1 8 November 1988
2 Vancouver, B.C.
3
4 (PROCEEDINGS RESUMED PURSUANT TO AN ADJOURNMENT)
5
6 THE REGISTRAR: Order in court. In the Supreme Court of British
7 Columbia; this Tuesday, November 8, 1988. In the
8 matter of Delgamuukw versus Her Majesty the Queen at
9 bar, my lord.
10 THE COURT: Well, do counsel have anything further to say about
11 what I said last night?
12 MS. MANDELL: My lord, if I could in brief. I think that the
13 suggestion which you raised is helpful and I wanted,
14 though, to ask you to consider with respect to three
15 other points. The first is a point which was
16 identified by my friend, Mr. Willms, yesterday and
17 that is the definition of strategy and, on that
18 point, I urge your lordship to consider the Bogosian
19 case where there -- instead of the definition being
20 left to strategy, it was succinctly put as documents
21 prepared by attorneys containing solely their mental
22 impressions and thought processes relating to the
23 legal theories of a complex case.
24 THE COURT: Well, the problem with it, I find, with those kinds
25 of definitions is that the documents you have to
26 deal with never fit the definition; they have --
27 nothing never deals solely with something. There is
28 always something else put in.
29 MS. MANDELL: That's right, and that's why your concept of
30 blacked out I think is probably the way to go where
31 there will be some judgment call on the part of
32 counsel as to edit out the portions of it that seem
33 primarily concerned with strategy. Although, on
34 that point, I'd ask your lordship to consider that
35 where the documents are to be blacked out, it's my
36 submission that there should be, if possible, some
37 certainty with counsel that once the judgment call
38 has been taken by counsel in this case that there is
39 prima facie an assumption that there has been there
40 a claim for privilege made and, if then there is to
41 be a disclosure through the methods that you seek
42 that there be a burden of proof established in the
43 formula which in my submission ought to shift to
44 those seeking disclosure to show that the document
45 is necessary for credibility or reliability. And on
46 the burden of proof, I just would like to draw your
47 lordship's attention in the Steeves case which is

1 found at tab 8 of our submission at page 74, where I
2 think in that case Mr. Justice Ruttan --
3 THE COURT: Bouck.
4 MS. MANDELL: I am sorry, Mr. Justice Bouck says there that he
5 resolves some of this difficulty by the burden of
6 proof method:
7
8 "Where a court must decide whether a particular
9 piece of evidence is caught by the
10 solicitor/client rule of privilege, the law
11 places the onus upon the party resisting
12 disclosure. However, in my view when it comes
13 to deciding the statement of an ordinary
14 witness is privileged, the burden of proof
15 should be on the party demanding its discovery
16 rather than on the party resisting. What tips
17 the scale in his direction for me is the
18 desirability that each side should
19 conscientiously prepare its own case. In that
20 way, there is more likelihood the truth will
21 unfold."
22
23 And that was followed by United Services Funds case
24 which is found at tab 12 in our authorities. And if
25 I could just comment generally. The reason why I
26 was inclined to urge upon your lordship the firmness
27 that there be a prima facie case of privilege
28 established and then a burden of proof shift if
29 there is to be a disclosure by the court is that I
30 feel that the burden should still remain with
31 counsel to do this job, and where counsel can't
32 agree or where, because of the difficulties that one
33 counsel may be having in trying to get to the root
34 of the credibility issue through ordinary means or
35 another counsel may have reasons of their own for
36 resisting certain statements, where the situation
37 comes to the line, then and only then in my view
38 should the court be asked to intercede. But I don't
39 think that it's a full solution to the problem to
40 say, well, we are going to set up a method where
41 inevitably the court is going to intercede in each
42 and every black out because that's the prescribed
43 method and the party that's seeking disclosure would
44 have nothing to lose but to force to see whether or
45 not there is anything there which can be of use.
46 And so I say there should be some certainty that
47 counsel can go on and that in points of difficulty,

1 then of course I think your formulation that the
2 court intercede in the way you suggest is a good
3 one.
4 THE COURT: All right. Well, yes. All right, thank you. Mr.
5 Willms. I am sorry, one other thing. You are
6 not -- you are not suggesting that I shouldn't
7 follow Mr. Justice Finch's judgment?
8 MS. MANDELL: Not as I interpret Mr. Justice Finch.
9 THE COURT: Yes, all right.
10 MR. WILLMS: As I indicated yesterday, my lord, the phrase
11 strategic information was of some concern and what I
12 suggest, bearing in mind the steps that your
13 lordship proposed, was that if strategic information
14 means any part of the presentation of the
15 plaintiff's case where the information is not
16 related to the substance of the report or the
17 substance of the evidence, then that's strategic
18 information. And I should -- and I use the word
19 substance because that's what Mr. Justice Finch used
20 in Phillips Barratt, and by substance, what I
21 suggest, my lord, is that that's the scope of the
22 report or the evidence and the expertise underlying
23 that. When I say scope, that would catch what's
24 actually in the report but also it would catch
25 what's been taken out of the report, but it would
26 be -- the focus of the inquiry would be on the
27 substance of the report and not on the general
28 advice and the backing and the forthing, so the
29 starting point would be looking at, all right, does
30 this information bear on the substance of the report
31 or the substance of the expert's evidence and
32 substance.
33 THE COURT: Or credibility.
34 MR. WILLMS: Or credibility, but I am --
35 THE COURT: Of course strategy would hardly bear on credibility.
36 MR. WILLMS: Yes, on credibility. The credibility issues, my
37 lord, would probably not be caught within that
38 strategic information. In terms of onus -- my
39 friend suggested the Steeves v. Rapanos case, there
40 is some onus on us to show it shouldn't be
41 privileged. We will -- we can't see it. Steeves
42 and Rapanos was a case where a pretrial application
43 was made to see a witness' statement, and one thing
44 that troubled his lordship was the fact that the
45 witness was available to the parties seeking
46 production of the statement and that it's in that
47 context that Mr. Justice Bouck said that I am going

1 to tip the scales in those circumstances in favour
2 of putting the burden on the party seeking the
3 document rather than the other way around. Well,
4 here, of course, the experts aren't normal
5 witnesses. We can't go phone the expert up, sit
6 down with him, interview him. The expert is cloaked
7 with my friend's work product privilege and is not
8 like an ordinary witness in which there is no
9 property.
10 So what I suggest, as I suggested yesterday, that
11 my friends -- and this is in particular with respect
12 to the listing proposal that we discussed and agreed
13 before the break. So long as my friends maintain a
14 claim for privilege, they should identify in respect
15 of that claim what it is. We have now got two lists
16 from my friends and all that the list says is
17 privileged in parenthesis.
18 THE COURT: Does it identify the document --
19 MR. WILLMS: It identifies the document. It says Overstall to
20 Hatler, a date, and then privileged. Now, there is
21 no way for us to -- I mean, there is nothing I can
22 say. If I was making a submission to your lordship
23 about why that isn't privileged, because I don't
24 know what the claim -- if the claim is for fees, for
25 example, which my friend yesterday conceded may be
26 relevant, then the claim would disappear. So what I
27 am suggesting is that the onus does still remain
28 with my friends that they should assert the
29 strategic information; in other words, not what it
30 is but that there is strategic information.
31 THE COURT: Categorize it.
32 MR. WILLMS: Categorize it, and also assert that it is unrelated
33 to the substance of the report or the substance of
34 the evidence.
35 THE COURT: Would you agree that if that is done, if it is
36 categorized, then the onus should shift to the
37 parties seeking to get behind the privilege, the
38 prima facie privilege?
39 MR. WILLMS: Well, if the category is set out with -- I would
40 say this, my lord: That once that has done the
41 obligation, and I am speaking only for myself here,
42 but I am agreeable to assuming the obligation to
43 advise my friends of the reasons why I say that it
44 should be disclosed, and advancing arguments in that
45 respect.
46 THE COURT: Yes. All right, thank you. Miss Koenigsberg?
47 MS. KOENIGSBERG: I don't think I find myself in disagreement

with either of my friends this morning. I would simply emphasize that in the resolution of what I can call the very difficult cases that you have posed and that we are dealing with in part again this morning that it is the jurisdiction of common sense of the trial judge which, in my submission, must not only be reserved but must be given wide latitude and, as an illustration in dealing with just this last point that we have been talking about, it is -- it seems fairly clear that if one party advancing the claim of privilege sufficiently identifies the area for the claim of privilege, then they have in fact advanced the argument on behalf of the privilege and discharged that onus, but it always of course is subject to whether there has been sufficient disclosure that the other side can't adequately respond.

THE COURT: All right, thank you. Well, I have struggled with this problem overnight and I have been greatly assisted by counsel's submissions. And as a practical matter, I think I will proceed more or less as I described yesterday but I propose to compose a written judgment in this area because it is a matter of great concern to your profession generally. The difficulty with that is that this is an unusual, indeed extraordinary, case, and I am not yet convinced that whatever I decide here will necessarily be of useful general application to ordinary litigation, but that's a matter that I am still wrestling with.

I am going to adopt the practise that has been disclosed to me with respect to the 15 items in Miss Mandell's collection of documents for which privilege is claimed, and I think that as a practical matter the only way to resolve difficulties is for me to look at the documents and make a decision on them. I hope that, by the comments I will make in the 15 items that were ventilated yesterday, that counsel will be able to dispose of most of the difficulties that will arise and, if not, they may reasonably expect that I will try to apply the principles that I am going to attempt to establish by the conclusions I reach with respect to these 15 items. I think that I am going to do my best to conform to the principles established by Mr. Justice Finch but, at the same time, wherever possible, consistent with fairness

and the integrity of the trial process to preserve the historic privilege which attaches to a solicitor's brief. There is no duty that a -- that the privilege must give way to the search for truth within reasonable bound and indeed it is fundamental to Mr. Justice Finch's judgment that the privilege can no longer be regarded as absolute, but I am going to preserve wherever I can what the American -- our American friends call the work product of solicitors. All of which I hope will be made more clear when I am able to give counsel my reasons which will not be for a couple of days because, unfortunately, I am committed to matters this evening and tomorrow evening and I am going to be here in court all day. But certainly counsel can expect to have my judgment early next week.

In the mean time, I think we should proceed if we can on the basis of the practise that was followed with respect to the 15 items that are in Miss Mandell's collection. To that extent, however, it seems to me that I am now in a position where I must have more assistance from counsel; for example, tab 10, I think I must now look at it. It was offered to me yesterday but I declined to do so, I declined to look at it, because I did not want to see something that hadn't been shown to opposing counsel, but I think that we are at the intractable interface, the privilege has been claimed, Mr. Willms says, I can't say whether it's properly privileged or not because I have never seen it, and I think the only answer is for me to look at it and make a decision. I don't have a problem with tab 11 or I don't think I do but -- or tab 12 because nothing seems to be blacked out; is that correct, Miss Mandell?

MS. MANDELL: You have a problem with tab 11 but not tab 12, 13 --

THE COURT: What is the problem I have -- no, there is a problem with tab 11, but I can deal with it.

MS. MANDELL: I think you can. You've got all the same kind of information.

THE COURT: I have got both copies.

MS. MANDELL: No, you don't.

THE COURT: I don't have the clear copy.

MS. MANDELL: No.

THE COURT: You are quite right. So I need that tab as well.

MS. MANDELL: And I believe that you need tab 15.

1 THE COURT: Well, tell me first, tab 13 is unedited.
2 MS. MANDELL: That's right.
3 THE COURT: And your friend has it?
4 MS. MANDELL: Yes.
5 THE COURT: All right. And tab 13, I am not sure what it is
6 here for.
7 MS. MANDELL: Well, if I could just say this, that tab 13, 14
8 and 12, these letters were all sent and there is no
9 claim of privilege with respect to them. I was
10 going to use them in my argument to illustrate the
11 kinds of places that although it is slightly outside
12 the -- perhaps considered outside the area of the
13 subject matter that in any event we consider that it
14 was enough to disclose it, but not for your
15 lordship's decision.
16 THE COURT: Then I do not have a clean copy of tab 15, but I was
17 told that the blacked-out area or portion relates to
18 financial matters and do you maintain a claim of
19 privilege?
20 MS. MANDELL: We don't claim privilege. The only other is a
21 letter of December 20 which I have a copy of, your
22 lordship, where I advised my friend we claim
23 privilege and it is with respect to -- there is no
24 tab here with it. It's really very much a part of
25 the same objection which you will be dealing with
26 with the Pojar memorandum which was taken from
27 tab -- tab 10, so I will hand up that letter to your
28 lordship at the same time.
29 THE COURT: All right. If I could have those, I will do my best
30 to complete a judgment as quickly as I can, but I
31 regret the intrusions but it is too late to deal
32 with it now. So I will deal with it as quickly as I
33 can. If it is of any assistance to counsel, I think
34 I can say also that, if I didn't mention this
35 before, I am going to try and confine myself to --
36 to considering documents that have come to the
37 attention of or have been in or are in possession of
38 the witness. I have thought overnight of counsel's
39 musings about the report, and it seems to me that if
40 they did not reach the witness then I ought not to
41 get into them, and I will try to make that clear.
42 It is easy as I have said to conjure up scenarios
43 that might leave one to a train of inquiry that
44 would logically say that it must be disclosed.
45 Example I gave was if the lawyer was to write to his
46 associate, this report is excellent, it is a good
47 thing he doesn't know about X or Y, I think that's a

professional matter that is beyond the scope of the present investigation and I don't see how it affects the content or the credibility of the witness if it was never made known to him. To that extent, I apologize for this rambling description of what I hoped sometime to say may be of some assistance. All right. Are we able to proceed?

