In the Privy Council

VOLUME 2

ON APPEAL

FROM THE COURT OF APPEAL FOR ONTARIO

BETWEEN:

THE McKINNON INDUSTRIES LIMITED (Defendant) ..... *Appellant*

— AND —

WILLIAM WALLACE WALKER (Plaintiff) ..... *Respondent*

Record of Proceedings

L. BINGHAM & CO.,
1 Budge Row, E. C. 4.
Solicitors for the Appellant

HANCOCK & SCOTT,
222-225 Strand, W. C. 2,
Solicitors for the Respondent

LEE PRINTING COMPANY
ST. CATHARINES
1950

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EXHIBITS

ALEC. DeROCHE, sworn,

EXAMINED BY MR. KEOGH:

Q. Mr. DeRoche, you are a laboratory technician and chemist at the metallurgical laboratory of the McKinnon Industries Limited? Is that right? A. Not a chemist, metallurgical engineer.

Q. In the metallurgical laboratory. I understood you had taken a course in chemistry at Queen's. Is that right? A. In metallurgical engineering, yes.

Q. Oh, yes. In what university? A. Queen's.

Q. Then, you made some of these test computations that have already been submitted by the last two witnesses, did you? A. Yes.

Q. I understand you did not make very many. Mr. Davey made most of them, but you made some for approximately what period? A. About two months.

Q. When? A. In the fall of 1947.

Q. In the fall of 1947? A. Right.

Q. Will you produce a specimen of the computation sheet made up by you as to the lower items on it? A. Yes.

Q. Now, understand — to save time perhaps I may lead — Mr. Gaukroger explained this. I understand the top two rows of items were given to you by Mr. Longhurst, or came to you from him? A. Yes.

Q. And that it was just the three last items on the sheet that were the result of your computations? A. Yes.

Q. Were you in Court when Mr. Gaukroger described the procedure of making these computations, this morning? A. Yes.

Q. And did you make these computations shown on that sheet, in accordance with that procedure? A. Yes.

Q. And did you record the results of that truthfully and completely on that sheet in front of you? A. Yes.

Q. May I have this marked as Exhibit 130, my lord?

HIS LORDSHIP: Yes.

——EXHIBIT No. 130: Sample computation made by DeRoche.

Q. And you have extra copies, have you? A. I have.

MR. KEOGH: One for his lordship, one for the Court and keep one for yourself to refer to, and one for my friend Mr. Slaght.

MR. SLAGHT: Thank you.

MR. KEOGH: That is all, thank you.

In the Supreme Court of Ontario No. 35 Defendant's Evidence Alec. DeRoche Cross-Examination 2nd May, 1949

CROSS-EXAMINATION BY MR. SLAGHT:

Q. Mr. DeRoche, did you make any computations during the strike? A. No, I did not.

Q. Were you there, at the plant? A. Yes.

Q. And I see the sample you picked out — did you pick this out, or who picked the sample out of the others? A. I picked this out, — out of some I had done.

Q. Did you just grab one by chance, or what did you do? How come you selected this one? A. I just took this one.

Q. There was no design in the sample you took? A. No.

Q. I see. It is one down in the last figure I am interested in, as 65. And you were here when the last witness told us that was the standard the machine was set at the paper was white and clean for the 65? A. Yes.

Q. And then you ran this paper through that was handed you by somebody, it gave 35 as — A. A reading.

Q. And that 35 and 65 leaves 30 — would that leave. of dirt that the paper caught, 30 parts, or 35 parts? A. I don't know.

Q. Well, what does the "35" mean? A. That is an indication on the photo-electric cell in comparison with the standard.

Q. Well, an indication on the cell in comparison with the standard. You don't know what that means at all? A. No.

Q. That is all. Oh, pardon me — if I may ask another question, my lord? Did you save the filter papers? A. No, they were extracted with ether.

Q. They were all destroyed? A. Well, they have been chemically processed on the extractor.

Q. Which means they are not available now? A. Not to my knowledge.

Q. That is all.

——Witness excused.

In the Supreme Court of Ontario No. 36 Defendant's Evidence Stanley Klimek Examination-in-Chief 2nd May, 1949

STANLEY KLIMEK, sworn,

EXAMINED BY MR. KEOGH:

Q. Mr. Klimek, are you also a laboratory technician in the metallurgical laboratory of the McKinnon Industries Limited? A. Yes.

Q. I understand that you also made some of these dust computations? A. Yes.

Q. Over what period did you make them? A. Oh, about two months.

Q. At what time? A. Around May, 1947; May and June.

Q. And have you with you one of the forms which you made up from your own computations? A. Yes.

Q. In connection with this dust business? A. Yes.

Q. Will you produce that please? A. (Produced.)

——EXHIBIT No. 131: Sample computation made by Klimek.

In the Supreme Court of Ontario No. 36 Defendant's Evidence Stanley Klimek Examination-in-Chief 2nd May, 1949 Continued

Q. Keep one in front of you and there is a copy for his lordship and one for my friend. Now, on this Exhibit 131, just to make clear for the record, the two top lines of information across the top of the page came to you from somebody else, did they? A. Yes.

Q. Who did they come from? A. Mr. Longhurst.

Q. Then, the three last items on each sheet represent the results of your own computations? A. Yes.

Q. And did you personally do the work represented by the three last items on Exhibit 131? A. Yes.

Q. And were you in Court when Mr. Gaukroger described the procedure in connection with the work, this morning? A. Yes.

Q. And did you do your work on the computations you made in those two months in complete accordance with that procedure? A. Yes.

Q. And did you correctly and completely record on that form, Exhibit 131,, the correct and complete results of your own computations? A. Yes.

Q. How did you come to pick that one out? A. Just one of them I took.

Q. Was there any particular reason for taking that one any more than any other one? A. No.

Q. Just selected at random? A. Yes.

Q. Your witness.

In the Supreme Court of Ontario No. 36 Defendant's Evidence Stanley Klimek Cross-Examination 2nd May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. Mr. Klimek, the photo-electric cell, B.L.65, S.35, — we have heard what all B.L.65 is. That is the standard of clean paper? A. Yes.

Q. What does the 35 mean? A. That was the reading on the instrument as received when I put the dust that was collected on the paper.

Q. Well, that is the reading on the instrument. What did you look at when you got the reading? A. The indicator.

Q. And it jiggled around to 35? Is that the idea? A. No, it didn't jiggle around to 35.

Q. Well, how does it get to 35? A. I just put the paper that the dust was collected on on this instrument, and it read 35.

Q. How does it read 35, on the face of it?

HIS LORDSHIP: Is it a needle that moves? A. A needle that is there, yes.

MR. SLAGHT: And what does 35 mean to us? Tell us, or do you know? A. No, I don't know.

Q. You don't know what the 35 means? That is all.

——Witness excused.

In the Supreme Court of Ontario
No. 37
Defendant's Evidence
Dr. Morris Katz
Examination-in-Chief
2nd May, 1949

DR. MORRIS KATZ, sworn,

EXAMINED BY MR. KEOGH:

HIS LORDSHIP: Did you take the oath on the Jewish Bible? A. I do that, too.

Q. Well, you do, too. I want to know what you feel binds your conscience? A. That is.

Q. Would you prefer to swear on the Jewish Bible? A. It makes no difference to me. This binds me just the same.

Q. You feel that the oath on the Bible as given binds your conscience? A. It does.

Q. Yes.

MR. KEOGH: Dr. Katz, are you on the staff of the National Research Council, at Ottawa? A. I was on the staff of the National Research until some time in 1947, when I transferred to a position with the Defence Research Board.

Q. And since then you have been on the National Defence Research Board at Ottawa? A. With the Defence Research Board, yes.

Q. And what university courses did you take, and what university degrees did you obtain? A. I graduated in chemical engineering at McGill University, 1926. Then entered the Graduate School at McGill. Received my Master of Science degree in chemistry, and Doctor of Philosophy degree in 1929, majoring in organic chemistry and biological chemistry.

Q. And are you connected with the Joint Technical Advisory Board of the International Joint Commission? A. I am chairman of the Technical Advisory Board of the International Joint Commission, that is, the Canadian section. There is a similar chairman for the United States section of the International Joint Commission.

Q. That is a body that, I believe, is presently studying atmospheric pollution in the Detroit and Niagara Rivers? Is that right? A. That is right, sir.

Q. In the vicinity of those rivers? A. Yes.

Q. Then, what experience have you in connection with the scientific investigations of the effects of sulphur dioxide? A. I have studied the effects of sulphur dioxide on plant life for about 20 years. I was officer in charge of the investigation in connection with the Trail Smelter fumes investigation, conducted by the National Research Council of Canada. I have —

Q. Just before you leave Trail, for what length of time was your scientific investigation carried on in connection with Trail? A. For about eight years.

Q. Yes. Then, I interrupted you. Go on. A. I have been technical consultant and chemical advisor to the Ontario Government in connection with an investigation to determine the extent of atmospheric pollution in the Sudbury district, since early in 1945.

Q. And do you still have that connection, or has that ceased? A. That has not ceased. I don't know how active we are going to be this year, but I am still a member of the committee. We have meetings.

Q. Well, that is enough for my purpose. And then it may come out in some questions later on, but, in connection with that Ontario Government investigation, did you have occasion to visit Sudbury from time to time, since 1945? A. I have visited Sudbury.

Q. I don't want exact dates. A. Frequently, since 1945.

Q. We will come to that later, but I believe you have collected some specimens of air on one or two occasions? A. Yes.

Q. Then, have you written and had published any scientific treatises or works on the effects of sulphur dioxide in the temperature and on vegetation? A. I have published, with various collaborators, a considerable amount of technical reports on the results of the Trail Smelter fumes investigation. I have published, with collaborators, a book on the effect of sulphur dioxide on plant life. I have recently addressed, by invitation, a national meeting of the American Chemical Society, in San Francisco, on the same subject. I have also many published works on other fields in chemistry.

Q. Now, were you in Court, Dr. Katz, when Mr. Longhurst was describing the equipment in the test houses, — first of all, the test house on the Warren Pink property near McKinnon's, and, secondly, the test house started in 1948 at Dunn's greenhouses on Queenston Street? A. Yes.

Q. Were you in Court then? A. Yes.

Q. And did Mr. Longhurst, in a general way or character, describe in layman's language that equipment? I want to show you three exhibits. I am now showing you first Exhibit 110, which was identified by Mr. Longhurst as a photograph of the sulphur dioxide tube mechanism. Is there any better scientific description of that? A. There is a scientific term for that item of apparatus. It is the Thomas Automatic Analyzer for gases.

Q. Then, I want to show you Exhibit 111, and then I will come back to both of them. Is that also a part of that Thomas Automatic Analyzer? A. This is the recorded Wade Stonebridge mechanism of the analyzer, which determines the concentration of solutions that are being aspirated by the Wade Stonebridge recognized method of determining the conductivity of the motions and deflections of the galvanometer needle, and those are recorded

by the pen, which is oprated by means of a sliding carriage connected to the galvanometer mechanism and when that needle of the galvanometer moves and resistance is automatically thrown in, the two balance the circuit and in that way the pen moves at the same time and indicates the concentration at that particular time; the change in concentration at that particular time.

Q. The concentration of what, doctor? A. In this case, the concentration of sulphur dioxide.

Q. And can you explain how that concentration is arrived at in the other part of the machine, Exhibit 110, apart from the recorder? A. The known value of air drawn in from outside the test house is aspirated with and is used to aspirate a known volume of solution. The initial conductivity of that solution is recorded and, if any sulphur dioxide is present in the air, it is absorbed by the solution and reacts with the excessive hydrogen peroxide in the solution converted to sulphur dioxide. That increases the solution of sulphur dioxide in the solution and therefore increases the conductivity of the solution that changes the resistance, and the breech of the galvanometer is then deflected. Automatically enough resistance is drawn in to balance the galvanometer and the open carriage goes with it and the indicated line on the chart, as it advances, indicates the concentration at that point. For 30 minutes the particular cell that is being aspirated ceases to aspirate: the solution is drained out of it. In the meantime a second cell has had a fresh solution run into it automatically. The measured volume of that solution has been run in and it is already prepared to take on the next aspiration cycle, and this is repeated continuously. The reason for the two cells doing that, while one cell is being aspirated, the other one can be drained and filled with fresh solution.

Q. And that is the procedure, is it, that there is one cell through which the air is being forced through the solution at all times the equipment is operating? A. Yes.

Q. And were these the cells that Mr. Longhurst referred to as the conductivity cells Nos. 1 and 2? A. Yes.

Q. And there is a number on each one, which can be dimly seen in the photograph, Exhibit 110? A. Yes. I would like to point out that the machine on the Dunn property operates on the same principle, but is slightly different in its mechanical arrangement, in that there the two cells operate in the same manner, that the air passes through one absorber for two minutes, and then it is switched on to the other one, and then switched back and forth like that and then, at the end of about 30 minutes, the cells are drained within about two minutes of each other. The reason for that is that the other was a machine which could also be used for laboratory purposes. In fact, it was one of the instruments used in the Trail Smelter investigations for determining the effects of sulphur dioxide on plant life.

Q. Which machine? A. The one at the Dunn station.

Q. And that is the one that you are referring to now in Exhibit 110, in the McKinnon test house, — the test house at McKinnon's operated how long on each conductivity cell? A. Thirty minutes continuously.

Q. On each conductivity cell, No. 1 and No. 2? A. Yes.

Q. And then, at the bottom of Exhibit 111 is what appears to be a white square of paper and the recorder. Is that a chart? A. That is the chart that is inserted in the instrument, and it is just a roll of paper with the indentations in it on each side to fit the paper carriage and the roll will last for about two weeks at the normal rate of operation.

Q. Then, we had one produced as Exhibit 113. Is that a fair specimen roll from that sulphur dioxide recorder? A. Yes.

Q. And looking at Exhibit 113, you will see a red line towards the left hand edge? A. Yes.

Q. Is it that line and its position on the chart which tells you or enables you to determine the amount of sulphur dioxide in the reading at any particular time? A. That is right, yes. When that line has travelled vertically up and down, the air is free of sulphur dioxide, and whenever the line begins to advance towards the right, it indicates sulphur dioxide and the extent of that travel is calibrated according to a definite procedure. In other words each scale division on this chart represents a definite amount of sulphur dioxide, if you take the calibration data and the air volumes, temperature and pressure on readings which are on each sheet submitted by Mr. Longhurst.

Q. Who got that calibration? A. I did that, all myself.

HIS LORDSHIP: Let me understand what is vertical, and what is horizontal on this chart. A. That is vertical.

Q. That is, you look at the chart long ways? A. Yes, sir.

Q. And you say when it is vertical it is free of sulphur dioxide; when it travels to the right, it shows the presence of sulphur dioxide? A. Yes, sir.

Q. I see.

MR. KEOGH: Q. Then, I believe Mr. Longhurst told us that every half hour there is a jog in the line which indicated that the other cell was then being aspirated? A. Every half hour the carriage is switched from one cell to the other and you start a fresh cycle and at that instant the initial conductivity of the solution is measured so that at any time we have the conductivity of the solution in the cell, and then, continuously during that 30 minutes, we have the change in conductivity due to sulphur dioxide in the air, if any.

Q. And what has been — perhaps I should have asked you this first. Mr. Longhurst said that you and he prepared the solution which went into these cells, in accordance with the instructions received from you and in certain proportions? A. Yes.

Q. And did you instruct him as to how to prepare them and make up that solution? A. Yes.

Q. Would you mind repeating the proportions that he was to make it up at? A. I want to make clear that those proportions are not critical, — that the instrument itself indicates the conductivity of the test solution. Consequently, the proportions were given merely to make up a solution which would keep the conductivity on the recorder chart not being too high and not being too low an amount. The proportions can be varied within certain limits but they are for about — are three litres of solution you can use —

HIS LORDSHIP: Now, that is not the question you were asked. You were asked what instructions you gave to Mr. Longhurst. A. As I recall the instructions, I told him to add to three litres of free solution, ten millimetres of 0.01 normal sulphur dioxide and about one millimetre of 30% hydrogen peroxide.

MR. KEOGH: Then, you visited St. Catharines from time to time in the course of this investigation? A. Yes.

Q. You started your investigation, I believe, about November, or October of 1944? A. That is right.

Q. And you carried it on up to the present time, although I appreciate you have not got your recent data, have you? A. The investigation was carried on to about November of 1945, and then it was commenced again in May of 1946, and it was continued until about the end of October, 1946. It was then commenced again in — early in May of 1947, also continued for that growing season and then —

HIS LORDSHIP: Well, when was it concluded? A. I can give you the exact date, if you like.

MR. KEOGH: Well, it was roughly the end of October, or the first of November? A. Yes.

Q. We will come to that when we get to the report. A. It was then discontinued until May of 1948 and, since May of 1948, the investigation has been in progress.

MR. SLAGHT: Till when? A. It is in progress at the present moment.

MR. KEOGH: Carrying on since the early part of May, 1948? A. Yes.

Q. Then, before we leave the photograph Exhibit 110, there are certain other items of equipment in there that I want you to describe and there, among others, there is a mercury column and a water manometer column, and anything else that is of importance? A. The water manometer column is used and is the indication that the air stream is passing through the cells properly.

If, by any chance, there should be a break in the tube, then, there would be no manometer reading and therefore the operator would immediately check the source of the trouble. It is therefore used entirely as a guide to make sure the outside air is being carried to the conductivity cells.

The mercury manometer is used in order to determine the suction on the system. On any system on which you are pumping air through the scrubber, there is a reduction in pressure and the height of the mercury column is therefore measured and taken into account in the calculation of the final reading and calculation being based on the volume of air put through its temperature and pressure and that is converted to the temperature, to the volume under standard conditions; that is the volume at zero degrees centigrade, and 760 millimetre pressure, 1030 millibars.

MR. SLAGHT: Would you mind repeating that last? A. The degree centigrade was 273 absolute.

MR. KEOGH: And then, at all times, when you visited the McKinnon test house, was a barometer installed there? A. Yes, a standard barometer obtained from the Dominion Meteorological Service and readings were taken on the barometric pressure.

Q. And Mr. Longhurst, I understand, took those readings? A. Yes, sir.

Q. I want to get through with the equipment and then we will go back to the records. You say when you came — now, have you referred to all the important parts of the equipment in Exhibits 110 and 111, or is there anything else? A. The meter there is self-evident. The rest consists —

Q. The meter, you say, is self-evident. We have already had evidence that that is to measure the air flow? A. Yes. The rest of the equipment is simply a mechanical arrangement of valves, with the valve rods, and cam followers, and a reduction gear system, an electric motor and pump. The cams are cut in such a way that, at the proper time, the various operations will be performed by the opening and closing of the valves in the system.

Q. And did you have this equipment made up for this McKinnon test house, or did you get it from somewhere? A. I had this equipment made up according to the specifications used in previous investigations.

Q. Then, I take it we are through with the important features of Exhibits 110 and 111. Now, I wish to show you Exhibit 112, which Mr. Longhurst said was a photo of most of the dust collecting equipment in the McKinnon test house, but which did not show the intake pipe which he said would have been at the

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Continued

top. Just starting at the top, will you describe, first of all, the intake pipe and the filter, and so on, and then deal with the rest of the dust equipment as shown in the photograph Exhibit 112. A. This was equipment installed to collect dust and organic matter in the air, — in the atmosphere. At the top, not shown in this photograph, is a brass holder, and a connecting pipe. The pipe is open at the inlet; under and in the holder there is a periphery plate and an arrangement for clamping a filter paper, a Whatman paper in place, so that the rubber rings, a gas tight connection is made so that the air, when being pumped into the system, can only pass through the filter paper; all the particular dust and organic matter in solid form will be trapped by this paper. When I say "all," I mean practically all. There are always infinitesimally small particles which will pass through any system, but practically all the solid matter will be trapped by the filter paper. Whatever vapour is not trapped by the filter paper passes through the silica gel tube. That is a lucite tube packed with silica gel, which has un-adhibitive properties for organic vapour, and therefore any organic vapour which has passed the filter paper by reason of the fact that it is not in the form of droplets but probably in the form of gaseous vapour, will be trapped by the silica gel tube. At the same time —

Q. Now, just before you leave the tube, first, I believe Mr. Longhurst said the wool and the silica gel were in a glass ball or bulb, and, from then on, it was in a tube. Is that right? A. I should say now that this arrangement shown here was started in the summer of 1946. In 1945, we had a special type of glass bulbs that were packed with cotton wool, glass wool, and silica gel, and they were equipped with ground glass stoppers and the tubes were inserted in the apparatus and exposed to the air stream for fairly long periods of time, in a way which I will describe later. They were then shipped to Ottawa, where they were analyzed and the mass concentration determined.

Q. And that was to the end of '45 and to the end of the growing season in 1945 and since the early part of May, 1946, you have had an arrangement of the filter paper and the silica gel in the lucite tube, which you have just got through explaining. I am looking for a drawing of that and I only have two of these, my lord. This is a drawing of the filter paper and the lucite tube, the intake pipe arrangement, is it not, which you have just described, or, rather, a photostatic drawing to be specifically correct. Is that right? A. Yes.

——EXHIBIT No. 132: Photostatic drawing of intake tube at Defendant's test house.

MR. SLAGHT: How do we describe that? It is a photostat of what?

MR. KEOGH: It is a photostat of the drawing of the intake tube into the dust collecting machine, which intake tube contains filter paper, rings and the silica gel tube that the witness has just got through describing. Sorry I did not do that before.

MR. SLAGHT: That is all right. You have been very generous.

MR. KEOGH: Q. Now then, will you continue, doctor, and describe the rest of the dust collecting equipment shown in Exhibit 112, which is in front of you? A. The air then passes through a meter, where the volume is measured and as soon as the pressure is changed, there is a mercury manometer which registers the difference in pressure between the barometric pressure and the pressure in the system, and that is taken into account in calculating the difference, the massed concentration of the dust. Then the air pipe is connected to a fairly large pump and electrometer.

Q. And is there any other water manometer, or anything else on that? A. No, there is no water manometer on this.

Q. So that you have described the important features of the dust collecting equipment now, have you? A. Yes.

Q. And is there any name for that dust collecting equipment? A. There is no special name for that. That is the standard method of measuring concentrations of dust in the atmosphere, the massed concentration.

Q. And is that made up to your specifications, or did you get it from some one? A. That was made up to my specifications, based on my knowledge of the literature.

Q. Now, when all of this equipment started up, I am speaking now of the McKinnon test house — you have already told us the Dunn test house did not start till the middle of June, 1948,— but in the McKinnon test house, when all this equipment started up, did you personally inspect it yourself, at the start? A. Yes.

Q. And how did you fiind it to be working when you first inspected it on its completion? A. I made careful checks to see that everything was working properly. I instructed the operators in charge of their duties. I inspected the daily sheets that they made of tabulated data and made sure that everything was done properly.

Q. Now, we will come in a minute to what you did on your visits here, but you spoke of operators, and you used the word their. Was there somebody else besides Mr. Longhurst, or was it Mr. Longhurst? A. It was Mr. Longhurst. I was referring also to the men, who, later on, undertook to perform certain analyses in the laboratory of the McKinnon Industries.

Q. We have been calling them computations; dust computations, here. You are referring now to the instructions that you gave the men in Mr. Gaukroger's laboratory, in connection with that? A. Yes.

Q. Then, Mr. Longhurst said that, with the exception of a key for the hydro men in Dunn's and for a short period through the strike, three months. I think, you and he were the only ones that had access or had keys to these two test houses. Is that right or wrong? A. That is right.

Q. Then, there is still some more equipment that we have to have you describe, and that is the wind equipment. Will you tell us about that and the names of it and how that was set up, and where? A. In the late fall of 1944, I obtained recording wind equipment from the Dominion Meteorological Services, from Toronto. This consisted of an anamavane and an anamagraph. The anamavane was mounted on the top of the power plant building of the McKinnon Industries, and connected by the regulation cables to the recording part of the instrument, the anamagraph. That instrument records both wind direction and the velocity of the wind at any time of the day or night, and has been in use as long as we have operated sulphur dioxide machines.

Q. And are the anamavane and anamagraph,—how do they compare with the instruments at the Dominion Meteorological Bureau, which that Department uses itself in Toronto to measure wind velocities? A. They are identical instruments.

MR. SLAGHT: Pardon me. Did he say velocity and direction?

THE WITNESS: Wind direction and velocity.

MR. KEOGH: Q. Then, we have some other exhibits filed by Mr. Longhurst which I wish to show you for the purposes of identification. Mr. Longhurst filed a column, a sheet, Exhibit 114, and it has words on top, "Sulphur dioxide machine" on one side, and "Test apparatus" at the other, and the words "McKinnon's" in the centre, at the top. A. Yes.

Q. That was a sheet that he said he made up and, without going into all the details, can you identify that and, if so, as what? A. This is the sheet which is used by Longhurst every day in order to tabulate the various readings he was required to make. The readings consist of measurements of temperature, the change in the air, otherwise in the mercury column in inches, the centimetres of water in the water manometer to indicate that the flow is going through the cells and there has been no leak in the system; the volume of air aspirated per aspiration or cycle; the cumulative totals of the meter readings and the barometric pressure, and so on, and other readings which are used in the calculation of the data, including sulphur dioxide and dust. It is well known that, in order to determine the concentration in parts by volume, you

must reduce your air measurement to some standard definite volume and, in the case of sulphur dioxide, it is zero degree centigrade and 1013 millibars pressure. That is reduced to standard volume. In the case of dust it is 70 degrees F. and 1013 millibars.

Q. And did you see sheets similar to Exhibit 114 handed you by Mr. Longhurst, on the occasion on which you made your visits to St. Catharines in connection with this investigation? A. I have seen every one of these single sheets.

Q. And that was one of your documents, that you used in making your calibrations you spoke of already? A. These sheets I used not only in calibration, but also to calculate the daily sulphur dioxide readings, or otherwise.

Q. And you used them for that purpose? A. That is right.

Q. Then, I show you Exhibit 114 (a) which was also filed by Mr. Longhurst, as giving certain readings in connection with the test matter. Did you use that and similar sheets in connection with your calculations concerning the dust? A. Yes, sir. These are the cumulative totals in cubic feet of air that have passed through the dust system.

Q. Then, there is another exhibit, No. 115, which are eight sheets. Mr. Longhurst identified them as charts from the anamagraph. Did you use those and similar charts in making up your calculation regarding the wind? A. For every series of sulphur dioxide test, we have corresponding wind direction and velocity taken directly off these charts. If no sulphur dioxide is present, then we give the average picture for the day but, whenever sulphur dioxide is present during the duration of those readings, we give the prevailing wind direction and wind velocity.

Q. You are using the editorial "we" now, and you are referring to yourself now in your computations? A. Yes.

Q. Then, I show you Exhibit 116 which was produced by Mr. Longhurst as a binder in which he said he correctly entered down the data concerning the wind, which he obtained from the wind charts Exhibit 150? A. That is correct.

Q. And, on your visits to St. Catharines in connection with your computations and calibrations of the wind, did you refer to that binder Exhibit 116 at all times? A. I have referred to these, yes, sir.

Q. And your computations regarding the wind are based on the data on that and in these wind charts? A. Yes, sir.

Q. Would you mind just telling us, doctor, so that his lordship and I will understand, just what you did, say, on a typical visit to St. Catharines to make up some computations and calibrations which I will introduce to you in a few minutes? Would you

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mind just telling us what you did? A. On a typical visit, I visited the test house, both test houses when they were both operating. I inspected the apparatus thoroughly, checked the apparatus. I then looked over all the sulphur dioxide and other records and calculated the concentrations from the data which was available from the automatic instruments and from the laboratory and from the readings by Eric Longhurst. I also made it my business to look over the area and see if I could detect symptoms of sulphur dioxide injury on vegetation. I also —

Q. I did not want to go into any inspections. We will come to that later, but I just wanted to get a rough general idea of what data you took down and what you did in making up your figures. It was just the figure end of it I was going into now. A. Oh. I inspected all the charts and records.

Q. And you made your calculations and calibrations from them, did you? A. Yes, sir.

Q. In longhand, pencil, or ink? A. They were made on sheets of paper which were typewritten.

Q. And where did you have them typewritten? A. They were typewritten at the McKinnon Industries.

Q. From longhand sheets of figures made up by you personally? A. That is right.

Q. And then, after they were typed, did you compare them with your handwritten figures? A. Yes.

Q. And you checked them.

HIS LORDSHIP: How did you compare them? A. Compared the typewritten —

Q. No, I say, how did you compare them with your handwritten figures? A. By looking over the typewritten figures on the sheets of typewritten data with the figures that I had.

