOB EVANS: If the court please we have taken no defaults at all.

THE COURT: I merely meant they were not represented. Then I understand Mr. Willis and Mr. McDonald represent this defendant, they have divided between them some interests.

MR. A. C. HATCH: How much land do you claim a right

to irrigate?

MR. WILLIS: As to the Charleston lower canal, we claim 525 acres and in your answer to that you admit 525 acres, but you allege that a portion of that, the amount you don't know, is swampy, and does not require irrigation.

MR. A. C. HATCH: Are you willing to stipulate that 74.90 acres is all of that 525 that requires irrigations?

MR. WILLIS: I would like to talk with a clients a moment before entering into that. I will take it up and let you know later, Judge.

MR. A. C. HATCH: We are willing to and have admitted they have 525 acres under the lower ditch, Lower Charleston Canal, and Mr. Stewart gives it as 74.90 acres.

THE WITNESS: UP to a certain point.

MR. A. C. HATCH: Yes, but there are 525 acres under that canal. Of course, we deny that it is all or any considerable portion of it requires irrigation, particularly does not require irrigation during the low water season. As regards the upper Canal what do you claim, Mr. McDonald, for that?

MR. McDONALD: I cannot say, Judge, at this time, I would have to determine that probably from the individuals. I think the answer was drawn by Judge Thurman and as I understand it is included, that acreage is included in the Fort Field and Wasatch. I have here a note that the Charleston Company-- well, the amount is unknown. This note says ~~though~~ this is acre feet though rather than acres of land, but 525 acres. Now, I understand Judge Hatch that is included in the 5345 acres of the North Field and Wasatch, but I am not certain.

MR. A. C. HATCH: If the court please, we don't recognize the Wasatch and Charleston as being in any way related. They are separate corporations and acquire separate rights. I understand they claim 716 acres to be irrigated by

their upper canal; if that is right we are prepared to let the record so state it.

MR. McDONALD: I cannot tell until I go through the matter with Mr. Winterton.

Q Now, as to the Kamas land --

THE COURT: Let me suggest with ~~specific~~ reference to these various ones that you consult with your clients as soon as you can and maybe you can stipulate if you will find out what they claim.

MR. WILLIS: I hardly think it is possible to stipulate as to the 74.91 acres so-called swamp, for the reason that I think later in the year it is used for pasture, and after the irrigation above it is not swamp land.

THE COURT: Possibly you may be able to agree as to what the facts are.

MR. WILLIS: I would like to talk with my people before I say.

Q You yourself prepared the Exhibit now on the board?

A Yes sir.

MR. A. C. HATCH: Exhibit 56, we offer that in evidence at this time.

MR. RAY: No objection to it as illustration of the testimony, your honor.

THE COURT: That is all it is received for.

MR. WILLIS: We may have objections, I would like to examine it first, your honor, so far as my clients are concerned, the reason being with the exception of two or three of my clients the acreage has been -- in their answer they have admitted and if this was in any way conflicting with that I shall object.

THE COURT: It will be merely received as illustrating the evidence.

MR. WILLIS: Have no objection as to that.

THE COURT: It may be received for that purpose.

Q Proceed now to the lands of the Kamas or Summit county lands. Have you a plat of them?

A Yes sir.

Q What did you do in relation to determining the quantity of irrigated from Provo River sources in Summit country?

A In Summit county I made an actual survey of the canals that I will mention. The farthest land up the river is under the Sunrise and Bench canal, then farther down the river towards Kamas is the land under the South Kamas canal and under the Washington canal extending down as far as Beaver Creek canal.

Q There is a Beaver Creek canal that diverts water from the Beaver Creek, a tributary of the Weber River?

A As I understand it, yes.

Q What land did you find irrigated under the Sunrise canal?

A Under the Sunrise and Bench Creek canals?

Q The Bench Creek canal, we don't know anything of that in this suit, and I am asking you for the Sunrise canal only?

A I am unable to segregate it.

THE COURT: Do I understand from the way you refer to that it is all one canal, Sunrise and Bench, or do you refer to two canals?

A It is probably two companies, but there is one canal that runs along the foot of the mountain and I took all the land under that canal.

Q That is the canal to which I refer, but I didn't understand that Bench Creek was any part of its name. It is the Sunrise canal is what it has always been designated.

A Possibly I am in error in putting the word "Bench Creek" on there.

Q Very well, if it is all the same canal.

A It is all the same canal so far as I know, except some water run into this canal from sources other than Provo River, some

small streams at some times of the year.

Q What is the land lying under it, the area?

A The area lying under that canal is 327 acres as an irrigated area below this canal to the crest of the Bench.

Q And below the bench, between that and the river, is there any land irrigated?

A At certain points there may be some small areas, though none I believe, so far as I carried the work down, I mean as far west as I carried it down. I believe there is nearly no irrigated lands in the bottom there, so far as I am able to --

Q Are there any swamp lands in the area you have given us?

A Swamp lands, no sir.

Q Now, the South Kamas Canal.

A The area below the South Kamas canal and the Washington Canal is not separated, the total area irrigated by both of those canals is given as one area.

Q What is that area?

A That area is 2266 acres down to the Beaver Creek canal.

Q Give me that again.

A 2266 acres below this canal, and the crest of the bench and down as far as the Beaver Creek canal.

Q Give us the boundary of that area as nearly as you can?

A Do you wish to know within what sections?

Q Yes-- just a moment, the topographical.

A The South Kamas Canal lies close to the foot of the mountain and includes all of the ground between the foot of the mountain and the river.

Q The Provo River?

A The Provo River, down as far as the Beaver Creek Canal.

Q North?

A Yes down northwesterly as far as where it intersects the Beaver Creek Canal. Then the Beaver Creek canal runs in a southwesterly direction and is the limit of the work that I

did.

Within the crest of the bench on the south side limits of the irrigated area as I have given it, there are certain small tracts adjacent to the river and below the crest of the bench, which are not included but are irrigated areas but not included in this estimate.

Q Did you make any survey of any of the river bottom land in Summit county to determine the quantity?

A No sir, I did not.

Q You prepared the Exhibit 57?

A Yes sir, I prepared the exhibit.

Q Were there river bottom lands there that you didn't survey?

A Yes sir, there are river bottom lands there which I did not investigate.

Q Can you approximate the area of those river bottom lands?

A It probably wouldn't be just for me to do so.

Q Now, in your estimate you include the roads and streets, do you, or do you exclude them as to the irrigated area under the South Kamas and Washington canals?

A The streets and roads are included within the estimate of 2266 acres.

MR. A. C. HATCH: We now offer Exhibit No. 57.

THE COURT: It may be received.

MR. McDONALD: Your honor, it is received as illustrating the testimony only, we don't admit the accuracy of the evidence.

CROSS EXAMINATION by Mr. Willis.

Q Mr. Stewart, how did you arrive at the amount of so-called swamp lands under the Charleston Lower Canal?

A I think that is entirely a misunderstanding on your part.

Q You so stated, I understood it?

A That is the Judge's statement and not mine.

Q All right, no cross then.

MR. THOMAS: I want to ask a few question as to Kamas, but I cannot cross examine because of the fact I sent the data we had away, and it has to be checked over.

MR. A. C. HATCH: Mr. Stewart is in the employ of the united States and desires to leave.

MR. THOMAS: I don't challenge the accuracy of the work done by the witness and I think I'll not take up the time of the court now. We may be able to stipulate exactly the area.

CROSS EXAMINATION by Mr. John E. Booth.

Q I have just a question or two. The Lake bottom Canal, Mr Stewart, you referred to that as being an accumulating canal, I think the terms you used water accumulates from its head on down to where it empties into the lake?

A Yes sir, the Lake Bottom canal receives water from springs, small springs along above the canal and also from seepage.

Q If the water used in the West Union Canal and the Provo Bench Canal should be reduced would that not naturally tend to reduce that seepage.

MR. JACOB EVANS: Wait a moment, we object to that as not proper cross examination. This witness was merely put on to show acreage and not as an expert to give his opinion concerning seepage.

MR. JOHN E. BOOTH: I don't know what he was put on for, but he testified the waters in that canal increased.

THE COURT: Yes, he gave the sources from which the water came into the canal, and the fact a large proportion of it arose in the canal.

MR. THURMAN: He gave that as a reasons why he would not segregate the actual irrigated lands from Provo River, because some of the water was seepage.

MR. JOHN E. BOOTH: As long as he testified to that, I think I am entitled to know what effect he had.

MR. JACOB EVANS: He didn't testify any of the seepage water come from any of these canals spoken of by Judge Booth.

THE COURT: He may answer the question unless it is ~~not~~ objected to that he is not qualified to testify on that subject.

MR. JOHN E. BOOTH: He has testified to that fact, and I want to know if that fact would not be changed under some other conditions.

THE COURT: He may state if he knows.

MR. JOHN E. BOOTH: Of course I only asked for his knowledge about that.

Q I think that matter would depend entirely on the circumstances the quantity used above, if they were -- great many times what they now are seepage into these lower canals might be increased. However, that would depend upon the sub strata.

Q That was not what I asked you. I say suppose the water in the West Unit West Union Canal and the Provo Bench Canal was materially decreased, would that not tend to decrease the seepage in the Lake Bottom canal. Of course, if you don't know you can say so?

A I really don't know whether it would tend to or not.

Q I see, in the first number here of your giving acreage, you give ~~first~~ fractions until you come to the West Union, that and the Smith Ditch you don't give any fraction. Is that coincident, or is it something that is really strange, that all of the others should have a fraction and those two should not, or is it because you didn't make as ~~as far as~~ accurate measurements.

MR. THURMAN: Sometimes it would come out even.

MR. JOHN E. BOOTH: I want to know.

A Under the West Union Canal the tracts are measureably large, particularly at the lower end in comparison and it is not out up nearly like some of these other canals, and these acreages were compiled from the records, and it is entirely possible that I have thrown away a small fraction or included a small fraction.

Q Have you the details from which you made up these totals?

A Yes sir, in general I have the details.

Q I would like to test you on one or two, and that would be an indication as to the others. I will be very brief about it. Under the Faucett field, for instance, have you the Hallet place separate?

A If that is what I have marked as the J. E. Booth place.

Q That is the man, what have you there?

A 21.75.

Q That would be, that would include more than the Hallet place.

A I have it listed as J. E. Booth.

Q What have you for Ada Hickman?

A Ada J. Hickman, 5.08 acres.

Q Joseph Faucett, have you a piece for Joseph Faucett there?

A Joseph Faucett 2.25.

CROSS EXAMINATION By Mr. Bagley.

Q Calling your attention to the Timpanogos, the figures given by you is the actual irrigated acreage?

A Yes sir.

Q The nonirrigable lands and the irrigable lands which ^{are} not excluded were excluded in this?

A Yes sir.

RE-CROSS EXAMINATION by Mr. John E. Booth.

Q There is one question I omitted and would like to ask. You referred to some timber tracts up in there?

- A Yes sir.
- Q Do you know whether or not in the highwater those timber tracts are irrigated for pasture, and not irrigated in low water?
- A As I stated, the waste water from the cultivated area may at times run onto those timber portions, and I would presume that in high water there would be a larger waste water than in low water, therefore it might run over some greater area in high water time than in low water time.
- Q Do you know the land of Hyrum Baum?
- A If you could tell me the section.
- Q Right south of Peter Boyce.
- A About in 25?
- Q That would be in 24, southeast quarter of 24.
- A Where is that from the Peter Boyce land?
- Q Right south of the east line of Peter Boyce's and south from mine, just east of the railroad track in there, east and west of the railroad track?
- A I have a tract marked Milanda Jorgensen, could it be that?
- Q No, it joins that, ^{A.} Elizabeth Ferguson land?
- Q It is east of Elizabeth Ferguson, but that will answer, Elizabeth Ferguson land also and the Jorgensen, through there. Now, did you examine that to see where the timber land is actually irrigated in high water and used for pasture?
- A On the Elizabeth Ferguson land it is practically admitted as irrigated area. You might see here, Judge, very small tract there, here is the Peter Boyce, that has considerable area of timber.
- Q If you will take the quarter section ~~west~~ north of there for just one question. What have you there marked as Robert Cordner?
- A I have 6.06 acres.
- Q Is that amount for irrigated land or for the whole of the land?