MR. GRANT: Yes, my lord. Maybe possibly, though, I have -- I have not anticipated -- of course pre-anticipated your ruling of the argument which I wasn't here on, but I do have some disclosures to make with my friends, I have some material to bring into the court for this next witness, and possibly if we could have a five minute break so we can get organized.

THE COURT: All right. I will go to my chambers and madam registrar can phone me when you are ready to proceed.

THE REGISTRAR: Order in court. Court will recess.

(BRIEF ADJOURNMENT - 10:27 A.M. TO 10:49 A.M.)

THE REGISTRAR: Order in court.

THE COURT: I am sorry to have to advise that this is another day when I have a meeting scheduled at 11:15 so I am sorry to get started and have to break again.

MS. MANDELL: Thank you for bearing with us -- with me, my lord, in terms of discussion.

THE REGISTRAR: Stand and take the bible in your right hand, please.

RODNEY CHILTON, a witness called on behalf of the Plaintiffs, having been duly sworn, testifies as follows:

THE REGISTRAR: Would you state your full name for the record and spell it, please?

THE WITNESS: Rodney Chilton, C-h-i-l-t-o-n.

THE COURT: Sit down, please, Mr. Chilton, if you wish.

THE WITNESS: Thank you.

MR. GRANT: My lord, before commencing to qualify this witness, I would like to set out the opinion I propose to tender him to give. Mr. Chilton is a climatologist, and I am tendering him to give an opinion on the relative rate of evapotranspiration.

THE COURT: Evapotrans --

MR. GRANT: -- piration. E-v-a-p --
THE COURT: I am sorry, just a minute. E-v-a-p-o --
MR. GRANT: -- t-r-a-n-s-p-i-r-a-t-i-o-n.
THE COURT: I am sorry , p-i-r-a-t --
MR. GRANT: -- i-o-n
THE COURT: Yes.
MR. GRANT: Of berries over the territory which is shown in the map atlas of the plaintiffs, I think it is exhibit --
THE REGISTRAR: It's marked for I.D. 358.
MR. GRANT: Exhibit 358 for Identification and map 21 of that atlas which madam registrar had arranged to have available.
THE COURT: Map 21.
MR. GRANT: Yes, dealing with map 21.
THE COURT: Thank you.

EXAMINATION IN CHIEF BY MR. GRANT:

Q Now, I have and possibly -- I have tendered to the court a document book, it is a short document book, which experts -- excerpts from evidence are included as I will be making reference to them, and I will deal with each document in it as a separate exhibit. And possibly that green book, the witness copy -- or the exhibit copy, could be put in front of the witness and, at tab 1, my lord, is the curriculum vitae for Mr. Chilton. Do you want to look at tab 1?

A Yes.

Q And you have had an opportunity before taking the stand today to review this curriculum vitae?

A Yes, I have.

Q And that curriculum vitae is your curriculum vitae and sets out your qualifications?

A Yes, it does.

Q Now, what I would like to ask you is if you can explain to the court what a climatologist is?

A Well, a climatologist studies past, future and present climate or weather.

Q Yes.

A And the part of climatology that I am involved with is an applied climatology, and that relates to man's -- the effect of climate on man, like agricultural concerns and forestry. They look at things that are quite sensitive to things like frost and heat units and the effect on crops, that sort of thing.

Q For example now, outside of the research you did for this court case, are you involved in any specific project that exemplifies what you are describing as a climatologist?

A Well, presently, I am looking at the kiwifruit in British Columbia and we are trying to assess where they can best be grown. One such area is the Saanich Peninsula and because that crop is a subtropical crop, they are very susceptible to winter damage and freeze free periods, so those two elements we have examined in quite great detail to try and find out where we can define the areas where they can best be grown.

THE COURT: I thought it was settled they could best be grown in Chilliwack?

THE WITNESS: You saw that on the news, did you?

THE COURT: I have some of them in my refrigerator at home.

THE WITNESS: Yes, that's pretty well the eastern limit of kiwifruit. They won't grow anywhere further in the interior than that because it gets too cold.

THE COURT: Surprised it grows there.

THE WITNESS: Yes, marginal area actually.

MR. GRANT:

Q Are you involved in that project in Chilliwack now?

A Not in Chilliwack per se, but we have weather stations there and we are monitoring the response of kiwifruit to the weather. There is five acres there.

THE COURT: Is it successful in Saanich?

THE WITNESS: In Saanich it is, yes. We haven't had losses there like the Fraser Valley has been quite devastated by 1985 winter. There was over 50 percent loss of kiwifruit in that winter. That was a very early extreme event but that's the kind of thing they are concerned about growing them here.

MR. GRANT:

Q I'd like to refer you to your own work experience, and you have a bachelor of science degree in geography with a specialty in climatology from the University of Victoria?

A Yes, that's correct.

Q Which you obtained in 1971. And in -- before that you have a meteorology technician diploma from Atmospheric Environment Service (Canada) 1966?

A That's correct.

Q Now, in the course of your research for this project -- when I refer to this project, the work

that you are doing that you are giving evidence about today, did you use data from the Atmospheric Environment Service?

A Yes, we did.

Q Are you familiar with how that data is gathered from your work -- from your diploma at that time?

A Yes, I am. Yes.

Q Can you explain what -- how Atmospheric Environment Service data is gathered and given, for example, in the area you covered?

A Yes. Atmospheric Environment Service data is usually collected at airports and also by volunteers and usually they collect temperature and precipitation information, and they are usually long-term stations. Within the region -- study region, the Smithers Airport is a good example of a station that collects Atmospheric Environment Service data.

Q And have you in the past yourself been involved in collecting that type of data?

A Yes, I was in the training course, and also with the Provincial Government we had weather stations throughout the province that we visited and collected the charts and compiled the information and then analysed the information.

Q Can you say anything about the quality of Atmospheric Environment Service or A.E.S. data in the climatology field?

A Well, it is excellent where they have stations, it is just that within British Columbia because it is such a very topography, we often need additional stations, but they have very high standards of information that they collect.

Q And over what range -- time range is that data collected say within the study area that you are involved in this project?

A Well, records go back to the 1930s certainly, and prior to that a little bit, I think, too.

Q And did you use provincial data that you have just referred to?

A Yes.

THE COURT: Is this A.E.S data, is that federal or provincial?

THE WITNESS: That's federal data, yes.

MR. GRANT:

Q And what type of provincial data did you use and what do you know about how that data is gathered?

A Well, that datea is much more extensive throughout

this region. They usually collect temperature and precipitation elements at all of their stations, and they put a far number -- far greater number of stations out in a region for a short period of time and then the data is compared to the Atmospheric Environment Service data to come up with long-term averages based on three to four year climate networks.

MR. GRANT: Okay. Could I have Exhibit 358 map 21 put in front of the witness, please. Your lordship may wish to --

THE COURT: We are looking at map 21?

MR. GRANT:

Q Yes. This is the map. Now, you have seen this map before?

A Yes, I have.

Q And on that map, does it show either A.E.S stations or provincial stations or both?

A It shows both.

Q Okay. Can you just give an example for his lordship so that he can understand what you are referring to here?

A Okay. Near --

Q An example of each?

A Okay. All right. We have got the key here indicated the little squares.

THE COURT: Little black squares?

THE WITNESS: Little black squares are Provincial Government stations, so that would be a Provincial Government station right there. And the triangles are the Environment Canada, Atmospherice Environment Stations, and there is one near New Hazelton, right there.

MR. GRANT:

Q This one here Hazelton, Temlaham, is that a federal station?

A That is as well, yes. You can see it there anyhow, put your fingerprint. So there is quite good --

THE COURT: These are unmanned stations, are they?

THE WITNESS: That's right, yes.

THE COURT: All of them or are some of then manned?

THE WITNESS: Well, the airport stations have an operator there at all times to look at the data every hour actually and the -- some of the other stations are volunteer stations and they are just operated by someone out of his home. He may just look at the station once a day.

THE COURT: Yes.
THE WITNESS: Our stations are left for a month at a time and then we have a technician that used to come in and change the stations every month.
THE COURT: Change the location of the station?
THE WITNESS: No, change the data or remove the chart and put a new chart on and take that chart back to Victoria. Then it will be compiled.
MR. GRANT:
Q When you are referring to our stations, is that the provincial station?
A Yes, that's when I was with the Provincial Government.
Q And that's what I was getting to. You worked with the Provincial Government, Ministry of Environment, as a climatologist for ten years from 1971 to 1981?
A That's right, yes.
Q And your C.V. suggests that your duties included, and they refer to two items, the coordination of climate data requests from other government agencies, industry and the public. Can you summarize what you did in that job?
A Yes. Well, we had requests for climate information. Often it required analysis, so I'd go into the data files and extract data that applied to that particular problem and often I had to calculate averages and extremes for those particular users, and then distribute the information back to them.
Q In the course of that, would you be using data such as the data you used on this project?
A Yes.
Q The study of the various drawings?
A Yes.
Q You were involved in the Southeast Kootenay climate network's scientific research?
A That's right, yes.
Q Now, this -- the commentary on Exhibit 358 (21), if I can call it that, which was the map 21, the commentary refers to potential evapotranspiration. Now, can you explain -- did you work with potential evapotranspiration mapping in the Southeast Kootenay climate scientific research?
A Yes, we did.
Q Can you explain what you -- why you did and what you were doing there?
A Well, an important part of the Provincial Government programme is to assess and map the climate

capability for agriculture in different regions and an important part of that is to assess the moisture deficit within regions and, as a part of that, you have to estimate the potential evapotranspiration within that region, and you take the difference between that and the rainfall to come up with the moisture deficit. It is very critical in agriculture to determine how much irrigation is required, et cetera, and --

THE COURT: What is the -- every man's definition of evapotranspiration?

THE WITNESS: Well, evapotranspiration can be defined as the amount of evaporation from a soil surface and the amount of transpiration from plants. An evaporation of course is just where the atmosphere changes liquid or solid like ice or water to water vapour. That's what evaporation is.

THE COURT: I got as far as you measuring the amount of evaporation from soil surface.

THE WITNESS: Yes, and transpiration from plants.

THE COURT: What do you mean by transpiration?

THE WITNESS: Well, a plant during the day releases moisture in response to solar radiation and temperature, transpire much as we do I guess in a sense. So that's the transpiration part of that. And I was dealing here with potential evapotranspiration.

MR. GRANT: That's the next question. I wanted to ask you what -- can you explain what potential evapotranspiration is?

THE COURT: Is that potential?

MR. GRANT:

Q Potential, yes.

A Yes. Potential evapotranspiration assumes that moisture is unlimited in its supply so you always have a source of water to evaporate, so that's what -- that's all that means.

Q And then what -- so you assume that there is an unlimited supply of liquid to evaporate?

A To evaporate, that's correct.

Q And what do you come up with then as a result of that? I mean, what's the --

A In --

Q I mean, is that potential evapotranspiration a theoretical concept?

A It is -- it can be addressed in different ways. There is formulas to estimate the amount and also there has been studies done on actual -- the actual

evapotranspiration, but that's very sight specific and can only be done once or twice in a region.

Q Have you had an opportunity before today to read the commentary on the top of map 21?

A Yes, I have.

Q And is that commentary a summary of your -- of your opinion?

A Yes, it is.

Q And you agree with it with a few exceptions relating to some typographical errors which I will refer you to?

A Yes, I do. Yes.

MR. GRANT: The second paragraph of that, the derivation of the drawing index --

MR. WILLMS: My lord, I wonder whether my friend is finished the qualifications because I do have some questions on qualifications for this witness. It sounds like he is getting into the opinion of the witness and has passed beyond qualifications.

MR. GRANT:

Q I am not finished the qualifications. I am going to the very point which was raised about evapotranspiration on this map and I will certainly give my friend a chance to cross-examine on qualifications before I go to the opinions. The term potential -- you see that paragraph, it starts, the term:

> "Potential evapotranspiration",

And goes on:

> "...may be defined as the amount of moisture that, if available, would be removed from a given land surface by evapotranspiration"?

A Yes.

Q Do you agree with that?

A Yes.

Q And is that an accepted definition amongst climatologists?

A Yes, it is.

Q Okay. Then it says:

> "Evapotranspiration is defined as the combined loss of water from a soil surface and by transpiration of plants."

And that's what you just described?
A Yes.
Q And then:

"Potential evapotranspiration (P.E.) then may be regarded as a representative figure as the drawing potential of the atmosphere."

Is that right?
A Yes, that's correct.
Q Is that what you were involved in in the Southeast Kootenay climate networks research?
A As a part of that.
Q As part of that project?
A Part of that project.
Q Did you map potential evapotranspiration in the Southeast Kootenays?
A Actually, we didn't get to that stage, no.
Q But you -- you gathered the data that could then have been mapped?
A Yes.
Q Now, I have in your -- or you have in your C.V. focused on two examples of what you have done with the Provincial Government for the ten years you worked with them. Was there any other work you did with the Provincial Government in that ten-year period which -- which experience you relied upon in the preparation of this -- of your work in this case?
A Well, generally you get a base of expertise when you are working in an area and more specifically I mapped potential evapotranspiration for the capital regional district, that's throughout the Saanich Peninsula, greater Victoria region, and I referred to that in one of my reports.
Q I am sorry, you referred to -- you referred to that later in your C.V?
A Yes, that's right.
Q And then your work experience is that you were contracted with the Grape Growers' Association?
A Yes.
Q And in that, you were doing climatological mapping for them?
A Yes, that's correct.
Q And from 1983 to the present, you are now a consultant and, amongst other things, you assisted

Dr. Mauro Coligado and Mr. Robert Marsh in developing air pollution models?
A That's correct.
Q Have you, in the work you have done in this case, have you relied on Dr. Coligado's -- any material or any of his work?
A Yes, yes, I have.
Q And I won't go into it at the moment, but I just refer you to tab 3 of your document book there, if you could go to tab 3?
A Yes.
Q Can you explain what that document is?
A Yes. This is the scientific documentation for the computer programme that I used to determine the potential evapotranspiration figures for the Northwest British Columbia, within the study area.
Q Within -- in this work for this case?
A Yes, that's correct. And the very last page of that document in tab 3 is the one that I was concerned with and that was --
Q The second last page, would it be?
A No.
Q The last page is references.
A Oh, sorry, second last page, yes. Page 17.
MR. GRANT: Mm-hmm.
THE COURT: Tab 3.
MR. GRANT: Tab 3 of document book, page 17, in the upper right-hand corner. Calculation and equasions.
THE COURT: Oh, yes.
MR. GRANT:
Q Is that the equasion that you utilized in developing the potential evapotranspiration for the food drying index map?
A Yes.
Q And could you explain who Dr. Coligado is and what his --
A Yes. He is an agrometeorologist with the Provincial Government, Ministry of Environment; he is a doctor, and that's his specialty, is agrometeorology.
Q Did you work with him while you were with -- employed by the Provincial Government?
A Yes, I did.
Q And also afterwards in this consulting --
A I have talked to him about certain problems, yes.
Q Then I am going back to tab 1, and you described -- you have already referred to page 1 at the bottom, your work with Agriculture Canada, the Ministry of

Agriculture and the Kiwifruit Growers. That's what you were just describing --

A Yes.