Q. You checked each item? A. I checked each item.

MR. KEOGH: And then, in your handwritten data that you had typed and subsequently checked concerning the sulphur dioxide and concerning the dust computations, did you correctly set forth your calibrations and computations from all of these charts and records and readings that were available to you? A. Yes, sir.

Q. And did you, in your compilations, did you completely set forth the correct results from all of these readings and charts? A. Yes, sir.

Q. In other words, you set the whole story out, as well as you could, scientifically in the figures that you made out? A. Yes, sir.

Q. And that took place on each visit to St. Catharines, did it? A. Or, wherever the work was too much to perform on the day of that visit, I took some of the data home with me.

Q. You took some of the data, if it was bulky, as you say, back to your Ottawa office and you had some typed out there? A. Not typed, calculated.

Q. Calculated some of it and then typed there? A. Yes. Some of the work was typed at the National Research Council and some typed at the McKinnon Industries, depending on the convenience of the arrangement.

Q. And wherever it was typed. you re-checked after typing? A. Yes, sir.

——Intermission.

EXAMINATION CONTINUED BY MR. KEOGH:

Q. Doctor, I show you Exhibits 128, 129, 130 and 131, being four dust computation forms which were produced by the witnesses Gaukroger, Davey, DeRoche and Klimek, respectively. Did you see forms of dust computation similar to those on your various visits to St. Catharines in connection with which you made up the dust calibrations, or whatever you call them? A. Calculations, yes, sir.

Q. And there are in the second line across — better take, first of all, the first line across the page of each of those exhibits. What does that mean? A. That identifies the number of the paper. Each paper that was put into the dust collector, was assigned a number and it indicates that that paper was exposed to the temperature and had air drawn through it from 7.45 a.m. May 13th, 1947, to 11.30 a.m. May 13th, 1947.

HIS LORDSHIP: Which one are you looking at? A. This Exhibit No. 131.

Q. Just a moment. Yes, I see that.

MR. KEOGH: There is a line of headings? A. Yes.

Q. I wish you would explain those? A. The first one is the average temperature and degrees "F." degrees Fahrenheit 81; pressure in millibars 990.0; inches of mercury column 7.0. That indicates, as I have already stated, the suction on the system; the reduction in pressure, due to the fact that the air has passed through a filter, having a certain resistance. Then the time of the test, which means the abbreviated time interval in hours, 3.75 hours; then the cumulative total.

Q. Just before you leave the time interval; to me, at any rate, does that mean that air was being passed through that particular paper for that length of time? A. That is what it means, and whatever was in the air in the form of solids was being deposited for 3.751 hours, and then the total amount of air passed through that system in these 3.751 hours was 760 cubic feet.

Q. And that is shown in the heading? A. The cumulative total cubic feet; the sample of the filter paper, then the holder, the holder containing the filter paper and silica gel tube. Those two items were then taken into the laboratory and turned over to the McKinnon laboratory for analysis.

HIS LORDSHIP: Well, you say "analysis." Are you using that word advisedly? A. I am using it in a certain sense. What I mean is this. We determine the mass concentration of the filter paper.

Q. Well, that is not an analysis, though? A. Well, it is an analysis of the air, which is what I am concerned with.

Q. Oh, doctor, an analysis would show the constituent parts, but merely a measuring of the dust and organic matter contained is not an analysis of the air. A. Well, it is an analysis of the air, the massed concentration for those two.

Q. Well, it is not an analysis of a massed concentration. There is a massed concentration of dust and organic matter, but there is nothing to show what that consisted of. For instance, there is no indication of how much was iron? A. Well, we have made analyses of that, too.

Q. I am talking about this. A. Yes.

Q. Don't let us get off on to something else. It is really not an analysis? A. In the strict sense, no.

Q. Well, I am being strict, and I want to be strict in your use of terms. That is all. I am not criticizing you, but let us be accurate in our use of the English language. That is all. A. I would say that this determines the mass concentration.

Q. It is turned over for the purpose of measuring the dust and organic matter in it? A. In terms of massed concentration.

Q. Well, isn't that determined by weight in grams? A. Also by the amount of air that has been passed through the system.

Q. Oh, yes, in relation to — A. And in relation to the air through there; it is the massed concentration.

Q. Well, I understand it, but do not let us, in dealing with what has been done, confuse the record by referring to an analysis, which would mean that you should exclude certain things that may be there. If it is an analysis, it shows what was there and what the constituent parts were. Use the term advisedly and strictly, because otherwise we get our record confused. A. Yes, sir.

Q. Are you through with this, Mr. Keogh, because there are one or two things I want to clear up.

MR. KEOGH: Not quite, my lord.

Q. Now then, looking down you have still got Exhibit 131 in front of you, and we will take that as a fairly representative specimen, I assume? A. Yes, sir.

Q. Looking down at the second line, the item "soluble organic matter," one of the witnesses said that the filter paper, with whatever dust was on it, was put into some kind of extractor. I did not get the name of it. A. Yes, sir. The Suckley Extractor.

Q. I think they used the word "ether" in connection with that, and I take it that this reading opposite the words "soluble organic matter," would include anything that would dissolve in ether. Is that it? A. Yes, sir.

Q. We had one of the plaintiff's witnesses earlier refer to or use the words "ether solubles." Would that be the same thing? A. That is the same thing. Soluble organic matter represents the soluble component of the dust on the filter paper and also what has been trapped by the silica gel tube.

Q. Well, we had some reference earlier to a sticky, oily substance, and I think somebody used the word "sticky" and "oily" and I think somebody else used the word "tar," and somebody else used the word "ether solubles." Are they all pretty much the same thing? A. They are all the same thing.

Q. In other words, this measurement or computation of soluble organic matter on Exhibits 128 to 131, would show how much oil or tarry substance was in the air? A. That is right, yes, sir.

Q. That being, generally speaking, the substance that goes completely through the filter paper and is deposited on the silica gel? A. Not completely through. Part of it may be deposited on the paper, because it consists of fine droplets, as well as vapour.

Q. Well, I think I was mixed up for a minute. It seems to me that Mr. Gaukroger said that they put silica gel in the thimble and then they put the thimble on the filter paper and then they put that along with the dust filter paper to get this extractor in the machine? A. Yes, sir.

Q. So that we have from both sources of sticky, oily substances that would be in the air, passing through your dust equipment, represented by these readings on these exhibits of soluble organic matter? A. Yes, sir.

Q. And then, to get the matter that would not dissolve in ether, we have to substract the solubles from the total to find it, do we? A. No, sir.

HIS LORDSHIP: No, those above are in addition to the solubles? A. Yes, sir, they are in addition. Now, we cannot subtract the soluble organic matter from the total dust and organic matter, because the total dust in organic matter refers to material trapped by the filter paper alone; whatever was on the filter paper. Now, the silica gel tube, plus whatever contents of that tube that are extractable by ether, plus whatever is extracted by ether, by filter paper, and any soluble organic matter, — the idea there being that part of the dust will consist of insoluble material and it may contain silica and it may contain metallic particles and so on, but there is a definite organic fraction.

MR. KEOGH: Would this be right, and I do not profess to any chemical knowledge, that, whatever iron oxide there was in the dust, would appear in this first and last three items, total dust and organic matter? A. Yes, sir.

Q. And then the last item of photo-electric cell, that shows the relative degree of shall we say opaqueness, or translucence of the paper?

HIS LORDSHIP: It shows how much more the paper has been or has become opaque after exposure to the dust? A. Yes, sir.

Q. It is done in the same process as you use the light meter for photography? A. Yes, and I might add here I have heard a lot of things said about this. Originally, we tried to make a qualitative measurement out of this photo-electric cell determination, by trying to calibrate it in terms of actual massed concentration of dust and organic matter on the paper, but we found there was such a great variation that we could not do that, for the simple reason that the colour of the deposit varies. Sometimes it is darker, sometimes it is lighter in colour, and that affects the reading. Having once started the thing, we decided the best thing to do would be to continue and we found it useful in a qualitative way in looking at the readings, but we have never attempted to make any quantitative use of those two readings.

MR. KEOGH: Q. In other words, you did not compile any calibrations, based on the photo cell? A. No, sir.

Q. For that particular reason. Now, these Exhibits 128 to 131 are similar exhibits. I think you have already told me you were shown them by Mr. Longhurst on each visit to St. Catharines? A. Yes, sir.

HIS LORDSHIP: Now are you through with that?

MR. KEOGH: Yes, I think so.

HIS LORDSHIP: I just want to ask one short question. I am not hurrying you.

MR. KEOGH: Then, did you receive from Mr. Longhurst, by mail, in the latter part of 1944 and in the year 1945, these glass bulbs that were the first dust collecting mechanism that you referred to? A. Yes, sir.

Q. I think you used the word "bulb," but there isn't any doubt you and Mr. Longhurst were talking about the same thing? A. Yes, sir. It is a glass bulb.

Q. Now, I am through with that.

HIS LORDSHIP: Now, doctor, if you will take Exhibit 130, for instance, and Exhibit 131, and the time of exposure in 130 was 4.5 hours, and the time was 3.75 hours in 131? A. Yes, sir.

Q. The cumulative total of cubic feet was 1180 in Exhibit 130; 760 in Exhibit 131. What does that variation mean? A. It means this, sir, that depending on the nature of the deposit, the air that goes through there, through the filter paper will vary to the same extent. Its importance in this test is exactly the same all the time, the nature of the test, to have the same flow rate going on all the time. The flow rate is bound to vary as the dust deposit builds up and the tendency is for the flow to decrease to a certain extent.

Q. Well, the quantity of dust and organic matter has to be related to the total flow of air? A. Yes, sir.

Q. In order to get the concentration? A. Yes, sir.

Q. Well, then, if you go to Exhibit 129, you have the time exposed as 4.5 hours? A. Yes, sir.

Q. The cumulative total; that would be the flow of air, 700? A. Yes.

Q. And the total dust and organic matter is .85 or .0085, rather. That would seem very much less than in Exhibit 131, yet the cumulative total of the flow of air and it is certainly very much less than in Exhibit 130. 130 is .0160 dust and organic matter? A. Yes, sir.

Q. From a cumulative total of flow of air of 1180? A. Yes, sir.

Q. What would be the — A. The actual concentrations?

Q. Yes, but what does that indicate, — that the sort of dust and organic matter in Exhibit 129 restricted the flow of air much more than in the case of Exhibit 130. Although there appears to be a great deal more — of course I do not know whether it is more proportionately or not, I have not figured that out. A. Well, we have the exact concentrations covering these determinations, and you will notice that the inches of mercury, Exhibit 130, is 7.0. In the case of Exhibit 129 it is 2.81, indicating that we had a different order of resistance in the system.

Q. Well, what does that mean? A. That means that you would have had to pump harder in one case than in the other. You would have to pump harder in order to get the required amount of air through in one case than the other, but the actual concentrations depend on the total cumulative flow of air, barometric pressure, and the inches of mercury column and, when these readings have been calculated out, and are available —

Q. Well, I am wondering if there is a great deal of mechanical variation, if I may put it that way, from one day to another. Can it all be related that you can compare one day with the other accurately, with scientific accuracy? A. I think that one day can be compared with another.

Q. Well, I am saying with scientific accuracy? I am not saying that you cannot compare them. A. The concentrations depend on the total weight of material collected and the air volume put through.

Q. Yes, but I am saying there seems to be a considerable mechanical variation, and I am saying can you compare one day with another with scientific accuracy? A. Yes, sir, I think you can.

Q. You think you can? A. Yes, sir, because the essential factors are all known. We know the cumulative total of air put through; we know the conditions under which the air was measured, the temperature and the pressure, and so on, and we know the weight of material collected.

Q. Then, we will probably be hearing more of this as we proceed. Proceed, Mr. Keogh.

MR. KEOGH: Q. Then, doctor, you made up, I believe, from these charts and records that you have seen and the other calculations and calibrations that you made off them, first of all. a detailed record of the readings and indications shown by the sulphur dioxide recorder shown for the period from November 25th, 1944, to December 14th, 1944, and which record also shows the prevailing wind direction and the average wind velocity from the anamagraph that you have mentioned already and as contained in the charts in the binder? A. Yes, sir.

Q. And is this the original of the compilation or calibration you made up of that? A. Yes, sir.

——EXHIBIT No. 133: Detailed records sulphur dioxide machine taken by Katz November 25th to December 14th, 1944.

Q. Then, I will come back to this after having filed them, my lord. Then you made from these readings Exhibit 133, you made, I am instructed, two tables summarizing them according to days? A. Yes, sir.

Q. And average readings over certain periods in the day as shown thereon, instead of the detail by half-hour periods shown on Exhibit 133? A. Yes, sir.

Q. And that while the first sheet is headed "Table 1" and the second sheet is headed "Table 2," it all results from Exhibit 133 as the summary? A. Yes, sir.

Q. I am sorry I have not got an extra copy of this. It is about the only thing I have not got an extra copy of. I will have one made later, my lord.

HIS LORDSHIP: It is awfully difficult to work on a case of this sort if you are excluded from these important exhibits, while they are locked up in the vault of the Registrar, as they will have to be.

MR. KEOGH: Yes. And in the meantime, may I file the summary of the table Exhibit 133?

HIS LORDSHIP: This is covering the same period as 133?

MR. KEOGH: Yes.

——EXHIBIT No. 134: Tables summarizing records as in Exhibit 133.

MR. KEOGH: Q. Then, commencing on December 14th, 1944, and extending through to September 4th, 1945, did you make a similar compilation of sulphur dioxide and wind readings for that period? A. Yes, sir.

Q. And is that the original of that compilation? I have an extra copy of this, my lord.

THE WITNESS: Yes, sir.

——EXHIBIT No. 135: Summary sulphur dioxide test for period December 14th, 1944, to August 31st, 1945.

Q. Then, from Exhibit 135, did you make a daily summary table, covering the same period as Exhibit 135, and is that the original of that summary table? A. Yes, sir.

——EXHIBIT No. 136: Daily summary for same period as in Exhibit 135.

Q. Then, from Exhibit 135, did you make a monthly summary table covering only sulphur dioxide readings for the same period as Exhibit 135, and is that the monthly summary table I now hand you? A. Yes, sir.

——EXHIBIT No. 137: Monthly summary same period as in Exhibit 135.

HIS LORDSHIP: This is all still for the year 1945? At least, from November 14th, 1944?

MR. KEOGH: Yes, my lord. This, I believe, starts December 19th, 1944.

HIS LORDSHIP: Oh, I beg your pardon. I made an error in my notes.

MR. SLAGHT: What is this Exhibit 137?

MR. KEOGH: Yes, it is a monthly summary of sulphur dioxide.

HIS LORDSHIP: For the same period of December 14th, 1944, to the end of August?

MR. SLAGHT: Now, I took it down as September 4th, 1945. Are you changing that date?

MR. KEOGH: Well, the monthly summary is from December 14th, 1944, to the end of August. September was not complete, so it is to the end of August.

MR. SLAGHT: Oh, I see. Thank you.

MR. KEOGH: Q. Then, referring back to the first detail readings, Exhibit 133, and the period covered by it, namely from November 25th to December 14th, and the subsequent Exhibit No. 135 for the period from December 14th, 1944, to the early part of September, 1945, did you make up a total, which I now hand you, relating to dust concentrations over the period from November 25th, 1944, to August 2nd, 1945? A. Yes, sir.

HIS LORDSHIP: What does this mean? A. This is the average concentration of dust in milligrams, from November and the matter of wind directions from westerly and southwesterly and the wind from other directions. That is the time the wind was from the north, or east, or southeast, and so on.

HIS LORDSHIP: Yes, but the average concentration of dust. What do you mean by that? A. The earlier dust work was confined to average concentrations taken over comparatively long periods of time.

Q. What do you mean by average concentrations? I want it related to any value that it has in this case, not something that is just a mathematical calculation, because I do not see what value an average has with it. A. Well, I call that the average concentration, because it was determined over a long period of time.

Q. Well, let me see what you did. I want to get to understand it, to begin with. We have the period from November 25th to December 16th, 1944, and you have it headed "Average mass concentration of dust, milligrams per cubic feet, wind direction south directly westerly and southwesterly," and under that you have ".237." Now, in the first place, what does ".237" mean? A. That means the milligrams of dust per cubic meter of air.

Q. So that in every cubic meter of air there was .237 milligrams of dust? A. Yes, .237.

Q. Is it the hourly average, the daily average? A. That is the average over that period.

Q. Well, that is, for every minute that you took the whole time there would be the concentration of dust to that extent in the air? A. Yes, sir.

Q. If it were distributed evenly over the whole time? A. Yes, sir.

Q. It may be that at some times it was very dense and at other times it would be comparatively clear? A. Yes, sir.

Q. For all we know? A. Yes.

Q. I understand now what you mean. That is, if you distributed the concentration over the whole period, that is what you would get? If you could distribute it evenly over the whole period, you would have that in the air at all times? A. Yes, sir.

Q. I see. Then, from the wind there, from other directions, you have got two items, .133 and .166. Why the two items? A. Because we had two bulbs which were exposed during that period to the wind from other directions.

Q. Well, are they to be added together, or is it a different reading? It is a reading of the same thing, but a variation between the two bulbs? A. Yes, sir.

Q. I see; and the ratio of dust concentration from the direction of McKinnon Industries to that of other directions. Now, what does that mean? A. Well, I have attempted here to find out how, during this period in question, — attempted to find out how much greater the dust concentration is with the wind from southwesterly and westerly directions, as compared with other directions.

Q. Then, we come down to February 6th, or December 16th to February 5th, rather. There are just three items there. Yes. Well, I undertsand that, I think.

MR. KEOGH: I don't think we marked this as an exhibit yet, my lord.

——EXHIBIT No. 138: Table of dust concentrations November 25th, 1944, to December 14th, 1944.

Q. Then, you made from the same records and charts a tabulation or compilation of similar sulphur dioxide and wind readings from the same records or similar records for the period from September 4th, 1945, to November 24th, 1945, the original of which I now hand you. Is that correct? A. Yes, sir.

Q. And that will be Exhibit 139.

——EXHIBIT No. 139: Sulphur dioxide and wind readings Septemper 4th, 1945, to November 24th, 1945.

Q. Then, of that last compilation, Exhibit 139, you made a daily summary of the sulphur dioxide readings and wind directions, which I now hand you. Is that correct? A. Yes.

——EXHIBIT No. 140: Daily summary of records in Exhibit 139.

Q. And also from Exhibit 139 you made a monthly summary of sulphur dioxide readings only, which I now hand you. Is that correct? A. Yes, sir.

——EXHIBIT No. 141: Monthly summary sulphur dioxide only as in Exhibit 139.

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HIS LORDSHIP: Now, what does this mean? Can you explain this summary, doctor? A. Yes. In each month we have the time that the recorder was not operated for any reason. It might have been due to mechanical defect, or it might have been due to a shutdown, holiday, or something like that. Usually, we try to operate the recorder continuously, but there were timees when certain parts had to be replaced and therefore we could not maintain a 100% operation. Then, in the month we tabulated the number of hours of zero readings, the number of hours during which the recorder showed that no sulphur dioxide was present in the atmosphere. Then, we took the readings, the sulphur dioxide readings and broke them down into various concentrations, ranges. The traces to December, .04 parts per million, the number of hours of those readings; the number of hours from December .05 to zero; December, 10 parts per million, the number of hours from December 11th to December 15th, parts per million. The number of hours from December 16th to December 2.5 parts per million duration and then we add up the hours and determine the total duration of sulphur dioxide readings, and we also listed the highest reading of sulphur dioxide obtained during the month.

Q. Yes, I see, under the various monthly columns? A. Yes, sir. The columns read in hours and months, so that you can tell.

Q. Now, am I correct in this? Are these all dealing with times when the wind was in the southwest? A. No, sir. This deals with the wind in any direction. Whenever we obtained a sulphur dioxide reading, it was recorded, and then when we made up this table, we simply broke the readings down in convenient form, but we have not related them to any type of wind direction.

MR. SLAGHT: Are you looking at Exhibit 140?

HIS LORDSHIP: I am looking at Exhibit 141.

MR. SLAGHT: No, my lord, I have not got it.

HIS LORDSHIP: I think Mr. Slaght had better have this one, because he cannot get along very well without it.

MR. SLAGHT: Oh, I am following pretty closely, my lord.

MR. KEOGH: Then, is your lordship through with that point?

HIS LORDSHIP: Yes.

MR. KEOGH: Q. Then, Dr. Katz, did you make up, for the period from April 5th to December 18th, 1945, a table of — a table headed "Organic vapours and tar, fog," the original of which I now hand you? A. This was subsequently labelled, "Soluble organic matter."

Q. I see. That is a table of soluble organic matter? A. Yes, sir.

Q. And you made that up from the charts and records at your disposal on that point, which you have already mentioned? A. Yes, sir.

——EXHIBIT No. 142: Table of readings taken by Katz April 5th to December 18th, 1945, showing organic vapours and tar fog.

HIS LORDSHIP: Well, this was when the prevailing wind was in a given direction for a definite percentage of the total time. What does that mean? A. Yes, sir. This means that during that interval, for instance, the first heading April 5th to 12th, during that period we found that the southwest and west winds were the prevailing winds, and the percentage of the time during that period is 70%.

Q. That would be 70% from April 5th to April 12th? A. Yes, sir.

Q. And from April 12th to 26th, 81%? A. Yes, sir.

Q. Oh, I understand that, but get down to December 18th. Well, that is just 100% from the 14th to the 18th. Is that right? A. Yes, sir.

Q. Well, I understand that now.

MR. KEOGH: Then, for the period from May 2nd, 1946, to October 31st, 1946, did you make up the total daily computation of the sulphur dioxide readings and wind direction and velocity from the similar charts and records available to you? A. Yes, sir.

Q. The original of which I now hand you? A. Yes, sir.

——EXHIBIT No. 143: Daily computation of sulphur dioxide and wind readings May 2nd, 1946, to October 31st, 1946.

Q. Then, for the same period as Exhibit 143, did you make up a daily summary table showing the sulphur dioxide readings for that same period and the original of which summary table I now hand you? A. Yes, sir.

——EXHIBIT No. 144: Table of daily summary as in 143.

HIS LORDSHIP: You have a column that shows above .25 parts per million, the last column? A. Yes, sir.

Q. You did not put in what the readings actually were? How high did they go. I suppose one will find that somewhere on the daily summary? A. If there is no reading in the summaries, then, it means that it is left blank.

Q. No, but where there is a reading? A. Where there is a reading —

Q. For instance, on the third page, there is .25 parts per million, 30 hours. That is correct, is it? A. 30 minutes zero.

Q. 30 minutes? A. The maximum would be .28, right opposite.

Q. How do you mean? A. Well, that means that the highest reading that occurred that day, on the 5th of July, would be .28 parts per million.

Q. Oh, yes, I see. That is the maximum reading for each day? A. That is the maximum reached on that day, your lordship.

Q. So that that column would show the maximum at any time? Well, then, you go to the 15th. Over the 15th to 16th, that would be .69 for ten minutes. Is that right?

MR. SLAGHT: Is your lordship reading Exhibit 143?

HIS LORDSHIP: Yes. That would be .69. Excuse me till I get Mr. Slaght straight. This is Exhibit 144, daily summary.

MR. SLAGHT: Thank you, my lord, Exhibit 144.

HIS LORDSHIP: That one is .69 for ten minutes. Yes, and then these others — yes, I think I follow that all right now, doctor. Yes, Mr. Keogh. Mr. Slaght can see that now.

MR. KEOGH: Then, did you also make up from Exhibit 143 and covering the same period, a monthly summary of sulphur dioxide readings, the original of which I now hand you? A. Yes, sir.

——EXHIBIT No. 145: Table of monthly summary as in 143.

Q. Then, for the period from May 3rd, 1946, to October 29th, 1946, did you make up a compilation of concentration of dust and organic matter, the original of which you compiled and I now hand you? A. Yes, sir.

——EXHIBIT No. 146: Table of dust and organic matter taken by Katz May 3, 1946, to October 29, 1946.

MR. SLAGHT: What is your starting date there?

THE WITNESS: May 3rd to October 29th, 1946.

MR. KEOGH: Then, Dr. Katz, for the period from April 29th, 1947 —

HIS LORDSHIP: Then, we jump a period there?

MR. KEOGH: Yes, we start now on another year. This was the 1946 for dust.

HIS LORDSHIP: Yes, I see. April?

MR. KEOGH: April 29th, 1947, to November 14th, 1947, did you make up from the similar records that were available to you a compilation of the sulphur dioxide and wind readings during that period, the original of which I now show you? A. Yes, sir.

——EXHIBIT No. 147: Table of sulphur dioxide and wind readings taken by Katz April 29, 1947, to November 14, 1947.

HIS LORDSHIP: You may have explained it, doctor, but I do not know that I remember. You have on certain days, or rather at certain hours of certain dates, you show the wind. For instance, take April 29th. There is nothing to indicate the direction or velocity of the wind until you come down to April 30th? A. April 29th was the first day of the records and I think that the recording anamovane was not in full operation. I think it actually came into full operation on the 30th April at the start, at 8.00 o'clock.

Q. Then, if we get on later, it continues in the same, but actually there is a change. Is that right? A. Yes.

Q. For instance, you start on the 30th at 8.30, showing south? A. Yes, sir.

Q. And that will continue for the rest of the day to be south, I take it? A. Yes, sir, until there is —

Q. And you start on May 1st south again, and it continues down to 1.30, and you say S.M. What is that? A. That means, during that period the few hours, the wind changed from south to north and then afterwards the reading was northeast. In other words, there was a complete reversal in the wind direction during that two hour period.

Q. I see. Well, it may have been blowing part of the time from the southwest and then coming straight directly west and then northwest, and then north, or it may have gone around the other way. We cannot tell? A. Unless we consult the chart for that day.

Q. I just want to get the interpretation of this, that is all. A. I might say that we endeavoured to put in the wind direction and the velocity as frequently as possible whenever we had corresponding sulphur dioxide readings, but where, for instance, there was a day with no sulphur dioxide present, then we merely put in on that line the prevailing wind direction for that day if no sulphur dioxide was present, having in mind that was — there would always be the original records to go back to if you want to get the wind direction at any hour of the day.

Q. Well, you explained that a little earlier and I was just wanting to recall what it was you said. I remember that now. Very well, Mr. Keogh. Mr. Slaght, I think if I see these records — until you have finished your cross-examination, you may have them, because I can conceive it would be rather difficult to consider them without having them before you.

MR. SLAGHT: Thank you, my lord. I will try and look at them after we adjourn or in the morning. I have got a sort of hazy notion and notes of it, but I will look at them to determine which ones I need.

HIS LORDSHIP: Well, you can look at them. I have my markings on them, but you can let me have them back after your cross-examination.

MR. SLAGHT: There are extra copies?

HIS LORDSHIP: There is one extra copy you can use up till you are through with it, and then I will have it for my own.

MR. KEOGH: Then, Dr. Katz, from the data contained in Exhibit 147 and covering the same period, did you compile a daily summary table of the sulphur dioxide readings over that period, the original of which I now hand you? A. Yes, sir.

——EXHIBIT No. 148: Daily summary from 147 sulphur dioxide readings.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Examination-in-Chief 2nd May, 1949 Continued

Q. Then, Dr. Katz, for the same period as Exhibit 147, from the information in Exhibit 147, did you compile a monthly summary table of sulphur dioxide readings for the same period, the original of which I now hand you? A. Yes, sir.

——EXHIBIT No. 149: Monthly summary from 147.

Q. And then, doctor, for the period from May 1st, 1947, to November 14th, 1947, from the records available to you that you mentioned before, did you prepare a table of the concentration of dust and organic matter and also of the wind direction and velocity, the original of which table I now show you? A. Yes, sir.

——EXHIBIT No. 150: Table of dust and wind velocity, May 1, 1947, to November 14, 1947.

Q. Then, over the same period as Exhibit 147, and from the same data, did you prepare a table headed, "Meteorological conditions on days when sulphur dioxide was about .10 parts per million," the original of which table I now hand you?

HIS LORDSHIP: Now, you say that is a table covering the same period, do you mean?

MR. KEOGH: The same period as Exhibit 147, namely, from May 4th to October 21st.

HIS LORDSHIP: April 29th to November 14th is Exhibit 147.

MR. KEOGH: Oh, thank you, my lord. There is a slight difference. I should change the date of this meteorological table, covering the period from May 4th, 1947, to October 21st, 1947, and is that the original of that table which you have prepared? A. Yes, sir.

——EXHIBIT No. 151: Tables showing meteorological conditions May 4, 1947, to October 21, 1947.

HIS LORDSHIP: Now, this is a different table, or a table of a different character than we have had before.

MR. KEOGH: It is just a different type of summary than we have had in.