- A what is the whole of the land and also all considered irrigated.
- Q You didn't examine the deed to see whether that is correct or not?
- A No sir, taken from the county records, county plats.
- Q I will state the deed I have shows an acre more.
- A Here is another acre, ~~is~~ 1.06 to the south; in my report, Cordner 6.06 and 1.06 would make 7.12 the total.
- Q And that is included in your acreage is it, of the irrigated land?
- A Yes sir.
- Q Well, that is all right, that is all.

CROSS EXAMINATION by Mr. Corfman.

- Q Mr. Stewart, in the surveys of the land under the Timpanogos system, did you include the lands owned by Provo City, about twenty or twenty-five acres?
- A Provo City area was credited there with 17.64 acres.
- Q You included that?
- A That portion of it, but there is the total area of the provo City tract is 25.64, but part of that comes above the canal, and we gave the city credit for having an irrigated area of 17.64.

CROSS EXAMINATION by Mr. McDonald.

- Q Mr. Stewart, will you be kind enough to give me the total number of acres under the Wasatch canal, nevermind the territory, just give me the number of acres?
- A The area under the Wasatch canal is 3562 acres.
- Q 3562, now can you give me the area under what you term the McDonald, Ditch, or is that included?
- A That would be, the McDonald ditch is mostly included in the North Field Area.
- Q All right, we will get that when we come to the North field.

MR. THURMAN: That is 127 acres, isn't it?

A The McDonald ditch may cover more than that, the 127 acres was given as a swamp area.

Q All right now, that is just as convenient. Give me the North Field?

A North Field xxxi area, total was given as 2729 acres.

Q 2729. Now, you say in the north Field you excluded what you termed a fringe along the west side?

A Yes sir.

Q The entire length. I thought you added thirty acres to that?

A I gave 2699 and added thirty.

MR. THURMAN: What was that thirty added for?

A That was added because it was below the Heber-Midway road, and separated in a way from the rest of the North Field tract.

Q Can you give us the number of acres excluded by what you term the fringe on the west side?

A No sir, I cannot.

Q Do you know whether or not that land is irrigated for pasturage purpose?

A It didn't appear to me.

Q Do you know whether it is or not?

A No sir, I don't.

Q You say you cannot give the area of that?

A I could only approximate it. It could be determined from my map, but I haven't determined it.

Q Now, will it be just as convenient to give us next the Charleston Irrigation Company?

A Under the Charleston Upper, I think they call the Charleston Upper Canal, 653 acres.

Q Now Spring Creek?

A One hundred eight and a half. The Spring Creek I did not segregate from the Sage Brush.

Q Where do you get the hundred and eight and a half?

A That is in the west part of Section 1.

Q Well, you have to give us Spring Creek and Sage Brush together then, do you? A. Yes sir.

Q All right, give us those;

A $1445\frac{1}{2}$ acres, of which I excluded 137 acres as swamp.

MR. THURMAN: Just a moment, Mr. Stewart, did you give 1337 for Spring Creek and Sage Brush combined less 137 in swamp?

A I didn't include the small tract of 108 acres in the west part of Section 1.

THE COURT: The way I have it in my notes, Mr. Stewart, you gave the area under this Sage Brush and Spring Creek as 1337 deducting 137 leaving a net of 1200, to which you afterwards added 108.5.

A Yes sir.

Q Making 1308.5 acres, is that correct, that is the way I have it?

MR. A. C. HATCH: That is the way I have it?

A Yes, net area of 1308 $\frac{1}{2}$.

THE COURT: After deducting 137 swamps?

A Yes sir.

THE COURT: And including the 108.5?

A Yes sir.

Q Now, do I understand you to say that you excluded or included some land north of the road leading from Weber to Midway in the North Field?

A I excluded some land north of the road from the North Field area which lies to the south of Spring Creek.

Q Why did you exclude it?

A Because it is irrigated apparently from Spring Creek.

Q Apparently?

A There are no flumes across Spring Creek to serve this ground from the North Field Irrigation Company's system

- Q You excluded from the north field how many acres?
- A I cannot give that as a matter of excluding from it, I have given what I included in the North Field but portion in here which I could not estimate. You might say I excluded everything else from it, I cannot exclude.
- Q As I understand you, you excluded some specific of land there which you concluded was irrigated from Spring Creek?
- A That is the area I have marked "Swamp" on the map.
- Q How large is that?
- A The total area I have marked "swamp" is 237 acres.
- Q 237 in the North field?
- A Not wholly within the North Field, partially to the south of the Heber-Midway road.
- Q Part of it? A. Yes sir.
- Q And do you consider that part of the north field that is ~~west~~ south of the Heber Midway road?
- A I consider that the North Field came only to Spring Creek.
- Q You did not consider that the road leading from Heber to Midway was the dividing line?
- A No sir.
- Q Now, can you give us an idea of the amount of land which you claim was swamp land in the north field and lying west of what you term McDonald land?
- A 127 acres.
- Q 127 acres, and you don't care to change that?
- A No sir.

CROSS EXAMINATION By Mr. Wahlquist.

- Q Mr. Stewart, with reference to the Sunrise Canal, does your map there show the Sunrise Canal?
- A Yes sir, it is called the Sunrise and Bench Creek canal on my map.
- Q What authority had you for calling it Bench Creek canal?

- A The Bench Creek Canal appears to empty into or be a part of the same canal, only extended farther up.
- Q Isn't there cultivated lands above the Sunrise Canal?
- A Yes, James Lewis tract under the Bench Creek, marked on my map 55 $\frac{1}{2}$ acres.
- Q That is the only irrigated tract above the Bench Creek canal, or above the Sunrise Canal?
- A Only one known to me.
- Q You have no knowledge as to the irrigated area above the Sunrise Canal?
- A Only the one stated.
- Q Bench Creek, as you call it, is a natural stream or natural channel coming down from the hills there, isn't it?
- A Yes sir.
- Q And in finding its way to the Provo River it would naturally cross the Sunrise Canal or Sunrise Canal would cross it?
- A The natural channel from bench Creek would cross the Sunrise canal.
- Q And that would be the fact whether there was any water in that natural channel of Bench Creek or not at the point of intersection? A. Yes sir.
- Q Does your map there show the point of diversion of the Sunrise Canal from Provo River?
- A Only approximately, southeast corner of Section 17.
- Q Do you know how far it is from there to the point of diversion?
- A That is as near as I know the point of diversion.
- Q On which side of the river is that?
- A The diversion is on the south side of the river, probably -- I think I have stated the diversion point. I got that only from the estimate of someone I saw in the vicinity. I simply asked them where it was and they pointed it out to me and I platted it as near as I could by approximation.
- Q Now in making your survey did you follow the Sunrise right

along, and measure the canal itself, or just triangle from point to point?

A I followed along the canal.

Q So that, as you have plotted there it represents an accurate survey of the course of the canal itself?

A Yes sir.

Q Have you the details from which you computed your acreage of 327 acres?

A Only the map, the computation was made from the map.

Q Computation made from the map?

A Yes sir, that is the perimeter of the area. It is a perimeter of the area taken by means of a plainimeter from the map.

Q I don't think I understand that very well, now, you say it includes the lands below the canal and above the bench?

A About the crest of the bench and below the canal.

Q How many places did you measure across from the canal to the crest of the bench?

A I run a line ~~xx~~ along the crest of the bench the same as I run the canal line.

Q Follow it in all of the bends?

A All the substantial bends, yes sir.

Q You didn't measure each cultivated area owned by individuals and the compute the total area from that?

A No sir.

Q What is the length, if you know, of the Sunrise canal from the first lateral where water is taken from it to the terminal?

A Approximately two and a half miles.

Q Well, that approximately you mean as the crow flies?

A I simply made that approximation from the map itself here, you can see the section as it extends here.

Q I know, but you say you measured it, if you did you have field notes, haven't you?

A Yes sir.

Q And could give me the exact distance?

A My notes are taken from station to station, and include side shots here, and it would take a little while to really get the information that you wish as separated from my other information.

Q You can get it for me later? A. Yes sir.

Q All right, I wish you would after dinner. Now, another thing there then, did you make any inquiry as to the lands west of the terminal of the Sunrise canal, as to the source from which they were irrigated?

A No, I think I covered the Sunrise canal to what I understood was the last land, which is George Hardman's ground and there is a north and south road at that point. George Hardman's ground, that is the last land I examined as part of the Sunrise tract.

Q You didn't then examine or measure any of the land west of the road at George Hardman's?

A No sir.

Q None of the Fitzgerald lands?

A No sir.

Q Now, you rather gave the impression that you found some bottom land irrigated from the Sunrise canal near the upper end of the canal, is that correct?

A No sir, I think there are no bottom lands irrigated from it so far as I am able to tell, none examined by me. I went to the crest of the bench only.

Q Now, may I understand you correctly, I don't wish to do you any injustice, you measured the Sunrise canal by all its angles and then you came up the bench to the same point making a perimeter of the entire irrigated area?

A Yes sir.

Q And then made your computations by --

A Use of the planimeter which is a machine that you run around

a perimter, and which registers the quantity that the acreage is determined from.

Q You consider that just as accurate, do you, as if you had measured each tract?

A Accurate within reasonable limits.

Q There is a margin of safety in those calculations, is there?

A There is a possibility of changing that total slightly by an actual change of the measurement on every man's tract of ground.

Q Now, Mr. Stewart, inasmuch as you cannot give the distance from the head of the canal to the lower end of the canal, without excluding the -- or without first determining those side shots, I believe you call them.

A Yes sir.

Q How did you determine the perimeter of the entire tract?

A Any side shot that might be in here was platted as a side shot and not platted on the main line of the canal.

Q Will you show me some of those side shots you have platted on the map?

A No stations as marked on the map of the detail survey; and it would be difficult matter -- I couldn't do it at this time-- the information would have to be put on the map before I would be able to do that.

Q Did you connect up with section corners as you went along there doing down the canal or up the crest?

A Yes, with what corners I could find, I connected with the corner of Sections 7, 12, 13 and 18.

Q Where is that, indicate it?

A Right here, also with the quarter corner between Sections 13 and 18, and I believe to the corner of Sections 18 and 17.

Q And those are all the corners that you connected up with?

A No sir, I connected also to the quarter corner between Sections 12 and 13, and I am not positive whether I connected of 11,

12, 13 and 14 or not.

Q Who assisted you in making the survey?

A Mr. Frank Sallen was a rodman, Verne Brumhall, rodman, E. D. Clide teamster.

Q There was no one representing the Sunrise Irrigation Company present, or assisting in the surveys?

A No sir.

Q Do you know whether or not they had notice of the survey being made and were invited to be present or not?

A Mr. Clide was with us and was attending to those matters. We talked with quite a number of people interested there, but no one accompanied us.

Q That is, you incidently talked with people that you saw?

A Yes.

Q But you don't know whether he talked with any of the directors of the company or not, do you?

A He had a meeting with the --

Q Were you at the meeting?

A -- some of these people.

Q Just a minute, were you at the meeting?

A I believe, when I think about it, that it was not a public meeting, I believe though he met --

Q Were you at the meeting?