Q That's one of the projects you are working on?

A Yes.

Q And (d), under that, is the development of the food drying index for the Gitksan and Wet'suwet'en hereditary chiefs?

A Yes, that's correct.

Q I'd like you to refer to the subjects of the publications while at university. Do any of those publications -- did they involve research which gave you experience that was utilized in this project?

A No.

Q Okay. I'd like to go down to the publications while employed with the Government of British Columbia and particularly under 2(a) Climatic Study -- I take it the settlement suitability studies did not involve research that gave you experience that you could use in this work?

A No. Well, the (c) -- 1(c).

Q The South Kootenay?

A Yes. That was a part we -- I estimated the potential evapotranspiration figures for that.

Q When did you do that work in the Southeast Kootenays?

A When?

Q Yes, when. It was while you were employed by the government.

A Yes, that's right.

Q But do you recall about what years?

A It was just before I left the government, it was 1979 or '80, I believe.

Q And then under the Climatic Studies, (a), you have already referred to this summary for the greater Victoria region and you map potential evapotranspiration for the capital region; is that correct?

A Yes.

Q Who did you do that work for?

A Well, it was for the capital regional district.

Q Yes.

A They requested that the Ministry of Environment do that work for them. It was a whole portfolio of different experts just giving an overview of the -- well, the potential for the greater Victoria region in terms of ungulates and agriculture and a part of

that is the climate of the region as well, and that's the part I was involved in.

Q And (b) and (c) on the bottom of that page, did that involve any work that relates to the type of work you did with the Gitksan chiefs or for the Gitksan chiefs?

A No.

MR. GRANT: Okay. Going to page 4.

THE COURT: Page 4.

MR. GRANT:

Q I am sorry, my lord, page 3, yes. At the very top, you were involved in a climate summary for Templeton, McDonald and Grassy Creeks, three watersheds in West and East Kootenays. Is that part of the work you describe as the Kootenay project?

A Well, it is an off-shoot of the information we collected in that region but it isn't part of the project as set out initially.

Q Okay. What did you do in that project?

A I have trouble recalling this. I assessed the temperature and precipitation throughout these three watersheds and provided the information to Greg Utzig. It was a written report actually. I can't remember that much more about that particular project.

Q When was that?

A It was very early on in my career with the government.

Q Career with the government?

A Yes. It was about 1973, I believe.

Q What about the climatology of the Gulf Islands Trust area? Do you recall about when you did that?

A That was about the same time. Early on.

Q And did that involve potential evapotranspiration as part of that research?

A Not that I can recall, no.

Q And then you have Agriculture Publications. Were these prepared, that is, (a) and (b), were they prepared while you were with the government?

A Yes, that's correct.

Q And (b) deals with springtime minimum temperature patterns in the Smithers region of the Bulkley Valley?

A Yes.

Q What did you do that for and did you use data -- did you use any of the same data that you used for this project?

A Not actually, no. We were trying to assess the freeze potential or the freeze risk within the Smithers region, and I collected the information using a mobile temperature probe, that's suspended on the front of a vehicle. It is just a thermometer and you go along and measure the temperature as you go and you compare that information back to a base station, like Smithers Airport, for example.

Q Now, what I'd like to ask you is if you -- you have explained what evapotranspiration is and I'd like to ask you if you are familiar with other studies of potential evapotranspiration and if that was part of the research that you have done?

A Yes, I am familiar with other studies, yes.

Q Can you give some examples of some of those other studies which you are familiar?

A The Baier/Robertson approach is something with which I am familiar.

Q Okay. That's -- can you refer to tab 2 of your book?

A Yes.

Q And is that the Baier/Robertson --

A Yes, that's right.

MR. GRANT: My lord, I know your schedule and the time. Maybe we should break. I wonder if tab 1 could be marked as the next exhibit.

MR. WILLMS: No objection.

THE COURT: Yes, all right.

THE REGISTRAR: Exhibit 790.

(EXHIBIT 790 - CURRICULUM VITAE OF RODNEY CHILTON)

THE COURT: All right. We will take the morning adjournment now then, thank you.

THE REGISTRAR: Order in court. Court will recess.

(ADJOURNMENT AT 11:17. A.M.)

I hereby certify the foregoing to be a true and accurate transcript of the proceedings herein, transcribed to the best of my skill and ability.

TANNIS DEFOE, Official Reporter
United Reporting Service Ltd.

THE COURT: Mr. Grant.
MR. GRANT:
Q I would like you to refer to tab number two in your document book?
A Yes.
Q And that's the Baier Robertson report that you have referred to?
A Yes, that's correct.
Q I note that it's dated February of 1965, that's -- that -- their research in terms of estimation of latent evaporation from simple weather operations is still accepted in the climatological field?
A Yes, it is.
Q And -- I am still dealing with qualifications, my lord.
Can you -- did you utilize their procedure for other work you have done in the past and for the work you have done for the Gitksan and Wet'suwet'en chiefs?
A I haven't used this particular formula in other work but I have used it for the Gitksan-Wet'suwet'en.
Q Now, can you explain what Baier and Robertson, what they stand for in the field in terms of what -- why are they important contributors to this field, to your field of expertise?
A These particular researchers or working in the field of evaporation, they are experts in this area. And they have developed formulas to estimate evaporation.
Q All right. And that's what this report was about?
A Yes.
Q And they are -- they did work in -- for the federal department of agriculture?
A Yes, that's right. That's Agriculture Canada now, yes.
Q Can you turn to page 281 of that report which has a chart on it?
A Yes.
Q Now, you already referred to tab 3, Dr. Coligado's formula?
A Yes.
Q And you know Dr. Coligado and have worked with him?
A Yes.
Q Did Dr. Coligado's formula -- does it have anything to do with the Baier and Robertson formula?
A Well, Dr. Coligado modified the Baier and Robertson formula to suit British Columbia conditions, British

Columbia being so varied in topography and having the large Pacific Ocean next to it makes it not the same type of climate as you experience on the prairies and eastern Canada where this formula was derived.

Q The Baier Robertson formula?

A The Baier Robertson formula was derived for the prairie provinces and eastern Canada.

Q Using the chart on page 281, can you explain how Dr. Coligado modified the Baier Robertson formula to apply to British Columbia.

A Yes.

MS. KOENIGSBERG: Excuse me, I don't mean to interrupt my friend, but I, on behalf of the Attorney-General of Canada, don't have difficulty with this witness's qualifications in relation to climatology, in relation to the application of evapotranspiration, my concern to be allayed is in the area of food chemistry on or relationships of different kinds of foods, which we haven't heard about yet. So that I don't require that my friend take us through what does sound to me like the body of the report in order to qualify the witness. I accept him as a climatologist.

THE COURT: And as an expert in evapotranspiration?

MS. KOENIGSBERG: As an expert in the application of the formula of evapotranspiration of Baier and Robertson.

MR. WILLMS: My lord, I agree with what my friend says, it's the food drying part of it that it will be my submission, if I have an opportunity cross-examine on qualifications, that this witness is not qualified to give any evidence on.

THE COURT: It wouldn't seem, Mr. Grant, that you need to trouble us with the qualifications of the witness on climatology and evapotranspiration. I don't know where you think that takes you but --

MR. GRANT: I am not going to go further --

THE COURT: Do you propose to go further than that with this witness?

MR. GRANT: Well, yes, of course what I asked was that he would give opinions on the relative rate of evapotranspiration of berries, and the territories shown on map 21 and my friends refer to the fact that they are concerned about it with respect to food drying, and I will go to that point now with his qualifications.

THE COURT: All right.

MR. GRANT:
Q Now, referring you to map 21, Exhibit 258, it's titled A Food Drying Index. Now, can you explain what potential evapotranspiration, and the study you have done on that, has to do with food drying and what relationship, if any, there is to that?
MR. WILLMS: My lord, that is the opinion that my friend could lead if he established any background in this witness in food drying. And so this goes beyond qualifying the witness, this is asking him the ultimate question.
MR. GRANT: Well, I am in a Catch-22, my lord, because the point is if there is no relationship between potential evapotranspiration and how it affects berries, then my friend may have a point. But, of course, they agree that he is a climatologist and can talk about potential evapotranspiration but my understanding of his evidence is that you can't talk about potential evapotranspiration if you don't have something such as plants to deal with. You don't talk about it as --
THE COURT: I thought, I may be jumping to conclusions -- which something all judges do, the only exercise we get sometimes -- is that evapotranspiration is how a plant gives off moisture. I don't think plants give off moisture through berries, do they?
MR. GRANT: Well, berries are plants.
THE COURT: The berry is the fruit of the plant, isn't it? I mean, the plants breathe through the leaves, not through the berries, or do they?
MR. GRANT: When you are talking about potential evapotranspiration -- maybe I can raise it through another way.
Q Are you familiar with the work of Dyer and Brown?
A Yes, I am.
Q And who are Dyer and Brown?
A They are two researchers who have developed a hay drying model.
Q Were they climatologists?
A I am not certain, actually.
Q Now, in their work about hay drying, what -- when you say they developed a hay drying model, did that have anything to do with potential evapotranspiration?
A Yes, it did.
Q Can you explain how they used that in determining a hay drying model?
A They have done field work to assess the response of

1 hay when it's cut, and clover.
2 Q This is after it's cut?
3 A After it's cut. To environmental conditions, weather
4 parameters, such as potential evapotranspiration.
5 Q And have you -- are you familiar with their report on
6 that?
7 A Yes, I am.
8 Q And in developing your analysis of the drying of
9 berries in the study area, did you utilize a similar
10 method as Dyer and Brown?
11 A Yes, I did.
12 Q Are you familiar with any research done with respect
13 to drying of grapes into raisins?
14 A Yes. I am familiar with some work done in California.
15 Q All right. And can you explain what type of work was
16 done in that study?
17 A The researchers there looked at growing degree days.
18 MS. KOENIGSBERG: I wonder if we could have that study
19 identified.
20 MR. GRANT: I am going to get to that. Just a minute.
21 Q Do you recall the names of the researchers on that?
22 A I believe one of the researcher's names was Kolb,
23 K-O-L-B, I believe. I haven't referred to it in my
24 report, no. Because I didn't utilize that
25 information.
26 Q We will come to that in a moment. Anyway, what did
27 they do?
28 A They looked at what is called the growing degree day
29 and determined the time it takes to dry grapes into
30 raisins.
31 Q What do they use, what kind of a day?
32 A A growing degree day.
33 Q What is that?
34 A A growing degree day is -- I will have to think,
35 estimated based upon mean temperature during the
36 growing season. For grapes, for example, it's ten
37 degrees celsius, so you have a mean temperature of
38 ten degrees celsius and when you reach that you
39 begin accumulating growing degrees days so if you
40 have one day when it was 12 degrees in temperature,
41 you would have two growing degree days. And they
42 done the same thing after the grape's been picked,
43 when they are looking at grapes being dried into
44 raisins and they estimated the length of time it
45 would take to dry raisins based on this growing
46 degree day concept.
47 Q You looked at, in preparation for the research you did

in the study area, you looked at both Dyer and Brown and the Kolb's study on grapes?

A Yes, I did.

Q Did you utilize both of those studies or --

A No, I just used Dyer and Brown's work.

Q Why did you select that, their approach, over the Kolb approach on grapes?

A Well, the Kolb approach just assumes one parameter as an input, and that's temperature. And when you're looking at mean temperature and you are comparing a coastal climate to an interior climate, you may have the same mean temperature on the coast as in the interior but the drying potential of the atmosphere is far greater in the interior than it is on the coast. For example, Prince Rupert may have an overnight temperature of eight or nine degrees celsius in the summer and a high temperature of 16 or so and that would give you a mean temperature of about 12 and a half to 13 whereas in the interior you would have a much greater range in temperature and that's in response to the atmosphere being much dryer. But your mean temperature would be the same as the coastal conditions.

Q So the Kolb only utilized the mean temperature?

A Yes.

Q If you had used that approach, you may have had a distorted concept of potential evapotranspiration, because you were dealing with a coastal and interior environment in your study?

A That's correct.

Q Now, what variables -- I think that's the term you used -- did Dyer and Brown use in the hay drying study?

A They have looked at rainfall, dew, and solar radiation, which is the sun's energy, to come up with a model to predict the length of time it takes to dry hay.

Q And what variables did you utilize?