HIS LORDSHIP: That is what I mean; a different type of summary. You say "meteorological conditions," only to the extent and direction and velocity of the wind. A. Yes. The information is no different. Actually it is set up in a different way and according to a different principle. This is all stated in Exhibit No. 147 and this being merely a summary of that.

HIS LORDSHIP: It does not show the humidity. You call it meteorological. It does not deal with the humidity? A. No, sir, it does not deal with humidity.

MR. KEOGH: Q. Then, doctor, did you prepare a table in 1947, which does not apparently show the period covered? I will ask you about it. It is headed, "Dust concentrations in milligrams per cubic centimeters." There is no date shown on this report, but I obtained it from the doctor's 1947 report and I am asking him what period is covered. I wrote "1947" in pencil on top of it. Can you write on, doctor, the period covered by that report? I clipped it out of your 1947 report. Can you tell us the period that is covered by that table you are now holding? A. That covers the period covered by the previous table.

Q. The previous dust table, Exhibit 150? A. Yes.

Q. Well, would you mind just taking the dates from Exhibit 150 and writing them in?

MR. SLAGHT: As I understand now, he is speaking of something covered by the previous table. The previous table would be 151.

THE WITNESS: No. The previous dust table is 150.

MR. SLAGHT: Oh, yes; that one in as Exhibit 150.

MR. KEOGH: Just write, though, on the top of it, the period from so and so to so and so. Now, what have you written on that last exhibit, which I take it will be Exhibit 152? A. May 1st to November 14th. This was compiled from the dust table covering the records from May 1st to November 14th, 1947.

Q. And you are referring now to Exhibit 150? A. I am referring to Exhibit 150.

——EXHIBIT No. 152: Table of dust concentrations in milligrams per cubic centimeter made by Katz May 1/47 to November 14/47.

MR. KEOGH: And you say that Exhibit 152 covers the period from May 1st to November 14th, 1947? A. Yes, sir.

HIS LORDSHIP: Now, I want to understand this. You have a column in that which shows the number of tests? A. Yes, sir.

Q. And it shows the first line as 39? A. Yes, sir.

Q. What is 39? A. This 39 — the average, 39, represents the number of separate determinations on dust.

Q. Well, why have you broken it down into these groups? One group 39, another at 26, and another at 47? A. The reason for these — that the wind direction may be different in each one of those groups but, nevertheless, it is a compilation of the data covering the prevailing wind direction from the southwest, west, and northwest, 39 tests being in the first group, 26 in the second, and 47 in the third.

Q. Well, does this deal with all the tests that are shown on Exhibit 150? A. I think it deals with most of those tests. I have stated that tests in which the winds were variable, involving shifts

from the southwest to the southeast or other directions, were not used in this comparison. I have attempted to make a comparison based on — in other words, the data used were results which indicated clearly that the prevailing winds were in one direction or the other.

Q. Well, you show the tests for daylight hours? A. Yes, sir.

Q. 112, and the winds from southwest, west, and northwest? A. Yes, sir.

Q. And 57 when the wind is in the southeast, east and north? A. Yes, sir.

Q. Can you tell me how many tests were made during the period? A. Yes, sir.

Q. That is, during daylight hours? A. During daylight hours only? Well, I could give you the total number in tests for the whole period.

Q. No, it is for daylight hours I want, because when we get into relating different things to one another, it does not mean much. A. I have not got that figure available. It could be obtained by using the data in Exhibit 150.

Q. Yes. Well, I cannot get the meaning of this unless I have it related to something. Just an enumeration of a certain specific test does not advance it very far. There may be more importance than appears on the surface. Well, what were the total number of tests made during that period? You said you could give me that? A. Yes. The total number was about 365.

Q. During the whole period? A. Yes: that is, of dust and organic matter.

Q. Then, you dealt with 377? A. No, I dealt with 208 really.

Q. Oh, I see. If you add — oh, yes, I see. They cannot be added together. You deal with a total of 208 out of 365. A. Yes.

HIS LORDSHIP: That will be Exhibit 152.

MR. KEOGH: Then, doctor, you made another compilation of sulphur dioxide for the period from May 19th, 1948, to December 31st, 1948, — you made another compilation from the same or similar charts and records of the sulphur dioxide and wind readings over that period? A. Yes, sir.

Q. And is this the compilation which I now show you? A. Yes, sir.

——EXHIBIT No. 153: Sulphur dioxide and wind readings made by Katz May 19, 1948, to December 31, 1948.

Q. Then, doctor, based on the data in Exhibit 153, did you make a daily summary of sulphur dioxide readings covering the same period, the original of which summary I now show you? A. Yes, sir.

——EXHIBIT No. 154: Daily summary from 153.

Q. Then, based on the data in Exhibit 153, did you make a monthly summary total of sulphur dioxide readings for the same period as covered by Exhibit 153, and which table I now hand you? A. Yes, sir.

——EXHIBIT No. 155: Monthly summary from 153.

HIS LORDSHIP: Now, this is headed "Total number of sulphur dioxide readings per month occurring season 1948." That is not as specific as we should have it.

MR. KEOGH: The next sheet carries it on to the end of the year, my lord.

THE WITNESS: It is loosely termed the growing season but it should have been headed May to October inclusive.

HIS LORDSHIP: Yes, that is what I mean. Will you change the exhibit to read that way, "May to October"?

THE WITNESS: Would it not be better, seeing the second sheet is November and December, would it not be better to say May and December?

HIS LORDSHIP: Yes, I think so.

MR. SLAGHT: Well, it is the same as Exhibit 153, isn't it?

HIS LORDSHIP: Yes.

MR. KEOGH: Then, did you also make up a table for the period from May 17th, 1948, to December 31st, 1948, of dust concentrations and wind directions, headed "Recorder station near McKinnon Industry," and the original of which table I now show you? A. There is a period missing there. The period of the McKinnon strike; otherwise it is as you say.

Q. Yes, but outside of the McKinnon strike from July 14th to November 1st, that covers the other dates in that period, does it? A. Yes, sir.

——EXHIBIT No. 156: Table of dust and wind concentrations May 17th, 1948, to December 31st, 1948.

Q. Now, I want to direct your attention to the recorder's station at Dunn's greenhouses.

HIS LORDSHIP: Oh, well, you are starting something new now?

MR. KEOGH: A new set of tables for that.

HIS LORDSHIP: Oh, well, we will have that to-morrow.

——Whereupon Court adjourned until 10.00 a.m. Tuesday, May 3rd, 1949.

In the Supreme Court of Ontario
No. 37
Defendant's Evidence
Dr. Morris Katz
Examination-in-Chief
3rd May, 1949
Continued

Tuesday, May 3rd, 1949, 10.00 a.m.

EXAMINATION-IN-CHIEF OF DR. KATZ CONTINUED BY MR. KEOGH:

Q. My lord, I was able to last night, with the help of two or three officials of the company and one or two of the witnesses, to collect another set of all the exhibits, with some typing this morning, and I have given Mr. Slaght a set now of all the exhibits I have filed through Dr. Katz.

HIS LORDSHIP: Thank you, very much.

MR. SLAGHT: All of which I appreciate also.

THE REGISTRAR: You have already been sworn, doctor, and you understand, of course, that you are still under oath? A. Yes, sir.

MR. KEOGH: Q. Well, then, doctor, from similar charts and records that you have already described, arising from the test house at the recorder's station at the Dunn greenhouses, St. Catharines, did you prepare a daily record for the period from June 15th, 1948, to December 31st, 1948, of the sulphur dioxide and wind readings at the Dunn recording station or test house? A. Yes, sir.

Q. And is this the original of that record which I now hand you? A. Yes, sir.

Q. I have a copy for his lordship and a copy for my friend.

——EXHIBIT No. 157: Charts sulphur dioxide and wind readings made at Dunn's test house by Katz June 15/48 to Dec. 31/48.

HIS LORDSHIP: This is from what dates?

THE WITNESS: I thought you gave me December 31st, 1948.

MR. KEOGH: I thought I did, my lord, but maybe I was wrong.

HIS LORDSHIP: It starts December 24th — no, it starts June 15th.

MR. KEOGH: June 15th to December 31st. Is that not right, my lord?

HIS LORDSHIP: Oh, I beg your pardon. That is right. I had taken my note wrong.

MR. KEOGH: And then, doctor, from the data in Exhibit 157, did you prepare a daily summary covering the period from June 15th to December 31st, 1948? A. Yes, sir.

Q. The difference being that the station was not operating from June 1st to June 15th, and the original of which I now show you and I have copies for my friend and your lordship. Is that correct, doctor? A. Yes, sir.

——EXHIBIT No. 158: Daily summary from 157.

Q. Then, doctor, from the same data in Exhibit 147, at the Dunn test house, did you prepare a monthly summary consisting of two sheets, covering the period from June to December, which I now show you, and being the same period as in Exhibit 157? A. Yes, sir.

——EXHIBIT No. 159: Monthly summary from 157.

Q. Here is a copy for your lordship and a copy for my friend. Did you also prepare from the dust measurement record on the dust equipment in the test house at Dunn's greenhouses, a record of dust measurements and wind measurements for the period from June 14th, 1948, to December 31st, 1948, the original of which I now show you? A. With the exception of the period covered by the McKinnon strike, that is right.

Q. With the exception of the period covered by the McKinnon strike, which I am instructed, was from July 14th to November 1st, that record covers the dust and wind for the rest of that period? A. Except that the dust work was re-organized again on November 15th. In other words, the actual tests of dust start on November 15th.

Q. So there was a month that the dust measurements were not carried on, as you have indicated? A. From July 13th to November 15th, there is a period missing.

——EXHIBIT No. 160: Table dust and wind measurements June 18, 1948, to December 31, 1948 (Dunn's).

Q. Then, doctor, did you prepare a table, which is headed "Table wind, sulphur dioxide tests at continuous station near McKinnon Industries and Walker greenhouses, St. Catharines," and which appears to be a summary of the years 1945, 1946, 1947 and 1948, for the months of May to October, inclusive, showing certain readings of sulphur dioxide, and which I now hand you. You perhaps could explain that table better than I can. I have a copy for your lordship and a copy for my friend. A. This is a table which shows for the months of May to October inclusive, the various concentration levels of sulphur dioxide as a percentage of the total tests taken in each month. The reason for doing that is that, at times, generally short intervals. the continuous recorder was not in operation for various reasons related to its maintenance, and therefore we could not use the hours themselves in this comparison, — the hours at the various concentration levels. We used the percentage figure based on the total time that the recorder was operated in any given month and the break-down indicates the distribution of the various readings at various concentration levels and includes zero readings up to readings above .25 parts per million.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Examination-in-Chief 3rd May, 1949 Continued

HIS LORDSHIP: Well, doctor, what is the value of this table on the problem that we have here? The percentage of time that sulphur dioxide might be in the air, we will say, in sufficient concentration to be injurious? A. Yes.

Q. Would not have very much bearing on whether it was injurious or not. For instance, it might be in the air in injurious quantities, we will say, for two hours and do tremendous damage and that would form a very small percentage in the months? A. Yes, sir.

Q. Well, is that not right? A. That is correct, sir.

Q. Well, then, what value has this table got? A. This table has a value in comparing the distribution between the various years and noticing and observing the way the concentrations varied in duration. After all, these figures can be related to duration by simply using a percentage reading of the number of hours in the month, if you want to put it that way.

Q. Well, I can understand that as a sort of a scientific study of what was going on, but that is not — I am not conducting an investigation in the sense of a Royal Commission, or anything of that kind. I am conducting a trial as to whether it was at any time in the air in injurious quantities. A. Yes, sir.

Q. So that what value have percentages or averages got to do with that? A. Well, it has a general value because one can see, for instance, that in many months there are no concentrations higher than .25 parts per million. Furthermore —

Q. Well, I can see that, but what has the percentage of the time that there are zero readings, for instance, got to do with our problem? I do not want to get this trial involved with a whole lot of tabulations of things that do not mean anyhing in the issue that we have, that is all. If it has some real meaning, I want to grasp it. If it has not, I want to discard it from my mind. A. Well, I think it has another meaning in that during the period of the strike, we had sulphur dioxide readings, which were not substantially different in their break-down from what we had before the strike.

Q. Oh, I can see that. We can go into that, but I am dealing with the percentages themselves, the table of percentages. I can see these other points all right, but I am getting at what value it is to have percentages. A. Well, I think it has an indirect value in determining the relative severity of sulphur dioxide conditions.

Q. Well, we will see as we go along. It is not very clear at the moment.

MR. KEOGH: May I ask the witness a question?

HIS LORDSHIP: Yes, of course.

MR. KEOGH: Q. Did you make up a similar compilation for the Dunn station for the period that it was operating? A. Yes, sir.

Q. So it might have been some comparative value between the two for that period?

HIS LORDSHIP: Well, we will see as we go along. I just want to give a sort of warning. I am not, as I said, conducting a Royal Commission on sulphur dioxide generally.

MR. KEOGH: I do not want to put anything in that is not relevant.

MR. SLAGHT: May I ask one question that I think will be relevant here. I note on each column of your four series the last is .25 and you do not show how much above, or say what they are. Is that correct? A. Not on that table, but in other tables it is shown for each month.

HIS LORDSHIP: Yes, you will find them in the daily and monthly table.

——EXHIBIT No. 161: Chart sulphur dioxide readings made near Defendant's, May to October, 1945, 1946, 1947, and 1948, made by Katz.

MR. KEOGH: Q. Then, doctor, did you prepare a table similar to Exhibit 161 for the sulphur dioxide readings at the Dunn greenhouses station during the period it was operating, from June to October, 1948? A. Yes, sir.

Q. And is that the table which you prepared? A. Yes, sir.

——EXHIBIT No. 162: Chart sulphur dioxide readings made at Dunn's test house, June to October, 1948, made by Katz.

Q. Then, doctor, did you prepare a table of the dust measurements and prevailing wind directions at the McKinnon test station for the period from May 20th, 1948, to December 31st, 1948, the original of which table or a copy of which table I now hand you? A. This is divided into two periods, May 20th to July 12th, and November 15th to December 31st, and indicates the average concentrations of dust and soluble organic matter under the indicated test conditions. This is based on the data already submitted in the previous exhibit where the November readings are given.

——EXHIBIT No. 163: Dust and wind measurements made by Katz at Defendant's test house May 20/48 to December 31/48.

Q. Yes. Then, doctor. did you prepare a similar table of the dust in organic matter measurements during the period from June 14th to December 31st, 1948, with the exception of the strike period which you have told us about and that exception applies to the last exhibit and this for the readings at the test station at Dunn's greenhouse? A. Yes, sir.

——EXHIBIT No. 164: Dust and wind measurements made by Katz at Dunn's test house June 14 to December 31, 1948.

Q. A copy for your lordship and a copy for my friend. Then, doctor, did you prepare a graph showing a comparison of the sulphur dioxide readings at the McKinnon's test station and at the Dunn's test station for the period during which both of them were operating and which graph I now show you? A. Yes, sir.

——EXHIBIT No. 165: Graph prepared by Katz showing comparison between Defendant's tests and tests made at Dunn's.

Q. A copy for your lordship and a copy for my friend, and that graph is based on the data for these particular stations, which have already been filed as exhibits in this case? A. Yes.

Q. And it is correctly plotted and correctly prepared from that data, is it? A. Yes, sir.

HIS LORDSHIP: Just a moment now, till I understand it. Will you take the graph before you, doctor, and explain it to me, please? A. The ornates are in the duration of sulphur dioxide in percent. of total time.

Q. Oh, you are back on the percentage? A. Yes, sir. As I said before, this can readily be completed into hours, but I thought that the percent. is a more accurate comparison.

Q. I want to understand, though, what we are comparing? A. We are comparing the duration of sulphur dioxide at one station, the Dunn station, compared with the station near the McKinnon Industries.

Q. Well, in percentage of time? A. In percentage of time at different concentration levels.

Q. Now, let us start on that first. A. Yes, sir.

Q. In the first place you have got the dotted line at Dunn's? A. Yes, sir.

Q. And the straight line, or the continuous line is McKinnon's? A. Yes, sir.

Q. And we start off in May and we have got three different continuous lines? A. Yes, sir.

Q. Do each of these squares represent days? A. No, sir. The abscissa represents the months. Now, I see that in one instance three points have been misplaced slightly to the left, but that merely indicates that for the month of June, for example, we had certain levels of concentration at the McKinnon station and at the Dunn station.

Q. Now, doctor, you are going too fast for me. I want to go one step at a time. In the first place, if you will indicate what the first mark means in May, starting at the bottom of the page. You start off with a line that goes almost directly across, a con-

tinuous line. Now, what does that mean? A. That is a line representing the concentration above the .25 parts per million. It is virtually zero. There is a slight incline but, for the most part, that line is zero. There is a slight, very slight percentage of the time in June when the concentration was above .25.

Q. Well, now, I want to start right there. A. Yes, sir.

Q. You say there is a slight percentage of the time that might have been, for all we know, the concentration that was during one night, at a point four parts per million? A. Well, the exact concentration can be determined quickly from the tabulated data which is already in evidence.

Q. I realize that, but I am getting at what value a graph of this sort is in assisting me to determine whether or not there was, at certain times, a sufficient concentration to do injury. Now, can you tell me what value this has on that point, because I do not want to be led off the point that I have to decide by a general discussion of a problem of question of averages or percentages, or anything of that sort. The problem I have, and I want you to direct your mind to it in giving evidence, is whether at any time there was a sufficient concentration of sulphur dioxide at the Walker greenhouses to do injury. Now, that is the real question we have in this case, and a question of averages or percentages, or anything else, has nothing to do with it, because I am not assessing damages. I am only deciding whether there was — one of the things, at any rate, that I have to consider and we have to consider with your scientific help is as to whether at any time there was a sufficient concentration to do injury? A. Yes, sir.

Q. Now, does this graph help me at all on that problem and, if so, how? A. Not directly but indirectly it might help, because at any time the line representing the concentrations above .25 is above the zero percentage, then it would be advisable to look into that month.

Q. Well, I want to get your view as a scientist now. If, at any time, the concentration is above .25 it might probably do injury? A. That would depend on what the concentration was above .25.

Q. What do you mean by that, doctor? A. Well, now, if it were sufficiently high.

Q. No; I am saying, and the question I am putting to you now, doctor, and I want to give you this occasion as I gave to another witness and I aim to give to all expert witnesses. I have been saying in my views, no expert is an advocate for his side. He is a scientific man who comes here to assist the Court in a scientific way, irrespective of what the result may be, and I want it to be approached in that way by every one. A. Yes, sir.

Q. Now, I asked you a very simple question, and I am going to try and get a clear answer, if I can. A. Unfortunately —

Q. Just a moment. What do you say as to whether, if the concentration is at any time above .25 parts per million, it might probably do injury? Now, I am weighing each one of those words carefully. A. In my opinion, if the concentration was higher than .25 parts per million and especially higher than the point—

Q. Will you just answer the question I put to you? I am not dealing with any other than what I put to you, doctor. My question, and I will repeat it again, is from your very scientific point of view, from your knowledge as a scientist as to whether if the concentration is above .25 parts per million it might probably do injury. Now, as I have told you before, I am weighing each one of those words carefully, — might it probably do injury? A. Above .12 now —

Q. No, above .25 parts per million. That is the one I am dealing with first. A. Above .25 parts per million it might probably do injury if it were present for a sufficiently long time.

Q. Now, I put this one to you next. The length of time that it might take to do injury would depend on the climatic conditions, that is, the strength of the wind, the humidity and the temperature, and all that? A. Yes, sir.

Q. Well, then, we start off there. What do you say, having regard to all those features, is the minimum that might do injury at certain concentrations of humidity, certain conditions of the wind and all those features, temperature, wind, — the medium that might do injury? A. I have treated plants experimentally at a continuous concentration of —

Q. Now, doctor. A. Yes, sir.

Q. I do not want to be impatient but, after all, you are a scientist, and I am putting a very precise question to you, and I just want an answer. I will repeat it again. Having regard to climatic conditions, that is humidity, temperature, the condition of the wind and all those features, what is the minimum at which a concentration of sulphur dioxide might do injury? A. I think that the minimum is very close to .25 to 3/10, because that is the accepted —

Q. Yes? A. That has been accepted by the International Court.

Q. Well, now, I do not want something — there again, doctor, I do not want you to base your opinion on something that is accepted by an International Court. I want you to give me your opinion, as a scientist, giving it under oath. A. Well, I was going to add that I was identified with that and it is my opinion, too.

Q. You mean you were a member of the International Court? A. No, sir. I was a member of the scientific body that gave evidence to the Court.

Q. Well, you see, after all, I just want your opinion as a scientist, and please do not introduce into this trial things that are not admissible. That is what some other body has found. I know you do not know the rules of evidence and I gather you did not want to do it, but, you say your opinion is, the minimum concentration to be dangerous, we will put it that way, is .25 parts per million on any conditions — A. .25 parts to .30 per million.

Q. Per million? A. Yes.

Q. That is what I am dealing with and, of course, that is outside conditions, in the open air? A. Yes, sir, and the various concentration, duration, temperatures and all those factors and so on, have to be taken into consideration.

Q. But what I am starting with is that there is a minimum that may be dangerous? A. Yes, sir.

Q. And that is your view? A. Yes, sir.

Q. Is there any dispute among scientists as to that? You said you were a member of the body. Are there different views? A. I think that the majority of scientists will be in agreement with that.

Q. But there is quite a difference in the views expressed here? A. I have heard that. yes.

Q. Well, then, we will get back to this graph. Mr. Keogh, I am afraid I interrupted you, — that is dealing with percentages. Then, on the matter that I have been discussing with you, the concentration that may have existed at any time in a sufficient quantity to be dangerous, this would not cause very much trouble? A. No, sir.

Q. Well, I think that is fair, and I understand it now.

MR. KEOGH: Then, doctor, perhaps I should ask a question about that graph. Then, doctor, you prepared from the period from January 1st, 1949, to March 9th, 1949, a compilation from similar charts and records and readings at the McKinnon test house of the sulphur dioxide readings and wind readings during that period I have just mentioned, and the original of which I now show to you. Is that correct? A. Yes, sir.

——EXHIBIT No. 166: Sulphur dioxide and wind readings taken by Katz at Defendant's test house, Jan. 1/49 to Mar. 9/49.

Q. Then, doctor, did you also prepare a similar compilation of the same data at the Dunn greenhouse and recorder station for the period from January 1st, 1949, to April 13th, 1949, the original of which I now show you? A. Yes, sir.

——EXHIBIT No. 167: Chart sulphur dioxide and wind readings taken by Katz at Dunn's test house Jan. 1/49 to Apr. 13/49.

Q. Now, I believe you have not had time to make up any summaries of these last two exhibits, 166 and 167? A. No, sir, I have not.

HIS LORDSHIP: Mr. Keogh, you may have brought it out, but if you did I have forgotten, just the location of the Dunn greenhouse.

MR. KEOGH: I think I located it on the street — I probably should have located it a little more exactly. It is on Queenston Street, as you have said? A. Yes, sir.

Q. And, about — approximately how far from the recorder or test house station at McKinnon's? A. I believe it is about a mile, although I have not measured it, and it is only a guess.

Q. And the test house at Dunn's was located on the Dunn property adjacent to the most northerly greenhouse and potting shop, was it? A. Yes, sir.

HIS LORDSHIP: Could we locate it on this map of St. Catharines, which has been filed?

MR. KEOGH: This old map?

HIS LORDSHIP: Exhibit No. 1, for instance, would it not be?

MR. SLAGHT: No, it would not go that far.

MR. KEOGH: Queenston Street is shown here and St. Paul. It does not, of course, show the Queen Elizabeth Way in Exhibit 1. I think that the doctor could probably locate it approximately.

HIS LORDSHIP: If you know where it is, I will take your word for it. A. Queenston Street now runs out to the Queen Elizabeth, out here, some place, and it is just this side of the hospital on Queenston Street, and the hospital is located opposite Vine Street. There is a street there called Calvin Street and then Church, and it is about the intersection of Queenston and Church.

HIS LORDSHIP: I do not think the Reporter need take down all this discussion. When Mr. Keogh gets it located, we will fix it.

MR. KEOGH: Then, it is between Vine and Prince: I would say that it is right in there and McKinnon's is at the corner of Ontario and Carlton Street. It runs from Queenston Street right down to the canal, as Mr. Ferguson says. The Dunn property, and McKinnon's is at the corner of Carlton and Ontario, in the northwest section of the city, right on the city line; as a matter of fact, and partly in the county.

HIS LORDSHIP: Then, you say it would be about a mile and a half, doctor? A. Yes, sir.

HIS LORDSHIP: What scale is this map?

THE WITNESS: I think it is definitely over a mile.

HIS LORDSHIP: This is 400 feet to an inch. It is about 23 inches. It scales at about 9,000 feet. That is about 9,000 feet in a southeasterly direction. It is probably more easterly than southeasterly, but that is approximately the direction. Thank you.

MR. KEOGH: Well, then, doctor, having filed the tables and, by the way, I think we have filed all the tables and compilations now, that you made up, I hope. That is right, isn't it? A. Yes, sir.

Q. Then, I want to take you over in some detail, what you did each year, in the way of investigations and inspections, apart from compiling these tables, because we have already gone into the detail of how you made them up and how you inspected the test houses records, and so on. You started off on these investigations in November, 1944, I believe? A. Yes, sir.

Q. And you then came to St. Catharines, did you, and looked into the matter in a preliminary way? A. Yes, I did.

Q. You were requested to come by whom? A. The National Research Council.

Q. And they had received a request from the McKinnon Company. Is that right? A. Yes, sir.

HIS LORDSHIP: Well, I want to be clear, doctor. If it were not raised I would not ask the question, but are you here as an officer of the National Research Council, or are you here as an expert witness by the defendants? A. I started this investigation —

Q. Now, would it again be possible for you just to answer that question at the moment? A. Unfortunately, I cannot answer directly, because I am with the Defence Research Board now, but they recognize that I am continuing this work for the National Research Council.

Q. Have you been carrying this work on for the National Research Council? A. Yes, sir.

Q. Well, then, I will ask you one other question: I should not. Are you paid an expert witness fee by the defendants? A. To a certain extent, yes.

Q. There is no discredit or anything, doctor, but I just did not want the record to appear that you are an independent man brought in from the Government and have no connection with one side or the other except called as a witness. A. No, sir.

Q. You are called as an expert witness? A. Yes, sir.

Q. Well, it is all right. There is nothing to be ashamed about. I am not criticizing it, because that is the proper thing to do.

MR. KEOGH: Q. But this is a project, as you say, that commenced on behalf of the National Research Council and your publications in connection with it will form part of the records of that Council? A. Yes, sir.

Q. And, as far as the expert witness fee is concerned, you were served with a subpoena and paid $5.00 and railroad fare. Is that right? A. I did not mean that. I meant that, since I left the Council they have — my department has requested me to pay my own expenses here and bill the company for my expenses.

Q. That is something that would take place in the future. You have not —

MR. SLAGHT: I object to my friend stating that. I venture to say he has billed them month by month, and my friend says to him, "That is something will take place in the future." He should not say that. He should ask him.

HIS LORDSHIP: It is a thing I dislike going into at all and I should not, if it had not been brought out in the sense that he was a representative of the National Research Council. I know you were not trying to put a complexion on it as though he was independent entirely and had been conducting the investigation on behalf of the Government.

MR. KEOGH: Well, perhaps your lordship will ask him what the procedure was in the beginning, when he was still connected with the National Research Council.

HIS LORDSHIP: I think the doctor will tell us they were just letting him come, and then it is all over with.

MR. SLAGHT: Let us keep the amount secret.

MR. KEOGH: I do not want to give Mr. Slaght any bad ideas.

HIS LORDSHIP: You will be paid a retaining fee and a witness fee for your work, in addition to your expenses? A. Yes, sir.

Q. There is nothing wrong with that at all, so long as we just understand it, that is all.

MR. KEOGH: Q. Thank you, my lord. Then, when you came here in the beginning, in November, 1944, you, as you say, made a preliminary investigation and then was it at that time that you decided to have this test house installed adjacent to the McKinnon propery? A. Yes, sir. I decided that that was the only way to investigate the problem properly.

Q. And in coming to that conclusion, did you make any investigation of the gases that were being discharged by McKinnon's, or did you do that later? I do not want a detailed analysis at this stage. A. I made a visual examination of what was happening and decided that, to understand the problem properly, we should embark on a merely systematic investigation.

Q. And do you remember if, at that time, in December, 1944 — I beg pardon, November, 1944, you saw the cupolas? I don't mean going right up on top of them. You saw them?