A No.

Q You don't know what he did in that matter then, do you, only what he told you?

A Only indirectly.

Q Now, when was this survey made?

A The survey was commenced on December 4th, 1913. So you wish any more detail?

Q I thought you were looking to tell us when it was finished?

A No, I could not say exactly, a few days later.

Q That is immaterial, I thought that was what you were looking

for. Now, in going up the crest of the bench, how did you determine what was irrigated and unirrigated land?

A In general the crest of the bench was the lower limit of the cultivated land, and this^{was} taken as the lower limit of the the irrigation.

CROSS EXAMINATION by Mr. Willis.

Q Mr. Stewart, in speaking of the thirty acres under the North Field, laying south of the Midway road, is that land lying west of Spring Creek?

A Yes sir.

Q Do you know who the owner of it is?

A No, but it lies immediately west of Charleston dam, that is the dam to the Charleston canal.

Q Don't know the owners of any of it?

A I do not.

RE-CROSS EXAMINATION by Mr. McDonald.

Q As I understand you you didn't measure the land to the south terminus of the of the Charleston Irrigation Company?

A No, sir, I measured only to the south side of Section 14.

Q So that there is still other lands under that canal or system which you didn't measure?

A Yes sir.

Q You don't have any idea how much?

A Well, it is an indefinite idea, I stated here it was probably under 160 acres.

Q That is a guess?

A Yes sir, purely a guess.

RE-CROSS EXAMINATION by Mr. Wahlquist.

Q In arriving at the area where the perimeter is or the outline is so irregular as that is or would be apparently from the map

didn't you use kind of an average exclusion and inclusion there for the irregularities, indentations for the perimeter?

A Not in this case. We used an instrument called the plainimeter and run the instrument around this perimeter and took the area in that way, and that is much more accurate than including and excluding small tracts, much more accurate result.

CROSS EXAMINATION by Mr. Cluff,

Q Mr. Stewart, have you any record of the amount of land that is irrigated in the south fork of Provo Canyon?

A No sir, I have not.

12:00 Noon, Recess to 2:00 P.M.

SCOTT P. STEWART - - - - -

RE-DIRECT EXAMINATION by Mr. A. C. Hatch.

Q Mr. Stewart, calling your attention again to the question as to the total area irrigated by the Spring Creek Sage Brush canal, you gave it this morning as twelve hundred acres, thirteen hundred thirty-seven acres less one hundred thirty-seven.

MR. WAHLQUIST: That is not his figure, Judge.

MR. A. C. HATCH: Just a moment, pardon me.

Q In examining your plat I find noted there total area 1200 acres, total area irrigated in the area marked "swamp"-- 1200 acres total area?

A Yes sir.

Q Now, that would seem to indicate a total area irrigated under the Spring Creek Sage Brush canal, what is the fact with relation to that?

A Might have been some confusion in the answer due to the difference in the Spring Creek and the Spring Creek Ditch. The

Spring Creek follows along the north edge of the area marked "Swamp" and the Spring Creek ditch follows along to the east end of it and then later becomes the Sage Brush, and my answer in which I included 108½ acres in Section 1 was given thinking that you wanted to include the water or the lands irrigated under Spring Creek, which is not Spring Creek ditch.

Q So that the 108 acres is land irrigated from Spring Creek and not from the Spring Creek Sage Brush Canal?

A Yes sir.

Q And then the total area irrigated under that canal would be 1200 acres?

A 1200 acres.

Q And would any swamps be deducted from that?

A That includes what I call a hundred acres of the swamp land.

Q So that the area then requiring irrigation would be 1100 acres?

A Well, the area that received the irrigation is 1200 acres, but there is some question whether that hundred acres marked in the swamp area requires it or not. It receives it, but probably does not require it, or at least in as large an amount.

RE-DIRECT EXAMINATION by MR. Jacob Evans.

Q Now, have you segregated the acreage irrigated from the Dixon farm, Park & Nuttall, Alfred Young and George Baum ditches?

If so, please give the acreage?

MR. A. C. HATCH: Pardon me just a moment, I would the court's attention, the answer of these people claimed only 1220 acres as being irrigated from their canal.

THE COURT. That is the Spring Creek and Sage Brush?

MR. A. C. HATCH: Spring Creek -- Sage Brush -- and we have admitted the 1220, but the figures as he had them this morning, was 1308½ as I remember correctly.

Q You may proceed now.

A Yes, sir, I have segregated the areas under those various

ditches and will read them.
ditch --

Under the Barton and Young

MR. RAY: Is that the same as the Alfred Young ditch?

A No sir. Total acreage of 53.71 acres.

Q Can you now give the names of the persons who irrigate through this ditch?

A Yes sir, Rudolph Riard.

MR. COREMAN: May I call your attention, gentlemen, that Rudolph Riard is dead, died since the commencement of this suit.

MR. JACOB EVANS: He was served with process, wasn't he?

MR. COREMAN: I don't think so, he wasn't in the State of Utah for a year or two after you commenced your suit.

Q Proceed, give the names of the other persons.

A 26.94 acres. Permelia Young, 16.77 acres; Ada Young Littley, 5 acres; Betty Y. Goodman five acres. That completes the part under the Barton and Young ditch.

Q Now, going to one of the other ditches.

THE COURT: Let me ask what ditches were these farms included in this morning.

A In the river bottom, East River Bottom.

MR. JOHN E. BOOTH: Beg your pardon, they don't belong to the East River Bottom, they are on the west side of the river.

A They were included in the estimate given for the East River Bottom.

THE COURT: In the 516 acres?

A Yes sir.

MR. JOHN E. BOOTH: I didn't so understand it this morning.

A This testimony now will clear that up, Judge, in giving these

totals now it will clear that matter up.

MR. COLRMAN: Then this amount should be subtracted from the East River Bottoms acreage to get the acreage of the East River Bottoms?

A I couldn't say that, I will not give it that way, I will give you the East River Bottoms later. Under the Park and Nuttall Ditch there is a total of 73.54 acres as follows: L. W. Nuttall 19.12; Rudolph Riard and D. B. McBridge, 12.50; David S. Park 41.93, total 73.54.

Q Proceed.

A Under, I think they call it the Cluff Ditch, anyway, William Cluff, successor to B. B. Richmond -- no, I don't think it is William Cluff either, William Cluff, successor to B. B. Richmond 21.44 acres. Under the George Baum Ditch, George Baum 16.55; S. S. Cluff, Jr., 2.02, total 18.57; Under the Alfred Young Ditch --

Q That was under what was known as the George Baum Ditch?

A Yes sir. Under the Alfred Young Ditch James Stewart 8.20; Mary Greenalgh 5.12; James Amicone, 4.03; S. S. Cluff, 1.49, total 18.84. Under this ditch also is the Provo Pressed Brick 14.02.

MR. THURMAN: You say James Amicone? How much was his?

A 4.03.

MR. BAGLEY: Is the Pressed Brick in addition to what you have given?

A I think it comes under that ditch. Yes, it is in addition, total 32.86.

MR. BAGLEY: That is thirty-two and eightysix hundredths of an acre?

A Yes sir.

MR. BAGLEY: That is the total of 18.84 and 14.02?

A Yes sir. Dixon farm ditch, Provo Pressed Brick Company 22.58.
East River Bottoms Water Company 344.44.

Q Then the acreage for the East River Bottoms Water Company,
instead of reading a total of 516 acres should read 344.44?

A Yes sir.

MR. THURMAN: Mr. Stewart, give me the name of that
last Dixon, Dixon and somebody.

A Dixon Farm Ditch.

MR. THURMAN: That was 22.58, wasn't it?

A 22.58.

Q But in reality the 22.58 acres credited to the Provo Pressed
Brick Company was watered through the Dixon Farm Ditch?

A Yes sir.

MR. THURMAN: Is 32.86 the amount of Provo Pressed
Brick right?

A No sir.

MR. THURMAN: You gave 32.80?

A That is total under the Alfred Young ditch includes part of
the Provo Pressed Brick ground.

Q As I understand it the Provo Pressed Brick Company has some
land which is irrigated under the Alfred Young Ditch, as well
as some land irrigated through the Dixon Farm ditch?

A Yes sir, and still some more under the city right.

Q That of course will be taken care of by the city?

A Yes sir.

Q That completes the segregation with the exception of the First
Ward pasture, does it not?

A Yes sir, I think so.

Q Are you able now to give the corrected area irrigated in the
First Ward pasture?

A No sir.

MR. McDONALD: He has not given us Spring Creek.

Q You can answer that question.

A Which question?

Q About the First Ward Pasture.

A I cannot give the accurate information on the First Ward Pasture at the present time.

Q How about the Spring Creek Ditch?

A Spring Creek Ditch, I failed to have time to segregate.

Q Can you do it?

A Well, I think with the help of Mr. Wentz. There are several conflicting ditches in that vicinity, but I think I can do it all right with some assistance.

Q If you can I wish you would do it this afternoon so that we may have that.

MR. JACOB EVANS: We would like to reserve the right to put that in after the plaintiff commences their case.

THE COURT: The defendants?

MR. JACOB EVANS: The defendants, I believe.

THE COURT: That will be all right.

MR. JACOB EVANS: I believe that is all.

RE-CROSS EXAMINATION by MR. Corfman.

Q Mr. Stewart, these several, this classification you have given in the surveys of those using water in the aggregate, are they supposed to cover all the water users in Utah County? These several areas that you have testified to, are they supposed to cover all the water users of Utah county taking water from Provo River?

A No sir.

MR. CORFMAN: I would like to inquire at this time of counsel for the plaintiff whether or not the water users of South Fork have been made parties to this suit?

MR. JACOB EVANS: Yes.

MR. CORFMAN: And also on Provo River, below or

above the intake of the water users here in this valley.

MR. A. C. HATCH: Yes, we tried to make everybody parties that used water from Provo River.

MR. COLEMAN: Have the appropriators of Vivian Park been made defendants?

MR. JACOB EVANS: Yes, as I remember, I am not entirely sure as to that.

MR. A. C. HATCH: Who is the owner of it?

MR. JACOB EVANS: I think Mr. Carter owns it.

MR. COLEMAN: Yes, and I understood from him he had not been made defendant.

MR. JACOB EVANS: I could not say definitely. If you desire to have him made we haven't the slightest objection.

MR. COLEMAN: We have no desire, but ^{he} is a user of the water from Provo River.

MR. JACOB EVANS: I should think the city would be more interested than anybody else. He is above your intake.

RE-DIRECT EXAMINATION by Mr. Jacob Evans.

Q You said there was some land in Utah county that was not covered by the acreage that you have given me. Who are they that you had in mind in answering Mr. Corfman's question?

A Well, the Provo Reservoir Company ground is not covered in my testimony.

Q Who else?

A I am not positive at the present time where the county line goes in the Canyon, but none of the interests in Provo Canyon has been investigated by me.

Q This covers the users of water below the mouth of Provo Canyon in Utah county with the exceptions of the Provo Reservoir Company and the Sege Irrigation Company, does it not?

A As far as I am able to state it covers every interest that is entitled to a direct flow from the river, with the exception

of those mentioned.

MR. THOMAS: When you say entitled to, you mean those who are drawing water now?

A Yes sir.

MR. JOHN E. BOOTH: Mr. Stewart, who is the Upper --

MR. JACOB EVANS: Just a minute, Judge Booth.

Q Did you make any measurements of the lands of persons living in Provo Canyon above the mouth of the canyon?

A No sir, I did not.

Q And none below the lands just below Charleston, as you have testified to this morning?

A No sir.

Q Do you know in a general way what these lands consist of, are they lands along the river bottom?