A Within this study region I used temperature, the maximum temperature, that is, and the range in temperature, and that's essentially the annual, and also the I had estimates of solar energy at the top of the atmosphere that takes into account the day length in various latitudes.

THE COURT: I am sorry, solar energy at what?

A At the top of the atmosphere, at the top of the earth's atmosphere.

MR. GRANT:
Q At different latitudes?
A For different latitudes, that's right.
Q And I would like you to go back to page 281 of tab 2 of your document book.
THE COURT: What is solar energy measured in?
A I am sorry?
THE COURT: What is solar energy measured in?
A That's the amount of energy received from the sun.
MR. GRANT:
Q Is there a unit of measurement that you could call it?
A They use Langleys and calories, those are the terms of measure.
THE COURT: Calories?
A Calories, yes.
THE COURT: What's Langley?
A Per centimetre squared. Now you're going to ask me -- I knew you were going to ask me that. I can't define a Langley but that's the unit --
THE COURT: What's the difference between solar energy and temperature?
A Well, that's a very good question.
THE COURT: I didn't intend to be a good question. Just a lucky guess on my part.
A There is a one to one relationship between the amount of energy received from the sun and the temperature of the earth. So they are very closely-related. One's in response to the other.
THE COURT: All right.
MR. GRANT:
Q Now, I would like you to go back to the chart and there I would like you to refer to method one.
A Yes.
Q Now it says meteorlogical variables that Baier and Robertson used, and there is maximum range and Q. 0., what is that is Q. 0.?
A That's the energy received at the top of the atmosphere that I talked about earlier.
Q So you utilized those variables that they had?
A Yes.
Q Now, at the very bottom, there is five, six variables utilized under method eight?
A Yes.
Q Why did you not use method eight as opposed to method one?
A I didn't use method eight because I didn't have the input of those parameters. The wind wasn't

1 measured, vapour pressure deficit, which is E. W.
2 minus E. A., I believe, I can't read it here very
3 well, and also Q. S. wasn't available, which is the
4 solar energy at the earth's surface.
5 Q Now, did Dr. Coligado's formula which you utilized,
6 does it -- well, which -- looking at this chart,
7 first of all, which of these two -- of these methods
8 is the most accurate in terms of your standard of
9 error?
10 A Method eight is more accurate.
11 Q Now, does Dr. Coligado's work and the equation you
12 referred to in tab 3, does it -- did it assist you
13 in increasing the accuracy of method one?
14 A Yes.
15 Q And can you just explain how that happened, how that
16 worked, without getting into the formula itself?
17 A No, I won't get into that. Dr. Coligado did what is
18 called a regression, which compares method one
19 results to method eight for stations, weather
20 stations that have the information. Like airports
21 collect all of this information so he could compare
22 the two formulas. And he came up then with a
23 prediction, based on this regression, that could
24 modify equation one to give him results that were in
25 keeping with method eight.
26 Q And so the use of Dr. Coligado's equation gave you
27 greater accuracy in terms of the potential
28 evapotranspiration?
29 A That's right.
30 Q I just want to go back to Dyer and Brown and you say
31 they used rainfall, dew and solar radiation?
32 A Yes.
33 Q But you adopted, my understanding is you adopted a
34 similar approach to the issue, the question before
35 you, about potential evapotranspiration for berry
36 drying, but used maximum temperature range of
37 temperature and solar energy?
38 A Yes.
39 Q At the top of the atmosphere?
40 A Yes.
41 Q Now, how did your variables -- it appears that your
42 variables are different than their variables, and
43 how did you account for that in terms of your
44 research?
45 THE COURT: I am sorry, Mr. Grant, I am not following this
46 because I don't see where Dyer and Brown have in
47 their --

MR. GRANT: This is Byer and Robertson.
THE COURT: Sorry, where those scholars have used rainfall and dew in either methods one, four or eight?
MR. GRANT: No, I am sorry, my lord, it was probably me jumping and I was -- I had the witness explain Byer and Robertson which deals with latent evaporation, and Dr. Coligado in his equation at tab 3 deals with how method one can be accurately related to method eight. The witness has explained that. Now I was moving to not Baier and Robertson but Dyer and Brown, they are the people who did the hay drying work and their report is not within the document book but it is cited in his report. I mean disclosed.
THE COURT: I am confusing Dyer with Baier. How do you spell Dyer, by the way?
MR. GRANT: D-Y-E-R.
THE COURT: Sorry, you will have to state the question again then.
MR. GRANT:
Q Mr. Chilton, you explained that Dyer and Brown when they were measuring the drying of hay, used three variables, meteorlogical variables?
A Yes.
Q Rainfall, dew, and solar radiation?
A Yes.
Q You have explained that you, in doing a similar study in the preparation of map 21, utilized three variables: Maximum temperature, range of temperature, and solar energy at the top of the earth's atmosphere?
A Yes.
Q And that follows method one of Baier and Robertson that you have just explained?
A Yes.
Q And it also takes in to contract Dr. Coligado's equation to make that more accurate as in method eight?
A Yes.
Q Why did you use different variables than Dyer and Brown?
A Hm-hmm.
Q Firstly.
A Okay, firstly. Well, I disregarded the rainfall and dew elements because we are dealing with drying berries in a covered rack. So those two elements didn't come into play within my assessment. And

these three elements that are listed in Baier and Robertson's equation one are just the same sort of -- in a sense they are saying that this is the solar radiation input, that's what those three elements represent, because there is a link with temperature to solar radiation, there is that direct relationship of temperature to solar radiation, so that that's reflected in those three elements.

Q And you -- okay. When you said that the berry drying wasn't covered, under cover didn't deal with rainfall, this was an assumption that you were informed about?

A Yes, that's right.

Q And you were operating on the basis of that assumption?

A Yes.

Q Just one other thing, I would like you to refer briefly to tab 5, and this is a transcript of a -- four page transcript of an interview relating to the drying or making berry cakes at Kispiox in the 1920s, and were you provided with this transcript so that you could understand how berry drying occurred for the purposes of establishing how to -- how to best determine the way of analyzing berry drying?

A Yes, I was.

Q Okay. Now I would like to refer you to tab 4, and you have had an opportunity yesterday to review this transcript, this is the transcript of Olive Ryan's evidence, pages 138 through to page 141 in this action, you have had an opportunity just yesterday to review this evidence?

A Yes.

Q And of course you didn't review it before you did your report?

A No, I didn't, no.

Q And tab 6?

A The same applies to tab 6.

Q The same applies, you just had an opportunity to review it?

A Yes.

Q And in reviewing that evidence of berry drying from those -- from what you read as to the description of Mrs. Ryan and Mr. Joseph, did that change your -- did that information have any effect on what you determine in terms of potential evapotranspiration for berry drying?

A No, it did not.

Q Okay. I would like you to answer Mr. Willms' and Ms. Koenigsberg's questions relating to your qualifications.
A Yes.

CROSS-EXAMINATION ON QUALIFICATIONS BY MR. WILMS:

MR. WILLMS:
Q Do you have any habitual familiarity with the biology of food plants of northwestern British Columbia?
A No.
Q Do you have any habitual familiarity with the biology of other food sources of northwestern British Columbia?
A I am aware of some of that work. I have seen some publications on what the native people ate and so on.
Q I am talking about the biology of the actual food source. cell structure, things like that?
A I have taken a certain amount of biology courses at university so I am familiar with how cells and plants work.
Q Have you done any studies or research on drying food plants?
A No, I have not.
Q Have you done any studies or research on drying animal food products, like fish?
A No, I haven't done any research in that area.
Q Before preparing the map that is map 21, had you prepared any food drying indexes before?
A No.
Q The basis for your report is an assumption that berries and salmon, for example, dry the same way that hay dries; is that right?
A Yes, that's correct.
Q But you have no way of knowing whether that's true or not?
A Well, I do. Water vapour responds in the same way for all elements of the earth and once a berry's removed from a plant or hay's been cut the water vapour is released to the atmosphere by weather conditions. And we assume that the atmosphere is consistent in its effect upon that water.
Q What I am really asking you is not how the water -- how much water gets out of it, I think that's what you are talking about, isn't it, how much water can get out of whatever is being dried?

A Yes.
Q My question is, do you have any personal knowledge of whether hay dries in the same manner as berries dry, specific to the plant?
A No, that work -- I don't think there has been any work done in that area.
Q With respect to salmon, because salmon are mentioned as well?
A Yes.
Q Do you have any personal knowledge of whether salmon dries in the same manner as hay dries?
A No, I can't say that.
MR. WILLMS: Those are all the questions I have, my lord.
THE COURT: Ms. Koenigsberg?
CROSS EXAMINATION BY MS. KOENIGSBERG:

MS. KOENIGSBERG:
Q I just have one further question, Mr. Chilton, have you done any studies like the study that Dyer and Brown did in the field?
A No, I have not.
THE COURT: That is the hay, that's the hay people, are they?
A Yes.
MS. KOENIGSBERG: Maybe I should make that clear.
Q Applying a formula for potential evapotranspiration to a foodstuff or any plant or animal in the field?
A No, I have not.
THE COURT: What did you assume, that the berries would be in trays, inside a building?
A That's right, yes, I did.
THE COURT: Out of the wind?
A Yes, but exposed to the atmosphere. Like, I had pictured or been told that these drying racks have a roof of leaves but they are open on the sides so that the --
THE COURT: So that is wind would flow through?
A So that the wind can come through, yes. And of course they are responding to the temperature conditions and the humidity in the air as well.
THE COURT: All the people at the garden shop tell me that wind is as important a factor in deciding how much water your plants need as temperature is.
A It's fairly important, but research has indicated that about 80 percent of the evaporation occurs in response to radiation or temperature whereas only about 14 percent occurs in response to wind. But it's still significant.

THE COURT: Do you think my gardener at the at the garden shop people are misleading me?
A To a degree.
MR. GRANT: Mr. Chilton may be available to go there with you, my lord.
THE COURT: And what is it that you are attempting to determine, the length of time it takes a berry to dry so that it has no moisture left in it or partially free of moisture or what?
A Well, I wasn't given any guidelines in that regard, I was just told to come up with an idea for the region of the drying potential and how much you might expect in an average summer. This map indicates the regions where more drying of berries or what have you, or any part of the environment, occurs.
THE COURT: What is it the greenest green are the best drying areas?
A Yes, the yellow green is the areas where there is the most evapotranspiration.
THE COURT: That's in the river valleys mainly, is it?
A Yes, and in the lee of the coast mountains. And also up in the plateau country on the far right, right hand top corner is plateau country there.
THE COURT: That's well north of the claim area?
A Yes, just slightly northwest.
MR. GRANT: No, my lord. This is an east and west orientation so --
A Or northeast.
MR. GRANT: It's -- that would be south, actually southeast. And I should just say, my lord, that this -- that the black line proximates the claim area.
THE COURT: Yes.
MR. GRANT: But it's not necessarily identical to map 9-A.
THE COURT: Yes. Well, for practical purposes within the claim area it's the Bulkley River Valley?
A Yes.
THE COURT: What is this area to the west, that's --
A The Nass, is that the Nass?
THE COURT: I am looking way down south. I can't read that word.
MR. GRANT: Is it Suskwa?
THE COURT: Yes.
MR. GRANT: The Morice River going up to the --
THE COURT: Yes. And portions of the Suskwa and Skeena rivers and up around Meziadin Lake are the drying areas that you say are the better ones for the claim area?
A Yes, that's correct.
THE COURT: And they are generally lower elevations?

A Yes, they are. They are valley bottoms and again in the lee of mountains where your climate becomes dryer.

THE COURT: Yes. Why wouldn't the Babine Valley be a good drying area?

A That Babine area is a little higher in elevation, generally, up around Babine Lake and so on?

THE COURT: No, in the Babine River area -- sorry -- yes, the Babine and the Sustut, and Upper Skeena areas are not shown to be as good drying areas?

A Not as good because it's slightly higher in elevation and the Temperatures are cooler.

THE COURT: All right. Thank you. Well, I will have to hear counsel -- how do you want to do this, gentlemen, you're challenging the qualifications of the witness, are you, Mr. Willms?

MR. WILLMS: My lord, the challenge is the food drying index and the relationship to berries, and I, in the cross-examination, the witness admitted that he doesn't have any habitual familiarity with the biology of food plants in the area and any habitual familiarity with the biology of food sources, that he has never done this kind of project before this time, that he has never mapped a similar map before this time, it's the first time, and it's all based on the assumption that food dries the same way as hay, which I think, if you think about it logically, if you have dried any food or cooked anything, it doesn't make any sense. And in my submission, whereas he might be able to draw a map saying here is what the Baier and Robertson formula shows here, here and here, and he is not qualified to say where the best places to dry food are in northwestern British Columbia or, in my submission, anywhere.

THE COURT: Ms. Koenigsberg?

MS. KOENIGSBERG: I have to concur with my friend. I have no objections to this witness's qualifications if he was going to talk about the relative rate of evapotranspiration in the abstract, in this area. I accept that he properly, although I haven't had an opportunity to actually check it yet, properly accumulated the climatological data and that he applied an appropriate formula for the purposes of determining, if I can put it this way, the moisture in the air.

But in relation to food drying, in particular berries or fish, in my submission, he has no

qualifications and has done no work and knows of no work that was done upon which he, in my submission, could only assist the court in evaluating the climatological events and I certainly concur with my friend that he it certainly doesn't lend itself to my intuition that hay in a field dries in the same way as berries under a cover. And so, I can't suggest to the court that it's just so obvious that we ought to let it go. In my submission, he is not qualified to give the opinion that he has been tendered for.

THE COURT: What I am not sure about, Mr. Grant, is whether or not the witness has shown in his different colour codes anything different from rates of evapotranspiration.

MR. GRANT: Evapotranspiration?

THE COURT: Yes.