MR. SLAGHT: Suppose you ask him what he did. I don't think you should suggest he did go or didn't go on top. I want to know.

MR. KEOGH: All right. What examination did you make of the McKinnon cupolas in November and December, 1944? A. In November, 1944, I inspected the plant, also walked on to the roof of the foundry and I made an examination of the area surrounding the plant; that is, the foundry and the other plants associated with it.

Q. Did you go up to the top of the cupolas and look in, or did you not? A. I did not look into the cupolas, but I went up on the ladder to the top and looked around. I did not attempt to look over the top of the cupolas.

Q. Can you tell us what sort of smoke device was on the cupolas at that time? I am talking about November and December, 1944. A. I understood —

MR. SLAGHT: Well, don't tell us that.

MR. KEOGH: Don't tell us what you understood — what you saw, doctor. A. What I actually saw was a deposit of dust and fly-ash on the roof surrounding the cupolas.

HIS LORDSHIP: At that time the chain system was on?

MR. KEOGH: And are you able to tell us whether or not at that time, as his lordship mentions, the chain system was on? A. I never saw the chain system, myself.

Q. I know you did not go up and make a detailed examination, but can you tell us from the roof that there was some sort of chain system? A. Well, I could presume there was some such system in operation.

Q. I don't want you to presume; but could you tell from the roof there was some sort of chain system up there, although you cannot give us the detail? A. I would say most probably it was, because that is one of the ways in which the chain curtain would operate.

Q. Now, you said you were up on the roof. I take it you are referring to the roof of the foundry? A. Yes, sir.

Q. And what was the condition on the roof of the foundry as to dust, soot, fly-ash, iron oxide, when you were on it in these two months of November and December, 1944? A. There was a considerable accumulation of fly-ash on the roof of the foundry.

Q. A considerable accumulation? A. Yes, sir.

Q. And we had one witness for the plaintiff say that they carted that down a walk off the roof. How does that compare with your observation? A. I made no quantitative examination of the amount of dust, but I would say —

Q. I just wanted to know what you meant by the word "considerable"? A. Oh, that would be of the order, I would think — something of that order.

MR. SLAGHT: What was that — down a walk?

MR. KEOGH: Down a walk. I think Edwards said in a wheelbarrow; they carted that down the walk. Now, at the time you commenced your investigation in November and December, 1944, was there or was there not any visible discharge of dust through the three cupola stacks of McKinnon's? A. There was visible discharge of dust at certain times.

Q. I am referring now to the times when the cupolas were operating, and presumably when you saw them during the daytime. A. Yes, sir.

MR. SLAGHT: Do you mean dust, or smoke and fumes?

MR. KEOGH: Dust, I said. I will ask him about smoke and fumes, too. I am coming to them. And what was visible from the cupolas, as far as smoke was concerned? A. There was some smoke coming out of the cupolas, the colour sometimes being light brown.

Q. I am speaking now of November and December, 1944. A. Yes, sir.

Q. Then, you came back, did you not, in the early part of 1945? A. Yes, sir. Pardon me, I came back in 1944.

Q. Well, I thought I had covered November and December, 1944. If there is anything else you want to deal with, other than that. Then, you made further trips to St. Catharines in the early part of 1945. I am directing your attention particularly now to the months of January, February and March, 1945. A. I made a trip in January of 1945 and did not visit in February.

Q. You did not visit in February? A. No.

Q. Now, dealing with your trip in January, was there any difference in the conditions then, as far as the cupolas and the roof of the foundry, from what you observed in November and December in 1944? A. No difference, as far as I could see.

Q. Then, coming down to the month of April, 1945, did you in the months of April and May, 1945, again visit St. Catharines? A. Yes, sir.

Q. And in what part of April and in what part of May did you make those visits? A. I made a visit towards the end of April, 1945.

Q. Towards the end of April, 1945? A. Yes, sir.

Q. And was there any improvement in the dust and smoke conditions at that time, that you noticed? A. Well, there was a noticeable improvement.

Q. Can you give us a little more details of that improvement, doctor? A. There was more steam — a definite quantity of steam being emitted from the cupolas and what little smoke there was was very much cleaner looking and lighter coloured.

Q. And that was, as you said, towards the end of April, 1945? A. Yes, sir.

Q. Then, did you or did you not make another visit in May of 1945? A. Yes, sir.

Q. And how did the conditions in May, 1945, compare with what you saw in April, 1945, as far as smoke and dust was concerned? A. About the same.

Q. About the same. Then, you cannot tell what anybody told you, but did you make any inspection of the cupola stacks in May or in June, 1945? I am speaking of, not from the outside, but from the inside, as of what was in them? A. I did make an inspection of the cupola stacks in May, 1945.

Q. And what, if anything, did you find had been put in them? A. I found a water-wash system in operation.

Q. You found a water-wash system in operation and there were, at that time, three cupolas? A. Yes, sir.

Q. And in how many of the cupolas was that system in operation at the time of your inspection, in May, 1947? A. I believe three.

Q. In all, three. And we shall have other witnesses to describe the system in detail, but can you tell us, just in a general way, what it was, so that we can tie it up with some of the evidence that has gone ahead? A. Generally, it was a system whereby water from a large tank was pumped to each one of the cupola stacks, and this water was distributed at the top of the stack, through a system of nozzles, and was spread out in the form of a curtain.

Q. And through that curtain, what passed or what was supposed to pass? A. The gases from the cupolas were supposed to pass through that curtain and remove the dust and fly-ash.

HIS LORDSHIP: You say a system of nozzles that spread out into a curtain. Did the nozzles not deposit the water on a cone? A. I believe there was a cone there, but I could not be sure of that. What I did see was the spray.

Q. You saw the water coming out of the nozzles? A. Yes, sir.

Q. But whether it deposited it on the cone and then that formed the curtain — A. I could not be sure now.

Q. Well, I think we need not go into too much detail with Dr. Katz.

MR. KEOGH: Yes.

Q. That was later, though, on top of the cone?

HIS LORDSHIP: Oh, I see.

MR. KEOGH: Then, with this water spray in operation, this nozzle spray in the three cupolas as you say in May, 1947, how did the condition as to deposit of ash and dust and iron oxide on the roof of the foundry compare with what you had seen, say in the month of January, 1945? A. It had virtually disappeared.

Q. The deposits on the roof had virtually disappeared? A. Yes. The roof was clean.

Q. Then, did you make any inspection or examination of the oil used in the foundry and in the forge shop when you were there, say, in the early part of 1945? A. I did not make any quantitative examination of the oil. I just know that bunker oil was being used.

Q. Did you see any haze that has been mentioned by some of the witnesses? A. Sometimes I could see a haze from the — I judge it was coming from oil from the core ovens.

Q. From the part of the foundry they are in? A. Yes, sir.

Q. And did you make any inspection to see how the vapours from the core ovens were exhausted? A. What was that again?

Q. Did you make any inspection to see how the vapours, the haze and the other vapours from the core ovens were exhausted, or got rid of? A. They were exhausted through the short stacks in the roof of the foundry and dissipated in that way.

Q. What, if anything, can you say about their rate of dilution? A. I thought that the rate of dilution was quite rapid.

Q. And at that time, in the early part of 1945, did the haze and the vapours from the oil used in the core ovens, in your opinion constitute any danger to plant life? A. I did not think so.

Q. Now then, from your experience in investigations of smoke and fumes, atmospheric pollution, what is the situation, from your experience, which is to be sought for from the standpoint of whether or not injury to plant life and vegetation is or is not being caused? A. I believe that any operations involving the use of coal, coke or oil, sulphur dioxide is the main cause of injury to plant life.

Q. And is there any other gaseous constituent in the smoke from the combustion of those substances, that would likely be injurious to plants and flowers and ordinary outdoor vegetation? A. I think not.

Q. You think not? A. No, sir.

Q. Then, in connection with the dust in the atmosphere, you started a certain procedure to investigate that? A. Yes, sir.

Q. And that was in connection with the last bulbs that you have mentioned? A. Bulbs.

Q. And that was sent to you by Mr. Longhurst, I believe, once a week or something of that order? A. I would not put it that way. The bulbs were sent periodically when it was deemed that the contents were collected enough — were sufficient for analysis. Pardon me, I should say awaiting determination; determination of mass concentration, not analysis.

Q. The computation then you described to us already. The Thomas sulphur dioxide recorder which you established in the McKinnon test house, was there any more accurate method known to science for the determination of low concentrations of sulphur dioxide gas in the air, than that Thomas sulphur dioxide recording machine? A. I do not think so, sir.

MR. SLAGHT: Did he say than his type of recorder?

MR. KEOGH: He said there was not any more accurate method known to science than the Thomas sulphur dioxide recorder that he has already described. Now, perhaps I should take you down through the rest of the year 1945, what were your observations as to first of all, dust and fly-ash and iron oxide particles, not dealing in detail, but generally speaking, as compared to the portion of 1944, November and December and the early part of 1945, January, February and March? In other words, I want a short comparison of the dust. A. I would say that, based on average concentrations, the dust showed a reduction in concentration over — that is, during the summer of 1945, over the preceding winter and late fall of 1944.

Q. And you have already told us that you began to notice that improvement in the month of May, 1945? A. Yes.

Q. We have had evidence here from the plaintiff, Mr. Walker, and I believe one or two of his employees or relatives, that the conditions as to dust and also smoke, I believe he said — he included both, I think were much worse from, I believe he said April, 1945, on, than they had been before. What do you say as to that, from the results of your own personal observations before or after April, 1945, as to whether you agree or disagree with that statement? A. I disagree with that statement.

Q. Then, after you had seen these water cone spray nozzles, can you describe briefly the smoke that was coming out of the cupolas, when they were in operation? A. The smoke was different in character.

HIS LORDSHIP: He has already covered that.

MR. KEOGH: I believe he covered it before the water cones.

HIS LORDSHIP: No, he covered it, did you not, doctor.

THE WITNESS: Yes. I believe I made reference to what I saw after the water-wash system was put in.

Q. You did as far as dust was concerned.

MR. KEOGH: Yes, you did, as far as dust was concerned, and you described something as far as the chains being on, but I did not understand you had described it after the water cone was put in.

MR. SLAGHT: Yes, he went into that.

HIS LORDSHIP: He said there was some steam and lighter coloured smoke.

MR. KEOGH: Oh, well, I am sorry, then.

HIS LORDSHIP: Yes; he contrasted the difference.

MR. KEOGH: O.K., then, I will pass it.

Q. Now, I would like to ask you, without referring to individual figures in the tables which you have compiled for part of the year 1945, what your general observations were and general conclusions which you came to were as a result of the sulphur dioxide readings which you obtained in the year commencing in the latter part of November, 1944, and extending over to December 14th, 1944, and from then on to September 4th, 1945. I am referring, for the sake of ready reference, to the data contained in Exhibits 133 and 135.

MR. SLAGHT: My lord, I want to object to that question. He said, "without referring to the figures of 1945, what was your general conclusion over the period he outlines." I submit that the witness can refer to his figures or can give evidence of what he saw, but for him to purport to give a general conclusion I submit is not proper or receivable evidence. He can speak on the facts and comment on those facts, but I submit to ask for a general conclusion and exclude him from referring to figures, is not admissible.

MR. KEOGH: Well, I am not excluding the witness from referring to figures. He can refer to them if he wants to, but I thought I would shorten them up. The figures are available. My friend can cross-examine on them. What I wanted to find out was from the data of those readings over that period as I have mentioned, its relation with others, with all other data, such as wind, temperature and so on. Did you come to any conclusion as to whether or not the smoke and soot and ash and iron oxide from the McKinnon Industries Limited was a source of serious pollution in the atmosphere at the McKinnon test station?

HIS LORDSHIP: I am afraid that is really the problem I have to decide.

MR. KEOGH: Perhaps I will put it this way. What conclusion did you come to from that data —

HIS LORDSHIP: Oh, yes, I know, but if you are just expecting to get some answer to a question put a little differently — I do not want to exclude any scientific opinion, but an expert is not called for the purpose of displacing the function of the trial judge. I think I have to try, as far as I can, to get the facts, then I must decide whether there has been, having regard to all the circumstances, evidence that would justify me in coming to the conclusion that the air was polluted within the meaning of the cases, or within the meaning of the law, on the subject of nuisance. There is a legal aspect to pollution. As far as the factual aspect is concerned, I think he can only help us as to fact.

MR. SLAGHT: There are vacancies on the Bench. You might get him appointed to the Bench.

MR. KEOGH: Some day they may find Mr. Walker up there.

HIS LORDSHIP: Well, I do not think we had better get into any discussion on that.

MR. KEOGH: Well, what facts have you —

HIS LORDSHIP: Well, after all, have you not got all the figures in the reports?

MR. KEOGH: Well, my lord, I have got to get some statements from him, because I know that your lordship is going to go over them, but it is quite possible some other Court might not attempt to go over them.

HIS LORDSHIP: Yes, if the other Court does not go over them, but I think it is highly likely they will.

MR. KEOGH: Well, we are not as optimistic as your lordship on that last statement.

HIS LORDSHIP: But, Mr. Keogh, you cannot ask this witness to perform the function of any judge. Isn't it this? I put a question to the doctor that I think is a proper scientific question, and I have in mind what may be revealed in these, and that was the minimum concentration that could be injurious to plant life under any circumstances. Now, that is one thing, and that sort of thing is the type of thing to put to an expert witness for an expert opinion, if we can get it, but you are not permitted to put in "Well, I have got all these figures and I have come to the opinion Mr. Walker could not have suffered any injury."

MR. KEOGH: No, I understand. I will try and keep along the lines that your lordship indicates.

MR. SLAGHT: I want to make my position clear, because I started this with the objection. I have no objection to this witness being asked his own expert opinion on certain data, if the data is put to him, as to what it is, and offering his expert opinion.

In the Supreme Court of Ontario
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Examination-in-Chief
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Continued

HIS LORDSHIP: Well, you could not object to that. At least, not successfully.

MR. SLAGHT: With great respect, I could, but it would be foolish, because that is the law, and I do not want to curtail it in any way by any objection I have made, but I want my friend to keep within that point. He started off by asking, "What was your general conclusion?"

MR. KEOGH: Oh, well, I have dropped that.

HIS LORDSHIP: Probably we might have an intermission of ten minutes now.

MR. KEOGH: I do not object to that.

——Intermission.

——On resuming:

EXAMINATION-IN-CHIEF OF DR. KATZ CONTINUED BY MR. KEOGH:

Q. Doctor, I would like you to explain a little more of what you said to his lordship about the .25 parts per million of sulphur dioxide might cause injury if left for a sufficiently long time. It was the last part I would like you to explain. A. Well, in my opinion, .25 parts per million is not considered an injurious concentration if present for an hour or two hours, or even three hours or four hours. If one were to submit plants continuously to .25 parts per million for a very long time in the proper temperature and other conditions, they might be injured.

Q. Well, what are the most important factors, having regard to the possibility of injury, in connection with concentrations of sulphur dioxide? A. The important factors are the concentration duration, the temperature, the relative humidity, and the internal condition of the plant, because plants in a wilting condition, for instance, do not absorb sulphur dioxide, or absorb it only to an extremely small extent. On the other hand, if the plants —

HIS LORDSHIP: Doctor, can I ask you just to pause for a moment. You said the important factors are temperature, humidity, and what other? A. Duration and concentration.

Q. And then you said the condition of the plant? A. And the internal condition of the plant governing the rate of absorption of sulphur dioxide through the stomata of the leaves. For instance, plants can be subjected to sulphur dioxide with higher concentrations for longer periods of time during darkness than during daylight. In addition to that —

MR. KEOGH: Just before you leave that, may I interrupt to ask if you can tell us a little more of what you mean by the internal condition of the plant. I thought you used the word "wilting" just before his lordship spoke. A. Yes. What I mean is this: that plants that are at the wilting point, in other words, they are suffering from the lack of a proper amount of soil moisture, will be much more resistant than plants growing under normal conditions of soil moisture. Furthermore, it is recognized that in the early spring and the late fall, higher concentrations can prevail without injury and, in the winter period still higher concentrations can prevail. Furthermore, in careful experiments on the rate of foto-synthesis and respiration of plants, we have determined that in actual practice, .44 to .50 parts per million is the point at which there is the first perceptible sign of any influence on the foto-synthesis.

MR. SLAGHT: .44 to .50 parts? A. Per million; the first perceptible indication of an effect of foto-synthesis under optimum growing conditions.

HIS LORDSHIP: Now, just pause there, please.

MR. KEOGH: And then —

HIS LORDSHIP: Just a moment. What do you mean by that? A. I mean that it requires a concentration as high as .44 to .50 to show the first perceptible reduction in the rate of foto-synthesis of plants due to the action of sulphur dioxide.

Q. Well, that is what I want to know. The rate to what is the first perceptible reduction in foto-synthesis? A. That means in the assimulation of carbon dioxide and its liberation in the foodstuffs in the plant.

Q. What do you mean by — first by "perceptible"? A. I mean that that is the level at which you first begin to get a reduction in the rate of the carbon dioxide assimulation, or foto-synthesis. Below that you do not get the reduction in foto-synthesis, unless the fumigation is continued so long that visible markings appear on the leaves.

Q. Well, might the plant be injured, although you did not get a reduction in the foto-synthesis? A. No, sir.

Q. Could not be injured? A. Impossible.

Q. Well, how is that statement consistent with what you have said before, that you may get an injury at .25? A. It is consistent in this respect that, if you continue to subject plants to .25 for a long time, many hours, you may get visible injury to the leaves and that will cause a reduction in foto-synthesis.

Q. Well, do you mean, then, that the .44 to .50 is the point where you would get an immediate perceptible reduction? A. Yes, sir.

Q. Oh, yes, I quite understand that. That is, there would be an immediate reaction at that point, but, on the other, it would be more gradual and take time between .25 and .44, depending on the length of exposure? A. There would be no reduction in foto-synthesis during that period, as long as the plant was not injured; as long as the chlorophyl or proto-plasa was not injured the foto-synthesis would continue on the normal level.

Q. Yes, but there might be an injury that would cause a reduction in foto-synthesis to commence at the same time? A. Only after some of the tissue has been killed.

Q. Well, I just want to understand the course of what you say, that is all.

MR. KEOGH: Q. And you used the words "many hours" in connection with .25 parts per million. What do you mean by many hours? It is the word "many" I want to get. A. Well, I would say hours in the order of 20, 30, 40, and so on.

HIS LORDSHIP: Well, you said a moment ago — you started off at 1, 2, 3 or 4; unless it was present for 1, 2, 3 or 4 hours there could be no —

MR. KEOGH: That was .44 to .50.

HIS LORDSHIP: No, no, that was .25.

THE WITNESS: No, I stressed the fact that it was much longer, 1, 2, 3 or 4 hours.

Q. No, as I took it down, you said .25 is not considered injurious unless present for 1, 2, 3, 4 hours.

MR. SLAGHT: That is what I took down.

MR. KEOGH: Is not considered —

HIS LORDSHIP: Yes. I took it there might be cases where it might be present for more than one hour or present for more than two hours, or present for more than three hours, or present for more than four hours, depending, I take it, on the susceptibility of the plant, and on the temperature conditions? A. Yes, sir.

MR. KEOGH: Well, I want to clear this up, because I want to know what duration you have to have in .25 parts per million, what the humidity and growing temperature and the other climatic conditions are to cause injury. You used the word "sufficiently long time," at one time. "Many hours" at another time, and now his lordship mentions 2, 3 and 4 hours. I would like to get that cleared up. A. What I meant to say was that .25 would have to be present for a very much longer time than 1, 2, 3 or 4 hours.

Q. For very much longer? A. Yes, sir.

HIS LORDSHIP: Well, I do not quite understand why you make these steps. It might have been present. If you mean it would have to be present for four hours, why did you not say so?

Why did you not make it four hours, but if you say it would have to be present for more than one, more than two, more than three, or more than four, I was taking it that you were making it in that aggravation, having regard to the variety of the climatic conditions and the susceptibility of the plants. A. No, sir.

Q. Why did you make the steps? A. I was merely emphasizing it would have to be much longer than three or four.

MR. SLAGHT: Why didn't you make it five?

HIS LORDSHIP: Don't interrupt, Mr. Slaght, please. I am interrupting Mr. Keogh now more than I should, but I would like to get it. What would be the minimum, having regard to the most susceptible plant? Some plants are more susceptible than others? A. Yes, sir.

Q. Having regard to the most susceptible plant and, we will say, the worst atmospheric conditions, of practically no wind, very heavy humidity and a concentration of .25, what would be the shortest time in which a plant might be injured to some degree? Now, that is Mr. Keogh's question, as I understand it. A. Yes, sir. I would say it would have to be of the order of at least 24 hours continuously.

MR. KEOGH: 24 hours continuously? A. Continuously.

Q. And then, given those same conditions, what would be the shortest time at which the most susceptible plant would be injured by concentrations of .44 to .50 parts per million of sulphur dioxide? A. About eight hours continuously.

Q. About eight hours continuously? A. Yes, sir.

Q. And then, while we are at this point, I might as well clear it up. We had a witness for the plaintiff who said .15 parts per million of sulphur dioxide would cause — well, I believe .12 was used at one time and I believe .15 was mentioned at another time, parts per million of sulphur dioxide would cause injury to susceptible plants under favourable climatic conditions and growing temperature and in daylight. Do you agree or disagree with that statement? A. I disagree with that statement.

Q. Would concentrations of that order cause injury to susceptible plants under favourable conditions, with any amount of duration? A. I can answer that only with the experience that I have had, and that is that I have experimented with average concentrations of that order for as high as 500 to 600 hours and determined the yield of the plants grown under those experimental conditions, and they were in no way less than the controls, — in other words, there is no effect on the growth at a continuous exposure for that length of time on susceptible plants.

Q. And of all the factors that you have enumerated, the concentration, the duration, the humidity, the growing temperature and the sunlight, which, in your opinion, are the two most important factors in determining the possibility of injury from sulphur dioxide? A. The two most important factors?

Q. Yes? A. I would say would be the relative humidity and light intensity.

HIS LORDSHIP: Well, would the condition of the wind not be very important, too? For instance, if you had a very humid day with bright sunlight and a high wind, would that have some tendency? A. No, sir. It is the level of concentration that is important. The wind is only an indirect influence in that it brings the gas to the plant.

Q. Yes, and it may blow it away again very quickly, too? A. Oh, yes, but, sir, we are discussing fixed average concentrations. In other words, these examples I have given are fixed, average concentrations.

Q. Oh, I see. Oh, yes. You are directing your mind to a constant average condition such as one would find under experimental conditions? A. Yes, sir.

Q. But a high concentration for a few minutes might do a lot of damage where an average for an hour would be low? A. I would not say, sir, a high concentration for a few minutes is generally not injurious, unless it is extremely light, like four or five parts per million, which is not involved here, but it has been found to occur in other areas.

Q. Well, if you get a concentration that would affect a workman here, feel it in his throat and could smell it heavily, would that be a high concentration? A. Your lordship, some people are very susceptible to low concentrations of sulphur dioxide and can feel a slight irritation of the throat when the concentration is of the order of a few tenths.

Q. Can you tell me what concentration an ordinary individual might feel? I don't mean a highly susceptible person, but what would be the concentration in an ordinary individual who might be affected by it? A. Well, that varies a great deal. Some people are not conscious of the presence of sulphur dioxide under most conditions that it is found in the field.

Q. Well, again, I want the ordinary individual; not one that is not susceptible, but the ordinary man, — that it would be a discomfort to him, — what concentration? A. I would say that if the subject really knew what he was talking about, then, the concentration would have to be quite high.

Q. Well, I am just asking you if you can say what concentration creates a measure of discomfort in the ordinary individual, even for a short time? What concentration might affect one to cause one to feel discomfort? A. I am afraid I cannot give you a correct answer.

Q. Your experiments have not gone that far? How about yourself, as you are conducting your experiments? Are you able to say anything about that? A. Well, I think I can detect concentrations of the order of about 3/10 of a part per million by the taste.

Q. That would be .30? A. Yes, sir.

Q. And you say you can detect it at that by the taste? A. Yes, sir.

Q. Then, the ordinary individual who might not know what it was, he might detect the taste of something, but he would not know what it was? A. No, sir; he would not know what it was.

Q. But he would detect the taste of something. Is that fair? A. I can quote experiments carried out by other people, but I cannot give you any experiment conducted by myself. I know from experience that most people are not aware of sulphur dioxide, and when they think it is present they are usually smelling, or being irritated by something else.

MR. SLAGHT: Well, how do you know that?

HIS LORDSHIP: Well, never mind, Mr. Slaght. All right. Mr. Keogh. I have got you again away from what you were discussing.

MR. KEOGH: Well, thank you, my lord. It has been quite helpful.

Q. Now, to get back to your investigations in 1945, may I ask you first the general question, that you carried these investigations on until Exhibit 135 commenced on September 4th, 1945? A. Yes, sir.

Q. Now, in the course of those investigations, what sources of atmospheric pollution did you find in the St. Catharines area? A. Well, will you ask that question again, sir?

Q. In the course of your 1945 investigations, what sources of atmospheric pollution did you find in St. Catharines, other than the McKinnon Industries Limited? A. I found that, with the wind from the east and southeast, that we were getting measurable concentrations of sulphur dioxide of about the same order as we were getting with the wind from the west and southwest. Sometimes, with southeast winds, the concentration might even be higher, and I concluded that the pollution in the St. Catharines area was not the result — not only of the operation of the McKinnon Industries, but of the other industrial plants in the area; the contribution made by domestic heating furnaces, and if we were measuring pollution in an area which was a residential and industrial area, consequently, the readings could not be attributed to the operation of only one plant.

HIS LORDSHIP: Could you say the readings were not contributed to by the operation of the McKinnon plant? A. No, sir, I would not say that.

Q. Would you say they were contributed to by the operation of the McKinnon plant? A. Yes, sir.

MR. KEOGH: To what extent were they contributed to by the operation of McKinnon's? A. In my opinion the extent —

HIS LORDSHIP: Well, now, just a moment, I wonder if that is a proper question.

MR. KEOGH: Well, I think it is only a question of fact.

HIS LORDSHIP: Well, if it is a question of fact, then, it is not a question of opinion.

MR. KEOGH: Well, I suppose it is like the parson's egg; it is probably mixed fact and opinion. Perhaps I should ask him first if he can tell.

HIS LORDSHIP: Well, if there are any facts on which he can base his opinion, or point to in his result of his experiments that indicate the extent to which McKinnon's are a contributing factor, —

MR. KEOGH: Are there any facts or measurements as a result of your experiments in 1945, which indicate or enable you to state the result of the contribution of the McKinnon Industries to the general atmospheric pollution in this area? A. I could not answer that definitely on the basis of 1945 results.

Q. I see. Well then, we will pass it. On any occasions in your investigations in 1945, did you detect any unusual odour at the McKinnon test house? A. Yes, sir.

Q. What odour did you detect, and when? A. The odour characteristic of emanation from paper plants.

Q. To be a little more specific, can you describe the odour, as to the source and the substance from which it comes? A. The odour is due to the sulphur dioxide and volatile organic acids which are released into the air when the digesters in the paper mills are blown, and they are blown at frequent intervals.

HIS LORDSHIP: Well, probably you will relate it to something we have got to-day.

MR. KEOGH: Has it got some connection with the substance — I am referring to sulphite, for instance? A. Yes. It has got a connection with the sulphite lacquer.

HIS LORDSHIP: But it is not suggested there are any paper mills in the vicinity of the Walker greenhouses?

MR. KEOGH: No, not in St. Catharines.

HIS LORDSHIP: He says the odour is similar to the odour of the paper mills. Now, can you tell us what would be the cause of the odour at Walker's plant?

THE WITNESS: In my opinion, the odour was due to the gases from the paper mills, especially the one at Merritton, Thorold, being carried to our test station.

MR. KEOGH: Can you tell us anything about the direction of the wind at the test station when you noticed the sulphite odour, in 1945? A. Southeast.

Q. And would a southeast wind come from the direction of Thorold and Merritton? A. Yes, sir.

HIS LORDSHIP: Well, how far is Thorold and Merritton from St. Catharines, from this Walker's test house? A. About three miles, I think.

MR. SLAGHT: What — Thorold? A. Merritton.

HIS LORDSHIP: You say, in your opinion, it came from Thorold and Merritton.

MR. KEOGH: One runs into the other, my lord. You asked about Merritton first, and then Thorold.

HIS LORDSHIP: Well, how far are the paper mills from which any odour comes to Walker's greenhouses?

THE WITNESS: That is in the vicinity of our test house.