A There is considerable area immediately below Charleston and then smaller areas along the river. from there on down, which receive some water from the river.

Q But as to the number of acres you are not informed?

A No sir.

MR. THURMAN: If the court please, I believe, strictly speaking, it is the duty of the plaintiff as part of its case to put in all the lands of the defendants according to my best information, and its necessities for water before resting, because we are claiming that after all lands are supplied as that have a prior right to us, there is still a surplus which we are seeking to obtain. It doesn't seem we are ready on some of those upper lands. I don't think my brethren will be very particular if we put that in, for instance, when I come to put in the Timpanogog claims I represent. In other words, they are well enough acquainted in a general way with these lands up the river here along the margin of the river to consent and stipulate now in open court that we may give the exact acreage of those later on and rest with that exception.

MR. JOHN E. BOOTH: We will consent to that.

MR. MCDONALD: We consent to that.

THE COURT: If there is no objection it may be done.

MR. WAHLQUIST: Just a moment, I have been out of court last few days, and I understand Mr. Huffaker has been away; have you put on any testimony as to the area on the west side of the river in Wasatch county?

MR. MCDONALD: Yesterday Mr. Huffaker was here.

MR. THOMAS: I noticed this morning when the land was given in and the land irrigated under the Wasatch canal and the others there was no reference to lands being irrigated on the river bottom. I don't know whether the plaintiff claims -- or what its claims are with reference to those lands. I would like a statement from them on that.

MR. THURMAN: I assume the plaintiff considers all the lands irrigated by the waters of the Provo River are involved in this action, and we have tried to make everybody defendants as far as we had information to rely upon, and we will make the same promise in regard to that as to the particular lands you refer to as to the others. We will get that data and put it in, if it is a matter of any great substance-- I could see a reason for objecting to it, but they are only comparatively insignificant in this case, the rights remaining that have not been collated. It won't vary, I am satisfied. I have been over that matter myself and heard evidence in relation to it, somewhere thirty-seven hundred to thirty-nine hundred acres in round numbers. They called it four thousand, but I think the exact amount would be a little less than that.

MR. A. C. HATCH: Only a portion of that is irrigated direct from the Provo River.

MR. JACOB EVANS: It seems to me, if the court please, in all probability when these defendants begin to make their

cases, where we have been unable to secure the definite information as to the acreage that that matter would be cleared up by each of the defendants as they make their cases here without the necessity of us having to make an additional survey of this land. It might require twenty or thirty days for us to go and survey that land.

THE COURT: I take it an inquiry of the attorneys representing the owners and water users of any of these lands will disclose whether they have an opinion or not.

MR. JACOB EVANS: Their answers set up what they claim.

THE COURT: If you are willing to admit what their answers set forth.

MR. JACOB EVANS: There is really no dispute between the defendants and the plaintiff.

THE COURT: There is no necessity for proof then.

MR. A. C. HATCH: We have denied their acreage in some instances.

THE COURT: If you don't introduce any proof, their allegation will stand.

MR. A. C. HATCH: That is what I understood Mr. Thurman was asking for, to be allowed to be allowed to put in the proof at a later time in the course of the trial. Now, we have a measurement of the Midway area, all of it, and we think we know what it is. The party who actually made the measurement happens to be out of the city at this time and we have agreed with the Midway Irrigation Company upon the area of their land, so that don't dispute what they will now claim.

THE COURT: Now, Judge Booth, you suggested you wanted to cross examine.

RE-CROSS EXAMINATION by Mr. John E. Booth.

- Q Just a question or two. Where did you commence from the north to include land in the East River Bottoms Water Company, whose is the first name that you have?
- A Henry Smith.
- Q Henry Smith? A. Yes sir.
- Q Have you Gordon next to him.
- A Yes sir, Gordon is almost opposite Henry Smith.
- Q How much for Gordon?
- A 15.69, that is J. H. Gordon.
- Q Then is there another Gordon?
- A Yes, Rose Gordon, 7.11; John Gordon, Sr. 7.43; John H. Gordon,
- Q 5.34.
- Q There is one other question, what have you for me in that company, you gave me the Faucett field this forenoon, what have you of mine?
- A 26.26 acres.
- Q Have you the separate pieces?
- A Yes sir. 15.99 in one eighty hundredths, 8.98 and 3.49.
- Q Now, you don't take into consideration the primary and secondary rights that that company has in there, you don't know anything about that?
- A No sir.
- Q That would account for it taking primary rights. Who is the lowest one? want to find out how far you went?
- A George Baum with forty-one hundredths of an acre on the north side and Major Pierce with 2.10 on the other side.
- Q You are acquainted with that land in there?
- A Yes sir.
- Q Do you know where Thomas Foots's land is?
- A Yes sir.
- Q Succeeded John W. Brown?
- A I have it in the name of Thomas Foots.

Q Is he the last one?

A No, George Baum is immediately by him.

Q James Bennett, have you any of his?

A Yes sir.

Q Isn't he below the others?

A No sir, not as I have it, I have it listed a little above or about even with them there.

T. F. WENTZ recalled.

DIRECT EXAMINATION by MR. Evans.

Q Mr. Wentz, you made a survey of the lands irrigated in the First Ward Pasture ?

A Yes sir.

Q Will you state the acreage irrigated by the First Ward Pasture Company?

A From the Factory Race there is 20 acres irrigated on the east side of the race, 127 acres on the west side of the Race, making a total of 147 acres irrigated from the Factory Race.

Q Do you know whether or not there is any other land that is irrigated?

A Yes, there are other lands irrigated from the East Drain.

Q Is the East Drain any part of the waters of Provo River?

A No.

MR. JACOB EVANS: Now, we shall assume unless there is something to the contrary that Mr. Stewart may be excused; with the exception, of course, for the testimony of the further acreage which of course we may produce by the introduction of some other witness.

THE COURT: Does the plaintiff rest at this time then?

MR. A. C. HATCH: We rest with that understanding

that we may add to our testimony as to the acreage of the parties up the river and as to the Spring Creek land, if necessary, in this area.

MR. JACOB EVANS: We will submit in the morning the acreage on Spring creek.

MR. MCDONALD: Our attention was called this forenoon to the fact we might agree on the number of acres irrigated by the Charleston Irrigation Company. I have investigated the matter, and we are willing to accept the figures of Mr. Stewart of the amount irrigated. He gives 553 acres and his judgment as to 160 he did not measure which will make a total of 813, and we are willing to accept that total number of acres.

MR. A. C. HATCH: No, we will not concede that. All they claim is some seven hundred and twenty acres, I think, in their answer.

MR. MCDONALD: 760, is it?

MR. A. C. HATCH: 720, as I remember it, I think is claimed by them as irrigated land under their upper canal, but as to the lower canal --

MR. MCDONALD: I have nothing to do with the lower canal, I am speaking of the Charleston Irrigation Company, that would include the upper canal.

MR. A. C. HATCH: It takes in all the land under both canals. The Charleston Irrigation Company, along both those ditches, and in treating with the Charleston Irrigation Company, we want to treat with it as a whole, whoever may represent it.

MR. WILLIS: You cannot treat with the Charleston Irrigation Company as a whole, because there is a dispute as to so-called swamp land, and we could not stipulate anything as to that, your honor.

MR. A. C. HATCH: As to the irrigated lands under

the upper canal, 720 acres, we will agree to.

MR. McDONALD: I will look at the answer on that. One of my men has gone to Charleston to get the number of acres, and I will report on that later.

THE COURT: Very well, Provo City ready to proceed?

OMITTED.

Discussion as to holding court in Heber; notice by Mr. McDonald of the filing of a motion for a non suit; and discussion as to notifying counsel who are absent when matters they are interested in come up.

THE COURT: Now Provo City may proceed with their evidence.

MR. THOMAS: May it please the court, I will waive the reading of the answer which in effect denies the affirmative allegation of the plaintiff's complaint and compels the plaintiff to put proof in. Further answering the complaint of the plaintiff by way of (Reading)

We shall direct your honor's attention now to the decrees of this court, number 718, commonly known as the Morse decree, and the decree referred to in the complaint commonly known as the Chidester decree, Numbers which have been given.

MR. JACOB EVANS: Neither of those decrees were introduced.

MR. THOMAS: You could not introduce the decrees. It is the understanding, I think, of the court's order before that the decrees are part of the record and files of this office and are not necessarily introduced in evidence.

THE COURT: I don't remember of making such a statement. Anything in this case, any paper filed in this case the court will take notice of, but decree in another case the court will not take notice of.

MR. THOMAS: Then we offer now in evidence the decree of the court in No. 718, Fourth Judicial District Court, Utah county, Utah, Provo City et al, vs. West Union Company, et al, decree filed Provo City, Utah February 3, 1902, signed F. Bochman, Clerk, recorded in Book "B" page 571.

MR. THURMAN: The plaintiff objects to it except as admitted heretofore when it was offered by the plaintiff in specific cases.

THE COURT: Objection is overruled, it may be received. It will be considered for whatever purpose it is

competent or material evidencel

MR. THURMAN: I just want to save a further objection in behalf of the defendant, the Timpanogos Irrigation Company, the Wasatch Extension Company, as irrelevant, incompetent, and immaterial as to those defendants.

MR. JACOB EVANS: We desire on the part of the plaintiff to add the same objection, it is incompetent, irrelevant and immaterial, the plaintiff not having been made a party or in no way bound by the provisions of that decree.

THE COURT: It will not be considered with reference to any persons in that situation, If a person was not a party to the action it does not affect him in any way.

MR. WAHLQUIST: During the proceedings on the part of the defendant may the same rule obtain that was made in the beginning of the case, that any objection taken and exception saved by any of the defendants may be available to all others?

THE COURT: Yes.

MR. BAGLEY: Or by the plaintiff.

THE COURT: That stipulation will hold all the way through.

MR. JACOB EVANS: The plaintiff excepts to the ruling of the court?

MR. RAY: And the defendants.

MR. JACOB EVANS: Why not get a certified copy of that and save using the original?

MR. THOMAS: I have a copy but it is not certified.

THE COURT: You may introduce your copy that is not ~~making~~ and if it appears later there is a mistake, it can be corrected.

MR. THOMAS: That may be done.

MR. JOHN E. BOOTH: If the court please, do I

MR. JOHN E. BOOTH: If the court please, do I understand now this decree is introduced in behalf of any^{one} of the parties who desire to use it?

THE COURT: Yes, it is in evidence, the decree is in evidence.

MR. JOHN E. BOOTH: So far as it is material.

THE COURT: Yes, and it is available--

MR. JOHN E. BOOTH: Reason I asked, I understood when the plaintiff offered it the other day that was the order of the court, it should be so considered, and if it was, I didn't see any use introducing it again.

THE COURT: I didn't remember this was the decree, I thought it was the other one.

MR. THOMAS: There were two decrees, the Chidester decree and the Morse decree. This Chidester decree was presented to the court, as I remember and the court made the rule which your honor has just suggested, once in, it was in for all purposes for which it would be admissible.

THE COURT: Now, however, in the sense the party would in any way be prejudiced or bound by the fact they offered the decree. Of course, there are portions of it they would not want to be placed in the position of having offered, but when the decree is received in ^a the case such as this where so many parties are interested in it, it may be received for the benefit of any party.

MR. JOHN E. BOOTH: I wanted it understood if I desired to call some particular attention to a paragraph in there, I would not have to reintroduce it.

MR THOMAS: That is the understanding we had of it.