MR. GRANT: Well, my friends urge some form of logic which contradicts what the witness said on cross-examination, because it's not -- the witness isn't saying that if you put hay in a field or berries in a field, that they will dry at the same period of time, or if you put hay in the field and you put berries in the field, under a roof with open -- an opening, that one will take one day and the other will take five days. If my friends are saying that's what he can't say, I have no problem with that. What he is saying is that climatologically, when you take a plant species, or any substance with water in it, and you put it in the environment to dry, you can use the potential evapotranspiration, as has been done with grapes and with hay, and as he has done with berries, and you can determine the rate of drying in relationship, not to another species of plant, but in relationship to another geographical location and that's all he is doing. He is saying, if you put berries anywhere in this area, what you can do is, you can find, climatologically, the best place in relation to another place in this area where they would dry. And that's all -- that's why it's a food drying index in terms of rate of drying. And that's what he is qualified to say. And he explained quite simply to Mr. Willms that water vapour responds in the same way in all elements and in all substances. And what evapotranspiration is, as he explained in the beginning of his qualifications, is the

transpiration of water and, of course, evapotranspiration is the evaporation of water, and if you think of it, if we want to talk of it in terms of logic, what is drying, drying of something by atmospheric means -- and we are not talking about cooking here, we are talking about drying -- there is an element, I agree, in the evidence, that the berries are pre-processed but then there is a drying process. And that' all we are talking about

THE COURT: When you say pre-processed, they have been picked and stripped of leaves and put in trays, is that what you mean?

MR. GRANT: The evidence of Ms. Ryan, what happens they are picked, they are stripped of their leaves, they are put in a -- there is a wood box that they are put in, which has had hot rocks in it, the rocks are taken out, the berries go in there for blanching, one might say, and then they are put on these drying racks. And of course all that we are talking about here is -- and that her evidence is that it takes a couple of days, her evidence was that it took two days that they had to be dried. And all he is showing in a geographic and a topographic method, if you are going to take berries and say where should we dry berries, should I go to Prince Rupert or should I go to Hazelton, then this map shows it would be better to go to Hazelton to dry berries.

THE COURT: I suppose Mr. Chilton would be saying that the same thing would apply if you were drying hay, you would say that these yellow green areas are the best for drying hay, are they?

A Yes, that's correct.

THE COURT: Bananas, apples and anything else?

A If you want to do say that, yes.

MR. GRANT: Salmon.

THE COURT: Salmon may be different from --

A Well, no, it's water in an element and it's --

THE COURT: I know but there is a skin on salmon that's different from the skin on a berry, is the skin on a berry different from the structure of a stock of hay?

A Well, in the business of climatology, we have to assume that potential evapotranspiration is reacting in the same way through all elements and all plants on this earth or we couldn't do estimations. You would have to take into account every different kind of tree and every different kind of landscape there

is on earth and we don't do that. We give a geographical, we look at it geographically and we approach it assuming that the reaction of water vapour is the same.

THE COURT: Are you really showing us by this map diagram, map 21, where the best areas are in this part of northwestern British Columbia for drying hay?

A Well, it could apply to anything being dried.

THE COURT: The best places to dry anything?

MR. GRANT: Right.

A Yes, that's right. That's why I have called if a drying index, I haven't said in this index which areas are excellent or poor, I have just said most suitable to least suitable, and I think we can say that based on this research.

MR. GRANT: The only point I think with respect to the berries of course he was asked in terms of the terms of reference he was asked with respect to berries, and of course it was in analyzing the best method approach, in terms of it could be a drying index for other species. I think the question of the thickness of the skin and things like that that all those would affect the length of time for a particular thing to dry but what's important here is geographically where would be the best drying area if you use the same species. My friend is saying it's a big thing if it's hay or if it's berries that's not relevant. What's relevant is geographically where are the best drying areas.

THE COURT: To dry anything?

MR. GRANT: To dry anything. If my friends wanted to do an analysis of hay drying, for some reason, in their evidence, I am sure they would be welcome to utilize this map and say, well, it shows we can dry hay better in Hazelton than in Prince Rupert. But that's not relevant.

THE COURT: I suppose also, Mr. Chilton, that if a hard working Indian woman wanted to dry her kids' clothes, on an outside line, the best place to dry them would be in these yellow-green areas?

A Yes, I could say that. I don't feel uncomfortable with this at all, because I was looking at a berry here and a berry there, I wasn't looking at an orange here and an apple there. I am looking at one element and I think we can compare elements when we are looking at the response of that element to the atmosphere.

THE COURT: All right. Any reply, Mr. Willms?
MR. WILLMS: My lord, I think that your lordship put it, if this is an index for hay drying, that's what this is.
THE COURT: He says it's an index for drying anything.
MR. WILLMS: Well, the problem is, is that it's an index -- we know that hay dries, somebody did a study on that, we don't know whether or not if you fill a plastic ball up with water and seal the plastic ball and put it out in the sun, it will dry, and somewhere in between may be the berries, with the skin, and fish. So, in my submission is related to the word food drying index. If he wants to call it a drying index, that things with water in them, that can dry, without human intervention, dry better here, that's fine. But that's not what I understand my friends are tendering this evidence for.
THE COURT: Ms. Koenigsberg?
MS. KOENIGSBERG: I have to agree again. As I said, I have no difficulty if we want to call this a drying index. That this, if this witness can tell us that there are differences in this area geographically in relation to the moisture content of the air, and I am over- simplifying but essentially that's how I understand it, and any inferences that can be drawn to what kind of food you can dry more easily, and the importance of that, of the climate to the method by which you dry it, I think this witness is not qualified and I am afraid that all of those assumptions are in this report. They are particularly in the legend of the map 21, that is that we are talking about different, very different environments for drying than a field and we are talking about fish and we are talking about berries. We aren't talking about hay, unless we go to how we arrived at the formula to look at berries.
MR. GRANT: My lord, it may be of assistance, my friend says, you know, putting a plastic ball, but Ms. Ryan at page 1140, at page four, describes this exact thing and it's in evidence, and my review of the evidence was this evidence was not contradicted on cross-examination. Question, line 28.

"Q And you describe that the leaves are spread out when the berries are dried. how long was that?
A Well, that's when the berries were dried, you know, and put on another rack over it and turn

them around, and they did it. In about two days they will dry.

Q Was there a way you could keep the berries from burning while they are on the rocks?

A Well, the rocks cool off as soon as they put in with the berries."

Now, what she describes there, basically, is drying on racks and that's been evidence in this case and up to this point, there has been -- I don't think there was any challenge to the fact that they did that. And there is ample evidence that the Gitksan did that not for five years but for a long time. But -- so, what Mr. Chilton was asked to do was to determine where the best areas geographically within this entire zone were for drying of berries, but obviously from what he has explained to you, if we had asked his opinion regarding the drying of hay or any other species it would be the same. But it's an environmental and climatological map and I am not -- I take the view that with respect to the drying of salmon, I am not pressing that because I think that there is some different evidence as to the methodology of drying salmon where it's based on Mrs. Chilton's assumptions, that's why I focused with respect to the berries.

THE COURT: Well, I don't propose -- I am sorry.

MS. KOENIGSBERG: Sorry to bounce up again, my lord, but I think if Mr. Grant is tendering this on the basis of Ms. Ryan's evidence, it becomes important to assess what did Mr. Chilton assume? And what he assumed was that the berries were covered and as a result of assuming that, he changed the variables in the hay drying study to accomodate that and removed the effect, in -- mathematically, I assume, of rainfall and dew. Now for whatever else one might concern oneself with, it might have also been taken into account, he certainly adjusted the diagram to accomodate a very different environment.

THE COURT: Well, did you -- you did assume that the berries were drying under cover?

A Yes, I did.

THE COURT: And does that constitute an alteration of variable in the -- from the hay drying study?

A It simplifies it because you have removed two elements. All I took from the Dyer and Brown work was that hay dries in a linear fashion, that was the basis of all I gathered from their work. And when

you have a covered rack, you're still exposed to all the climate elements that are in the air. But it's removing the input of rainfall and dew so that simplifies things, you don't have to take those things into account.

THE COURT: Doesn't the question of something drying in sunlight as opposed to shade make a difference?

A No, that's what we talked about a little earlier, we talked about the link between temperature and solar radiation. There is that direct relationship between the two. That's why Baier and Robertson have been able to estimate evapotranspiration just based on to get the temperature as you see in formula one there, in the table there, that's all temperature-related parameters.

THE COURT: Doesn't it make a difference if it's in the shade? Ice dries more quickly in the sun than the shade, why wouldn't berries?

A Well, it does, but I don't think that's the point. Because this work is comparing covered racks throughout the region and we are looking at that throughout the whole of the region.

THE COURT: I guess my problem is the same as Ms. Koenigsberg raised, where do you get out of the hay drying model into this one, one's in the sun and one's in the shade.

MS. KOENIGSBERG: I think Mr. Chilton also assumed that there was a fire under the berries, which I would assume affects the temperature?

A I did for the first couple of days, I assumed that they dried the berries initially by fire but they utilized the atmosphere to dry the berries after that. That was in our discussions initially, that the atmosphere was an in integral part of the drying.

THE COURT: Well, Mr. Grant, I don't think that I need an expert to tell me that organic material exposed to the atmosphere will dry. I think that it falls within the province of an expert to tell me what the best drying areas are. I have some difficulty seeing how it can, how that can be related to any qualitative question involved in drying and berries or fish -- you have abandoned fish. I think that if the evidence goes in, it can only go in on the limited basis that it would show where, within the claims area, one would get the best drying results for berries of similar water content.

MR. GRANT: Yes.
THE COURT: And take it no further than that.
MR. GRANT: Yes. Except I would say that it shows where within the area covered by map 21.
THE COURT: Yes.
MR. GRANT: Not just within the claims area.
THE COURT: Within map 21 area, yes.
MR. GRANT: That was the relative --
THE COURT: I think, for that limited purpose, the work's been done, the witness is here and I think that I should receive the evidence for that limited purpose. Should I do that now or at 2 o'clock?
MR. GRANT: Probably at 2 o'clock, my lord. Thank you.
THE COURT: All right.

(PROCEEDINGS ADJOURNED FOR LUNCH)

I hereby certify the foregoing to be a true and accurate transcript of the proceedings herein.

Wilf Roy
Official Reporter ⊥h2 R. Chilton (for Plaintiffs)

(PROCEEDINGS RESUMED PURSUANT TO AN ADJOURNMENT)

THE REGISTRAR: Order in court.
MR. GRANT: My lord, before we go very far, and Mr. Willms cures himself behind the map -- or Mr. Chilton, I mean. Before we go very far, I wonder if -- Ms. Koenigsberg, just before the break, talked to me about a proposal relating to admissions that may foreshorten necessity to lead certain evidence of this witness at this stage.
THE COURT: We have already got it all mapped, haven't we?
MR. GRANT: One way or the other. If you want to wait for another 20 minutes, we can finish or possibly take a 10 minute break and have the admissions.
THE COURT: Whatever counsel prefer.
MR. GRANT: I have not had a chance to speak with Mr. Willms concerning this and he just raised some things with me that he would like me to sort out, and I wonder if we could stand down now.
THE COURT: I will be in my chambers and madam registrar can call me when we are ready.
THE REGISTRAR: Order in court. Court will recess.

(BRIEF ADJOURNMENT - 2:02 P.M. TO 2:22 P.M.)

THE REGISTRAR: Order in court.
THE COURT: Mr. Grant.
MR. GRANT: Yes. As with all these things, I am still here leading this evidence so --
THE COURT: All right.
MR. GRANT: We made our efforts and I think that there is some shortening accomplished.
THE COURT: Something ventured, nothing gained.
MR. GRANT: My lord, just to comment on your comments before the lunch break, in terms of the qualification is that -- that as you have suggested, that this map 358 (21) and the opinion of this witness that I am seeking his qualification would be to give opinions on the relative rate of evapotranspiration and as you said of the same species of berry, for example, throughout the area and that may be that there is different types of berries, and if he took any one of those and their relative rates of evapotranspiration.
THE COURT: Yes, as long as you are comparing similar berries to each other.
MR. GRANT: That's right, or similar fish to each other.
THE COURT: Similar anything. Similar anything to each other.

EXAMINATION IN CHIEF BY MR. GRANT:
Q Right. Now, I'd like to have you look at Exhibit 358 (21) and you have indicated before that you have reviewed the copy, the summary at the top?
A Yes.
MR. GRANT: Now, I just wanted to advise the court, and you can correct me if I am wrong, on the third column the second paragraph under Baier-Robertson formula, and it states:

> "The formula first calculates latent evapotranspiration."

And I have been advised by you, Mr. Chilton, that that it should read, "latent evaporation."

It was a transcription error.
THE COURT: Where is that?
MR. GRANT: That's on -- it is in map 21, the third column, under the Baier-Robertson, the second full paragraph, the formula first calculates latent

evaporation.
THE COURT: Oh, yes.
MR. GRANT:
Q And then the formula -- and that's correct, Mr. Chilton?
A Yes, that's correct.
Q And the formula is LE equals, and it should be bracket minus (-87.03) end bracket. And again, you use the correct formula but this was a matter of error in the transposition onto this document; is that correct?
A Yes, that's right.
THE COURT: You mean the minus sign should be in brackets?
MR. GRANT: The entire thing. It should be LE equals (-87.03) end bracket.
THE COURT: All right, plus 0.928.
MR. GRANT:
Q That's right. Then on the same line it should be bracket (temperature range), plus it should be plus 0.0486, so that that decimal point should be moved over one figure to the left; is that correct?
A Yes, that's correct.
MR. GRANT: And on the next line there are two brackets where it says P.E. (adj) equals, and then there is a bracket, 88.4 plus .66 and those two brackets --
THE COURT: There is no brackets on my line.
MR. GRANT: On the fourth column. PE equals 88.4 plus .66, there should be no brackets between those figures.
THE COURT: All right.
MR. GRANT:
Q That's correct, Mr. Chilton?
A Yes, that's correct.
Q And I would just have you make those markings on that document on the exhibit or the document that's in the exhibit book?
A Okay.
Q Thank you. And now, can you explain what you were asked to do and what you did do and what assumptions you based your work on to do this mapping?
A Yes.
Q The beginning of the work?
A I was asked to come up with a map of the drying potential in the northwest part of British Columbia and I looked at it in a few different ways and finally came up with the technique of potential evapotranspiration as my tool to do this.
Q Okay. And in the preparation, were you given -- did

you -- were you referred to any specific elements that you were analysing the drying for?