Q. I said, how far are the paper mills from which you say that this odour comes, in your opinion? A. Yes, sir.

Q. From Walker's greenhouse? A. The one at Merritton is about three miles, I think.

MR. KEOGH: And the one at Thorold? A. That is an approximation. I have not measured the distance on any of them.

HIS LORDSHIP: Well, one would have thought, in making up your opinion as to where the odour came from, you would have been careful to ascertain how far the mills were away. A. Well, it is so characteristic of a paper mill odour.

Q. Oh, well. Do you know how far the two mills are away? It may be characteristic of a paper mill odour, but did you take any steps to find out how far they were away? A. I not only looked at the map, but I also went down to Merritton and Thorold.

Q. Well, how many miles are they away? A. I think Merritton is about three miles from our test station.

Q. And how far is Thorold? A. About six miles, I think.

MR. KEOGH: Don't answer this question until his lordship rules on it. What was the direction of the wind when you obtained the highest sulphur dioxide readings in your 1945 investigation?

HIS LORDSHIP: That is a perfectly proper question.

MR. KEOGH: You are refreshing your memory by referring to your 1945 compilation? A. Yes, sir.

Q. May I help you by asking you to look at page 9. These are calculations based on his report, which cannot be filed, although I will be glad to file it if my friend wishes it. A. I think your page 9 is —

Q. At the end of the second paragraph on page 9. A. I have —

MR. SLAGHT: Well, excuse me, witness, I am addressing a remark. This report I assume was compiled long after his records were taken and if he had records made at the time from which he can give the figures, he may refresh his mind, but I submit he cannot take a report that he made weeks after and refer to that now and quote figures.

HIS LORDSHIP: I think all Mr. Keogh is doing is directing the witness's attention to an item that may be indicated on Exhibit 135.

MR. KEOGH: My friend's suggestion that this report was made long after your records in Exhibit 135 and of September 4th, — you made up this report under what date and on what day? A. The report was made up on September 10th, 1945.

Q. Ond if my friend wants the exact hour —

HIS LORDSHIP: Oh, let us get it from the witness first, and then we will check it up.

MR. KEOGH: Yes. What was the direction of the wind when you obtained the highest sulphur dioxide readings, during your 1945 investigation? A. When the wind from the east.

HIS LORDSHIP: Will you please give me the data of the highest sulphur dioxide readings? A. Yes, sir. On December 27th we had a reading of — a maximum reading of 0.565 parts per million, with a southeast wind. December 26th, 1944.

HIS LORDSHIP: December — A. 26th.

MR. KEOGH: Exhibit 135, my lord, 10.00 o'clock to 10.30.

MR. SLAGHT: The question now was in the year 1945.

MR. KEOGH: Oh, yes, this is 1944. His lordship asked you for 1945.

HIS LORDSHIP: Now, he has given us something. Now, let me find it.

THE WITNESS: I am sorry. It is the 27th of December. December 27th, and the readings are indicated there.

MR. SLAGHT: What year? A. 1944, at 10.00 to 10.30 a.m., the reading was .565, and the wind was east, with an occasional south.

MR. KEOGH: Then, on December 29th at 7.00 to 7.30 a.m., what was the sulphur dioxide reading? A. At 7.00 to 7.30 a.m. it was .51; the wind was southeast.

HIS LORDSHIP: Just a moment. December 29th what? A. 7.00 to 7.30 a.m., the concentration was .51 parts per million.

Q. Now, there is an item on this that is again in as an exhibit, that ought not to have gone in, because it does not accord to the description of the exhibit.

MR. KEOGH: Well, I did not know that that was there, myself, till Mr. Pond just showed it to me. I think we can have a general understanding, my lord, that any of the terms of that kind will not be considered as part of the exhibits.

HIS LORDSHIP: Well, I want them struck out of the exhibits, because these misunderstandings will not help us. This is merely a factual tabulation from the recorder? A. Yes, sir.

Q. And it is not intended to include any observations, except, I think it is fair to be put in "recorder not operating," or that sort of thing.

MR. KEOGH: Yes, or "plant closed down," but any other statement of evidence, I will have Mr. Pond go over and strike them out.

MR. SLAGHT: Well, there is more than that on my copy on page 8 of Exhibit 135; December 27th, "smoke from the stack directly over recorder at low level."

MR. KEOGH: Well, that will have to be struck out.

HIS LORDSHIP: Oh, well, that is merely an observation of fact. It is not very consequential on a deduction; as to where the odour is coming from, is a very different thing.

MR. SLAGHT: Yes, my lord. Then he has got south and southeast on December 27th. He has told us nothing about south and southeast fumes. He simply said east with occasional south.

MR. KEOGH: Yes, but he was asked for the wind at the time of that high reading, and that is what he gave. Those other ones were earlier and later on in the day. Now then, going on with your investigations, — I got kind of sidetracked there, — we dealt with 1944. Now, can you tell us the highest concentration of sulphur dioxide that you observed in the readings of 1945? That is, from the period the recorder was operated, from January 2nd, 1945, to September 4th, 1945? A. The highest concentration was .70 parts per million.

Q. On what day? A. It occurred in January, the 28th.

Q. At what time of the day? A. At 7.00 to 7.30 a.m.

Q. And what was the direction of the wind at that time? A. East wind.

Q. The wind was east? A. Yes, sir.

Q. Now, in the winter time, are the temperatures growing temperatures, — that is in the month of January, the 28th, 1945? A. No, sir.

Q. Are they temperatures that are conducive to injury by sulphur dioxide or are they not? A. Not conducive to injury by sulphur dioxide.

Q. And how does the humidity on January 28th, 1945, compare with conditions of humidity conducive to sulphur dioxide injury? A. At that time of the year, for outside plants the humidity is not of any great importance.

Q. So that you would not ordinarily, at that time of the year, expect injury from a concentration of .70 parts per million? A. No, sir.

Q. And how would those observations relate to plants inside the greenhouses, like Walker's greenhouses? A. One would expect that inside the greenhouses, the concentrations would be lower than the concentrations outside.

Q. Why? A. Because the greenhouse prevents the free circulation of outside air into it. If the ventilators are open at the time, there will be some air getting in, but it is generally recognized that concentrations in the greenhouse will be lower than outside concentrations.

Q. Then, can you tell me the total duration during your investigation in 1944 and 1945, of concentrations of sulphur dioxide higher than 25 parts per million? A. You mean .25 parts per million.

Q. I beg your pardon. Yes. .25 parts per million. There is quite a difference. A. I have tabulated to the total duration between December 1st, 1944, and March 31st, 1945, of concentrations at the .25 parts per million, and the total is 37 hours; of the period April 1st to August 31st, 1945, two hours.

Q. Did you, between the months of May to August, 1945, obtain any sulphur dioxide readings, higher than .25 parts per million? A. From April to August? Is that the question?

Q. Yes. A. Above .25 parts per million, during the month of April, the duration was 40 minutes and for May the duration above the .25 parts per million was one hour and 30 minutes.

Q. Now, just dealing with these two, first of all the 30 minutes in April. Was that a continuous fumigation, or was it not? A. That represents one reading.

Q. One continuous reading of 30 minutes? A. At the .25.

Q. And then, the duration in April, was that one continuous duration, or was it not? A. That may be made up of three separate 30 minute intervals. I would have to go into the detailed exhibit in order to say.

Q. Well, can you look at your detailed exhibit, 135, and tell us that? A. Yes. There is a duration of 30 minutes above .25 on May 7th, I believe. Sorry. Are we dealing with May?

Q. Yes, May? A. May 7th, at 6.30 to 7.00 a.m., a duration of 30 minutes at .30 parts per million.

Q. Then, how was the rest of the duration for May made up, the length of time, continuous? A. There was a duration of .38 parts per million for 30 minutes on the 25th of May.

Q. That is, an hour between those two; and then how was the rest of it made up? A. I see that .25 was counted in that column above .25, and that makes up the other 30 minutes on May 10th.

Q. So those are three durations that make up that total duration for the month of May? A. Yes, sir.

Q. Now then, were any readings higher than .25 per million found in the months of June and July, 1945? A. No, sir.

Q. And what reading or readings, if any, above .25 parts per million were there in the month of August, 1945? A. There was a reading of .60 on August 14th.

Q. For how long? A. For 15 minutes.

Q. Now, referring to this 1944 and 1945 concentrations and durations which you have just given me, could any injury be caused by any of those sulphur dioxide concentrations and durations to even the most sensitive species of plant, by fumigations of that character? A. I do not think so.

Q. Now, in the course of your investigation, did you have occasion to consider and inspect the smoke stack from the McKinnon power house boiler, located south of the test house? A. Yes, sir.

HIS LORDSHIP: Excuse me, the smoke stack from the power house boiler. That is something we have not heard much about.

MR. KEOGH: Yes. I just wanted to ask the witness, first of all — I don't suppose you have ever climbed to the top of it, but can you give us the approximate height of that smoke stack? A. I believe it is about 175 feet. I have been on the top of the roof.

Q. Well, I just wanted to get an approximation. We will get it exactly. You have seen it? A. Yes.

Q. And, having regard to that and the approximate height of it, does that enter into the picture at all as far as soot and smoke damage to Walker's premises are concerned, in your opinion? A. I think not. I think the stack is far too high.

Q. Far too high to affect this picture? A. Yes.

HIS LORDSHIP: How far is it from Walker's?

MR. KEOGH: My friend tells me it is about 600 feet.

Q. Would you agree with that? A. That is approximately the distance.

HIS LORDSHIP: You mean the smoke would not come down?

MR. KEOGH: Well, my friend says now I said it. Perhaps I did. We have a plan here, and it is shown on Exhibit 1 as being practically due south of the test houses with the word "stack" on it? A. Yes, sir.

Q. And a scale of this plan, Exhibit No. 1, is one inch to 50 feet, and if we take the most southerly greenhouse of Walker's, the No. 1 greenhouse, it is about 12½ inches — a little less than that, but that is approximately 12 times 50 would be 625 feet, approximately? A. Yes.

Q. South of Walker's most southerly, or No. 1 greenhouse? A. Yes, sir.

Q. That, you said, in your opinion, does not enter into the picture at all? A. No.

HIS LORDSHIP: I was wondering why do you say that? You said because it was so high? A. Your lordship, smoke when it issues from a stack will separate upwards and outwards and downwards in the form of a rough cone. Depending on the stack height and the point at which the smoke first reaches the ground, there will be some relationship between the stack height and the point at which the smoke would reach the ground.

HIS LORDSHIP: We have all seen these very humid days when the smoke will come down and almost drop down out of the chimney, directly. Have you never noticed that? A. Very, very rarely.

Q. You say that is rare? A. That is comparatively rare.

MR. SLAGHT: You find tons on your own roof.

HIS LORDSHIP: Well, never mind, Mr. Slaght.

Q. I am just wondering why you arrive at an expression of opinion in such an unqualified way with a stack 125 feet.

MR. KEOGH: I believe he said 175.

HIS LORDSHIP: Well, 175 feet high could not enter into the picture of depositing smoke and cinders on something 600 feet away, because it was too high. A. I meant to say that, most of the time it would not be possible for smoke from that stack to be deposited on the area adjacent to Walker's premises.

Q. Well, that is putting it a little differently? A. Yes.

MR. KEOGH: Now, you made certain investigations of dust and soot and soluble organic matter borne by the air in the same period, from November 25th, 1944, to the early part of September, 1945, did you, doctor? A. Yes, sir.

Q. Those were average determinations for comparatively long periods. I want to draw a distinction between the tests made under those conditions and our later tests which were over much shorter time intervals. But just, first of all, on the question of organic matter included in those early observations, would that include oily tar, and tar and smudge that has been spoken of here, from combustion? A. It would include any organic matter that was air borne in the form of fine mist, or fine droplets, or vapour.

Q. Some entries have been read out from Mr. Walker's diary and other entries filed, as this: "Smoke, gas and oil very bad to-day." What I am trying to get at is, from your tests of organic soluble matter, can you give us some help on the question? A. There will be in the tests carried out in 1946 and later years, because those tests relate to specific days and time intervals on those days, and they would help there.

Q. They are not much help, then, for 1944 and 1945? A. No, I don't think so. Those are average conditions.

Q. They were further apart. Then, do your tests for dust, in the period from June 1st to August 2nd, 1945, give us any help on the question of how the dust washing equipment in the cupola stacks was functioning? A. Not directly but, in other ways one can only do what I have done and compare the average dust conditions with the wind from the west and southwest, and the dust conditions with the wind from the opposite directions, or other directions when smoke —

Q. Well, just one question and we will leave this now. The period from June 1st to August 2nd, 1945, how did the dust in the air with the wind from the west and southwest, according to your measurements, compare with the dust in the air with the wind from other directions?

HIS LORDSHIP: Now, what exhibit are you referring to?

THE WITNESS: I am referring to an exhibit.

HIS LORDSHIP: Well, what is the number?

MR. KEOGH: Well, it is the last item on Exhibit No. 138, I believe, my lord.

HIS LORDSHIP: Yes.

THE WITNESS: The comparison indicates a slightly higher average with the wind from westerly and southwesterly directions.

Q. .16 and .15? A. Yes, sir.

Q. Respectively.

MR. KEOGH: Is a point very much? Is the difference between .15 and .16 very much in those calculations? A. No, sir.

Q. Then, I believe in 1945, you made — I do not think we have the record that you have, but I would like you to produce it. At least, I have never seen it, but you did make a chemical analysis of the dust that was coming out of — you made some chemical analysis of some dust, did you, in 1945? A. Yes, sir.

Q. Can you tell us what dust it was first, and then, secondly, what the composition of it was? A. The dust contents?

HIS LORDSHIP: Well, we want to know what dust it was, first.

THE WITNESS: This was dust collected in our dust bulb.

Q. Yes, with the wind in what direction? A. I have not stated definitely what the direction was here.

Q. Then, we do not know what dust it was? A. Except it was dust collected in our dust bulbs.

Q. All right. A. 30% combustible organic matter; 31% silica; 23% iron oxide; 40% lime; 1.5% alumina and trace of magnesium oxide.

HIS LORDSHIP: What is silica? A. Silica is found in sand, also found to a certain extent in ash of coal and quite widely distributed in the earth's crust.

Q. Would it come from the burning of coke? A. There is a certain amount of silica in the ash of coke.

Q. Would you get any from the fumes of oil? A. No, sir.

Q. Then, we will adjourn until 2.15 p.m.

——Whereupon Court adjourned until 2.15 p.m.

Tuesday, May 3rd, 1949, 2.15 p.m.

EXAMINATION-IN-CHIEF OF DR. KATZ CONTINUED BY MR. KEOGH:

MR. KEOGH: My lord, Dr. Katz told me during the noon hour that, on Exhibit 145, he wishes to correct one figure in the maximum concentration which is the monthly summary, Exhibit 145; that he discovered last night. The daily and the hourly tables are all right, but it was not carried over into monthly. In other words, it appears in 143 and 144, but it does not appear in 1945. The last figure in the September column of 145, which he instructs me instead of being 0.18, should be 0.40. There was one comparatively high reading during that month, which was overlooked in making up the monthly summary, Exhibit 145. I have spoken to my friend, Mr. Ferguson, about it, ,and perhaps we could have the witness mark it on Exhibit 145 in blue pencil.

HIS LORDSHIP: Which one?

MR. KEOGH: In the last figure, in the September column, 0.18 should, I am instructed, be 0.40. Will you mark that in blue pencil, doctor? A. Yes.

MR. KEOGH: Thank you.

Q. Now then, doctor, on or about June 7th, 1945, did you pay a visit to the greenhouses of Mr. Walker in this action? A. Yes, sir.

Q. And were you accompanied on that visit by any one else? A. Mr. Palmer and Dr. Ledingham.

Q. And did you examine the glass on the Walker greenhouses at that time? A. Yes, sir.

Q. And what was the appearance of it, that you saw as far as soot and ash and dirt are concerned? That is all I am interested in. A. There was some deposit on the glass, but it

was not sufficient to cause any concern, as far as I saw — as far as I could see.

Q. And were you in all the greenhouses that day? Were you in all of Mr. Walker's greenhousese that day, the seven of them, or in more than one, or what? A. I was in the large greenhouse, the north greenhouse, and some of the others. I do not recall whether I was in every one, but I was in the large one and also some of the others.

Q. That large one has been referred to in the evidence as No. 1 on Exhibit 1? A. Yes.

Q. And having regard to the proximity of the city of St. Catharines, is there anything else you can say about the soot and dirt on this greenhouse glass at the time you saw it? A. I would say that the condition was not unusual for a greenhouse situated in an industrial and manufacturing area like St. Catharines.

Q. Then, in the growing season. which I take it to mean from the 1st of May to the 1st of November, 1945, did you make any inspections of vegetation in the vicinity of the McKinnon Industries plant? A. Yes, sir.

Q. When did you make those visits and what for, and with what results? A. I made inspections on May 9th to the 10th inclusive; June 5th to the 7th inclusive; July 31st, August 29th to 31st.

Q. And what were you looking for when you made those inspections, if anything? A. I was endeavouring to find symptoms of sulphur dioxide injury on the native vegetation.

Q. And what were the plants and other vegetation which you inspected in the course of those inspections? A. Various grasses, sweet clover, red and white clover, susceptible weeds, garden crops, such as potatoes, carrots, lettuce, tomato, rhubarb and many flowers and ferns, as well as some varieties of trees and shrubs.

Q. Now, on any of those inspections, did you find symptoms of sulphur dioxide injury? A. I could not find any of the characteristic symptoms of sulphur dioxide injury on any of these species examined.

Q. And among the names that you mentioned, are any of them susceptible or comparatively unsusceptible to sulphur dioxide? A. Most of them are quite susceptible to sulphur dioxide.

Q. Then, did you make any inspection of flower beds on the McKinnon property in that growing season? A. Yes, sir.

Q. What flower beds on the McKinnon property did you inspect, and when, and with what result? A. I inspected the beds adjacent to the McKinnon Industries' power plant, foundry and forge shop.

Q. Are you speaking now of three different beds, or one bed? A. Three different beds.

Q. Three different beds adjacent to those buildings? A. Yes, sir.

Q. And take, for instance, the bed adjacent to the forge shop. Where would that be with reference to the forge shop and Mr. Walker's premises? A. Well, the bed was on the forge shop premises. It was not far from the butain tanks.

Q. That is between the forge shop and Ontario Street? A. Yes, sir.

Q. And if you drew a line from the forge shop to Mr. Walker's premises, would that line pass over or through some portion of that flower bed? A. I believe that it is directly west of the Walker property; maybe a little bit north of it, but not very much.

Q. Then, the other two beds, one of them you said adjacent to the McKinnon foundry; on which side of Ontario Street is that bed located? A. That is a small bed on Ontario Street. That was on the west side of Ontario Street; the same side as the foundry is located.

Q. And, if you drew a line from the foundry to the Walker greenhouses, take the most southerly Walker greenhouse for the sake of being definite, would that line pass over that flower bed, or would it not? A. A line in what direction, sir?

Q. From the foundry to the southerly Walker greenhouse No. 1, on Exhibit 1? A. This particular bed is right close to the foundry.

Q. This blue one I am talking about, No. 1 greenhouse on Exhibit 1? A. Yes. It would be approximately in that direction, although it is a little to the south of the main part of the foundry.

Q. I see. It is south of Carlton Street, this bed you are talking about, and on the west side of Ontario Street? A. Yes, sir.

Q. And then did you also inspect the flower bed on the McKinnon property in the vicinity of the forge shop, or have we covered that? A. You mean the power plant? Is that what you mean?

Q. Oh, yes, the power plant, I should say. Yes, I beg pardon. A. Yes, sir.

Q. And the power plant is on the east side of Ontario, under the chimney, the location of which you gave his lordship this morning? A. Yes, sir.

Q. And —

HIS LORDSHIP: Is that where the stack appears on the plan?

MR. KEOGH: Yes, that is where the word "stack" appears on Exhibit 1. Well, it is south, but the flower bed is where, with relation to the stack and the power house? A. The flower bed was a little to the west of that stack.

Q. It is at the front of the power house building, isn't it? A. Yes, sir, and it was directly across Ontario Street from the

foundry.

Q. Yes, on the east side of Ontario, about 600 feet south of Carlton, in front of the front end of the power house building, from the rear end of which this large stack runs? A. Yes, sir.

Q. It is a little back in from Ontario Street, this power house plot? A. Yes.

Q. But it is not on Pleasant Avenue, or anything like that, as my friend suggests? A. Oh, no, sir.

Q. And will you tell us, first of all, what flowers were in the two beds at the foundry, the butain tank — I beg pardon — at the forge shop, the butain tank and at the foundry plot? A. The flowers were principally gladioli.

Q. And what flowers were in the power plant bed? A. They were the same, principally.

Q. Principally gladioli in all three beds? A. Yes.

Q. And did you tell us when you inspected those? I don't think you did. A. I gave the dates on which I made the inspections earlier. I read out the dates and during those dates —

Q. On the dates already mentioned? A. Yes, sir.

Q. And then, what was the condition of those gladioli and the other flowers? A. In these three plots?

Q. Yes, when you inspected them? A. They were in good condition.

Q. Were there any marks on any of them of sulphur dioxide injury? A. No, sir.

Q. Were there any marks on any of them of soot, or iron oxide, dust, or other injury from organic matter?

HIS LORDSHIP: Well, you are putting two things together there. Just one at a time.

MR. KEOGH: Yes. Were there any marks on them of soot injury? A. The flowers were clean as far as I could see.

Q. And were there any marks on them from injury from iron oxide, dust in the air? A. No, sir.

Q. And were there any marks on these flowers in these three plots from oil, or tarry vapour in the air? A. No, sir.

Q. That is 1945 on the dates that you mentioned a few minutes ago. Then, what was the situation of the flower beds that you have just mentioned, at the foundry and the forge shop with reference to the exposure to oil burning and core oven operations in the McKinnon plant? A. I would say that with the possible exception of a bed near the foundry, which was to a certain extent sheltered by the wall of the building, that the other plants in the other two plots were exposed to those conditions.

Q. Now then, going back to the 7th of June, when you told us you made an inspection of Mr. Walker's greenhouses, what plants did you see in his greenhouse or greenhouses, and what

were you looking for, and what was their condition? A. I saw orchids, carnations, begonias and other flowering plants in good condition. I was not in the greenhouse very long and therefore I could not make a very detailed examination.

Q. Were you there long enough to enable you to see whether or not there were any evidences of injury to any of them, from sulphur dioxide? A. I didn't think that there was any evidence of injury from sulphur dioxide.

HIS LORDSHIP: That is not the question you were asked.

MR. KEOGH: Q. Were you there long enough to enable you to see whether or not there was injury on any of them from sulphur dioxide? A. I was there long enough to see; if the symptoms had been substantial, I would have seen them.

Q. And did you see any such symptoms of injury from sulphur dioxide on any of these plants in Mr. Walker's greenhouse? A. No, sir.

Q. After visiting his greenhouse on June 7th, 1945, did you then make an inspection or examination of plants growing outside on Mr. Walker's property? A. Yes, sir. I saw a number of lillies of the valley in cold frames — in one of the cold frames.

Q. And what was their condition? A. The tips of the leaves on nearly every plant were discoloured.

Q. Did you see anything that indicated the reason for that? A. My opinion was that the covering on the cold frame had been retained too long, with the result that the tips of the leaves were injured by mechanical contact.

Q. With the glass forming the upper part of the cold frame — A. Yes, sir.

Q. Did you see any dahlias growing in and outside the greenhouse on Mr. Walker's premises? A. Yes, sir, as well as petunias.

Q. And are dahlias susceptible or not susceptible to sulphur dioxide injury? A. Very susceptible.

Q. How does their susceptibility compare with the susceptibility of the lillies of the valley? A. The dahlias are much more susceptible to sulphur dioxide.

Q. And did you examine the dahlias in order to determine whether or not they showed any signs of sulphur dioxide injury? A. They were in excellent condition.

Q. What about the petunias? A. The peteunias as well.

Q. Then, did you see some gladioli which was growing then in an outside plot of Mr. Walker's premises? A. Yes, sir.

Q. Where was that plot located with reference to the No. 1 greenhouse shown on Exhibit 1, and which is the most southerly greenhouse? A. Growing in front of this greenhouse.

Q. You are indicating that this gladioli plot was in front of this — immediately south of No. 1 greenhouse on Exhibit No.

1? A. Yes, sir.

Q. And what, if anything, did you observe about this gladioli? A. There were some reddish brown discolourations on the leaves, but these markings presented an appearance that was entirely different from that typical of sulphur dioxide injury.

Q. By the way, this may be a convenient point to mention briefly, what is the usual appearance of sulphur dioxide injury on growing plants and particularly on gladioli? A. On most growing plants, the symptoms appear either between the veins, that is they are intercostal, or they appear on the margins of the leaves, or you can get both types of discolourations.

Q. Just a moment. It may be of interest. For instance, the witness has some specimens of gladioli collected by him at Sudbury, damaged by sulphur dioxide, which I would like to tender in evidence at this stage, to explain his description. They are not, of course, evidence otherwise, your lordship. They are in a glass case and mounted. .

MR. SLAGHT: Well, my lord, I object to this on the ground that my friend may comment these were damaged by sulphur dioxide. That is not good enough, in my submission.

MR. KEOGH: Well, I will ask the witness what is in this parcel which you handed to me this morning? A. Samples of leaves of gladioli which I collected in 1945, in the Sudbury area.

Q. How close to the smelters at Copper Cliff did you collect them? A. I collected them within a short distance of the International Nickel Company's smelter at Copper Cliff.

Q. What do you mean by a short distance? A. I mean within the little town of Copper Cliff in one of the gardens.

Q. Within a mile or two of the smelters? A. Within about that distance; within about a mile of the smelter.

MR. SLAGHT: Well, I would like my friend to ask the question — I know Copper Cliff and the smelter is quite some distance out in the town. You are suggesting about a mile. Let the witness tell his story.

MR. KEOGH: Well, don't take my suggestion. You say what the distance is.

THE WITNESS: The distance of the smelter from Copper Cliff is about a mile or so. May perhaps be a little over, but the smelter is situated just outside the town of Copper Cliff.

Q. And within what distance of the smelter did you collect these specimens in this parcel? A. Within about one to two miles.

Q. And you collected them personally? A. Yes, sir.

Q. And you made up and mounted the contents of that parcel personally, did you? A. Yes, sir.

Q. And are you identifying that as being specimens of being any particular kind of damage? A. I am identifying these as being specimens of sulphur dioxide injury to gladioli collected

in Sudbury on September of 1945, in the Sudbury district, within the town of Copper Cliff.

HIS LORDSHIP: Did you have anything particularly in mind when you were collecting these? A. I wanted what the authentic symptoms of sulphur dioxide were on gladioli.

Q. Did you not know at that time what the authentic symptoms were? A. I knew what they were but —

Q. But you just told me a moment ago you did not? A. I knew generally what they were, but in view of the discolourations I had seen in this area, I wanted to get some authentic specimens to refresh my memory.

Q. Well, what do you mean by that, now? You see, you had been called in on this difficulty here? A. Yes, sir.

Q. And were you not familiar with and were you not in a position to identify at that time sulphur dioxide burns? A. I felt that I was in a position to do so, but I wanted to be absolutely sure.

Q. Well, you were not confident in your own judgment, then? A. I was not positively certain. I wanted to be sure beyond a reasonable doubt.

Q. Then you went to Sudbury to collect gladioli there? A. Yes, sir.

Q. And were you having in mind a threatened lawsuit at that time? A. I had in mind the fact that I had been called in to investigate this condition and the possibility that I would have to establish definitely what sulphur dioxide injury is to gladiolus.

Q. That is, that you would have to give evidence in a lawsuit? A. I thought that there was that possibility.

Q. Well, how is it that you know these are authentic symptoms — A. Because —

Q. If you were not sure until you went there? A. Because I was reasonably sure but, as I said before, I wanted to remove any possible doubt from my mind.

HIS LORDSHIP: Well, I will receive them. We have the explanation.

——EXHIBIT No. 168: Gladioli leaves in glass case obtained by Katz in Sudbury district, September, 1945.

MR. KEOGH: Q. I think it might assist, your lordship, if your lordship wished to follow this and the witness's explanation. He told me about the reddish brown discolouration on Walker's gladioli and you said that they were not indicative of sulphur dioxide injury, and then you started to describe what would be the appearance of sulphur dioxide injury on gladioli, and then I interrupted you in putting in a specimen which I thought might be of assistance to his lordship in following your description. Well, now, give us a detailed description of the characteristic sulphur dioxide markings on the gladioli leaves. A. The characteristic

markings are a light straw-coloured bleach, and there are islands or areas of green tissue present between the areas, or adjacent to the areas where the leaf is affected. There is also a great shrinkage of the affected tissue, so that you have the effect of a thinness of the foliage along the areas that have been affected by sulphur dioxide, whereas the other parts of the leaf are very much thicker.