MR. JACOB EVANS: Before counsel proceeds I am inclined to think it would aid us all materially in the testimony if we could get from counsel a statement as to their theory of this

case whether or not Provo City claims to own in its municipal capacity, the water which is used for the irrigation of the lands and of the city lots or whether they merely claim to represent those persons, and that the owners of the land that is irrigated actually owns the water, but with the right of Provo City to regulate, distribute and control that water to the owners thereof. We would also like to have from them a statement if they can give it at this time, as to their theory whether or not the city claims to own the water that runs through the Mill race, or as to whether or not they admit that the owners of the machine interests along up and down the race own the water and they have the right to regulate, control and distribute that water to those mill owners; and we would like also to have them state their position with respect to whether or not they claim the ownership of the water in their pipe lines which is used for ordinary municipal purposes.

MR. THOMAS: I will suggest that the answer which Provo City has filed is the best answer which could be given to the query of counsel. I don't know any other way of answering them to set forth the facts as they were prepared and contentions that were set forth in the answer as presented by Mr. Coleman and Mr. Coffman. I don't know what other answer to make.

MR. JACOB EVANS: There is rather a peculiar condition arising in this case, as I understand it. The owners of these lands, I understand it, generally claim the water to the lands, but admit Provo City has the right to control, regulate and distribute it. The answer of the machine interests, as I understand them, who are also represented by Mr. Coffman, also claim this water, and if we could determine who is the owner of the water, why, it might aid us materially in proceeding in this trial.

MR. A. C. HATCH: The city claims to be the owner of it, machine interests also claim to be the owner of it, and they are all represented by the same counsel.

THE COURT: As I listened to the answer and followed it that thought was not in my mind. However, as I remember it, the allegations of the answer, the allegation of the city was to the effect that the city is the owner of this water.

MR. JACOB EVANS: Yes, that is true.

THE COURT: So that I take it the city's claim is and would answer your question by its complaint, it claims to be the owner of this water and not that the user is the owner, with the right of the city to regulate, so I take it from Mr. Thomas' reply that he relies upon the technical terms and averments of his answer. That would be their claim. Of course, if the other parties you refer to, these lot owners and owners of land are parties to this action, that is a matter for them then to set up, if they claim the ownership of it. If they are not parties to this action a decree of this court will not affect them.

MR. JACOB EVANS: I was just thinking where counsel represents two interests, and in each case claims that the interest that he represents which are separate of from each other claim to be the owner of this water, that probably counsel who represents these people may be able to make some explanation what their contention is, which might shorten up the examination.

THE COURT: Might be able to enter into a stipulation with reference to it, if the same attorney represents both sides.

MR. JACOB EVANS: I just wanted to know what the position was.

MR. COREMAN: May it please the court. the plaintiff

in this action seems to be somewhat worried concerning as to what position the city and the mill owners will take with respect to technical term ownership in water. Now, I don't know whether they question the propriety of counsel representing these two interests in this case or not.

MR. JACOB EVANS: No, I didn't question that.

MR. CORFMAN: From an ethical standpoint, nor do I care very much about that as to what view they may take of it, but I have no desire to play fast and loose with the court in this case, and I am willing to advise counsel for the plaintiff as to the position that is occupied at this time by the mill owners, and if it is permissible, I would like to state briefly something of the history of the water rights of this city. The water rights of this city -- and I speak of it in the broad sense of the term, all the water that is used within the corporate limits for all purposes were inaugurated in 1850. The early appropriations of that time and from that day to this were inaugurated through the city as a municipality. The claims of the mill owners to water were other applications to the city itself, their rights have been acquired by grant of franchise accorded them through the city. From that early day up to the present time, those rights from time to time have lapsed and applications have been made to the city for renewal. As late as three or four years ago a grant was made to the Knight Woolen Mills giving them the right to the use of the waters of what we call the Mill Race of Factory Race. Now, the use of the water, the right to the use of the water was claimed by the mill owners as an inherent right, not a right that is to be accorded them at will by the city, but a right that was continuous and positive with the mill owner, subject, however, to the right of the city to control the water. In other words the right to the water was in the first instance acquired

by the city, and they have been operating under the grant and their use has been under the grant made by the city at this time. They claim that is a right, as a property right for their mill site and their business interests that they are maintaining at the present time. Now, the mill owners are taking this view of it, they are the owner of the right to the use of that water, they are the owner of the water itself in that sense of the word, but the right has been inaugurated through the city. The decrees of the court heretofore granted, as I understand, have been on the assumption that the city is the owner of the water, subject to the right of the mill owners, property owners for irrigation purposes here within the city, to use the water upon their lands and I am frank to say it is a perplexing problem to determine just where the legal ownership exists. It may not be so material.

MR. THURMAN: Mr. Corfman, may I ask you a question, in the last analysis isn't your position that the mill owners own the right just the same as the field owners within the city own their right?

MR. CORFMAN: I think they are in the same category exactly.

MR. THURMAN: And the city controls the one as it controls the others?

MR. CORFMAN: As it controls the one, somewhat analogous to a public utility corporation that owns the legal title to the water, but dispenses it to its patrons. The city owns, you may say, the legal right of the water, subject to the right of the mill owners to use the water for the purpose for which they have acquired it.

MR. THURMAN: Just let me say without interrupting you, what perplexes us was -- however, I assume that was true-- why the individual land owners using water under the control

of the city doesn't come in with an individual answer and defend like the mill owners if the relation is the same.

MR. COREMAN: Perhaps they would if they had been made parties to the suit, but among the thousand property owners in this city that use water as the mill owners use water under the supervision and control of the city, they are not made parties to the suit. As I understand, the plaintiff in this case has only made the land owner without the limits of the city, or within the limits of it that are owning large tracts of land parties to the suit. The lot owner, as I remember, in no instance has been made a party to this action, yet I take it that the lot owner has inherent right, one that could not be divested of taking and using the water for the purpose of irrigation of his city lot, and we contend that the mill owner has the same right to call upon the city and the city would not have the right to take from the mill owners the use of the water as he has heretofore had and enjoyed.

MR. THURMAN: Permit me further question. It has appeared in evidence here that sometimes the Factory race gives way to the farmers or the lot owners or something of that kind. Do we understand from that that the mill owners' right is a kind of a secondary right, or upon what theory has that been done?

MR. RAY: Statute makes it a secondary right.

MR. THURMAN: The statute cannot make a secondary right in this case, if I understand it right.

MR. COREMAN: As far as that rule is concerned, we will contend, I will say to counsel, with reference to the fact that the statute makes it secondary and that the rights of these mill owners were inaugurated and even confirmed by the court before that statute ever become law. We claim it as a constitutional right. As suggested by Judge Thurman,

as to any change of water with the irrigators, that has been done by mutual consent and arrangement between the city council and the mill owners. The arrangement has been that by that interchange the mills during the night time and during the day-- or during the Sunday, they conceded the right of the irrigators to take the water from the race and use it for the purposes of irrigation. I think the evidence will be it has been as low as nineteen second feet at times it has been interchanged in that way, and by that method the irrigators have made concessions to the mills whereby during the day of the eight hours run when the mills are operating that that ^{water} was going to the race and double the capacity of the water that is used in the race for their purpose. That arrangement has been made and carried out between the city on behalf of the irrigators and between the mill owners as a mutual arrangement agreed upon. The position of the mill owners in this case is that they may have and use the water as they have had and used it heretofore, claiming no better right, contending they are entitled to the use of that water without diminution. That right as between the city and the mill owners and is not contested and that is why counsel is here and feels that he owes no apology to the court or to counsel by reason from a professional standpoint for representing these interests as long as they are mutual.

MR. JACOB EVANS: One other question. What position do you take with respect to the water that is in the pipe lines of the city? Does that stand on the same basis as the water used for irrigation purposes, and used for the mill, or does the city claim an absolute ownership of that water?

MR. COREMAN: No sir, the municipal use differs so much from that of the ordinary use that it is on a little different plane, manner of use is on a different plane. The control and regulation is on a different plane. Necessarily

by reason of the way the water is dispensed by the city to the users under those circumstances they adopt different rules of regulation. The requirements are different upon the users, but so far as the legal title^{itself} is concerned, I am unable to determine that there is any distinction between -- so far as the legal ownership of the water in the water system proper, the water that is dispersed to the irrigators and the water that is dispersed and used and controlled by the city for motive power purposes.

MR. JACOB EVANS: Just one other question to clear this up. It has been the case, in a number of instances, has it not, where persons owning lands under this irrigation system, and where there was a dispute between the city and the land owner as to the amount of land and quantity of water necessary to irrigate his land, where the land owner claiming the water has actually brought independent suits against the city to compel the city to furnish him the water for the land that he claimed he was entitled to.

MR. COREMAN: Now, I don't know as to that.

MR. JACOB EVANS: Do you recall the case of James A. Bean against Provo City.

MR. COREMAN: I am aware there was a case such as that, but what the court determined and what the facts were I have been unfamiliar with it. I had the statement from you such a suit had been pending in this court and decree rendered, but what the merits of the case were or what the court actually decided, I don't know. I understand a decree was rendered whereby Mr. Bean obtained right to use the water-- whether the city continued thereafter to regulate and control it, I don't know.

MR. JACOB EVANS: If the court please, I think this matter will involve some considerable discussion later on, and that was why I asked concerning the views of counsel,

and while I don't desire to occupy any time discussing the matter at all at this time, because I realize there is nothing before the court, but I will say that my view is that the water in the pipe line is a wholly different class of water entirely from the water used for irrigation, that the water in the pipe was actually appropriated by Provo City, and put in the pipe and is used and sold. They have the absolute ownership of it. Pipes were constructed at the expense of the city. The water is distributed the city levies a tax as to how much shall be charged for the water changing it from time to time as they may see fit, by ordinance. That water that is in the pipe, my view is is the absolute property of the municipality of Provo City, whereas the water that is used for the irrigation of the lots and the acreage, the element ownership of that water is in the owners of the soil, and that Provo City has no ownership whatever in or to that water, could not prevent anybody from using it, could not pass an ordinance fixing the rate that would be charged for the use of it, but that their authority extends only to the extent of levying a water rate sufficient to pay the cost of maintenance and distribution of that water. As to the mill owners, we think probably the same thing is true, that the municipality owns no interest whatever in or to the waters of the Mill race, and I believe that is a matter that ought to be thoroughly threshed out and determined as a matter of law in this case, so that in the future --

MR. THOMAS: You mean now, determined now?

MR. JACOB EVANS: Well, sometime during the case, and I thought it was proper to raise it at this time so that the court might have in mind the difference, if there is any difference, as a matter of law in the ownership of this water. If we went back into the appropriations of this water we would probably find that many of the owners of land

actually appropriated their own water, and that it was distributed by the city to the persons who had appropriated that water, and the same would probably be true as to the mill owners, but if you go into the appropriation as to the water in the pipe line we would find that the city as a municipality filed notices, made their appropriations as a municipality, constructed their pipe line to the various springs and put those springs in the pipe line, and have passed ordinances fixing the amount that should be paid for the use of that water, and we think there is a distinction and that the element ownership of the water in the pipe belongs to the municipality, while the element ownership of the water used for irrigation purposes belongs to the owners of the soil.

MR. RAY: With that view why were not the lot owners made parties, if that was the view?

MR. THOMAS: I was about to make that query.

MR. JACOB EVANS: Simply because every suit heretofore has been brought in the name of Provo City. They stand in the relation of a trust relation with these parties. That has been the history of all these irrigations suits so far as I know, but until this suit was commenced, so far as my knowledge goes, there never has yet been claimed this water belonged to anyone other than the owner of the soil. That has been your experience, hasn't it, Mr. Thurman, in all these suits. I call your honor's attention, if you desire to refer to it further, to the case of Fillmore ⁱⁿ against Springville City found, the 8th Utah. In that case Springville City controlled the water ~~the~~ just as Provo City controls the water here. The suit was commenced to determine the right of Mr. Fillmore as between himself and Provo City, or Springville City, and it went to the Supreme Court, and the court held, as I remember in substance, that

by reason of the long usage and under the statute that had been passed that Springville City had the right to control, regulate and distribute the water, but the element ownership of the water was in the owner of the soil.