A Well, in the original contract it was stated that they were interested in fish and berries.

Q Did that have any impact on the methodology that you used that they were looking at fish and berries?

A No.

Q Okay. Now, in the second line it says that the drying index used on the map -- I am sorry, this is the first paragraph of the map, my lord:

> "The drying index used on the map was prepared to assess the capability of the atmosphere to dry fish and berries in the open air or in a smokehouse."

Now, if that said the drying index used on the map was prepared to assess the capability of the atmosphere to dry organic elements through the -- through estimates of potential evapotranspiration, would that be equally -- an equally correct statement with respect to what you were doing?

A Yes, it would.

Q And so the specific elements that the Gitksan were interested in didn't have a bearing on the development of this map?

A No.

Q Now, can you explain to his lordship, and first of all in this region that you're established, was this region the area that you were instructed to prepare the map for?

A Originally it was a larger area. It extended somewhat beyond these borders.

Q To the east?

A Mostly to the east, that's right.

Q Which would be the area covered now by this summaration at the top?

A Yes, that's correct, and the original mapping was done at different -- on a different scale of map as well.

Q And what scale was that?

A It was one to five hundred thousand miles.

Q And the maps that are at the back of the room, there are five base maps and seven overlays, were those maps prepared by yourself?

A Yes, they were.

Q And the data from them was transferred onto this

map?
A Yes.
Q By somebody else?
A Yes.
Q And you reviewed this map to ensure that it corresponded?
A Yes, I reviewed the map.
Q Would it make a difference in your report in terms of this mapping if you, for example, instead of talking about berries drying as you described this morning which you understood, you are talking about fish, salmon, that was being dried in a smokehouse and it was being dried in a smokehouse throughout this area or in smokehouses throughout this area in the same method, would that have an affect on or change the drying index?
A No. As long as the smokehouse was open to the elements from the side that the atmosphere was or wind and so on was permitted to pass through the smokehouse, it wouldn't change it.
Q Okay. I'd like you to look at the photographs on 358 (21) in the upper right-hand corner?
A Yes.
Q You see there, those buildings. If I said to you that that was a photograph of a smokehouse, a fish smokehouse, and that was the type of smokehouse that was being used, would that affect your opinion with respect to the drying index for fish, and I must say that when you look at the photograph on the left you can see that there are cracks between boards but there are boards and there is a doorway?
A As long as those cracks are of sufficient size -- I can't see too much from this one. I assumed they were more open than that actually, but seeing there is cracks, you tell me there is cracks, I think it would be valid to have my index where that -- I can't tell from the picture, though.
Q No, I understand and fair enough. This picture was not -- these two pictures were not pictures that you utilized in preparing your data?
A No, not at all, no.
Q Now, in the third paragraph of the summary there is reference made to the field drying of hay, and then there is a statement:

> "It is assumed that fish and berries dry in a similar linear manner."

Is that your statement?
A Yes, it is.
Q Okay. Why do you assume that fish and berries dry in a similar linear manner?
A I am assuming that water vapour, once it is available to the atmosphere, would respond in the same way no matter if it is hay or a berry that's been picked.
Q What do you mean by a linear manner?
A Well, the response would be consistent with say temperature. There would be a one to one relationship of temperature to evaporation, for example, and there wouldn't be an exponential curve, it wouldn't drop off at a certain temperature; it would just continue to rise at a certain rate.
Q Is that assumption -- is that an assumption that you made -- is that an assumption that climatologists use?
A Yes. We have to assume that elements are going to respond in a similar fashion or we wouldn't be able to map things like -- such as potential evapotranspiration and it's mapped on a world-wide scale for different landscapes.
Q I see. And is that a type of an assumption that would be used in the type of work that you referred to earlier you did, for example, with respect to while you were with the province with respect to agricultural areas?
A Yes.
Q You would use the same assumptions?
A Yes.
Q Now, just listen carefully, Mr. Chilton. Let us say that I showed you something that -- a report by some other climatologist who had studied -- had and determined that fish and berries do not dry in a similar -- in a linear manner, okay, and you -- and since you did this report you had additional information that show -- show that that was not the case, would that affect your mapping of the drying index, the food drying index?
A Could you repeat that question again, please?
Q If something came to your attention, and I am not saying there is, let us say if it came to your attention since you did the report in 1987, that fish and berries do not dry in a linear manner, would that affect your food drying index?

A No, because we are looking at relative terms. What's true of this area is -- you can compare it over this region. It doesn't matter if the response is linear or not. The figures are such that -- well, there is response to the atmosphere, and it doesn't matter if it is linear or not.

Q So there is a relationship and, if it is a linear relationship, then this would apply and, if it's some other relationship, then the same food drying relationship would apply geographically?

A Yes, that's true.

Q Now, you have indicated this morning that the rainfall and dew functions were disregarded --

A Yes.

Q -- in your calculations. And is that based on the assumptions that you were given that the food drying was done in smokehouses or on covered drying racks?

A Yes.

Q Now, would this food drying index, this map 21, still apply if berry drying -- if you subsequently learned that berry drying occurred not under cover?

A Yes.

Q Why?

A As long as you are comparing the berries in the open throughout the region, it would apply.

Q As long as the methodology of drying is the same?

A Yes.

Q Now, the statement near the end, the last paragraph of the summary is that:

> "The drying index is based on estimates of evapotranspiration for the July to September period and is derived from present day climate statistics. Although the overall climate may have changed through time the most suited food drying sites are expected to have remained the same. This is because the region's topography is considered to be the principal climate controlling factor."

Is that your statement?

A Yes, it is.

Q That paragraph?

A Yes.

Q And can you explain why topography is the principal climate controlling factor?

A Yes, because our weather systems move from west to

east in the northern hemisphere and we have a block of mountains and it's always existed since -- well, at least since the glaciation, and this removes moisture from the atmosphere as it passes over the mountains, so you have this region in the lee of the coast mountains that tends to be dryer and the area on the windward slopes that tends to be wetter, so it is the westerlies that are in concert with the topography -- with the prime governing factor for the climate of the region.

Q Now, looking at this map, you've used a scale which is at the top that goes from the least climatic suitabilities for drying to the most, and it is less than 125 milimetres to greater than 175 milimetres; is that right?

A Yes, that's correct.

Q And you established that scale -- that scale could be different if you were dealing with a different area; is that right?

A Yes, that was an arbitrary choice.

Q Okay. But the purpose of establishing this scale was to show the relative drying potential?

A Yes, that's right.

Q Can you explain to his lordship what would be the distinction between an area, let us take the middle area of where you go from 125 to 150 milimetres, and the bottom area where it is greater than 175 milimetres. Is there a significant difference in drying when you see that kind of relationship on potential evapotranspiration?

A That's fairly significant, especially over smaller regions. It wouldn't be so great in a region this large but when you are dealing with valleys and having a trend, then it becomes significant, yeah.

Q What about in the less than 125 milimetres or greater than 175 milimetres?

A That's a significant difference.

Q Okay. Now, can you comment -- this was -- does this map with that scale show the better -- the areas that are more climatically suitable for drying?

A Yes, it does.

Q And those that are least suitable for drying?

A Yes.

Q Since you have done this report, has there been any other data that has come to your attention that makes -- that would make you alter the map -- this mapping?

A No.
Q If you took, for example, the area near Prince Rupert at Port Edward on the map, it is near the bottom of the map.
A Yes.
Q And you compared that, the area that's marked in blue, and compared that with the area say at Kispiox which is up the Skeena River and is in the brightest green colour?
A Mm-hmm.
Q Is that a significant difference in the drying capability between those two areas?
A Yes. There is in -- for that period, yes.
Q Based on your opinion, is it correct, and this mapping which you have done that the areas most suitable for drying in this chart area would include the upper Skeena Valley from Gitwangak to Hazelton?
A Yes.
Q It would include the valley bottomlands from northwest of Smithers through to Burns Lake?
A Yes.
Q And it would include the Bell-Irving River drainage base and south of Nangunsa Pass (phonetic)?
A Yes, that's right.
MR. GRANT: You have that, I believe, my lord. That's up in the Meziadin area.
THE COURT: Yes, I see it.
THE COURT: And the small area around New Alvansh?
THE WITNESS: Yes, that's right.
THE COURT: Why would that be?
THE WITNESS: Well, these figures are -- that you can see nearby the figures for -- could you pronounce that for me? Seasrinnish, is it, are very close to 175. And so that really doesn't -- because my choice is arbitrary on my designations, that area just appears to pop up because there is just that one station there that's above 175 milimetres. These aren't significantly lower but you have to make a choice when you're dealing with classes like that. In that region there.
MR. GRANT:
Q And I notice that on the scales on the map, and they are quite small, they are quite small, that you have numbering underneath these names, like at Nass Camp is at 180 and at that place Seasrinnish is 163?
A Yes.
Q What are those numbers reflective of?

A That's the potential evapotranspiration that occurs using my -- the Baier-Robertson formula of the Coligado adjustment for the period July to September on average. It is an average figure.

MR. GRANT: I'd like to have marked as the next exhibit tab 2 of the document book which is the Baier-Robertson material, and the -- and tab 3 which is the Coligado material.

THE REGISTRAR: The date?

MR. GRANT: Baier-Robertson is entitled Estimation of Latent Evaporation from Simple Weather Observations, article dated February 2, 1965. Coligado is May 1979, Ministry of Environment, climate statistics particulars.

THE COURT: Any objection?

MR. WILLMS: No, my lord.

THE COURT: All right. Tab 2 will be the next exhibit.

THE REGISTRAR: 791.

(EXHIBIT 791 - TAB 2, ESTIMATION OF LATENT EVAPORATION FROM SIMPLE WEATHER OBSERVATIONS)

THE COURT: All right. And tab 3 will be 792.

THE REGISTRAR: Thank you. 792.

(EXHIBIT 792 - TAB 3, DR. COLIGADO'S CALCULATIONS FOR EVAPOTRANSPIRATION)

MR. GRANT:

Q And I would like to -- you indicated, if you refer to tab 5, this was the information that was given to you in advance of your work so that you understood the basis upon which you understood how berry drying occurred?

A Yes.

MR. GRANT: I would ask that this be marked an exhibit for identification at this time. I concede it can't be an exhibit proper, I am sure my friend would object if I tried to.

THE COURT: 793 for Identification.

(EXHIBIT 793 FOR I.D. - TRANSCRIPT OF MAKING BERRY CAKES AT KISPIOX IN THE 1920s - N.J. STERRITT, N.B. STERRITT DATED JAN. 26 AND 29, 1986)

MR. GRANT: It is a February -- January 26 and 29, 1986 interview by M.J. Sterritt with Percy Sterritt

entitled Making Berry Cakes In Kispiox in the 1920s.

THE COURT: All right.

MR. GRANT:

Q The other two tabs are documents -- are transcripts. Can you explain to me why you -- I believe you refer to in your -- in the summary that you dealt with, the July to September period. Why did you choose that period for berry drying?

A Well, that was the period that was indicated to me that I should address.

Q Okay. So that was one of the parameters that you were given in the course of preparation?

A Yes.

MR. GRANT: At this point, my lord, I would ask that map 21 be marked as an exhibit, 358 (21).

THE REGISTRAR: 358 is for I.D.

MR. GRANT: 358 is only for I.D.

THE REGISTRAR: All the maps that have been marked have been marked for I.D.

THE COURT: This one can be 358, it can be marked by itself.

MR. GRANT: By itself.

THE REGISTRAR: As an exhibit proper.

MR. GRANT: This witness and a series of witnesses will be dealing with all of these maps now.

MR. WILLMS: My lord --

MR. GRANT: I anticipate some of my friend's concerns. I have no objection to the disregarding or the crossing out of the word "food" on the heading Food Drying Index, the word "food" in the third line from the bottom in the paragraph, the last paragraph.

THE COURT: Where does it say -- oh, yes, Food Drying Index, yes, sorry.

MR. GRANT: Yes, on the right-hand side, and under Source Chilton, Climatic Evidence, and I would take out the climatic evidence of good drying areas in northwestern British Columbia as a result of discussions with my friend. And maybe I should just deal -- and with the corrections as my friend has referred to, I have asked Mr. Chilton about this change of wording in the first paragraph and would ask the court to disregard the -- to alter the first paragraph accordingly for the record, in any event, that it would read:

> "The drying index used on the map was prepared to assess the capability of the atmosphere to dry organic elements through the estimation of

potential evapotranspiration."

Rather than that first paragraph and --

THE COURT: "...to dry elements"?

MR. GRANT:

"...to dry organic elements through the estimates..."

which is the last four words:

"...of potential evapotranspiration."

THE COURT: All right.

MR. GRANT:

Q Now, just one other point. On the very last line on that first column, the top of the second column, it says:

"Because most food drying in northwestern B.C. is done in smokehouses or on covered drying racks."

That is an assumption that you were operating under, isn't it?

A Yes.