Q. And then, those islands that you speak of, have they any relation to the veins or the margin of the leaf? A. These green islands are generally found between the areas that have been damaged by sulphur dioxide. One of the outstanding characteristics is the colour of the markings, a straw colour, or a pale bleach.

Q. And I am not sure whether I got an answer or not, have these markings any definite relation to the veins of the leaf, or have they not? A. They generally run between the veins.

HIS LORDSHIP: What do you mean by that now? You say they run between the veins? A. Yes, sir.

Q. Well, what do you mean by that? A. The veins of the leaf. I think they may be seen distinctly. The lines of the leaf where the plant sap is conducted to the tissue.

Q. That is, a sort of ribs that run up and down? A. Yes, sir.

Q. And what is it that runs between those? A. The injured areas and also the uninjured areas which lie among those veins.

Q. Take this first one on the left-hand side. The injured area does not run between the veins there, does it? A. You have in this case, you have a complete bleach here, but you have uninjured areas here.

Q. At the base, but there is an area which is a complete bleach down one side? A. But is also without any injured areas here — relatively uninjured, and the same thing you find here.

MR. SLAGHT: Why don't you answer his lordship's question? He asked you, "It did not run between the veins."

HIS LORDSHIP: You said it generally runs between the veins. Yes, Mr. Slaght, you will have an opportunity. I don't want any interruption.

THE WITNESS: Yes, sir.

HIS LORDSHIP: Are you an expert on SO2 bleach? A. I have studied it for a considerable number of years.

Q. You regard yourself as one? A. Yes.

MR. KEOGH: Q. Did you receive from Mr. Cook, on or about the 18th of June, 1945, certain specimens of gladioli plants? A. What date was that, Mr. Keogh?

Q. On or about the 18th of June, 1945? A. Yes, sir.

Q. You cannot say what Mr. Cook told you as to where they came from, but you received them. And what was your diagnosis of the markings appearing on them? A. My diagnosis was that the markings were quite different from sulphur dioxide — authentic sulphur dioxide injury.

Q. And were you able to tell what the markings on those plants showed, or were you not? A. Yes, I was.

Q. What were they indicative of? A. I think I misled you there. What I meant to say was, I was able to say, or to satisfy myself, that they were not symptoms of sulphur dioxide.

Q. Yes. Now, I want to know if you can take it any further and say what they were, or could you not? A. Well, I had a faint suspicion, but I do not think I would like to go into that.

Q. Well, if you don't know, just say you don't know. A. Yes.

HIS LORDSHIP: Now, just a question I want to clear up, appropos of what I was discussing with you before. That was on the 18th of June, 1945, but you went to Sudbury in September, 1945, in order to satisfy yourself that you could be sure of your diagnosis of sulphur dioxide. What is your explanation now, speaking with assurance about in June, when you were not sure in September? A. The markings did not look like sulphur dioxide injury.

Q. Yes, but what I am asking you is, what is your explanation that you speak with so much assurance now of your diagnosis in June, when you were not sure in September and you went to Sudbury for the purpose of making a further study of it? A. I wanted to remove any reasonable doubt.

Q. You did not keep those samples that were shown to you in June? A. No, sir, I did not.

MR. KEOGH: Q. Then, what general observations can you give us regarding the reported concentrations of sulphur dioxide in the months of September, October and November, 1945? A. In September, the maximum concentration during the month was .56 parts per million.

HIS LORDSHIP: Excuse me. You are dealing with an exhibit number?

MR. KEOGH: September, 1945.

HIS LORDSHIP: I think I have it here. 139, is it not? What date was that in September, doctor? A. September 15th.

HIS LORDSHIP: Yes, I have it. It is 139 is the one I want. That is a concentration for 15 minutes, doctor? A. Yes, sir.

Q. And from 4.00 o'clock to 4.45 it was zero, and then for 15 minutes we have a concentration of .56, and then at 5.00 o'clock till 9.00 o'clock at zero. What would be the reason for a sudden concentration that lasted for 15 minutes? A. That would be

due to unusual conditions, meteorological conditions. It is difficult to explain it. I notice that the wind velocity was 13 miles per hour and it occurred at 4.45 to 5.00 a.m.

Q. Yes. That is in the morning? A. Yes.

Q. That is a.m.? A. Yes; 4.45 to 5.00 a.m. I would say that that represents a gust of smoke that was blown from somewhere, but I do not think I could pin it down to any particular plant or any particular operation.

Q. Well, do you know of any other operations, except the McKinnon Industries, that could produce a gust of smoke that would raise the concentration so intensely, in that area? A. I don't know. There are other plants in the area, too; very similar plants.

Q. Yes, but are they producing sulphur dioxide in any quantities, do you know? If you don't know, say so. Don't be ashamed to say you don't know, doctor. A. No, sir, I don't know.

Q. Then, I ask you this. Did you know at any time the quantity of sulphur dioxide being emitted from the stacks of the McKinnon Industries? A. I didn't know until quite late in the investigation.

Q. Well, tell me, when you say "quite late," tell me when? A. I had made some calculations of my own, but I really did not know the exact concentration until the data was presented here.

Q. In Court? A. Yes, sir.

Q. So that you did not know until we had this table presented in Court, the amount of sulphur dioxide that was being emitted at any time from the McKinnon Industries? A. Generally that is true. I had no idea of the quantitative amount.

Q. Well, why didn't you try to find that out? A. Well, I did try in my first report. I made an estimate of the probable amount of sulphur dioxide that would be emitted in my first report.

Q. Well, you are making a calculation on that by the instruments which were on the premises. We have had evidence of that, and we have a table, I think the first was in 1945, and they had got the instrument for the purpose of measuring it, and did you know they had instruments that would measure it? A. I suspected that they had.

Q. But did you know it? A. I did not know that they had.

Q. Well, why did you suspect? If you suspected it, why didn't you ask it to be used? A. What I mean to say is that any laboratory would be equipped to do that.

Q. Then, you mentioned that they would have an instrument and you could have measured the amount of sulphur dioxide that was being emitted into the air daily, if you wished? A. My

problem was to find a concentration on the ground and I was aware of the water-wash system that had been installed, and I therefore assumed that the concentration emitted from the cupolas would be quite low.

Q. Well, what did you assume it would be? A. I assumed that it would be relatively insignificant.

Q. What did you assume it would be? A. I cannot give the exact figure.

Q. Well, if you are making an estimation, I would have thought — you are a scientific man, and you are giving me opinions based on scientific investigations. I am just testing for the moment, the thoroughness with which you did your job. It is one thing to prepare a lot of material for presentation to put the best side on a case. Now, I am not saying you did that. I say it is one thing to do it; it is another thing to make a thorough investigation to get at the facts of the matter in a scientific way. I want to know what you assumed would be the amount of sulphur dioxide that would be emitted from the cupolas when you were making your assumption. It would be very low because you go on from there and give opinions. You have given an opinion about where the smell came from, that it came from Thorold, and I want to see just how much weight I can give to your opinions, because I have to weigh them against the opinions of others, and you might think I am being unfair to you, but I am just getting at the bottom of things, if I can. A. Well, I will say this. My experience with stacks involving damage has been that the concentrations were of the order of from a tenth of a percent. and higher.

MR. KEOGH: Q. Will you translate it into parts per million? A. I would say a tenth of a percent. represents a thousandth part per million.

HIS LORDSHIP: You mean you had not had any experience with amounts of lesser amounts than that, from stacks? A. My experience of emissions of lesser amounts than that have been negligible from the standpoint of their effect on plant life. Now, I admit that these stacks I am dealing with were higher than the cupola stacks; nevertheless, the problem presented to me with the water-wash equipment installed was that it was incidentally unlikely that high concentrations of stack gas could be emitted from the cupolas.

Q. Well, then, you were starting out your investigations on the premises that there could be no injury come from the cupolas? A. No. I did not make any assumptions. I started out with an investigation of sulphur dioxide conditions before the water-wash system was put in and I followed on the readings of sulphur dioxide and, in the meantime, I was told the water-wash system was being installed. In about the end of April, I saw the installation and I continued with the sulphur dioxide readings.

Q. You were continuing with your readings, in your mechanical readings, but what I am getting at is that at any rate you were never asked by McKinnon's to make an investigation to see how much sulphur dioxide was being put into the air? A. No, sir.

Q. You were not asked to do that? A. No, sir, I was not asked to do that, and I did not think that I could do that.

Q. Well, why shouldn't you do it if they were putting no amount into the air that would do any one injury? You would have a record of it and a scientific opinion could be brought to bear on the fact? But I am saying, why was it not a matter of great importance as to the amount of sulphur dioxide that was being emitted into the air? A. I considered it more important to find out how much sulphur dioxide was actually present on the ground than the concentrations that might be inside the stack. Having satisfied myself in the first place that the concentrations could not be very high, from my observations of what the company was doing.

Q. Now there is one thing that is involved, and that is a disagreeable smell. Now, you voiced the opinion that the disagreeable smell comes from Thorold and are giving the McKinnons a clean bill of health on that. You did that without knowing the amount of sulphur dioxide that comes out of the cupola? A. I base my opinion on what is coming from Merritton because of the wind direction and concentrations of SO2 associated with that odour.

Q. Well, would it not be an important thing, before you would make up your mind how much would come out of the McKinnon stacks? I may be entirely wrong on it, but it seems to me that, approaching the matter from the point of view of trying to find out the effects, regardless of whom they might hurt, that would be important. A. As a matter of fact, there are other sources of smoke involved as well as the cupola stacks. I mean there is a forge shop, for instance.

Q. Yes? A. And there is also the question of smoke from the power house and, considering all that, I thought that an investigation of the concentration in the cupola stacks. was desirable, was not actually essential to this investigation.

Q. You think it is of no value to me to know to what extent they are emitting sulphur dioxide, whether the water-screening is operating efficiently or not? What is the water-screen there for? A. It is to operate but, in my opinion, a thing of that kind is the business of the company in the first place.

Q. No, but it may be — I am just getting at the scientific approach to the investigation. If the water-screen was not there, I would take it that one would strongly suspect, anyway, that there might be sulphur dioxide burning. Would that be fair? A. Provided the concentrations on the ground were high enough.

We cannot assume because smoke is being discharged from a stack that sulphur dioxide injury necessarily follows, otherwise, you would have wholesale devastation and destruction everywhere, and that is not so.

Q. Now, doctor, I am not talking about smoke in its ordinary sense; I am talking about some of the fumes that are discharged from the cupolas and, if those fumes were being discharged without a water-screen, might we assume that there would be danger of sulphur dioxide burning? A. There might have been the danger.

Q. There might have been the danger of sulphur dioxide burning? A. Yes, sir.

Q. Then, if the water-screen was not operating efficiently, there still might be danger of sulphur dioxide burning? A. I would say —

Q. Am I wrong in that? A. I would say that the hazard, if any, would be very much less and it would still have to be related to the ground concentrations of sulphur dioxide. I would like to put it this way; that the concentration of gas in a stack and its relation to the concentration at ground level anywhere, depends on the inverse square of the distance roughly of the mass rate of emission of sulphur, on the wind velocity, on the rate of the mixing, or the ready diffusion and the lapse rate or temperature gradient. Now merely to give a concentration at the top of a stack is actually a very small part of the story and had I gone into the thing, I would have had to carry on a comprehensive investigation, confine my energies and a large staff only to that, and I just could not do it, and I therefore did what I could do, and that would be the most scientific approach to this problem.

Q. Did it ever occur to you that you had to measure the emission of sulphur dioxide from the cupolas? A. I would say that at times it probably did occur to me. I thought of the matter quite often, but I was always confronted with this fact that, after all, the ground concentrations are the important things, and we had established a test house close enough to the Walker property. In fact, at one time we wanted to put it on his property, and therefore we thought that, having regard to the conditions in this area, if we showed what the level of the concentration was continuously under all kinds of weather conditions, that that would help the problem.

Q. Well, that is one way of approaching it, but the whole problem that you were concerned with was whether Walker was suffering from sulphur dioxide fumes coming from the McKinnon Industries. That is the real problem we are concerned with now? A. Yes, sir.

Q. And I would have thought that the proper place to start, in the first place, was to know what fumes were being emitted, if there were none being emitted, or if they were inconsequential on

measurements it would be a fine start, but to start on a calculation on the ground, that is only doing half the job? A. But if I had started the other way, your lordship, I would still have had to do this.

Q. Oh, probably you would. A. In the investigation, because I could not assume that because the concentrations I have measured in the stack were of a certain level, that therefore the concentrations at the ground were too low.

Q. And there may be a wide difference of expert opinion as to the effect of these things. We have already had wide differences of opinion between you and some of the other experts, and it is just a question of getting the factual basis on which one can judge. But, however, it was not done and we have what we have. You did not know anything about the readings they took until you heard them in Court? A. Until I heard them in Court.

Q. I see. Well, Mr. Keogh, I was just giving you a rest.

MR. SLAGHT: Would your lordship permit me to make a suggestion? The point that raised all this discussion is on Exhibit 139, on the first page, September 15th, 4.45-5.00 a.m., .56, and for the record, the witness did not tell the Court which way the wind was that day. If I might bespeak your lordship's indulgence to ask him for the record?

HIS LORDSHIP: Southwest and west. That is correct, is it not?

THE WITNESS: Yes, that is correct; west and southwest as indicated here.

MR. SLAGHT: That is all. I thank your lordship.

MR. KEOGH: Q. After all, you were concerned with the injury to the plants on the ground, were you not? A. Yes, sir, I was concerned —

Q. Now, just a minute, and if you have 20 parts per million of sulphur dioxide coming out of the top of a stack, is that any indication of how much sulphur dioxide gas you are going to find in the air on the ground? A. No, sir, none whatever.

Q. Well, what part does diffusion play the minute that gas leaves the top of the stack? A. As I have indicated already, depending on the meteorological conditions, such as the wind velocity, the temperature, and the rate of mixing of the gas, of the stack gas with air, that that concentration can be diluted so rapidly that it might not be capable of being measured on the ground, except as a trace. On the other hand it may be a higher concentration.

Q. Now, you took specimens of sulphur dioxide injury in September of 1945? A. Yes, sir.

Q. Do you know the emissions of stack gas of sulphur dioxide from the smelter at Copper Cliff, at that time? A. I have —

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Defendant's Evidence
Dr. Morris Katz
Examination-in-Chief
3rd May, 1949
Continued

MR. SLAGHT: No. May I say this, my lord, before the witness answers, he is asked if he knows. I would like him to note that question and not say what somebody might or might not have told him.

MR. KEOGH: Yes. I did not want any hearsay. I just want to know if you know the general run of the gas at that time in Sudbury.

HIS LORDSHIP: I do not think I am going to go into that. These samples were taken of smelters a mile or a mile and a half away. I do not think a mile or a mile and a half makes any difference in the diffusion of sulphur dioxide gas in the air.

THE WITNESS: I said that it did. It also depends on the mass rate of emission of the quantity released.

MR. KEOGH: I just wanted to clear up one point and I will leave this. If your experience where you have had injury from sulphur dioxide on plants, what has been the order of parts per million of emissions of sulphur dioxide from the tops of the stacks?

MR. SLAGHT: Now, Mr. Keogh, let me interrupt. The witness has told you he has not had any experience whatever down here.

MR. KEOGH: Oh, yes, he has.

MR. SLAGHT: Just a moment, with anything under a thousandth part, until he starts in for this. When you are asking for his experience, I think you ought to, in view of that answer from him, add his experience of injuries of a thousandth parts or more.

HIS LORDSHIP: I will allow the question. I do not want to spend a great deal of time on it.

MR. KEOGH: All right. What has been the order of concentrations from the stack, in your experience, where you have found sulphur dioxide injury on plants on the ground? A. The concentrations have run from a tenth of a percent. up to several percent. In other words, from a thousand parts per million up to fifty times that much.

Q. Now, getting back to your readings in 1945, you have mentioned this one reading of .56 in September, at a certain date in September. What was the next highest reading during the month of September. 1945? A. The next highest reading was .21 parts per million.

HIS LORDSHIP: What date is that? A. That is on September 14th.

MR. KEOGH: And my friend might ask what was the wind. A. September 14th it was east until 6.00 o'clock and then it changed at 6.00 a.m. to southwest.

Q. But, I mean, at the time of this reading of .21 parts?

MR. SLAGHT: It is 5.30 to 6.00.

THE WITNESS: It was apparently east at 5.30 to 6.00 o'clock.

HIS LORDSHIP: Of course, the wind from 6.00 until midnight, it was southwest? A. Yes, sir.

MR. KEOGH: Q. Then, how did the sulphur dioxide readings in the month of October, 1945, compare with those in September, 1945? A. In October of 1945, the maximum reading was .22 parts per million.

HIS LORDSHIP: On what date? A. The date was the 16th of October.

MR. KEOGH: Q. And what was the duration of that? A. 45 minutes.

Q. And, apart from that reading of December 22nd —

MR. SLAGHT: Do you mind asking him the wind?

MR. KEOGH: Yes. The wind at the time of that reading of .22 parts per million? A. Southwest.

Q. Then, apart from that reading of .22 parts per million, how did the other readings in the month of October, 1945, compare generally with those in the month of September, 1945? A. The concentrations between .16 and 0.25 parts per million were higher — not zero — I was looking at the wrong month. The total in October, '45, the total duration of the sulphur dioxide was very much higher in October.

Q. Very much higher in October than in September? A. Yes, sir.

Q. And to what do you attribute that increase? A. I would attribute that increase to the fact that at that time of the year there is an increase in the use of fuel in this whole area, apart from — that is, in addition to the McKinnon Industries.

Q. For what purpose? A. For heating purposes and for manufacturing operations.

HIS LORDSHIP: Now, you say the total, again we are dealing with, I take it, you mean when you add it all up as the concentrations at the end of the month show more parts per thousand. What about the concentrations at any one time? A. We begin to get a very much longer duration of low concentrations up to December, .04 parts per million, and, coupled with that, a longer duration of readings between .05 and 0.10 parts per million and, to a certain extent, a longer duration between .11 and .15 parts per million.

Q. Yes. I see.

MR. KEOGH: How did the months of November compare in that respect? A. It is not very much different in the operation of concentrations from .05 to .10 and higher, but there is an increase in duration, a considerable increase in the duration of the concentration of trends, to .04. I would say that the trend was being continued. I think if this were put on a percentage basis, one would say the increase is the total duration of SO2 readings—

Q. Of low or higher readings? A. Of the readings below .25 parts per million.

Q. And you say that trend continued in November? A. Yes, sir.

Q. And I believe you discontinued your recordings — I have not got a copy of that table —

HIS LORDSHIP: On the 29th November.

MR. KEOGH: On the 29th November, 1945. Is that right? A. Yes, sir.

Q. Then, we have gone over now the results of your procedure for the year 1945. And what was your conclusion at the end of the year as to the source of whatever sulphur dioxide there was in the atmosphere during that period?

HIS LORDSHIP: No.

MR. KEOGH: I change the word "conclusion" to "opinion," my lord, in giving his evidence.

HIS LORDSHIP: No. That is not a scientific opinion. That is an opinion on facts.

MR. KEOGH: I see. Well, I suppose the readings speak for themselves.

Q. Then, in the latter part of 1945, to be exact about the 28th of December, 1945, did you prepare a report on organic vapours and tar fog in the vicinity of the McKinnon Industries Limited?

HIS LORDSHIP: Well, we will have our intermission now for ten minutes.

——(Intermission.)

——On resuming:

MR. KEOGH: Well, then, doctor, I was going to ask you some question about Exhibit 142, which is a table that you prepared covering the period from October 5th to December 18th, 1945, as a result of certain tests which you made. It is headed, "Organic vapours and tar fog." Have you a copy of that in your records? A. Yes, sir.

Q. Well then, first of all. tell us the procedure —

MR. SLAGHT: Excuse me, what exhibit is that?

MR. KEOGH: Exhibit 142. Will you tell us first of all the chemical procedure which you went through to reach the results shown in that table? A. The air, in measured volumes, was pumped through filters packed with fine cotton wool, then passed through especially activated silica gel and finally through another plug of cotton wool. The absorbed and trapped material was extracted with carbon bi-sulphite filtered, and the filtrate and washings evaporated on a water bath. The residue was dried to a constant weight and the concentration determined. I have already mentioned that this is essentially a soluble organic matter and in 1946 we changed over to ether instead of carbon bi-sulphite.

Q. And this is in comparison to the prevailing winds, as I understand it? A. Yes, sir.

Q. You have a copy there of Exhibit 142? A. I have.

Q. Well, can you tell us briefly what this table, 142, shows? A. The values show the average amassed concentrations in milligrams per cubic metre with the wind from the southwest and west direction in comparison with winds from other directions. Unfortunately, the test period is not sufficiently prolonged to give a complete story and merely indicates a preliminary investigation, more complete data being available in the later exhibits.

Q. I see. Then, we will go to the year 1946. You continued your investigations from May 2nd to the end of October in that year, did you? A. Yes, sir.

Q. And the tables in connection with that and the readings have already been filed. Was the same equipment and procedure used in that year as in the previous year? A. For sulphur dioxide, yes.

MR. SLAGHT: What exhibit is he talking about, please?

MR. KEOGH: I have not referred to any exhibit yet.

MR. SLAGHT: Well, you said "has already been filed."

HIS LORDSHIP: Exhibit 143.

MR. KEOGH: Q. And was there any change in the dust measurement procedure? A. Yes. The procedure for dust was changed according to the method that I have already described in earlier evidence.

Q. That is, about the filter paper and the lucite tube of silica gel which you have already described? A. Yes, sir.

Q. Then, how did the sulphur dioxide readings in and during the 1946 growing season compare with those found in the previous comparable period from 1945? A. During the 1946 growing season we had a greater duration of low concentrations of trace readings to .04 parts per million, compared with the comparable months in 1945.

Q. And what was the highest — I beg pardon. Did I interrupt you? A. No, sir.

Q. What was the highest sulphur dioxide concentration which you found in 1946? A. .69 parts per million.

Q. And when did that occur? A. That occurred in the month of August, 1946, and the duration was ten minutes.

Q. What was the date, please, doctor? A. August 15th.

Q. And the time of the day? A. I will have that in a moment.

MR. SLAGHT: Would you mind giving us the wind when you give us the time?

MR. KEOGH: Yes.

THE WITNESS: It occurred at 30 minutes after midnight to 40 minutes after midnight on the 15th, and the wind was south.

MR. SLAGHT: Velocity?

THE WITNESS: Six miles per hour.

MR. KEOGH: Q. Then, with the exception of that maximum concentration, what was the highest reading in each month during the 1946 period of your test, or I should have put it this way. Below what figure were the highest readings in the other months of the 1946 test period? A. I will give you the maximum readings, if you like, in each month. In September, the maximum reading was .04 parts per million and in October .24 parts per million.

HIS LORDSHIP: Is that September 23rd, the rate was .40? A. Yes, September 23rd, .40.

Q. And did you say October? A. October, on the 14th of October, .24.

MR. KEOGH: Q. Then, throughout the whole period of the 1946 test period, what was the total length of time of sulphur dioxide readings above .25 parts per million? A. The total was one hour.

Q. And what was the total of sulphur dioxide readings during the same period above .15 parts per million? A. May I have the exhibit, please?

HIS LORDSHIP: What was that question, Mr. Keogh?

MR. KEOGH: Throughout the whole of the same test period, what was the total number of hours duration of sulphur dioxide readings above .15 parts per million? A. May I have the exhibit you are looking at?

Q. Well, I am looking at your report, which is not an exhibit.

MR. SLAGHT: Here is the exhibit. He can have mine.

HIS LORDSHIP: These are calculations, doctor, as made from Exhibit 143.

MR. KEOGH: The whole of the 1946 period. A. The whole season?

Q. From May 2nd to October 31st, 1946. A. 15 hours and 10 minutes of readings higher than 0.15 parts per million.

Q. And in the month of October, 1946, how did the total duration of .10 parts per million readings and lower, compare with those other — those of the preceding months? A. It increased considerably.

Q. Increased again in October? A. Yes, sir.

Q. And to what did you attribute that increase? A. I attributed it to an increase in the output of smoke from the City of St. Catharines, in addition to the McKinnon Industries.

Q. And during that 1946 test period, can you tell us generally what sulphur dioxide readings you got with south, southeast and east winds? I don't want the exact figures, but can you give us any comparison between those winds and readings with other winds? A. In May the highest concentration occurred with a south wind, and the same was true for July, August and October.

Q. Is there any difference, according to those readings, in the general character of the fumigation, depending on the direction of the wind? A. The fumigations are of the same character whether the smoke is brought on by southwest, west, south or east winds.

HIS LORDSHIP: You referred to a night in May. What was the date of that? A. The highest concentration in May?

Q. Yes. What was the date of that?

MR. KEOGH: The date was not mentioned, your lordship.

THE WITNESS: I will find it in a minute. May 10th.

Q. Did you say May 10th, doctor, for that?

HIS LORDSHIP: Is that .22? A. On May 10th, it was .22.

Q. On those readings, with the wind being south, — first, supposing the wind is between southwest and south, how is it recorded? A. There was no direct record, as I recall, on the chart between southwest and south. We could see the wind change from southwest to south but in that narrow arc between southwest and south, I do not think that the instrument gives it, — can record east and southeast, and south and southwest, and west definitely, but, in between, I do not think that would interpolate, except in a very general way.

Q. Well, one often sees these wind vanes blowing, but they do not remain very constant, even for a minute; they will be waving back and forth? A. Yes, sir.

Q. How would that be affected by it? A. If the arc angle was greater than 30 degrees, it would engage the contact showing the next wind direction. Consequently, if you had a south wind, but if the vane were blown over to the southwest quarter, the south, southwest quarter, I should say, it would record both west and south, consequently your reading would be southwest.

Q. You see what I am really getting at. We talk rather loosely about directions, but I want to make certain that any deductions I draw are the right ones if I can, as far as humanly possible. If a wind may be recorded as southwest, and because it is recorded on your statement as from the south, during that period, does that absolutely exclude any possibility of any of the fumes coming from McKinnon's, or is it a mathematical certainty that they would not? A. I would not say that it was a mathematical certainty that they would not, but the chances are that there would be less from the McKinnon Industries with a south wind than with a southwest wind.

Q. Oh, yes, I can see that. But what I am getting at is that the variations that may take place in a short time, whether that, if it be precisely recorded, is the direction of the wind being precisely recorded having regard to it being maybe a little either off south or a little off southwest, and so on? A. I can take it that it will be precisely recorded because only the south equipment would be marking the chart record.

Q. Yes, but it might show south or still be partly southwest, and it might show south and still be partly southeast? A. Only a small deflection either way, not a large deflection. It could not deflect to the southwest.

Q. Well, you have 45 degrees, have you not? A. Yes.

Q. And — A. 22½ would be southwest.

Q. 22½ would be southwest? A. Oh, no, sir; 45 would be southwest.

Q. It is a 90 degree angle? A. Yes.

Q. Well, if you get something that is 22½, where would that be? A. That would be recorded as, — depending on the number of strokes, — as so much more of the south, to the west.

Q. Well, then, that would depend on the reading of it? A. Yes, sir.

Q. But you would just record it southwest. You do not go south by west or west by south, or — A. No, sir.

Q. Well, it is just that I want to know what the general approach is to be in any deductions that are to be drawn from this. A. Yes.

Q. Thank you.

MR. KEOGH: Then, witness, I direct your attention to Exhibit 146, which is a table of dust and organic measurements for the period from May 3rd, 1946, to October 29th, 1946.

HIS LORDSHIP: Now, those would be made by the new process?

MR. KEOGH: By the new process, as I understand it. Is that correct, doctor? A. Yes, sir.

Q. Then, will you tell us what, first of all, this average dust concentration shown on that table includes? A. After a preliminary period when the routine of the system was worked out, we endeavoured to distinguish between concentrations of dust occurring in the day time and at night, and also distinguish between concentrations occurring during week-end periods.

Q. And the percentages shown after the ones of the day, they mean — A. They mean that from the wind records the percentage of the time that the wind was prevailing in a given direction was calculated so that one could have some idea of the wind direction, the prevailing wind direction and the percentage of time that it persisted in that direction during the period of each test.

HIS LORDSHIP: Now, let us translate that into an illustration. Take the first item on May 11th; the percentage of time that the wind was in the northeast and southeast is 26% A. Yes.