MR. RAY: I don't so understand.

MR. COLEMAN: The court didn't so hold, absolutely not.

MR. JACOB EVANS: I say that was my understanding.

MR. THOMAS: We can easily get the case.

MR. COLEMAN: Does your honor wish to have this matter argued.

THE COURT: No sir, I have no wish in the matter.

MR. COLEMAN: We will submit briefs or argue the matter if you wish.

THE COURT: There is nothing before the court now to submit a brief, the court doesn't know what the facts are.

MR. RAY: If the court please, it seems to me in fairness to the court this is a proper proposition to begin with. I have some very definite views what a municipality can do and what it can't, and what it may own and may not, but the presentation has been sufficient to call to the court's attention the general thought of counsel upon it, and it seems to me the future determination ought to await the evidence?

THE COURT: There is nothing the court can determine at this time.

MR. A. C. HATCH: If the court please, from the remark made by Brother Corfman indicated to me that he had in mind even though this suit would determine Provo City was entitled to no rights to the water or its rights materially diminished, or its rights as he claimed them to be were materially diminished, in that case it would simply be a question whether the individual lot owners choose to go and

take the water and insist on bringing them in as individuals to determine the rights as to whether or not the city was enjoined or restricted to a certain degree, whether or not that would enjoin the individual lot owners. My view of this in the beginning was that any action brought against the city as to all of these waters would be binding upon the individual lot owners and all of those to whom the city had heretofore been distributing the water under the rule of acquiescence for forty or fifty years in the city's representation of them as the owner to represent them collectively in all suits brought to determine the rights to water and any degree that might be rendered as to the city would therefore be as binding upon the individual lot owner as though they were brought into court themselves. Of course, that is a question that might be discussed later. He asked why they were not made parties. That is why they were not made parties.

THE COURT: You may proceed.

MR. THOMAS: It is not necessary to make any reply to position of counsel, is it, at this time?

THE COURT: I am not determining -- I don't understand there is anything before the court now at all. This discussion all grew out of the question asked you.

MR. THOMAS: I will answer it again by referring counsel to the pleadings in the case as giving the best notion of the theory of the defense.

THE COURT: I don't think the answer discloses what your theory is as to the relationship between the city as trustee, if that is the way you view it, and the users of the water. It doesn't disclose that at all.

MR. THOMAS: I think that issue is not raised, and I don't feel we are called upon even to discuss it. If the court please, prove City was charged by the plaintiff with

having a direct interest and claim in the waters to which they claim some interest. They did not discuss Provo City in a fiduciary capacity. They did not say by exercise or the municipal rights it held certain control; they simply said Provo City is the owner or claims to be the owner of certain rights. They were guided in that by the records of this court, which had heretofore decreed a certain right to a certain municipality. It seems to me if there was any doubt in their mind or the minds of counsel that they should then and there have resolved any possible doubt in favor of the possible water owner and water user as against them.

MR. THURMAN: In a suit to quiet title as this, isn't that a fundamental practice. The plaintiff says the defendant claims some right and it devolves upon the defendant to show specifically what that right is, and that is what we expected in this case.

MR. THOMAS: You got the answer.

MR. THURMAN: We didn't get the answer you now make, really say your statement, your answer is a sufficient reply, I don't think it is.

MR. THOMAS: There of course we would differ. David Harem says "It is the difference of opinion that makes a horse race." You have alleged Provo City claims an interest, and Provo City answers and says it does claim an interest, and claims the ownership of that water. As far as the ownership of water in the pipes is concerned, I don't know that is material. In question insofar as relates to the sources of supply and so far as you will claim to any sources of supply that Provo City will be immediately interested, but your irrigation system might come and go and in no wise affect the water system as far as the water in pipes is concerned. So far as the water is applied to the farms, you reach out and seek that also. You haven't made any distinction as to the claims of

Provo City. You say Provo City claims certain rights to the use of certain waters. We say yes, that is true, we do.

GEORGE C. SWAN, called by the defendant Provo City, being first duly sworn, testifies as follows:

DIRECT EXAMINATION by Mr. Thomas.

Q Your name is George Swan?— I beg pardon, I wanted to call, unless it will be admitted, I should like to read into the record those passages from the so-called Morse Decree that have especial reference to the defendant Provo City.

MR. RAY: I submit all this decree is before the court.

MR. THOMAS: It is before the court.

THE COURT: It doesn't add anything to it to read it into the record. It is here as part of the record.

MR. THOMAS: very well.

Q Your name is George Swan?

A George C. Swan.

Q Where do you reside?

A In Provo City.

Q How long have you resided here?

A This last time since coming here I have been here about six years.

Q What is your official connection with the defendant Provo City?

A I am City Engineer.

Q How long have you acted in such capacity?

A Since May, 1912.

Q Will you kindly state the duties of your office generally?

A The duties of the office are such as are fixed by statute and ordinances of the city. I have --

MR. JACOB EVANS: We object to his stating what they are.

MR. THOMAS: I will shorten the examination then.

Q You may state if you have charge in your capacity as City Engineer of repairs to the water system and the irrigation ditches in this city?

A Only to a certain extent. The repairs of the water mains are more directly under the superintendence of water works.

Q You may state if in your official capacity you have become familiar with the location of the water mains in the city and with the irrigation ditches and with the canals which supply water to Provo City?

A Yes sir.

Q I will ask you if you have prepared a map showing the relative position of the water mains and the irrigation ditches with reference to the canals that take water out of Provo River for Provo City?

A I have prepared a map of the irrigation system, I also have a diagrammatic map of the water mains connected with the irrigation system.

Q This is a map of the irrigation system?

A Yes sir.

Q Mr. Swan, directing your attention to Exhibit 58, I will ask you to describe it?

A The map so far as the outside lands are concerned, was made with a Pantograph from the plats in the office of the county recorder, showing the lands as they surround Provo City. The plat of the platted portion was taken from the map of the city and scaled out. That is the foundation of the map--

Q Let me ask there if that was taken from the official records both of the county and of the city?

A Yes sir.

Q Proceed?

A The canal surveys were run on the main canal to locate them and the lines were platted upon this according to scale and the ditches were located in the platted portion from the location of the blocks, various portions of the city and position of the ditch was placed showing where the course of each ditches- ditches on the outside were all of them run out by survey and platted upon that.

Q Did you make a survey yourself?

A No sir, it was made by men under my--

Q Under your direction?

A Under my direction.

Q State whether or not this map, Exhibit 58, from the sources and of data which you have furnished was made and prepared under your direction?

A It was.

Q The map shows the relative position of the canal system and the irrigation ditches under the control of Provo City?

A It does.

MR. THOMAS: We offer that Exhibit 58.

THE COURT: Do you desire to cross examine Mr. Swan?

MR. JACOB EVANS: No objection to it, it may be admitted. under the same conditions other exhibits were offered.

MR. JOHN E. BOOTH: Your honor please, I would like to ask one question. What are those two heavy lines on the north?

A These two heavy lines represent the river.

MR. JOHN E. BOOTH: I mean running east and west? The white lines?

A This one?

MR. JOHN E. BOOTH: Yes sir, what is that?

Q That is the section line between Sections -- this is the corner of Sections 25, 31, 35 and 36.

MR. JOHN EL BOOTH: That is the north boundary line of provo City, is it?

A No, the boundary line is shown here in this broken line.

MR. JOHN E. BOOTH: That is what I wanted.

A The irrigation system extends beyond the city. I took in the lands far enough to show the ditches and diversions.

MR. JOHN E. BOOTH: I wanted you to point out the actual corporate limits of the city?

MR. JACOB EVANS: Just another question along that same line. You have pointed out the boundary lines of the city on the north, where ^{are} the boundary lines of the city on the east, west and south, are they shown on the map?

A The boundary lines on the east and west and the boundary line for a portion of the ways on the south is shown.

MR. JACOB EVANS: Point out on the map, will you, and fix where the boundary line of the city is on the south.

MR. THOMAS: I was about to do that.

MR. JACOB EVANS: I beg your pardon.

Q Go on ahead, I want it all disclosed?

A The boundary line on the south is the bottom of the map here over as far as the boundary line of the Spring Lake.

Q Where is that on the map?

A The meander line -- that is this bottom line here, the meander line of the ~~map~~ lake runs up here, these lines extend down below and outside of the irrigation system. They are accretion lands.

Q Where is your boundary line on the west?

A The map does not extend to the boundary line on the west. This was made to show the irrigation system of the city and that is -- the part of the territory to the west within the boundaries of the city is under the Fort Field and Little

Dry Creek.

Q Now, where is your boundary line on the east?

A The boundary line on the east is now shown. That extends to the mountain. The upper portion above this red line which represents the East Union Ditch portion of the territory is under the Upper East Union, and that would take in some territory outside of the map.

Q Is there any land that is irrigated under the Provo System which is beyond the boundaries of Provo City?

A A portion to the south, down about quarter of a mile to the south or a little more.

Q Is that all of the land that is irrigated by Provo City, that is outside of the municipal limits of the city?

A No, this land that is up in here, portions of it is under the city system, irrigated by the city. Also this land over to the west here that is outside of the boundary lines.

MR. BAGLEY: Up in here wouldn't mean anything in the record.

A Excuse me, up in the northeast portion under the East Union Ditch is under the city irrigation system, also in the north west portion on the east side of the river.

MR. JACOB EVANS: That is all I wanted.

A There is also a portion down here in the southwest portion of the city. This line here represents the boundary line of the city, this broken line, and to the southwest outside of that line there are also some pieces of land there that are under the city system. I have shown here a hatched line which --

Q In the southwest corner?

A In the southwest corner of the district, which is the boundary line of the land irrigated by the city.

Q Let us clear up some of this, Mr. Swan, the boundary line of Provo City is shown on the north, this line?

A Yes sir.

Q By this dotted line running about midway through the map, a white line.

MR. RAY: That is the township line, isn't it ?

A The boundary line of the city proper.

MR. JOHN E. BOOTH: It is the township line proper.

A A portion of the way the city limits were originally -- that is to the east of the Fifth West ditch, or City race, the township line is the north boundary of the city.

Q It is only for the purpose of this exhibit, to clarify it, is to show the boundaries of the city proper. Mr. Evans has made a suggestion that we will follow, and I will ask Mr. Swan if you can take and mark in say a blue pencil or some striking color, the boundaries of the city, taking the city ordinances as describing the city limits. This can be done during the evening hour so that we need not take up time now.

THE COURT: The map may be received in evidence.

Q Now, Mr. Swan, take the ruler please, and locate upon the map Exhibit 58, the Upper Canal controlled by Provo City,

A the farthest east canal controlled by Provo City?

Q Give its name?

A East Union ditch, it is out of City Creek in the northeast quarter of Section 36, and runs in a southeasterly direction irregular line to the piece of land marked to the east of the piece of land marked the "B.Y.U. Alumni Association;" then in a southerly direction --

Q Let me interrupt, it crosses the north boundary line of the city just after leaving the Alumni grounds, does it not?

A Yes sir.

Q Then runs for a short distance in a southwesterly direction?

A Somewhat southwesterly direction around to the southwest of the Brigham Young University grounds, then in an easterly

Q Let me interrupt you again, and within the city limits?

A Yes sir.

Q Proceed.

Q And in an easterly direction toward the eastern part of the land owned by Charles Conrad, then in a more southeasterly direction following close to the contour line not shown on the map, around to the west of the asylum building, State Mental Hospital building, I should say.