Q And that -- you were told that and that's why you disregarded the rainfall and dew function?

A Yes.

MR. GRANT: Okay. So I state for the record that of course that statement isn't to establish through this witness that that was done, it is an assumption. With those modifications, I would ask that -- and plus the corrections I made earlier, I would ask that that be marked as the next exhibit or Exhibit 358-21.

MR. WILLMS: If I might have a moment.

THE COURT: Thank you, Mr. Grant.

MR. WILLMS: No objection.

THE COURT: All right. Ms. Koenigsberg. I am only asking about the exhibit at the moment.

MS. KOENIGSBERG: Oh, good. There were three other things that played here, my lord. I have no objection.

THE COURT: Yes, all right.

(EXHIBIT 358-21 - FOOD DRYING INDEX)

THE COURT: Are you finished, Mr. Grant?

MR. WILLMS: My lord, I am sorry --

MR. GRANT: Oh, my friend --

MR. WILLMS: I hope the stamp is on it. Just about the lining on the map. There is an outline on the map in black and I don't know what that -- whether that is submitted to prove anything. If it is not submitted to prove anything --

THE COURT: It is only a rough pictoral representing of the general claims area as far as I am concerned.

MR. WILLMS: As transferred to whoever drew the map.

THE COURT: Yes. I don't know what mapping he was working from but it doesn't matter. It just shows the general area.

MR. GRANT:

Q Of course, your series of overlays, I am sure we can pick one out that will match that, but that's -- Mr. Chilton, the black outline, you don't -- you have no knowledge of that black outline?

A No, I didn't.

Q Okay. And I have just two or three more questions and then I am finished my direct examination, my lord. Did you do this research -- if you had been doing this research for the Ministry of Environment answering the same questions, would you have done it any differently?

A No, I wouldn't.

Q And prior to you commencing the research, were you informed or advised of any areas that were preferred by the Gitksan or the Wet'suwet'en for food drying purposes?

A No, I wasn't.

Q And prior to doing the research, were you shown something similar to the outline in black on Exhibit 358-21 to show where the specific claims area of the Gitksan and Wet'suwet'en was?

A No, I wasn't.

Q So you worked equally throughout that entire area shown on 358-21 without distinction?

A Yes, and a larger area even at that.

Q And a larger area to the east?

A That's right.

Q And that large area to the east is reflected on your original overlays that were delivered?

A Yes.

Q One other thing on Exhibit 358. Did you -- does it show microclimatic and upslope conditions?

A Not on this map, no.

Q Why not?

A This scale is far too small. It couldn't map microclimatic on this scale or even at one to five hundred thousand, it couldn't map microclimates.
Q And what do you mean by microclimate then?
A Microclimate is a climate on a very small scale.
Q Like an example, can you give us?
A It can go anywhere from the size of this desk top to a couple square miles I would call microclimate.
Q Did you map upslope conditions for drying?
A Not within the valley bottoms. I included the plateau region which is a little higher elevation but it isn't upslope per se. It is again another area just a little higher up.
Q Okay. Did you map areas where there was little or no climatic data?
A No, I did not.
Q And does this map reflect your opinion as to the best areas within this region for drying?
A For drying, yes, it does.

MR. GRANT: Thank you. Those are my questions.

THE COURT: Thank you. Mr. Willm's or Ms. Koenigsberg, whoever is going next.

CROSS-EXAMINATION BY MS. KOENIGSBERG:

Q I think I have only one question in cross-examination arising from the alterations of -- to the map 21 that my friend has made. You have told us, Mr. Chilton, that you have no special knowledge or expertise in the relative properties of foods and their rates of drying?
A That's correct.
Q And anything that you have said in your evidence or that is on map 21 as to the relative rates of drying of any organic element is an assumption on your part?
A Yes, I have to say that.

MS. KOENIGSBERG: Those are all my questions.

THE COURT: Mr. Willms, how long do you think you will be?

MR. WILLMS: I will be longer than a few minutes.

THE COURT: Well, I don't need to take an adjournment today but perhaps we should do so because madam reporter is going to be relieved anyway at about this time, so I suppose we should take an adjournment now.

MR. GRANT: My lord, before my friend proceeds, I would hope -- not pressing, but I would, as Miss Mandell said, I anticipated that -- and corresponded with both my friends that Mr. Chilton would take one day in total

and then I have another witness who was flown in for tomorrow and Thursday, and I anticipate my friend had some problems he wanted to associate with me and I would just hope that we may be able to -- I would ask the court's indulgence if it is only a few minutes longer, if we can stay a little bit longer today so we can complete Mr. Chilton so he can leave the area.

THE COURT: There will be no difficulty with me. We will take as short as possible adjournment then.

THE REGISTRAR: Order in court. Court will recess.

(ADJOURNMENT AT 3:00 P.M.)

I hereby certify the foregoing to be a true and accurate transcript of the proceedings herein, transcribed to the best of my skill and ability.

_____

TANNIS DEFOE, Official Reporter
United Reporting Service Ltd.

(PROCEEDINGS PRESUMED FOLLOWING SHORT RECESS)

CROSS-EXAMINATION BY MR. WILLMS:

MR. WILLMS:
Q Mr. Chilton, I am showing you a copy of an agreement dated May 24th, 1985. Is that your consulting agreement with the Tribal Council?
A Yes, it is.
MR. WILLMS: My lord, Exhibit 784-9, please.

(EXHIBIT 784-9: CONSULTING AGREEMENT WITH TRIBAL COUNCIL DATED MAY 24, 1985)

MR. WILLMS:
Q And, Mr. Chilton, I am showing you a letter dated July 5th, 1985, from Mr. Overstall to yourself. That's a letter --
THE COURT: The date?
MR. WILLMS: July 5th, 1985. That's a letter in reference to the subject matter of your investigations here?
A Yes, that's correct.
Q My lord, Exhibit 784-10, please.

(EXHIBIT 784-10: LETTER - OVERSTALL TO CHILTON DATED JULY 5, 1985)

MR. WILLMS: Perhaps if -- I have one question on the exhibit.
MR. GRANT: Which one?
MR. WILLMS: 784-10.
Q Mr. Overstall says, in paragraph one, numbered one, at the bottom, that "there may be a problem using measurements such as potential evapotranspiration or degree days in that they only record the amount of energy available and do not take into account the final moisture content of the food being dried or the ambient air humidity."
Is that statement true, to the best of your knowledge?
A Richard and I had this discussion and we concluded that it wasn't relevant to what I was doing. So, it isn't true, no.
Q You see on the next page Mr. Overstall suggests, "It seems to me that with higher ambient humidity more energy would be required to dry the food to a required moisture content."
Are you just saying that wasn't relevant at all to

what you were considering?
A Well, if that was the case, if there was higher humidity, yes, it would take more energy to dry the food, that's true. But his little graph at the bottom wasn't pertinent to what I was doing.
Q But the part about air humidity relative to energy is important, isn't it?
A Yes, it is.
THE COURT: But not to the relative drying conditions in various locations?
A Yes, it's taken into account in drying as well. It's the smallest part of three parameters, but it is a consideration.
MR. WILLMS: I will be coming back to this, my lord, the humidity part.
THE COURT: All right. If you're going to come back to it.
MR. WILLMS:
Q The next document is a memorandum dated January 4th, 1986 from Mr. Overstall to yourself, referencing one of your reports. That is referring to a draft report that you made?
A That is correct, yes.
Q And so you did a draft of your report on -- in August of 1985?
A Yes.
Q Do you still have a copy of that draft?
A No, I don't, actually.
Q Did you destroy it?
A Yes, it was destroyed, that's right.
Q Is that your normal practice when you're doing research to destroy your draft?
A I don't call it destroying, I just updated it. It was discussed at length and we felt it wasn't relevant any more so we did destroy it.
Q You say we?
A Or I destroyed it.
Q And I would ask that that be Exhibit 784-11, my lord.

(EXHIBIT 784-11: MEMORANDUM - OVERSTALL TO CHILTON DATED JANUARY 4, 1985)

MR. WILLMS:
Q The next document is a letter from Mr. Overstall to yourself dated January the 7th, 1986, you received that letter?
A Yes, I did.
MR. WILLMS: My lord, might that be Exhibit 784-12?

THE COURT: Yes.

(EXHIBIT 784-12: LETTER - OVERSTALL TO CHILTON DATED JANUARY 7, 1986)

MR. WILLMS:

Q And you will see in Exhibit 784-12, Mr. Chilton, that Mr. Overstall has enclosed a draft of your report that incorporates all the data and opinion that he feels is required for it to stand up in court?

A Yes.

Q Do you still have a copy of the draft that Mr. Overstall sent you under cover of this letter?

A Yes, I do.

Q Do you have it with you today?

A No, I don't. That should be in Richard Overstall's file as well. He would have copies of all correspondence.

Q Well, it's in your file and where is your file right now?

A Well, we were in the process of moving from house to house and it got -- I have got boxes everywhere and it's within those boxes.

MR. GRANT: I have -- Mr. Chilton did provide me with his file and it doesn't have this document that now is referred to here, but I must say that I advised Mr. Chilton and he provided me with what I understood was his file. It appears it has this draft that -- it's got separated from that file that he has. I just want to advise the court of that because I know my friend has asked if the file is here.

MR. WILLMS: I have also asked many times for drafts, my lord. The way I would like to leave it is like this, I would like to leave a request with the witness for that draft, and if anything arises out of it, I will take that matter up when the time comes.

THE COURT: All right.

MR. WILLMS:

Q The next letter is a letter of February 19th, 1986 from Mr. Overstall to yourself; you received that?

A Yes, I did.

MR. WILLMS: My lord, Exhibit 784-13.

(EXHIBIT 784-13: LETTER - OVERSTALL TO CHILTON DATED FEBRUARY 19, 1986)

MR. WILLMS:

Q Can you explain the concern that Mr. Overstall is discussing in paragraph numbered one about the time period being too broad?

A Just a sec here.
I am sorry, is that --

Q It's under food --

A Under food drying. Just a minute.

Q I take it Mr. Overstall is referring to, when he says "you", is something that you told him?

A Just a second. I have to refresh my memory here.
Oh, yes, well, originally I had expressed to Richard perhaps that the period that I look at might -- it might be more valid to look at a longer term period, May to September, perhaps, rather than July to September. I was -- I think I was trying to incorporate into my map something about the ripening period as well, and the tendency for them to do so in different regions. After discussion with him, we decided just to do the July to September as originally outlined.

Q So that your map covers the climate for that three month period?

A Yes, on average, that's right.

Q On average?

A Yes.

Q But if your map only covered that area for maybe September it might be different?

A No, I can't foresee it being any different in patterns, no. The actual figures, of course, would be different but the patterns would be the same, or almost identical.

Q There are no month-to-month temperature differences from July to September in any of the area that you mapped?

A There is, but relative to each other in that region, a site A to site B, the relationship holds that it's similar in September as it would be in July and August as well.

Q Isn't it cooler in the north in September --

A Yes, it is.

Q Isn't the temperature a lot closer in a period like July?

A Well, we are still in the summer period and there is still these coastal influences that cool the climate near the coast and the inferior is still as warm in September as it was in July and August.

Q I am just thinking of these weather maps that we see all the time with the cold front coming down from the north, and I am just wondering whether or not in July whether the cold front is beyond the area and in September it's part way down it?

A No, generally, it stays north of this region, certainly. It wouldn't be October, late October, where you start getting arctic air masses. September is still summer in the north Pacific region.

Q Was the gist of what you were getting at that if you were looking at drying berries we should look at the time period when we dry the berries?

A That was my understanding originally, that that's what I would be doing, yes.

Q I am showing you finally a letter of May 6th, 1986 from yourself, that's a letter from yourself to Mr. Overstall.

A Yes.

MR. WILLMS: Exhibit 784-14, please, my lord.

(EXHIBIT 784-14 LETTER - CHILTON TO OVERSTALL DATED MAY 6, 1986)

Q In that letter you say, in the second paragraph after the word first, "First, most of the requested changes to the first draft have been made as suggested in your edit."

How many drafts of the report did you prepare?

A There was just -- I believe there was just the two, the one that we discussed here and then the final, except for slight typographical changes.

Q Well, there was one that you prepared in the summer of 1985?

A Yes.

Q And forwarded to Mr. Overstall?

A Yes.

Q And then Mr. Overstall sent one back to you, that he had re-typed?

A Okay, yes.

Q Then the final?

MR. GRANT: Just a moment. Just a moment. My friend, I think, is referring to 784-12. I don't know if -- and I don't know why my friend says that he had the second, that Mr. Overstall's second one he had re-typed and had sent back. It just says it incorporates all the data and opinion and it could

be marginally annotated by hand.

MR. WILLMS: Well, I actually read a little further in the paragraph than my friend just did. I read the part where it says "I also enclose a copy of your original transcripts so you can compare the two versions." That's in Exhibit 784-12. I am sorry, maybe I was jumping to conclusions that there was a separate draft prepared by Mr. Overstall when he returned it. Maybe I could just ask the witness that.

A Could you rephrase it or repeat that question now?

Q You prepared a draft of your report and sent it to Mr. Overstall?

A Yes.

Q Mr. Overstall sent back your draft with comments on it, and sent you a typed-up sort of clean report?

A You know, my memory is fading on this because I can't really recall that for sure. You know, I just can't recall it. That's all there is to it. I believe we only went through about, with -- through one draft before the final. There was small typographical changes after that.

Q All right. Well, you're going to look for that anyway so --

A Yes.

Q The document that my friend and that you explained in your evidence is Exhibit 791, the Baier and Robertson report, this particular paper talks about four weather elements, talks about solar radiation, temperature, wind and humidity; is that right?

A Maybe you could repeat that too, please?

MR. GRANT: Does the witness have that in front of him?