Q. In the west, southwest and south, 30%? A. Yes.

Q. And northwest 44%? A. Yes, sir.

Q. Now, what bearing has that got on the other figures; the test period was 146 hours. Is that right? A. Yes, sir.

Q. And the average dust concentration at zero to .101 milligrams at — A. Zero to .101 milligrams per cubic metre.

Q. Per cubic metre of what? A. Air.

Q. That is, a cubic metre of air would go through the machine and it would produce that much dust? A. Yes, sir.

Q. Now, you say you tried to distinguish between night and day? A. Yes, sir.

Q. Where is that distinction? A. That distinction becomes apparent as we go along a little bit. For instance, a good place to start is in June; June 10th, where we divide the arc up into a morning period of test, a test period substantially in the afternoon, from 11.30 to 16.30, five hours, and an over-night period from 16.45 to 7.30 the following morning, and then, if we happen to have a week-end, then, there was generally a 62 or 64 hour test period. Now, I am giving these in general terms, but I think we can see as one goes through this table, that that is substantially the way the tests were carried out.

Q. Now, just to carry on, why were you dividing it between morning, afternoon and night? A. Because I wanted to relate the conditions to periods of high industrial activity and periods of low industrial activity.

Q. Well, were you aware of whether the McKinnon Industries were working night shifts at any of these times, or not? A. No, sir, I was not aware of that.

Q. It did not occur to you to relate it to that item? A. The purpose of these tests was that it might be related — if one got the data, but I did not attempt to relate it to day and night so far as at the McKinnon Industries.

Q. Well, the important thing was whether the McKinnon Industries were contributing substantially to this dust concentration in the air? A. Well, my object and my approach —

Q. Was it not? A. Yes, sir, but my approach to this was by using the data obtained on days when the wind was from the northeast and east and other directions blowing smoke away from the test house, to the days when substantially a good deal of the smoke was being blown to the test house.

Q. Well, that is one way of approaching it, measuring the smoke coming from an opposite direction to McKinnon Industries and the other measuring the smoke coming from the direction of the McKinnon Industries? A. Yes.

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Q. Another way of approaching it would have been measuring it when the McKinnon Industries were inactive and the smoke blowing from them, and the McKinnon Industries active and the smoke blowing from them. Would that not be a fairly obvious way of getting at the fact? A. Well, substantially, that is what I did, except that I did not —

Q. Well, where is it? A. Well, the day is divided up into those periods. Now, if the McKinnon Industries were operating on any special shifts during that time, that information, I imagine, is available.

Q. I know, but you are the man who prepared the table for a particular purpose, and what I am getting at is, I am trying to sift it to get the facts as to the relation of the McKinnon Industries to the alleged smoke nuisance. A. Your honour —

Q. Just a moment; and that is the only thing we are concerned with now. Quite rightly one aspect is what concentration of smoke there was in the air when the wind was blowing from another direction? A. Yes, sir.

Q. And another one is what concentration there was when the smoke was blowing from the McKinnon's, and still another one would be what concentration there was when the smoke was blowing from McKinnon's if they were not operating. That would be about the best sort of evidence that I think we could get, and then there is another one still, and that is the character of the dust when it comes from another direction, and the character when it comes from McKinnon's. Now, those are important things. Did those elements not strike you as being important? A. With regard to the question of the McKinnon Industries operating or not operating, I understood that they operated mainly —

MR. SLAGHT: Well, my lord, that is dangerous.

HIS LORDSHIP: Never mind, Mr. Slaght, I am asking the witness why he did not make calculations. I have suggested, and I am quite prepared to hear any explanation.

MR. KEOGH: That is his explanation why he didn't make them. Go on.

MR. SLAGHT: All right.

MR. KEOGH: Go ahead with your explanation, unless his lordship tells you to stop.

THE WITNESS: I would also have liked to have had a recorder or apparatus on the other side of the McKinnon Industries, but I had to do the best I could.

HIS LORDSHIP: Well, you see, there is this problem, and I may be very frank with you, doctor, because I have to get to the bottom of it, if I can, and do not think because I am trying to sift things I am being critical. We have no record for the time that the McKinnon Industries was closed by the strike, no dust record, have we? A. No, sir.

Q. Could you not have carried on your work, as a scientist, quite independently of the fact that they were closed by the strike? A. At the time of the strike we were faced with the continuation of the sulphur dioxide readings, which I considered a very important part of the investigation. We were not dependent on an outside laboratory for that work, consequently, we carried that on. As regards the dust work, I was at first under the impression that the strike was only a very temporary affair. I never realized that it would last so many months.

Q. That may have been, but you realized after a while that it was going to last, and you were conducting a scientific investigation as to the bearing that the McKinnon Industries had on the plant; that there was a nuisance and it had then at that time reached the stage I think, that the writ was issued, a lawsuit was under way, and you were compiling information for the lawsuit. Now, you could have had a dust machine operating and then we would have had a very fine record of the conditions without the McKinnon Industries. You realize that, do you not? A. I realize that.

Q. Well, why didn't you do it? A. Because of the impossibility of our organizing the work at that time, getting another laboratory and going ahead.

Q. You were coming all the way from Ottawa on this other matter regularly. You are not seriously telling me there was any serious matter in having this dust machine operate? You could have taken the results down to Ottawa and had them analyzed or tabulated? A. The quantity of work involved was such that it would have been a major undertaking and I hoped —

Q. How big an undertaking? Mr. Longhurst did it here. A. Well, it involved Mr. Longhurst and a number of people in the McKinnon laboratory analyzing these samples.

Q. Well, leaving that out of the consideration, at no time did you direct your mind to making a tabulation of the conditions when the wind was blowing from the southwest and the McKinnon Industries were not in operation? A. No, sir.

Q. Very well.

MR. KEOGH: Q. Then, still referring to Exhibit 146, that is the table of dust and organic matter, the ordinary layman understands one thing by "dust." What do you include under the heading of dust in this table? A. In this dust is included all solid particles and whatever liquid droplets are — whatever liquid droplets there would be in the air of sufficient size to be trapped by the dust filter.

Q. By the dust filter and the silica gel? A. Yes; whatever was not trapped by the dust filter by way of organic vapour, was trapped by the silica gel tube.

Q. So that under the heading of "dust," we have not only dust in the ordinary layman's sense, but we have also droplets of oil — is that right? A. The method is a standard method for collecting dust and in any industrial area it will collect not only solid particles, but may also collect oily particles as well.

Q. Well, it collected this blue oily haze that some of the plaintiff's witnesses have spoken about? A. It would collect all of that that was in the form of fine droplets.

Q. All of that that was suspended in the air? A. Yes, sir.

HIS LORDSHIP: Well, what would not be suspended in the air?

MR. KEOGH: Well, this was on the ground.

HIS LORDSHIP: Well, just a minute. The witness said all that was not in fine droplets. A. What was not suspended in the air would be gaseous or vapour material.

Q. That is, if it was a gas it would not collect it, but if it were in droplets, as you say, that would become deposited on the filter paper? A. Yes, sir.

MR. KEOGH: Q. Now, from what direction was the wind when you obtained the positive values of dust in this table, Exhibit 146, speaking generally? I don't want to go every individual day. A. From all directions.

Q. From all directions?

HIS LORDSHIP: Well, do you make any calculation as to a comparison between southwest and other directions? A. Yes, sir.

Q. Have you that? A. They have been submitted in an exhibit.

Q. Which exhibit is that? Take June 7th, for instance, doctor. Is there anything to be deduced from that except that you have got three readings, 369, 403 and 680? Now, those are for — A. 15.75 hours; 4.0 hours and 4.0 hours.

Q. Those are the total hours? A. Yes, sir.

Q. At what time of day through June 6th? A. 153 June 6th to 715 June 7th.

Q. I see; at different times during that time? A. Yes, sir.

Q. When the wind was blowing from the southwest? A. Yes, sir.

Q. And during the same period of time — oh, well, we come to June 10th where we get the wind in the northwest, northwest and north. This is awfully confusing to me. I don't understand how I can come to any real conclusion about it. A. Well, the way that it is set up.

Q. I would like to understand it. A. Well, unfortunately, I have to take the wind direction as it is. Now sometimes the wind will be from the southwest, sometimes it is from other directions.

Q. Well, would it not have been plainer if you had prepared it on June 7th for certain periods of time showing the wind blowing from the southwest, reading so and so, and then for another period blowing from the southwest reading so and so, and then for another period the wind blowing from the south and southwest so and so. You get the same dates. That is, divide it up morning, midday and night, and then the wind; it makes it awfully hard to arrive at a conclusion as to whether there was a greater concentration when the wind was blowing from the southwest than there was when the wind was blowing from the east, for instance. A. Well, you can arrive at that conclusion, your honour, by taking the average values of the terminations with the wind from the southwest and from other terminations to try and get the day when the wind was from the southwest and northeast and so and so on, all these different directions on the same day is difficult, because we have to take the wind direction as it is.

Q. But one could perform this experiment fairly simply by just taking a sample period of time when the wind was blowing the smoke from the cupola straight over the test house and then taking a sample period of time when it was blowing it straight away from the test house? A. Well, we have that in this table.

Q. Well, where is that? A. For instance on —

Q. It would have been very useful reading on the other side of the cupolas on June 7th, for instance?

MR. KEOGH: Unfortunately, there is a canal there, my lord.

HIS LORDSHIP: Well, the doctor is going to give me an illustration. A. For instance, on June 19th, 7.45 to 11.30 we have east and northeast winds and during that time we have .117 milligrams per cubic metre. On June 19th from 11.45 to 16.30 the concentration of dust was .262 milligrams per cubic metre with the winds from the northeast.

HIS LORDSHIP: That is just the same directions as you had before? A. Yes. Well, going on further, for instance, around the period June 21st.

HIS LORDSHIP: Take June 20th first. That has some relevance. June 19th you have the east and northeast with the readings, and June 20th you have from 7.45 to 11.30 southeast and south. A. Yes, sir.

Q. 5.52? A. Yes, sir.

Q. Now then, where is there any — of course, I suppose you cannot compare one day with another, because the humidity makes a big difference and the velocity of the wind on this? A. Yes, the velocity of the wind.

Q. One would have to make really to make a fair comparison one would have to take it at one side of the cupola and at the other side on the same day, to be fair? A. Yes, sir.

Q. Because the humidity and velocity of the wind would make a big difference in the concentration of organic matter that you would get in the air? A. Depending on the emission as well.

Q. Oh, yes. But I mean if you were comparing one day with another, as you say, it would make a big difference as to what process was going on and one notices for some reason or other a great belching of smoke at certain times and at other times one does not notice any. I am speaking of ordinary chimneys. A. I have prepared a table which gives the average readings on the days when the wind was from the southwest and west, compared with other days when the wind was from other directions.

Q. Yes. Well, that would have to be subject to the velocity of the wind, the humidity and the emission? A. Except that if you have a lot of these figures —

Q. It is a trend? A. It is a trend, yes.

Q. Yes. Well, which is that table?

MR. KEOGH: Is that Exhibit 152? Is that the table you are referring to? A. Well, that is 1947. I thought I had prepared a table like that for 1946.

Q. I don't remember seeing that table, myself. Have you a copy of it there? A. Well, it might be I am thinking of the 1947 table.

Q. I think you are, because I have not seen one.

HIS LORDSHIP: Well, just while we are discussing it, I am discussing a principle. Now, you said this Exhibit 152, which shows the averages of dust concentration in milligrams per cubic feet metre, the prevailing wind direction southwest, west and northwest, — well, now, have you grouped those in your averages? A. Yes, sir.

Q. Well, that is, that you would get the southwest wind over the lot? A. There were a certain number of readings with the northwest wind and I think that, judging the position of our test house and the relation of that test house to the forge shop, we should include northwest as well.

Q. Oh, well, the forge shop, yes, but the cupolas I am thinking of. If you are averaging that, you are averaging things that do not help us very much. What I have got in mind particularly is the emissions from the cupolas, and if you average what might come from the cupolas, which are, I should think, southwest by west from your test house, with something that comes from the northwest which would scarcely hit the forge shop at all, then, you have sort of diluted down what may have come from the cupolas. Don't you think it could be done a little better than that?

A. Well, the data can be presented with just the south and southwest winds, but I was of the opinion that the position of our test house relative to the forge shop, indicated that smoke could reach the test house. I see that forge shop —

Q. Oh, yes, but you see, if you are averaging something that would include an area with the cupolas from which one would not expect any dust particularly to come from, then, you dilute down the results of what would come from the cupola. If you had shown the southwest, west and northwest, you could have given those averages just as well and shown the southeast, northeast and north; you could have shown all the points and we could then have compared them ourselves.

Q. You mean separately? A. Yes.

Q. After all, when one gets into averages, one gets into a very dangerous field, because you have got to know what you are averaging. One can take the average height of a dozen men and you may make it sound as though they are of very small stature, but it may be that there are six of the dozen that are very tall men and one small man would bring the average down, so if you are dealing in averages and the like of that, I want to know what it is we are averaging. First, you are averaging the dust and then you are averaging the days? A. Yes.

Q. Well, I understand it, anyway. Well, that is all we have, anyway.

MR. KEOGH: Q. One more question. What were the results of your dust measurements in the 1946 period — what did they indicate to you?

HIS LORDSHIP: I think that is the same class of question as the other question.

MR. KEOGH: Well, just dropping that question for a minute, what has been your experience as to dust in the air in cities and in inhabited areas?

MR. SLAGHT: Well, now, there are on the escarpment, how many cities?

HIS LORDSHIP: Well, whether there is very much to judge by — the dust in Toronto, they say it is the worst city on the continent.

MR. KEOGH: I think I can speak as an expert on that.

MR. SLAGHT: There is one of the worst diffusions in the city in a building near me.

MR. KEOGH: I think I should have asked you what does a typical dust city area contain. I think that is the way —

MR. SLAGHT: Now, I think my friend should have to state the city. I know a very clean city in Ontario, Parry Sound, and Parry Sound and Toronto are not comparable. I do not want to stop my friend from any proper question, but I am afraid we are getting too far afield. There is dust in any city in Ontario.

HIS LORDSHIP: I do not think generalities of that sort are going to help me very much. If there have been scientific experiments conducted to show the content of the dust at places that could not be reached by the McKinnon Industries, that is important; but just a general statement of what the dust is in other places, I do not think I have got to decide Mr. Walker's grievances on that.

MR. KEOGH: I thought your lordship might be interested in some comparison of a city and country air, as far as dust was concerned.

HIS LORDSHIP: Oh, we do not get the same air in the city as in the country, but that is not this case.

MR. KEOGH: We do not always think of it in the terms of a particular dust. I just wanted to ask. Well, have you made any experiments to determine the relative dust content of city and country air in Ontario? A. Not — no, sir, not dust.

Q. You have not made any actual measurements? A. No, sir. No actual measurements.

MR. SLAGHT: Don't go to Toronto, or you will choke.

MR. KEOGH: Then, may I ask the witness what particles are usually found in the city air and country air and how they compare?

HIS LORDSHIP: No. We have got certain plants here.

MR. KEOGH: Well, did you find anything abnormal in your dust measurements of the air at the McKinnon test house?

HIS LORDSHIP: I do not think that is a question.

MR. SLAGHT: Is that intelligent or even admissible? Anything abnormal; "abnormal" might mean with Chicago.

HIS LORDSHIP: I do not expect — I know the witness's standard of normal. We have a specific complaint of a specific injury here, and any evidence directed to me that is admissible I will accept, but generalities to meet allegations of what is normal and abnormal, I do not think I can accept, and the complaint must be brought within the law with respect to nuisance.

MR. KEOGH: Well, perhaps I might be allowed to ask this question. As a result of your measurement of dust and oily droplets in the air at the McKinnon test during the 1946 test period, what do you say as to whether or not your measurement of dust, including oil, occurring during that period, indicated anything injurious to plant life? A. My observations in the vicinity of the test station, indicated that there was no injury to plant life from dust and organic matter found in the concentrations indicated at the test station.

Q. Then, was an experimental flower plot —

MR. SLAGHT: The witness said "my observations in the vicinity." Would you make it clear that that does not include the inside of the Walker grounds?

HIS LORDSHIP: Oh, you can cross-examine on that.

MR. SLAGHT: Well, I thought we would save time, because I am sure he was not there in 1946. A. No, sir.

MR. KEOGH: Then, at the commencement of the growing season in 1946, there was an experimental plot established in the enclosure surrounding the test house at McKinnon's? A. Yes.

Q. And who originated that, or initiated that experiment? A. That was initiated by myself and Dr. Duff.

Q. Then, I know that you did not actually handle the growing of the flowers in that plot, yourself, but you inspected it from time to time during the 1946 growing season on your visits to St. Catharines? Is that correct, doctor? A. That is right, yes, sir.

Q. And first of all, what flowers were planted in it? A. The main plants in the plot were gladioli. The plot also contained — I want to give the exact — geranium plants, petunias, and a number of aeguratum.

Q. And, by the way, you inspected this plot approximately every month when you came to St. Catharines during the 1946 growing season? Is that correct? A. Approximately once in every month. I can give you the exact dates, if you like.

Q. Well, all right. I am talking about 1946 now. A. Yes, sir. June 26th, 27th; July 16th to 19th; August 19th to 21st.

Q. And what about May 23rd? A. And May 21st to 23rd. I said I did not see it. I meant to say May 21st to May 23rd.

Q. Then, on each of those occasions when you inspected the flowers in that experimental plot, did you find any evidence of any sulphur dioxide injuries on any of them? A. No, sir, no evidence of sulphur dioxide injury.

Q. And on each of those occasions when you inspected the flowers in that plot, did you find any evidence of injury on the plants through an oily smudge, smoke, ash, or other types of dust? A. No, sir.

Q. That was handled by Mr. Lyons Dunn and his assistant, was it not? A. Yes, sir.

Q. Florists here in St. Catharines. You started it and gave the instructions and then Mr. Dunn and his assistant carried it on through the season? A. They were responsible for the planting of the flowers.

Q. Along with Mr. Jackson, the gardener of the company? A. Yes, sir.

Q. Then, was there anything done about water and soil conditions in connection with this experimental plot? A. The gardener watered the plot regularly.

Q. But, I mean —

MR. SLAGHT: Well, now, my lord, he was there half a dozen days or more, and he knows the gardener watered the plants regularly.

HIS LORDSHIP: No.

MR. KEOGH: I do not want him to say what anyone did. As I told you before, I do not want what anyone else told you, but what did you observe as to the state of turgor on the leaves on the plants in this plot when you inspected it in 1946? A. I wish to say that the plants were in a high state of turgor and soil moisture at the times that I saw the plot, and was sufficiently high so that the plants were in a susceptible state as regards sulphur dioxide.

Q. And what does turgor mean, for my friend?

MR. SLAGHT: Oh, no.

MR. KEOGH: My friend, Mr. Ferguson. I have at least two friends here.

THE WITNESS: Turgor is a term used to denote the internal condition of the plant when it is well above the wilting point and consequently not suffering from any lack of water.

Q. Yes, but, in layman's language, — you say well above the wilting point. It might be like some of these Englishmen's understatements. Isn't it a sort of rigid position of the leaves? A. It is the condition of the leaves, the appearance of the leaves, which indicate that the leaves are well supplied with water from the soil.

Q. That is the point I want to bring out and, as you say, in that condition they are more susceptible to sulphur dioxide, as you have already said? A. Yes, sir.

Q. Then, apart from sulphur dioxide injury, as to which you said there was none, did you notice any other markings or unusual symptoms on any of the plants in that experimental plot in the year 1946? A. Yes, sir.

Q. What plant and what did you notice, and when? A. Some of the leaves of the gladioli developed —

MR. SLAGHT: I wonder if you would pardon me a moment if I might ask my friend if this test plant bed was alongside the test house.

MR. KEOGH: It has already been brought out it was inside the enclosure surrounding the McKinnon test house. Is that not right, doctor? A. Yes, sir.

MR. SLAGHT: Beside the test house? A. Beside the test house.

MR. KEOGH: There was a high wire fence surrounding the test house and this experimental plot? A. Yes, sir.

Q. Then, I just forget what my question was — any other injury and, if so, to what plants and when and what was it? A. Some of the leaves of the gladiolus developed a gradual physiological break-down, the first appearance of these symptoms being noted during the period July 17th to the 22nd.

Q. And were you able to diagnose the cause of that break-down? A. No, sir.

Q. What did it look like? What was the colour or location of it? A. There was a brownish, — a reddish-brown to brownish discolouration on the leaves and it appeared to be the symptoms due to some disease, but I didn't know what the disease was. It had the appearance of a physiological break-down due to some type of disease.

Q. When you mention that feature of it, what was its continuity or duration during your observation? A. These markings continued to progress.

Q. Over what period? A. Over a period of several months.

Q. And you say they were brown markings on the leaves, or were they on any part of the leaves? A. They were generally confined to the older leaves, and they varied from a light brown, a light yellowish-brown to a darker brown.

Q. And on what part of the gladioli leaves did these markings generally appear? A. On the leaves which had been first put out by the plant.

Q. The older leaves? A. Yes, sir.

Q. But I mean where with reference to the tips of the leaves did these markings appear? A. These markings start at the tops and extend downwards toward the base of the plant as the time progresses.

Q. And then, was any other expert with you when you inspected these markings on these gladioli leaves on July 22nd, 1946? I do not want to know what other expert at all. I just want to know whether he was here or not? A. Dr. Duff and Mr. Palmer were present.

HIS LORDSHIP: Mr. Keogh, when you applied for leave to call more than three experts, I did not anticipate that you were going to call several experts on the same subject, or I should have put a limitation on you. I do not want this case to last forever.

MR. KEOGH: No, I do not either, my lord.

HIS LORDSHIP: And I think you should have in mind that one expert on one subject is surely sufficient, without having an array of them.

MR. KEOGH: Well, I have not called any expert on this particular point as yet.

HIS LORDSHIP: This man is giving expert evidence on it now.

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MR. KEOGH: No; he says he cannot diagnose it. He says it looks like a disease.

HIS LORDSHIP: I understood that he was: that is why he is being examined on it and he has been examined as to SO2 appearances and all that and I take it he is an expert on that subject. Now, try and keep the evidence within that channel so that we will have expert evidence from one expert on each subject, as far as possible. I know there is a certain amount of overlapping; there was with the plaintiff's case, but what I was more concerned with was whether you were going to call Dr. Palmer and Dr. Duff to give evidence about the same thing.

MR. KEOGH: No, I do not intend to, but I cannot guarantee there may not be more than one expert called on the same points, because the plaintiff called some experts, some of whom testified on several points.

HIS LORDSHIP: No. I do not want to restrict you in any narrow way, but I do not want to open the door, and we have already had part of an army of experts. I do not want to get any duplication if we can avoid it, that is all, but you will have all the privileges.

MR. KEOGH: I will try my best to carry out your lordship's wishes along those lines.

THE WITNESS: Now, may I ask a question, with your lordship's permission? I thought you were in 1946 and you used 1947 in one question.

MR. KEOGH: If I did, I am all wrong. I have been talking about 1946.

MR. SLAGHT: Well, that is as I so understood it.

MR. KEOGH: Q. Now, during the period of August 19th to 21st that you have already mentioned, did you see these markings again? A. Yes, sir.

Q. Then, what can you say as to their stage of perfection on August 19th to 22nd, from the time you saw them in July 17th to 22nd? A. The markings noted previously on the leaves of the gladiolus plants were still present.

Q. What I mean to say is, had they progressed at all in the interval, or were they the same? A. They had progressed; to a certain extent they had progressed.

Q. Well, on the 19th and 20th of August, did you make an inspection of other gladioli nurseries and plantations in the vicinity of St. Catharines? A. Yes, sir, inspected gladiolus nurseries on the Neff place near the Queen Elizabeth Highway and also near Fonthill.

Q. Now, did you at either of these other gladiolus nurseries find markings on the gladiolus leaves similar to those that you have already described at the McKinnon test plot?

MR. SLAGHT: My lord, I want to object to that question. We have no foundation for it, my submission is. We do not know how long they had been planted, what kind of soil; whether there was disease; whether there was the possibility of them being subjected by any chance to SO2 injury; and in the absence of my friend laying a specific foundation for similar conditions in other gardens, my submission is that it is too remote and too dangerous to receive. I do not want to shut out anything your lordship thinks we should have and maybe he will be equal to my suggestion to lay such a foundation, but another garden somewhere might not have parallel conditions, for we do not know how often that gardener watered them, for instance.

HIS LORDSHIP: I think it is opening a trifle wide the field of investigation. It is demanding that the plaintiffs have to go and investigate and find out all about the gladioli there in order that I may have the full facts. I think it is rather remote.

MR. KEOGH: Well, it may be, but Fonthill is quite a long ways from McKinnon's, and I just want to bring out from the witness, and I then wanted to show, as my friend showed at the beginning of his case, by two or three witnesses, that they went around the area for a mile and a half, I think some of them were as far as a mile and a half, and they claimed that they found evidence of similar markings at the various Armenian properties and the various farms in the area which they claim were the same as the markings they had on their own property. I then made this objection that my friend is making now about similar conditions, and so on, and that evidence was allowed in, and your lordship then said that I would no doubt be calling evidence to show that there were other places in the area where there were no markings.

HIS LORDSHIP: Yes, but let us see what we are dealing with. That inspection was made at a time when there was an allegation that on that particular night there had been a burning by SO2 and in the area that would be covered by the winds from the cupolas at that time, that one found other similar burnings that way, identified as burnings by SO2, then, that is relevant. But we will assume that you are attempting to prove that there was a disease in McKinnon's gladioli and that there was a similar disease with some one in Fonthill.

MR. KEOGH: Yes, quite a long distance away — similar markings.

HIS LORDSHIP: Or to prove that you found a similar disease in Straford.

MR. KEOGH: Well, I am leading up to certain evidence which has been led by the plaintiff that, in June, 1947, he had certain markings on his gladioli, and he claims he observed exactly the same markings on ours, and he says his markings were due to sulphur dioxide burns.

HIS LORDSHIP: We are dealing with 1946 just now.

MR. KEOGH: Yes, I am leading up to it.

HIS LORDSHIP: I do not know what markings, however, I will receive the evidence for whatever value it may have. One cannot always tell, but I do plead with counsel to approach this as a case where there are certain allegations and the evidence must be relevant to prove those allegations, and not disprove them.

MR. KEOGH: Well, if your lordship does not think 1946 is material, I will drop it.

HIS LORDSHIP: Well, if you are meeting something that was said in 1947, by what happened in 1946, it does seem to me to be remote, but I do not want to restrict you. All I am asking you is to try and keep it — I have not been complaining, but I am going to start to complain about the middle of next week if we are not getting near the end of this case because, after all, it is within a fairly narrow compass and if we can get down to it some time —

MR. SLAGHT: My lord, may I make one observation, that I do not, by silence, seem to acquiesce. My friend stated in the record that we have given evidence of places a mile and a half away from the Armenians and so forth. He is in error there. We gave evidence only of neighbours, Armenians and none further than five-eighths of a mile away. I did not want that statement to go unchallenged.

MR. KEOGH: Well, it may have been five-eighths of a mile instead of a mile and a half.

HIS LORDSHIP: Well, it seems like about a year since that evidence was given.

MR. KEOGH: Well, in view of the description by some of the witnesses as to the nature of the markings on our gladioli leaves that they saw in 1947, I just want to ask one question about this and then I will leave it.

Q. Did you or did you not find similar markings on any gladiolus leaves at Gledhill's Nursery, at Fonthill? A. Yes, sir.

Q. And how far, approximately, is Fonthill from the McKinnon Industries plant? A. It is several miles; about four or five miles.

HIS LORDSHIP: Well, we will resume to-morrow morning at 10.00 o'clock.

——Whereupon Court adjourned until 10.00 a.m., Wednesday, May 4th, 1949.

Wednesday, May 4th, 1949, 10.00 a.m.

EXAMINATION OF DR. KATZ CONTINUED BY MR. KEOGH:

THE CLERK OF THE COURT: You are already sworn, doctor, and you understand you are still under oath in this case? A. Yes, sir.

MR. KEOGH: Q. Dr. Katz, during the 1946 test period, did you find at the test house in the vicinity of the Walker premises, any concentrations and durations of sulphur dioxide which were injurious to plant life? A. No, sir.

Q. And during the 1946 test period, did you find at the same place any concentrations of dust, including soluble organic matter, which was injurious to plant life? A. No, sir, I did not.

HIS LORDSHIP: Just a moment. Yes.

MR. KEOGH: And in 1947, doctor, did you make some inspections of vegetation and plant life in the vicinity of the Walker premises and on experimental plots at McKinnon's? A. Yes, sir.

Q. Would you mind giving me the dates of those inspections, first of all? A. The dates were May 26th to 29th, June 24th to 26th, July 22nd to 25th, and August 25th to 30th.