Q Then does it follow the brow of the hill?

MR. A. C. HATCH: May I ask if the several canals are indicated by lettering upon the map?

A They are.

MR. A. C. HATCH: Then why the necessity for all this description if they are already described and the map is in evidence?

MR. THURMAN: We will get it recorded.

Q The line of the canal you are describing follows the brow of the hill, does it not to the southeastern part of the map as indicated there?

A Yes sir.

Q And does it extend to any distance beyond the map which you shown, Exhibit 58?

A It does for very nearly a quarter of a mile.

Q Please indicate upon the map where the lands are that are being irrigated by the East Union Canal?

A All of the farm land ~~between~~ lying between the East Union Canal and the Factory race and the larger portion of the Platted part of the city lying east of that. There is one tier of blocks --

Q That is in Plat D and Plat C of Provo City plat?

A In Plat B, Plat C, Plat D of Provo City and a portion of Plat A. There is one tier of blocks in Plat A, lying immediately east of -- that is between 1st West Street and 2nd West Street

down with the Factory race run and extending as far south as 1st North Street. That is irrigated from the Factory race.

Q Does it irrigate the lands which you have shown upon the map lying east of the -- what west is it, Fourth West?

A 1st West?

Q 1st West?

A Yes sir, and it irrigates two blocks in Plat A with the exception mentioned.

Q And what land does it irrigate to the southeast of Plat B and C as platted on that map.

A It irrigates all of the land to the southeast -- east of the canal with the exception of the First Ward Pasture lands. A portion of those lying under the San Pedro railroad.

Q Is there any appreciable amount of land irrigated by the East Union canal not shown upon this map Exhibit 58?

A I could not state just the amount of acreage.

Q Approximately, just for information at this time, if you cannot give it, we will proceed to something else?

A I cannot give it. I might state between the Rio Grande railroad and the San Pedro railroad there is some land which is not on the city schedule which catches the --

Q Are they irrigated directly from the East Union Canal.

A They receive water from the East Union Canal.

Q Now, take your pointer and show the next canal that lies nearest the East Union Canal that you have described?

A The next Canal is the Factory race. It heads near the same point as indicated for the East Union Canal, below the tail race of the Provo Pressed Brick Company's plant, towards the northwest corner of the land that is marked on the plat Roger Farrar.

Q That canal runs in a southerly direction?

A Runs in a southerly direction to Ex 5th North street in an irregular line and then follows down the east side of 2nd West

street as far as the middle of the block between 4th and 5th south, then it runs southeasterly to 5th South, one branch there running east to 1st West and then in a southeasterly direction across to the Smoot mill, which is located in the southeastern part of Block 1, Plat A, then in a southerly direction down until it reaches the lake.

Q What land does it irrigate?

A It irrigates the -- the lands are irregular, it irrigates a number of blocks laying north of Center street and west of the canal. It irrigates all of the tier, first tier to the west of the Factory race, with the exception on one block, Block 113 in Plat A.

Q Provo City?

A Of Provo City.

Q What other uses --

A And to the south~~west~~ where it reaches the south side of 5th South Street there is another branch which does not go through the Smoot Mill, which runs in a southerly direction and then turns in a southeasterly direction, crossing the other branch. At the lower end of Academy Avenue what is called the pasture lane, crossing over and entering the First Ward pasture.

Q Does it irrigate land there?

A It irrigates land in the First Ward Pasture, and also some of the lands lying to the west of the First Ward Pasture, and south of 6th South Street.

Q What other uses are the waters of that Factory race put to aside from the irrigation which you have just described?

A The waters of the Factory race, in conjunction with the waters of City Creek, and such waters as are turned to the Dry Creek, Fort Field and Little Dry Creek from the City Race, pass through the Provo Pressed Brick Company's wheel which is just above the Factory race. The Factory race is utilized for power by the Provo Ice and Cold Storage Company, the Hoover's Mill, the

Knight's Woolen Mill, Ward & Sons Mill and the Smoot Lumber Company's mill.

Q For power purposes?

A For power purposes.

Q Now, will you please point out on the map the next irrigating stream which lies to the west of the one that you have just indicated and give its name?

A The next canal is the City Race, or 5th West ditch, as it is marked here on the map. From the Tail race of the Provo Pressed Brick Company's plant there is a channel cut in a south-westerly direction.

Q And you have indicated it there with a red line?

A Yes, I have indicated with a red line to the head of City creek. From that point that is located on lands marked Provo Pressed Brick Company, a little north of the lands of James Bean. From this point it runs in a southerly direction irregular line to the south boundary of a piece of land marked J. B. Lloyd, and then in a northwesterly direction in an irregular line to the west side of 5th West Street. Then in a southerly direction, or south, I should say, southerly direction to 6th South Street, across the track where it makes a slight jog to the east, and again runs south down towards the boundary of the city.

Q Now please indicate --

MR. JACOB EVANS: Is there any mill located on that ditch?

A There is the foundary, Provo Foundary and Machine Company is located on Center Street and 5th West. That receives water from this stream for power purposes.

Q What lands are irrigated by that stream -- all of the first tier and the --

A First tier of blocks. The lands lying west of that over as

far as the Dry Creek on the north of the city, the first tier of blocks to the west throughout their whole length. The second tier from Block 95 Plat A, portion of which is irrigated from this ditch down to the south boundary of the platted portion and a portion of the next tier from 1st North Street south. Portion of Block 81 in Plat A also being irrigated from it and the land to the south of the platted portion and lying west of the lands irrigated by the factory.

Q Factory race?

A Or the Factory race, are irrigated from this stream as far west as the lands of Bent Johnson, Jr.,

Q Have you indicated that with its name?

A It is indicated on the map and being shown, and still farther west and south, lands of Nels P. Johnson.

Q As shown on the map?

A Yes sir. However, the lands to the west of that, the ditches are combined, the ditches from the City creek and the Tanner race or Dry Creek are combined after reaching the southern boundary of the platted portion of the city, and the lands receive part of their water from this ditch and part from the Tanner Race. The small ditches which pass through the platted portion --

Q As marked in red?

A As marked in red, being combined into a larger stream for the field irrigation.

Q What other streams or irrigation ~~six~~ ditches that you have belonging to the city which you have not indicated -- is there one called the Tanner's?

A There is one called the Tanner Race or Dry Creek.

Q Have you indicated that upon the map?

A I have.

Q And is it marked?

A It is marked somewhere, yes sir. Marked in the plat of Block 104.

Q Will you please indicate what land is irrigated from Tanner's Race?

A From Tanner's Race, all ^{lands} west of the Tanner's Race and west of those lands irrigated by the City Race too -- I don't know just how to describe these.

Q Mr. Swan, the lands that are irrigated from Tanner's race are shown upon this map to the west of the other irrigation ditches which you have named?

A Yes sir.

Q And the names of the owners of the lands are indicated upon the plat are they?

A Yes sir, and the extent of the small laterals are shown by red lines which extend out from the main red line indicating the canal.

Q Now from that map then is disclosed lines showing the canal system of Provo City together with the irrigation ditches within the city ?

A Yes sir, the ditches and canals being shown in red lines.

Q Now, have you undertaken to show upon Exhibit 58 the various laterals in the cross sections of streets as they actually exist in Provo City?

A Yes sir.

Q How have you indicated those?

A Those are also indicated in red lines showing where the ditches extend out and enter the blocks that are irrigated by them.

Q And wherever those and the red lines intersect the block or enter the blocks, it indicates that ~~was~~ water is carried by means of laterals into those particular blocks?

A Yes sir.

Q Can you state, Mr. Swan, what water, what amount of water has been diverted by Provo City into these various canals?

A The amount of water that has been diverted into these various canals is variable with the flow in the Provo River or variable

as Provo City supply varies. The proportions that have been --

Q Let me interrupt you, Mr. Swan, I will ask you to bear in mind that under the stipulation heretofore entered into, ⁱⁿ this case, I want you to state what waters were claimed ~~by~~ or what waters have been diverted by Provo City prior to the filing of this suit, as well as what waters were diverted under the act of the commissioners.

A That is what I understood.

MR. JACOB EVANS: Give us the years you are speaking of then, and the amount, please.

A From the year 1902 there has been an endeavor made to apportion the waters on the following basis.

MR. JACOB EVANS: Just wait a minute, you were not here in 1902, were you?

A No sir.

MR. JACOB EVANS: You don't know anything about that?

A I have the record.

Q Mr. Swan, just state the amount that has been diverted to your knowledge, and give the years of those diversions?

A You wish that from my own measurements?

Q Yes, Mr. Swan, are they available at present?

A I have them here.

Q If you cannot locate them I can proceed with other lines of inquiry.

A I can give an indication of what was in there on January or on June 2, 1913. There was in the Tanner Race 25.11 second feet.

MR. A. C. HATCH: Just a moment, I understood the question the water diverted in all the canals.

MR. RAY: He is giving them separately.

MR. A. C. HATCH: That necessitates a computation.

MR. JACOB EVANS: Go ahead.

A In the City Race 32.47 second feet;

Factory Race 74.91 second feet;

In the East Union 40.01 second feet. I have measured these canals at other times.

MR. JACOB EVANS: I would like to ask one question there. Were those measurements made by you?

A They were.

MR. JACOB EVANS: On this date?

A On June 2, 1913.

MR. JACOB EVANS: What would that make your total in the whole system?

A I measured in there, all so the Cluff and Dixon End, I will have to total it separately, 172.50.

Q Have you taken into consideration the amount of water that was diverted into the pipes and known as the water works system of Provo?

A There was at that time seven second feet in the water works.

Q In addition to what you have already given?

A In addition to what I have already given.

Q Mr. Swan, did you at that time make any measurements of Provo River to determine the quantity of water therein flowing at that time?

A I did not.

Q Give me your next measurement?

A The other measurements that I made were generally made at the time when we were short of water and I went at the request of the city water master to --

MR. JACOB EVANS: I object to this as not responsive to the question, let us have the measurements.

A Measurements were made separately, and I can give them separately.

Q Give me your measurements, Mr. Swan?

A On August 4, 1914, 46.99.

THE COURT: In what canal?

A In the Factory Race.

MR. THOMAS: Give the numbers again so that we will

all get them?

A 46.99. Did I give the year?

MR. JOEB EVANS: You said 1914.

Q August 4, 1914, Factory Race?

A That same day City race 23.2.

Q Have you the next?

A The river was fluctuating that day, I have several measurements taken on that same day. On June 3, 1914, the City race --

MR. JACOB EVANS: Can't we finish up with the measurements you made on all the rest on the same day?

Q Will you kindly give as nearly as you can the answer to the question and we will get along in a little more orderly way. I would like you to give the quantity of water which you found in the Factory race, City race and Tanner's race and the others you have named.

MR. JACOB EVANS: East Union.

Q I would like it to follow, August 4, 1914.

A There was in the Dry Creek at that time --

MR. COLEMAN: Speak of that as the Tanner.

A Tanner Race 12.77.

THE COURT: This is August 4th?

A This is August 19th. Was I giving August 4th?

Q Keep your August 4th, Mr. Swan, take time and get your August 4th data.

A I don't find the other measurements taken on these on that date.

Q Then go to your August 19th measurements and give the quantity you found in each of the streams.

MR. RAY: Now, your honor please, I object to the materiality of measurements in 1914 at a time when the river was being administered under stipulation by the commissioner, unless it is intended to dispute the testimony of the commis-

as to what he turned to Provo City.

MR. THOMAS: We are certainly not going to dispute the amount that the commissioner distributed at that time.

THE COURT: What is the object of this evidence then. When was the stipulation made?

MR. RAY: 14, 15 and 16, your honor.