A I have got the Baier and Robertson.

MR. GRANT: It's at tab 2.

A Where does that refer to that?

THE COURT: Did you say Roman four?

MR. WILLMS: Pardon?

THE COURT: Did you say Roman four?

MR. WILLMS: It's Exhibit 791 and the four elements that I am suggesting that are referred to in here are solar radiation --

THE COURT: Where are you reading from, Mr. Willms?

MR. WILLMS: The bottom of page one, and the paragraph comparisons.

A Oh, yes.

Q And at Summerland, B. C.?

A Yes.

Q And four weather elements, solar radiation, temperature, wind and humidity?
A Yes.
Q And if you look -- and there is a list over on page 278, you can go through that list and see, for example, that items two and three are temperature?
A Yes.
Q Items five, seven, eight and nine are solar radiation?
A Yes.
Q Item four is wind?
A Yes.
Q And item six is humidity?
A That's correct.
Q So those are the four elements that go into --
A Yes, that's right.
Q And one of the very important factors, and this is over on page 283, under discussion, just starting from the top of the page down to the third line, "It was found that on average, over all stations and years, variations in solar energy alone accounted for 50 percent of the variations in..." and that's "latent evaporation", isn't, it, E. L.?
A Yes.
Q Your formula, the formula that you used is primarily a function of temperature, isn't it?
A Yes, it is, but it's been modified the way I explained this morning by Dr. Coligado's technique.
Q But you have used one of the Baier and Robertson formulas modified by Dr. Coligado?
A That's right.
Q The formula that you used is the formula that deals with temperature and solar energy at the top of the atmosphere or -- is that right?
A Yes.
Q Now, on map 21, which is -- there are two photographs and my friend referred you to those two photographs in the upper right hand corner?
A Yes.
Q Will solar energy account for 50 percent of the variations of latent evaporation in that smokehouse?
A Assuming that it's open to the elements the way I was assured it was, it would, yes.
Q Well, let's assume that it's open to the elements just the way it looks?
A I can see the door and cracks in the wall, and it looks to be an opening here, yes.
Q So, your evidence is that solar radiation will make a

1 difference in that smokehouse?
2 A Yes, because temperature is tied to solar radiation.
3 Q Temperature is tied to solar radiation, where the
4 solar radiation has a -- and there is two effects,
5 there is the solar radiation effect in the upper
6 atmosphere; is that correct?
7 A That's used, that particular parameter, just to
8 indicate the length of daylight or the amount of
9 energy that's available at different latitudes.
10 That's why that parameter is used. So when you go
11 north in the summer you get the greater receipt of
12 energy, the potential is there. You see what I am
13 saying?
14 Q What I am trying to get at is that direct solar
15 radiation depends on whether there is a barrier
16 between the sun and the item that the radiation is
17 falling on?
18 A It does to a degree, but because I have indicated
19 earlier that temperature's intimately tied to solar
20 radiation, that there is that relationship that we
21 can express, because even if a standard Stevenson
22 screen, which is -- it's a weather box, they don't
23 put their thermometers out exposed to the sun, they
24 are in a slatted box and the temperature responds to
25 the solar radiation, but it's inside a box and it's
26 shaded, and it's slatted, so there is air movement
27 through, much as I assume is occurring in
28 smokehouses.
29 Q Is it -- sorry, are you finished?
30 A I had.
31 Q Isn't it the case that primary drying factors in that
32 smokehouse are going to be the temperature and the
33 humidity in the smokehouse?
34 A Yes, but that's in direct response to the outside
35 atmosphere.
36 Q Well, it may be and it may not be, you don't know
37 that, do you?
38 A Well, if it's open it would be and there is wind
39 permitted through the structure.
40 Q Well, would it make a difference if there was a low
41 fire in the smokehouse?
42 A I can't see that it would. Not directly, no.
43 Q Well, wouldn't that fire heat the smokehouse?
44 A It does in an immediate area, but I was led to believe
45 that that isn't important after a day or two. They
46 depend upon the atmosphere after the fires are used
47 for the initial drying. So you're right, it

1 probably does in the first day or two but they still
2 depend on the atmosphere to dry the berries and the
3 fish.
4 Q What I am suggesting is if there is a low fire in that
5 smokehouse that raises the temperature of the
6 smokehouse higher than the outside hair, the drying
7 capability inside is going to be better than
8 outside, is that right?
9 A It should be, yes.
10 Q If the humidity in the smokehouse is lower than the
11 humidity outside the smokehouse, then the drying
12 capability inside will be better than outside?
13 A As long as the fire is on.
14 Q Yes, I am assuming a fire. I think there is something
15 about fires in there.
16 A All right, for that period of time, yes.
17 Q Just on the hay study, where was the hay dried, in the
18 open air?
19 A Yes, it was.
20 Q Exposed to all the elements?
21 A Yes.
22 THE COURT: Of course if the hay got partially dried and then
23 you had a rainstorm, it would get wet?
24 A Yes.
25 THE COURT: And you would have to repeat some of the process?
26 A That's right. They depend on a couple of days for --
27 a no rain situation. Here, of course, we are
28 talking about a covered area, that's why the
29 rainfall wasn't considered.
30 MR. WILLMS:
31 Q You have, and this is referring to the description on
32 the top of the exhibit, if I can find it -- it's the
33 last column on the right-hand side, just immediately
34 to the left of the photograph, and you say there,
35 "Although the overall climate may have changed
36 through time the most suited drying sites are
37 expected to have remained the same. This is because
38 the region's topography is considered to be the
39 principal climate controlling factor."
40 Did the Little Ice Age have an important effect on
41 the climate in this area?
42 A I am not certain on that because I haven't seen very
43 much work in that -- for that period. That was
44 during the 1500, 1600 period. In Europe, of course,
45 it affected Europe but I can't say for sure.
46 Q So, can I put it this way, you haven't considered the
47 effect of the Little Ice Age in this report?

A Not directly. But we still had the mountains and we still had the air flow from the west generally, so that the response of the climate in the lee of the mountains is going to be relatively the same.
Q But, the whole formula that you used is temperature-dependent, it's temperature-related, isn't it?
A That's correct.
Q So that if the temperature is lower then the potential evapotranspiration is lower?
A Yes. But the areas within that region are still going to be relatively better than the area around Hazelton, for example, than they are around-- further north, around the Babine, for example.
Q So that at any particular time as a snapshot in time, this may be a relative example of potential evapotranspiration?
A Yes, for snapshot, I would say that.
Q But in terms of comparing today with 1850, you just don't know?
A We can't say for certain but I could would still say the relative pattern will be the same but I can't say for certain. Because there wasn't any meteorology instruments in that region. You have to go on other information.
Q And I am working with your formula here of P. E., if the climate was cooler and if the climate was wetter 100 years ago, the P. E. would be different everywhere?
A It would be relatively lower everywhere.
Q That's right?
A Yes.
Q And the ability to dry anything in that would depend on P. E. and the length of time it takes to dry something?
A Yes.
Q And the P. E. would be lower, assuming it was cooler --
A If we assume that.
Q -- or wetter, 100 years ago?
A If that's assumed. But I am still saying the relative pattern is going to be the same.
Q I understand that. But I suppose what I am getting at is that there may be certain fruits that will never dry in the rain forests of the west coast of Vancouver Island?
A Certainly.
Q No matter how long you leave the fruit out?

A That's probably true, yes.
Q And if the climate is different 100 years ago, that may affect the -- not the ability of the atmosphere, it will affect the ability of the atmosphere to take up water; is that correct?
A Yes.
Q But it may also affect the relative ability to dry anything?
A Yes, yes.

MR. WILLMS: I don't have any further questions, my lord.
THE COURT: Mr. Grant?

RE-EXAMINATION BY MR. GRANT:

MR. GRANT:
Q I believe you have been given a series of material. I only want to refer you to one, and that is the Exhibit 784-10. That's a July '85 letter.
THE COURT: The one from Mr. Overstall with the graph on the bottom.
THE REGISTRAR: I am sorry. Yes.
MR. GRANT:
Q Now, you were asked about this and I just want to refer you to the first page above that, you were asked about that comment under number one, you said that it was determined that it was not relevant. Can you explain why you determined it was not relevant for your report?
A Yes, I will have to think about that, Peter, just for a second. I can't remember how the discussion went after with Richard.
I will just read this again and refresh my memory.
MR. GRANT: Go ahead and read it, yes.
A Well, while I was doing this I assumed again, and referring to the map, that the response of organic elements as we have decided is linear and not as Richard indicates in a curvalinear fashion. He has indicated that as the moisture changes within an element, the response changes. That was what that discussion was about. So, we -- our -- I more or less decided to go with it the way it is appearing now.
Q Is that consistent with Coligado's equation in terms of it being linear?
A No, that's the Dyer and Brown.
Q Dyer and Brown?
A Yes.

Q I am sorry.
A Yes.
Q Going to the second page of that same document, you were asked about that second -- the comment at the top, "It seems to me that with higher ambient humidity more energy would be required to dry the food to a required moisture content."
A Yes.
Q Did you determine that that was relevant?
A That's true, because the coast is an indication of that, where you have higher humidities on average, it does -- it would require a greater length of time to dry something.
Q And did you take that into account in your calculations in your analysis, using the Baier and Robertson and Coligado?
A Yes, that's what that attempts to do, because you are looking at the range of temperature and the maximum temperature. That's a reflection of whether the climate is a continental or a coastal-type climate.
Q And Baier-Robertson, in their method eight, takes into account humidity?
A Yes. Could I look at that just for a second?
Q Yes, it's at tab 2, page 281.
A Yes, that's the vapour pressure deficit, that's the last term in that column.
Q And the Coligado equation you have already indicated enables you to use the variables in method one but to bring them into the range of category eight, thereby bringing in the humidity factor?
A Yes, that's right.
Q Now, you were also asked about if the humidity in the smokehouse, referring to the picture and photograph, if the humidity in the smokehouse was lowered by a fire in the smokehouse and it was different, this would have an impact on the drying in the smokehouse as opposed to outside. Mr. Willms raised that with you?
A Yes, I remember, yes.
Q So long as the smokehouses that were used all were using the same method of drying, that is with a low fire plus openness to the outside atmosphere, would that -- the fact of that low fire in the smokehouse have an effect on the 358-21?
A Well, when you are comparing the same structure, no, they are not.
THE COURT: Assuming the same fuel?

A Yes, true.

MR. GRANT:

Q Now, you were asked as well about the Little Ice Age and if the Little Ice Age applied to this area, if it covered this area, the Little Ice Age is a period of time when there was a cooling?

A A cooling of the climate, yes, that's right.

Q And you are familiar with the Little Ice Age references, this is a term, you have read on that?

A Yes.

Q But if the Little Ice Age applied to this area, the region, would that affect the relative drying throughout the region, that is, the relationship between, say, Hazelton and Prince Rupert?

A No, it would not.

Q It would lower the drying capability throughout the region but there would still be preferred areas for drying?

A Yes, that's true.

Q Do you know how cold -- I am going back to the Little Ice Age concept -- how cold or humid would it have to get in the region before there would be absolutely no drying? My friend gave you an analogy of the rain forests of Vancouver Island, as a theoretical option.

A Yes, that's a difficult question to answer. I don't think I could answer that, to be honest.

THE COURT: Cold enough that the moisture would just freeze in the product?

A Yes, but during the Little Ice Age the temperatures were only a couple of degrees celsius lower.

THE COURT: At some elevations?

A No, this is in Europe. I am citing European. There is little very little, if any, information for this region in the Little Ice Age. We don't even know if it affected this region.

THE COURT: We know that if affected the Rockies?

A Not that I am aware of.

THE COURT: You haven't seen the Colford Glaciers that were taken in 1816 and taken today?

A That could be in response to just more precipitation. It doesn't have to be that it was colder. If you get the field -- these glaciers, they are going to move, and it doesn't -- it could just be wetter. It doesn't have to be colder. I am not aware of any great degree of work that's been done in that area here. I know the glaciers have responded and they

1 are moving back.
2 THE COURT: They are moving back.
3 A Yes, but most of the work has been done in Europe
4 because they have a far longer record and we don't
5 seem to correspond in our climate to the European
6 situation. It seems when they get very cold
7 winters, we have very warm winters, it's the way the
8 atmosphere seems to be set up.
9 THE COURT: You say you don't know whether the Little Ice Age,
10 as it's called, had any effect on this area at all?
11 A No, I don't. There has certainly been warmer periods
12 and colder periods. Back 12,000 years ago there was
13 a colder period right after the glaciers retreated
14 and a warmer period around 7,000 years ago. But
15 most of the work it looks at pollen samples and so
16 on and they don't consider that time frame.
17 MR. GRANT: Thank you, Mr. Chilton.
18 THE COURT: Mr. Chilton, just two things. When you use the term
19 linear, do you mean that it dries evenly?
20 A Yes, as a --
21 THE COURT: There is no drying curve?
22 A That's right. It's a direct one to one relationship,
23 just dries in a straight -- a straight line is
24 assumed.
25 THE COURT: All right. And can you tell me, what are Mr.
26 Overstall's scientific and professional
27 qualifications?
28 A I don't know. I think he is a geologist. Could we
29 address the question to Peter?
30 THE COURT: No.
31 A I believe he is a geologist.
32 THE COURT: Thank you.
33 Should we adjourn?
34 MR. GRANT: That would be appropriate. Thank you.
35
36 (PROCEEDINGS ADJOURNED UNTIL 10 O'CLOCK A. M.,
37 WEDNESDAY, NOVEMBER 9, 1988)
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41
42
43 I hereby certify the foregoing to be
44 a true and accurate transcript of the
45 proceedings herein to the best of my
46 skill and ability.
47

Wilf Roy
Official Reporter