MR. THOMAS: We are getting up to the period of the stipulation.

THE COURT: Into the period.

MR. JACOB EVANS: We entered into that stipulation along in May, as I remember it.

MR. THOMAS: That is correct, your honor, and further testimony on this ground would not be material, because we are not contending any contest on that.

Q Directing your measurements -- let me ask you if you made any measurements prior to June 2, 1913?

A I did make some measurements, but I kept no record of them at that time. I made one with the water commissioner several times and made measurements as to the quantity, at his request.

Q Can you state from memory whether or not the quantities which you found at those times were approximately the same quantities, or more or less than those found in 1913?

A They were less than these quantities.

MR. JACOB EVANS: Wait, we object to that as incompetent, referring to the question whether it is less, ^{ask} and would also that you fix the date when these measurements were made.

MR. THOMAS: We will do that.

A I made the measurement on July 25, 1912.

Q Have you any record ~~at~~ of that measurement?

A Yes sir.

Q Have you got it there? A. Yes sir.

Q Please give it?

A there was in the Tanner's race 11.77 second feet;
City race 20.77;
Factory race 31.41;
East Union 19.6.

Q Have you any measurement prior to that time?

A No sir.

Q Did you make any measurements prior to that time?

A No sir, not prior to that date.

MR. THURMAN: How about the Factory Race that date?

Q Give all the measurements you had on that date in 1912,
please.

A I have ~~ga~~ given them all.

Q You gave all of them?

A Yes sir, gave all the four canals.

Q Now, Mr. Swan, I want to ask you this question, didn't you
have in your official capacity anything to do with the survey-
ing of the lines for the water system where appropriations were
made by the city, that is, extending the lines up making the
new conduit?

A No sir, except in some recently.

Q How recent?

A In 1914.

Q Please state what that work was and where it was done.

MR. JACOB EVANS: Was that ~~extmain~~ extending some
little lateral from the main line of the city here?

A That was up ~~s~~ in the canyon, extending a line to one of the
springs.

MR. JACOB EVANS: All right, go ahead.

A To add to the city as Nunn's.

Q In Provo Canyon?

A In Provo Canyon. We extended the lines on the south side of
the river taking in a spring there on the south side just east
of the station.

Q Do you know what that spring was called, if it had a name?

A I don't know that it had any individual name.

Q Were any other springs brought into the city at that time, to your knowledge?

A Not to my knowledge. Later there was another -- this same extension was continued and the other springs were taken in a little farther to the east.

MR. JACOB EVANS: I would like if I can -- I think there is a very sharp conflict between the plaintiff and defendant concerning these springs -- I would like to have you fix the date.

MR. A. C. HATCH: This is not our springs

MR. JACOB EVANS: These are on the south side.

A These are on the south side.

Q Extending up on the south side of the river what spring were brought in, you have named one that was called the Nunn station or Nunn's station and then the mains, I understood you, were extended farther up the canyon?

A Extending up the canyon a short distance taking in other springs.

Q Did those springs have any names to distinguish them you know of?

A Not that I know of.

Q State whether the waters of those springs was taken directly into the water mains of Provo City?

A Yes sir, the extension was made from the existing branch of the collection system and the waters were put into that branch.

Q Were any other springs taken into the system to your knowledge in 1914?

A There was a spring also taken in on the north side of the canyon.

Q Where?

A Near this same station extending eastward or northeastward from the Nunn's where the lateral was run taking in a spring on the Thayers flat, ground owned by Provo City.

Q Was that spring known by any name that distinguished it, either as to its water or locality?

A Not that I know of.

Q And that water, or the water from that spring was piped into the system?

A Yes sir.

Q And conveyed across the river?

A It was conveyed across the river. From there down it was conveyed into a lateral of the collection system.

MR. JACOB EVANS: Let us have the date when that spring on the south side of the can --

MR. THOMAS: We are speaking of 1914.

MR. JACOB EVANS: What date in 1914, what month?

Q Can you give the month let me ask, you have a record of that in your notes, haven't you?

A Yes sir.

Q And you can get it?

A Record of my survey, yes sir.

Q By next session give the exact date of all these surveys or additions? A. Yes.

Q And you will furnish them for the the morning?

A Yes sir.

THE COURT: You mention some place the spring was located on.

A Thayer's flat.

THE COURT: And that was on property belonging to the city?

A Belonging to Provo City.

Q Were any othersprings piped into the city service in 1914 of which you now have remembrance?

A Not that I remember.

Q What was ~~was~~ done in 1915?

A In 1915 there was a spring taken into the system which is west of the Spring Dell ground on the north side of the canyon.

Q Provo Canyon?

A Of Provo Canyon.

Q You have superintendency of that?

A No sir, I made the survey of the location of the spring, the ground, but the work of construction was under the superintendency of water works.

Q Were any other springs piped into the Provo system during 1914 or '15?

A Not that I know of.

MR. JACOB EVANS: Did the spring have any name that you know of?

A Not that I know of.

Q Can you give a location on it now, describe its location?

A It is a little west of the Spring Dell weir house, and on the opposite side of the river.

Q That is the north side of the river?

A That is the north side of the river.

Q The Spring Dell weir house is the weir house belonging to the city is it not?

A Yes sir.

Q Now, this spring which you have last described, is in a cotton wood hollow, is it not, or hollow where there was a lot of cotton-wood trees? A. Yes.

Q And some maple trees?

A I think so.

Q Isn't it in the hollow that is sometimes known as Spring Hollow?

A I didn't know it by that name.

Q Do you know of a spring that is sometimes called Maple Spring, have you ever heard of it by that name?

A I have never heard of this spring by that name.

5:00 P.M., Recess to 9:40 A.M., June 16, 1916.

MR. THOMAS: If the court please, in the excitement of the afternoon, being called out of court, I overlooked qualifying Mr. Swan as an engineer. I mentioned the matter to Judge Hatch, he said it would be admitted. Is there any objection from any of the counsel?

MR. McDONALD: We admit it.

MR. RAY: We admit Mr. Swan's qualification, your honor.

MR. A. C. HATCH: We don't think Provo City would employ an incompetent person and we will admit his competency.

MR. JACOB EVANS: I would like to inquire a little concerning this particular spring for this reason. There is a sharp conflict between the plaintiff and defendant Provo City respecting the ownership of a certain spring up there, but as to the particular identity of that spring it is hard for us to do that by any name, because it is not known, and I desire to make some objections to testimony when we come to this particular spring.

MR. THOMAS: It is this particular spring right now.

MR. JACOB EVANS: Is this the particular spring in question?

MR. THOMAS: It is this particular spring, and make any objections you care to now, because I am going ahead on this particular spring. The one you have called the Maple Spring is the one we have called the spring rising in

Cottonwood hollow, and it rises to the north of the Denver & Rio Grande track approximately about a third of a mile up the canyon from Mr. Heiselt's place.

MR. JACOB EVANS: It is the spring that was taken in to the power plant about which there was a controversy at the time between the plaintiff and the defendant Provo City?

MR. THOMAS: As to that, Mr. Evans, I am advised as to any controversy because I have been brought into the case later.

MR. JACOB EVANS: I could ascertain that by a question from the witness and that is what I wanted to do.

THE COURT: very well, you may ask the question.

GEORGE C. SWAN - - - - -

CROSS EXAMINATION by Mr. Jacob Evans.

Q Was this spring which you called Maple Spring -- what do you call the spring?

A I don't know it by any name, it is a spring which is located, as I stated yesterday, a short distance west of the Spring Dell weir house on the north side of the river.

Q Now, can you state whether or not this was the spring about which -- is it the lowest pipe line crossing the river that connects with the Provo City water mains?

A Yes sir.

Q Can you state whether or not this is the spring about which there was a controversy at the time the spring was taken into the Provo City water works system between Provo City and the Plaintiff, Provo Reservoir Company?

A It is.

Q Now, can you state what the basis of title to that spring was as claimed by Provo City, or as is now claimed?

MR. THOMAS: I object to any further cross examination at this time.

MR. JACOB EVANS: This is the point I want to make concerning that, if the court please. He testified that spring was taken in 1915. Now, they have introduced --

MR. A. C. HATCH: He testified also it was owned by the city .

MR. RAY: No.

MR. JACOB EVANS: They have introduced no evidence showing their sources of title to any of this property.

MR. THOMAS: Will counsel permit an interruption. We are just beginning our testimony and it is impossible for us to accomplish in a moment what you have sought to accomplish in something over a week. I object to this as being an improper cross examination at this time.

THE COURT: I will hear Mr. Evans as to his theory why it is proper cross examination.

MR. JACOB EVANS: My position is this. We don't want any evidence to go into this record concerning this spring about which there is a dispute, when we know what the spring is without having an opportunity to file proper objection or make proper objection and have rulings so that we may preserve a record. Our theory of this is when they took that into their pipe line in 1915 it was long subsequent to our appropriation, that the spring was on our ground, in our canal, that they didn't appropriate it through the state engineer's office, or in any other method or in any other manner, and it was our spring and not their's, but they merely took it by means of force, in a sense and we want to go to the question of the title and don't want to let evidence go in concerning this without an opportunity to object to it.

THE COURT: You have an opportunity to object to any of the evidence and to all evidence, but I think the questions you are proceeding to ask now are in the nature of general cross examination.

MR. JACOB EVANS: That may be so.

THE COURT: You may proceed with your examination. I understand your contention is that the spring is on your ground?

MR. JACOB EVANS: Yes, your honor, it is in our canal that we purchased.

THE COURT: Rises on your ground?

MR. A. G. HATCH: No, I don't so understand, on Heiselt's ground, but was flowing into our canal at the time it was taken by the city.

THE COURT: Now, you may proceed.

DIRECT EXAMINATION by Mr. Thomas continued.

Q Mr. Swan, directing your attention to Exhibit 58, I think last night you outlined the courses of the canals and ditches and the lands irrigated under the respective ditches, did you not?

A Yes sir.

Q Was there anything that you fig left out in answer to that question that you now wish to explain?

A I don't know of anything in regard to that.

Q During your experience as a city engineer, you may state if you have become familiar with the streets and the irrigation ditches and the like, in this city?

A yes sir.

Q You may state what you have had to do with the installation of and the laying out and installation of sewer courses and water courses and connections with the residences in this city?

MR. JACOB EVANS: If the court please, I desire at this time in view of the further examination to move to strike out from this record all of the testimony that was given by this witness concerning the spring that we have been talking about this morning. I presumed from what Mr. Thomas said

he intended to follow up that -- he said that was the thing he was now going to have the witness testify about, and he had already testified to some matters concerning this spring. before the identification of the spring was known, and I move now to strike out everything that he testified to concerning this spring on the ground that his testimony was incompetent for the reason that they have failed to show any title or any right, either by appropriation or otherwise to the water of this particular spring.

THE COURT: Motion is denied.

MR. JACOB EVANS: Take an exception.

Q Going back to this spring, I think you stated last night that the waters of this particular spring about which Mr. Evans has spoken was taken into the Provo water works system.

MR. JACOB EVANS: Now then, we make the same objection.

Q Did you make that statement?

MR. THOMAS: Just a minute, you will have opportunity to make objection, I was just asking if the witness stated about that last night. As I recall it he did.

A As I recollect I think I did.

MR. THOMAS: Just a moment.

THE COURT: Now make your objection, question is finished now.

MR. JACOB EVANS: I object to it.

THE COURT: I don't understand the theory upon which you are objecting to this evidence. Your objection would seem to be one in support of a contention that they were not entitled to any relief as to this spring rather than an objection to the admissibility of the evidence. The fact that they took the water into their pipe is one fact which standing alone would not entitle them to this water at all, of course, but might be a fact in connection with proof that they owned the