Q. And dealing first with the experimental plot at the McKinnon test house, what was mainly grown in it in the 1947 season? A. Gladiolus.

Q. And did you inspect the gladioli in that test plot on each of those occasions? A. Yes, sir.

Q. And in what condition did you find them at the times of your various inspections? A. During the inspections made July 22nd to the 25th, the growth on the experimental plot was good, but some markings were present on the tips of the leaves of the gladiolus. One variety had more of this type of markings on it than other varieties.

Q. What variety was that? A. This was the Aladdin variety.

Q. Will you describe those markings? A. The markings consisted of a dull grey marginal markings with brown or reddish-brown borders. That is the main description of them.

Q. Did the margins resemble, in any way, a bleach caused by sulphur dioxide? A. In my opinion they did not, sir.

Q. That was July. Then, during August was there any progression in those markings? A. During my visit in August, I noted that the symptoms observed previously on the older leaves had become more pronounced, and that some fresh markings had appeared on the younger leaves.

Q. And during the first part of August was McKinnon's operating, or was it not? A. I understand —

HIS LORDSHIP: No, what you did. A. I know that it was not through my — I want to say this from entries made on the recorder records which I saw.

MR. KEOGH: No. But when you came in the early part of August, you could see? A. I want to make it clear I was not present in the early part of August. I just want to say that I am aware of that.

MR. SLAGHT: What do you mean by the "early part of August," please. His visit was on the 25th to the 30th, I understood.

HIS LORDSHIP: Well, you will probably give us what you will prove as to the time it was closed so that we may relate it to the exhibits.

MR. KEOGH: It was the annual vacation and inventory was taken and the plant closed down approximately the first two weeks in August.

HIS LORDSHIP: The cupolas were closed?

MR. KEOGH: The whole plant was closed, I understand, in August, for the taking of the inventory, in the first two weeks.

HIS LORDSHIP: That would be during the first two weeks?

MR. KEOGH: I remember it ran from the 20th of July to the 13th of August, or something like that.

Q. But, at any rate, when you saw these leaves of the gladioli, on what date was it in August? A. I inspected these leaves during my visits from August 25th to the 30th of August.

Q. And you saw the markings on them and they had progressed on the older leaves and had started to appear on some of the younger leaves? A. Yes, sir.

Q. Then, what about the spikes of the flowers of the gladioli in the experimental plot, when you saw them in August? A. The spikes on the flowers appeared to be in fine, clean condition.

HIS LORDSHIP: Were they flowering in the early part of August?

MR. KEOGH: Oh, I beg pardon. I meant to say when you saw them? A. When I saw them, yes.

HIS LORDSHIP: They were in flower, were they? A. Yes, sir.

MR. KEOGH: Then, also in August, were you present when some of these gladioli in the experimental plot were cut? A. Yes, sir.

Q. When was that? A. On August 25th.

Q. And who were present at that time? A. Dr. Duff and Mr. Dunn.

Q. That is Mr. Lyons Dunn? A. Yes, sir.

Q. Then, did you examine some other gladioli plants in the plot beside the McKinnon Delco Building? A. Yes, sir.

Q. Was that also in August that you made that examination? A. Yes, sir.

Q. And what, if anything, did you observe about the condition of the gladioli at the Delco Building? A. The gladiolus plants were in good condition and relatively free from markings on the leaves.

Q. Then, at the time of your visit in June, 1947, did you make any inspection of vegetation in the immediate area adjacent to the McKinnon and Walker premises? A. Yes, sir.

Q. What vegetation did you inspect? A. Several varieties of clover, timothy, wild carrot, dandelion and other weeds, flowers in the area, and various other species of garden crops and flowers.

Q. And did you see any evidence on any of them of sulphur dioxide injury? A. No, sir, I did not.

Q. Did you make any further inspections of vegetation in the surrounding area, — in the immediate area, rather, on your other visits in July and August? A. Yes, sir.

Q. And with what result? A. There was evidence of markings on the gladiolus close to the forge shop but, apart from that, the vegetation appeared to be in good condition with only normal discolourations which one encounters anywhere.

Q. You are speaking now of the vegetation in the area, are you? A. Yes.

Q. Then, will you describe the markings on the gladiolus in the McKinnon forge shop property? A. It appeared to be suffering from fusarium.

Q. Is that the disease that Dr. Savile referred to here? A. Yes.

Q. I think he used fusarium yellows? A. Yes, that is the popular term.

Q. Does that describe it? A. Yes, sir.

Q. The word yellows, in other words, describes it? A. Yes.

Q. Then, during the 1947 test period did you find any concentrations and durations of sulphur dioxide at the test house in the vicinity of the Walker premises, which were harmful to plants or vegetation? A. No, sir, I did not.

Q. And, in the same period and at the same place, did you find any concentrations of dust, including soluble organic matter, which was harmful to plants and vegetation? A. No, sir.

Q. Then, what were the dates of your inspections, that is of vegetation, in the year 1948, the growing season? A. May 17th to 20th, June 15th to 18th, July 19th to 22nd; August 17th to 20th, and September 20th to 24th.

Q. Now, on each of those occasions, did you make an inspection of susceptible plants and weeds in the area surrounding the McKinnon plant and the Walker greenhouses? A. Yes, sir.

Q. And did you find any evidence of sulphur dioxide injury on any of that surrounding vegetation on any of those inspections in 1948? A. No, sir.

Q. And was that inspection generally of the grasses and weeds and flowers that you have already listed for the years 1947 and 1946? A. Yes, sir.

Q. Then, you have already filed tables of the concentrations that you found of sulphur dioxide in 1948, and I do not propose to go into detail with them, but you took certain observations, or, at least, you ran those tests for sulphur dioxide during the period from July 14th to November 1st when the McKinnon plant was on strike? A. Yes, sir.

Q. And without giving us the figures which appear in the detailed tables, can you tell us generally how the concentrations and durations of sulphur dioxide during the strike period, compared with the general run of concentrations, say. in the months of the same year before the strike period? I do not want the exact figures, — just a summary. A. On the whole, there was no outstanding difference.

Q. There was no outstanding difference in the sulphur dioxide concentrations and durations, generally speaking, during the strike period, from what they were in the three months before the strike period? Is that right? A. Yes, sir, bearing in mind that our readings indicate over the years that there is always an increase in duration in the fall months and continued on to the winter.

Q. And by fall months you are referring first of all to the month of October, are you? A. Yes, sir.

Q. And then November and December? A. Yes, sir; the winter months.

Q. And you got that increase, did you, during the strike period? A. Yes, sir.

Q. In October? A. In October.

Q. As you had got in previous years? A. The trend was there, although the duration is less; but the duration is less than it was in the period of 1947 but the duration is not much less than it was in 1946. However, there is some difference, but the trend is there.

Q. And apart from this seasonal increase in October which had been active, you say, in the previous years, the months of the last half of July, August and September compared how, as to sulphur dioxide, with those months — with the preceding three months of the same year? A. It compared favourably.

Q. You mean by the word "favourably," do you mean similarly? A. I mean similarly. I don't mean exactly. I mean in a broad manner, yes.

Q. In a broad manner? A. Yes.

Q. In other words, in a broad manner, there was no —

HIS LORDSHIP: Well, I think you had better leave the word as the witness gave it.

MR. KEOGH: Yes.

Q. Then, you have filed, we already have it in the record, that you started sulphur dioxide readings at the test house and the Dunn greenhouses approximately June 14th, 1948, and continued them to the end of 1948, I believe? A. Yes. sir.

Q. And we have already filed comparative tables of those and I do not want to go into the figures. But what information of assistance in your investigation did you obtain from the recordings and duration of sulphur dioxide at the Dunn station, speaking broadly, as you have said? A. The durations at the Dunn station for June — there is only half a month for June, so I won't give that, but, for July, the duration is somewhat less than at the McKinnon station.

HIS LORDSHIP: Now, just a moment. Couldn't you take June? Did you not work out the half of the month? A. I worked out the half of the month.

Q. Well, just give us what you have got. A. Yes, sir. In June, the duration was greater than for the corresponding month at the McKinnon station.

Q. That is, greater at Dunn's? A. Greater at Dunn's.

Q. What do you mean by "the duration"? A. That means the possible duration of all types of sulphur dioxide readings.

Q. Oh, but it does not give the high. You see, you might take in the centre of the City of St. Catharines and get a continuous duration of sulphur dioxide readings which would mean nothing, but you go to some place where it was high on a particular day and it might do a tremendous damage and it would mean a lot. I want to get what the significance of the duration is.

MR. KEOGH: I was just coming to it. The witness has made up figures. I did not file the table. There are only two lines. I thought he could read them out. Will you first of all read out the maximum concentration at each station during the months of May to December inclusive in 1948? Never mind May. The half month of June and then the rest of the months of 1948.

HIS LORDSHIP: You did not have the two stations, in May.

MR. KEOGH: No. I said, "Never mind May," because we did not have them. A. In June, the maximum at the McKinnon station was .31 parts per million and at the Dunn station for the period from June 15th onwards, to the end of the month, it was .12 parts per million. In July —

Q. Don't go too fast now. A. In July the maximum at the McKinnon station was 0.17 parts per million and at the Dunn station 0.31 parts per million.

HIS LORDSHIP: No. Wait. 0.17? A. At the McKinnon.

Q. And the other one? A. 0.31 parts per million. In August, at the McKinnon station the maximum was 0.14 parts per million and at the Dunn station 0.19 parts per million. In September, the reading at the McKinnon station was 0.14 parts per million and at the Dunn station 0.21 parts per million. In October, the maximum reading at the McKinnon station was 0.25 parts per million and at the Dunn station 0.14 parts per million. In November, the reading at the McKinnon station was 0.34 parts per million and at the Dunn station 0.30 parts per million. In December the reading, the maximum reading at the McKinnon Industries station was 0.30 parts per million and at the Dunn station 0.47 parts per million.

HIS LORDSHIP: I suppose you could give us the dates on which these maximums occurred? A. Yes, sir.

Q. We could look at the exhibit number and see the direction of the wind and all that. Have you got the dates? A. I have the dates.

MR. KEOGH: For 1948, my lord, they will appear in Exhibits 153 and 157, and for 1949 they will appear in Exhibits 16—

HIS LORDSHIP: We have not got to 1949 yet.

MR. KEOGH: No, Exhibits 153 and 157.

HIS LORDSHIP: Now, the doctor is going to give us the dates. Have you not got a ready reference to the dates?

MR. KEOGH: The maximum?

THE WITNESS: May I have that exhibit, please?

MR. KEOGH: Probably you had better give a detailed summary of 154 and 158, which shows your maximum readings and will enable you to find it quickly. Then, doctor, if you will look at Exhibits 154 and 158 in the column of "maximum readings," I think it will enable you to locate a date rather quickly. A. June at McKinnon Industries, on June 22nd, .31.

Q. Then, doctor, would you look at June 30th on the daily summary for Dunn's, Exhibit 158? A. June 30th, yes, sir, and McKinnon July —

MR. KEOGH: June 30th for Dunn's.

MR. SLAGHT: What date is McKinnon's? A. July 9th McKinnons, .17, and Dunn July 16th, .31. August —

HIS LORDSHIP: Just a moment. A. Yes, sir.

HIS LORDSHIP: Taking the month of July at Dunn's, with the exception of that particular date there does not appear to be a record that would indicate. I think the highest my eye catches is .07.

MR. KEOGH: In July, your lordship?
HIS LORDSHIP: Yes, in July.
MR. KEOGH: There is .10 on the 9th.
THE WITNESS: And there is .16 on the 21st.
HIS LORDSHIP: Well, would you have any explanation of how there would be a jump on one day, that would be for a short time? That would be so far out of line with anything else that appears. A. Your honour, the concentrations of sulphur dioxide —
MR. KEOGH: By the way, it is "your lordship," Dr. Katz.
HIS LORDSHIP: We will not worry Dr. Katz about those details.
MR. KEOGH: But we might as well have it right.
THE WITNESS: I am sorry. The concentrations of sulphur dioxide in the air depend upon the wind conditions and also the distance it travelled by the smoke, or whatever it is that is carrying the sulphur dioxide. If the concentrations represent the conditions where the air has been well mixed with the smoke, then, your readings will rise gradually to a maximum and fall off more or less gradually, or you might get a continuous period of relatively low concentrations of almost similar readings until the wind direction changes or the meteorological conditions are such that the fumigation disappears entirely. If, however, the mixing is not uniform, then you will get peaks caused by a non-uniformity in the gas and air mixture.
HIS LORDSHIP: Is there anything in the neighbourhood of Dunn's that would impede sulphur dioxide? A. I think that other plant in the St. Catharines area is contributing to the sulphur dioxide in this area.
Q. No, but is there any plant that would impede it in quantities, that there would be concentrations in the smoke, particularly that would bring it up to that figure? A. I understand that there is.
Q. Well, did you see anything?
MR. KEOGH: Just say what you saw, doctor. A. All that I have seen is a hospital in the area.
HIS LORDSHIP: I see. Is there any possibility that there would be errors in this mechanical test? A. I do not think that there are any serious errors in this method of measurement. I think it is the most accurate method devised so far for measuring.
Q. It may be the most accurate devised, but my question is — I am still having in mind the item of yesterday where I think it ran up to 5 or 6 and showed for 15 minutes, and showed an immediate drop to zero and a minimum rise, beginning or the starting of the 15 minute period, say from zero up to 5 or 6 and at the end of the 15 minute period dropped to zero again. There

is no levelling off, or anything of that sort. There is just a shooting up to maintain it for the 60 seconds to the last second and then a dropping down again. Now, I wonder if there is any room for a mechanical error there? A. No, sir.

Q. The sulphur dioxide hits it precisely on the second and it leaves precisely on the second and you have a solid concentration for 15 minutes, no more and no less? A. One must bear in mind that the calculated reading is an average for that period of 15 minutes. In other words, the curve may have showed a slight tendency to drop off towards the end of it, I don't know, but the point is that over that 15 minute interval, the maximum concentration of the reading was .56.

Q. Oh, well, then, that was the average for the 15 minutes? A. Oh, yes.

Q. Do you find it considerably higher than that at one point, because it begins at zero and ends at zero and if there is any tapering off — A. Yes, sir.

Q. I want to understand perfectly clearly, because we do know that our automobiles can go wrong and we know that an elevator can go wrong, and I am wondering if this mechanical device cannot make errors? A. Not to indicate concentrations of gas. If there is an error, then the record is useless; in other words, you cannot use it.

Q. Well, I am wondering if the solution — if any error can occur in the solution? A. No, sir.

Q. So that in your view this is absolutely accurate and beyond — A. And beyond doubt.

Q. You put it that strong? A. It reflects the actual conditions occurring in the atmosphere at that time.

Q. An absolutely accurate monitor? A. Yes, sir.

Q. As accurate as a barometer or as a thermometer? A. Yes, sir.

Q. You are putting it that strong? A. Yes, sir. I can say that it will detect one part of sulphur dioxide in one hundred million parts of air.

Q. That is not my point; powers of deduction, but powers of measurement again? A. I think I could put it this way, that those are its limits; that it will detect from .01 parts per million upwards.

Q. And measure it absolutely accurately without question? A. Well, that is a very strong statement.

Q. Well, I am making it strong, because you see, in this case, we have quite a wide difference of opinion between experts to begin with, men who are trained in the detection of sulphur

dioxide burnings. You come along with a mechanical instrument and I want to know what absolute value I can put on that as against other evidence that we have and other opinions. I just want to know how strong you put it? A. Perhaps I should illustrate this way, that, in the determination of the reading, it is possible to calculate it out to three decimal places, but I have not done so because I did not think the accuracy of the method warrants calculating out with assurance to the third decimal place but I think one can be sure of the second decimal place in these readings.

Q. Well, I think I have gone as far as I can with it. All right.

MR. KEOGH: Q. On that point, if this intake, the tube for the air, for the sulphur dioxide which sticks out in the test house, if one were to light a match in that tube, what sulphur dioxide reading would probably show on the instrument? A. You get a comparatively high reading, depending on the match.

Q. Well, how high, that is what I mean? A. Well, I would say you would get a reading of over a part per million, depending on the time of exposure, and so on.

Q. And automobiles have been mentioned. What would you say would be a fair average for the sulphur dioxide discharge from the ordinary automobile and ordinary in this? A. I do not think that affects the instrument appreciably.

Q. I am not talking about the instrument now. Is there any sulphur dioxide discharged by the exhaust of the ordinary automobile? A. Very little.

Q. Very little? A. Yes.

Q. I was mixed up with something else, I guess. Now, yesterday, you told his lordship on the plan it doesn't make much difference, only a couple of blocks out, but we may as well have it right, that Dunn's greenhouse was located between Prince and Vine Streets; it is a little closer to the next couple of blocks down the street, between Frank Street and Thorold Road.

HIS LORDSHIP: Have you figured out how far it would be on the plan?

THE WITNESS: Well, I have not. It is only a couple of blocks out. I don't think it makes any difference, as far as the wind is concerned.

MR. KEOGH: All I wanted to put right —

MR. SLAGHT: What is the alleged difference in mileage?

MR. KEOGH: Well, his lordship figured it out yesterday and said it was over 6,000 feet.

HIS LORDSHIP: No, 9,000 feet.

MR. KEOGH: But I am just pointing out that I made a slight error yesterday. Then, to get on with the dates. His lordship asked for the date of the maximum readings. You covered July. Will you give them to us for August, both for McKinnon's and Dunn's? A. The McKinnon maximum on the 10th of August —

Q. I think you could get them quicker by looking at Exhibits 145 and 158. A. The actual reading occurred at 11.30 to 12.00 midnight.

Q. Then, at Dunn's for August —

MR. SLAGHT: Well, he did not give us the figure yet.

HIS LORDSHIP: Yes, he did, .14.

THE WITNESS: The Dunn figure for August, there was a reading of .19 on the 24th and there was also a maximum reading of .19 on the 25th.

MR. KEOGH: That is at Dunn's? A. Yes, sir.

Q. In August? A. Yes, sir.

Q. And then September. Please look at September 1st for McKinnon's and September 2nd for Dunn's. A. Yes, sir. The maximum occurred on those days respectively.

Q. The maximum occurred on each day for those places? A. Yes, sir.

Q. September 1st at McKinnon's and September 2nd for Dunn's. That is right, is it not, doctor? A. Yes, sir.

Q. Then, will you give us the dates and the maximums for October? A. The 5th of October in the McKinnon records.

Q. And at Dunn's? A. The 23rd.

Q. The 23rd of October at Dunn's? A. Yes, sir.

Q. Then for November, please?

HIS LORDSHIP: Just a moment. Yes. Was it the 27th of November at McKinnon's and the 17th November at Dunn's? A. The 27th November at McKinnon's, and the 17th November at Dunn's.

Q. And then the last one, December. If you will look at December 2nd for McKinnon's — A. December 2nd at McKinnon's.

MR. KEOGH: And December 21st at Dunn's? A. December 21st at Dunn's.

Q. Thank you. Now, before we went into this, you started to say something about the general comparison of the durations as distinct from the maximum concentrations and the durations at Dunn's and McKinnon's in the period over which you ran the tests at both places. What can you tell us about that, without going into detailed figures? A. I have forgotten just now where

I stopped, but I believe it was the month of July, in that comparison. But the duration in July was a little less at the Dunn greenhouse that at the McKinnon. The durations in August at the two stations were comparable.

Q. By comparable, what do you mean? A. Well, quite close together, and the durations in September were quite comparable. In October there was a considerably higher duration of sulphur dioxide at the Dunn station compared with the McKinnon station.

Q. Then, have you been inside Dunn's greenhouses? I am not going to ask you in any detail, but have you been inside Dunn's greenhouses from time to time? A. Frequently, yes, sir.

Q. And have you made inspection of the plants growing there during this period? A. Yes, sir.

Q. And did you see any evidence of sulphur dioxide injury on any of them? A. No evidence of sulphur dioxide injury. There were some minor discolourations, but no evidence of sulphur dioxide injury.

Q. Then, I must ask you the general question I asked you already in connection with the earlier test periods. During the test period of 1948 at McKinnon Industries, did you find any concentrations and durations of sulphur dioxide at the test house in the vicinity of Walkere's premises, which were injurious to vegetation and plant life? A. No, sir.

Q. Now, what did you arrange for the growing of in the experimental plot at the test house opposite Walker's premises in the 1948 growing season? A. Chrysanthemums.

Q. Nothing turns on the varieties. They are not important, the varieties, are they? A. No, sir, I do not think so.

Q. I want to shorten this up if I can. And then you inspected this experimental plot from time to time, did you? A. Yes, sir.

Q. And also other vegetation in the area, during your visits in 1948? A. Yes, sir.

Q. We have the dates already. A. Yes, sir.

Q. And on your various visits to the experimental plot of chrysanthemums in 1948, did you notice any evidence of any sulphur dioxide injury on any of them? A. No, sir.

Q. And did you see the other plots of McKinnon's at the butain tank in front of the forge shop, and in front of the Delco Building, on your various visits during 1948? A. In June of 1948, I saw the condition of the gladioli, noted the condition of the gladioli in the bed near the butain tanks and the forge shop.

Q. And what was the condition that you noticed? A. Fusarium yellows.

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Q. And did you take in several plants from that bed, that is the whole plant? A. Yes, sir.

Q. And to whom did you deliver them? A. I delivered them to Dr. Savile, in Ottawa.

Q. And that is the Dr. Savile who has been in the witness box already in this case? A. Yes, sir.

HIS LORDSHIP: Are you in a position to identify fusarium yellows? A. I am in a position to be fairly confident of the condition but, in order to be absolutely certain, I preferred to call in another expert who is a specialist on diseases of plants.

Q. I was wondering if you identified it because of what Dr. Savile said, or whether you were sufficiently specialist to know that when plants were handed to you, you could identify the disease from which they are suffering? A. I do not think if I was handed a specimen of a plant, that I could identify the disease.

Q. I see.

MR. KEOGH: Then, did you see, during the 1948 season, did you see the outdoor gladioli in front of Mr. Walker's most southerly greenhouse? A. Yes, sir; I noted the condition of those plants, from the street.

MR. SLAGHT: May I interrupt. I am sorry, but I want to get the doctor's last answer, if you don't mind, Mr. Keogh.

HIS LORDSHIP: The Reporter will give it to you.

THE REPORTER: "I do not think if I was handed a specimen of a plant, that I could identify the disease."

MR. SLAGHT: Thanks.

MR. KEOGH: Then, did you see the outdoor gladioli in Walker's plot south of his most southerly greenhouse at the time of your visit, in June? A. Yes, sir.

Q. And what, if anything, did you observe about their condition? A. I could see that there were discolourations on the leaves.

Q. Will you describe the appearance of the discolourations? A. It consisted of a tip burn, what I call a tip burn, a burning of the tips of the leaves.

Q. And can you tell us the colour of it? A. Only in a general way.

Q. You were not on Walker's premises at that time? A. No, sir.

Q. You were looking in from Carlton Street? A. Yes, sir.

Q. Into his plot, which is in behind some houses there? A. Yes, sir.

HIS LORDSHIP: How far would you be from the plot? A. Oh, about ten feet away, I guess; ten or twelve feet away.

MR. KEOGH: Were you close enough to be able to tell us the colour of these markings? A. I don't think I could definitely tell you the colour. I noted the discolourations.

Q. Then, on your next visit, of the middle of July —
MR. SLAGHT: That is called peeking.
MR. KEOGH: Yes, perhaps.
Q. Then, on your next visit by the middle of July, did you see those again from the vicinity of Carlton — Walker's gladioli? A. Yes, sir.
Q. And what were the markings then from the point of view of progress or otherwise?
HIS LORDSHIP: That would be what date in July?
MR. KEOGH: He gave us the inspection date before, July 19th to 22nd.
HIS LORDSHIP: Yes.
THE WITNESS: The discolourations appeared to be much more pronounced; they were plainly evident.
MR. KEOGH: Q. And you still canont say aything about the colour of them, I take it. And was there any particular leaves —
MR. SLAGHT: Did he answer that?
THE WITNESS: I have no note on the colour. I cannot give you an exact description of the colour.
MR. KEOGH: Q. And have you any memo or note to refresh your memory on the leaves on which it appeared, as to whether they were older leaves or younger leavees, or both, or one or the other? A. It appeared to me that the outer leaves were much more injured than the other leaves. The outside leaves.
Q. With these markings that you saw from the street? A. Yes, sir.
Q. And did you see it again at the time of your visits in August and September? Did you see those gladioli of Walker's again? A. Yes, sir.
Q. With these markings that you saw from the street? A. Yes, sir.
Q. And did you see it again at the time of your visits in August and September? Did you see those gladioli of Walker's again? A. Yes, sir.
Q. And had the markings on the leaves progressed or not progressed when you saw them again in August and September? A. It was difficult to tell by then whether there was any further extension. They did not look very much different.
Q. You were not close enough to be able to say, or were you close enough to be able to say whether or not these markings resembled sulphur dioxide markings? A. I do not think I could answer that question.
Q. Then, where you have injury from sulphur dioxide on growing plants, within what length of time do you expect the visible manifestations of that injury to be evident to the eye? A. Within a few days.

Q. What do you mean by a "few"? A. I mean within one or two days.

Q. And then after the fumigations cease, what do you expect as to markings already made on plants by sulphur dioxide? A. If there are no more injurious fumigations, then one would expect that the plants would show a recovery of growth.

Q. And, in the absence of further fumigations, are sulphur dioxide markings on plants progressive or not progressive? A. They are not progressive.

Q. Then, have I asked you about inspections of vegetation in the area surrounding the McKinnon's and Walker's in the 1948 season — I cannot remember whether I have asked you that or not. Did you make inspections of vegetation in the area surrounding McKinnon's and Walker's on the dates of your visits to St. Catharines in the 1948 period, which dates you have already given to us? A. Yes, sir.

Q. And without giving us all the names in detail, what, generally, did you inspect in the area? A. Various flowers, native grasses and garden plants.

Q. And were they susceptible or not susceptible to sulphur dioxide, this vegetation that you inspected in the area? A. Quite susceptible to sulphur dioxide.

Q. Did you find in the area, on any of your inspections in the 1948 season, in your inspection of the vegetation, any evidence of injury to any of it by sulphur dioxide? A. No, sir.

Q. Did you see, apart from sulphur dioxide in the area of the vegetation, did you see evidence of injury of any other kind? A. Well, there were discolourations evident of a minor character here and there, as you find in any area.

Q. But not, in your opinion, due to sulphur dioxide? A. No, sir.

Q. I asked you already, doctor, and I do not want to go over it again if I did, — I asked you already for a comparison of sulphur dioxide during the strike period and the months before as to concentrations and operations, did I not? A. Yes, sir.

Q. We have gone over that? A. Yes, sir.

Q. By the way, on that point, first of all in the vegetation in the three plots at McKinnon's; first in the experimentation plot at the test house, second the plot at the forge shop, and third the plot at the Delco Building, you saw those on at least one occasion and probably two occasions during the strike period, didn't you? A. The plants at the Delco Building were not there on my July visit.

Q. No, I am talking about August and September. You made two visits, one in August and one in September, didn't you? A. Your question refers to the forge shop and the Delco Building plants?

Q. I just want to ask you one question and then I am through with the strike business. Did you notice any difference in the condition of the plants or foliage in the McKinnon test plots and in the other two McKinnon plots when you saw them in August and September of 1948? A. There were no plants — there were no gladioli in July. I did not see any gladiolus at the Delco, along the Delco building in July, and I did not see any gladiolus at the forge shop in July, or subsequently.

Q. It is just completing the comparison of the strike period and the working period. I want to know if there was any difference.

HIS LORDSHIP: If he did not see any, he would not be able to say.

MR. KEOGH: Did you see any difference?

HIS LORDSHIP: Well, if he did not see any plants, he would not be able to see any difference.

THE WITNESS: I made a general inspection of the area during the strike and before the strike, if that is what you mean.

MR. KEOGH: And what was the comparison as to what you saw in this general inspection of the area during the strike period, as compared with before the strike, as to the condition of vegetation of susceptible plants?

MR. SLAGHT: Will you let him tell you what time during the strike period?

MR. KEOGH: First of all, as my friend says, you had better tell us what time? You gave us some dates. Perhaps you had better repeat them,—during the strike period? A. During July, 19th to 22nd, and August 17th to 20th, September 20th to 24th, I made inspections both of the building near the test house and of the vegetation of the vicinity and in the surrounding area along Carlton Street, Manchester Street, up on Ontario Street, and I could not see any difference before or after, in the condition of the plants.

MR. KEOGH: Q. Now I am going to direct your attention to some dates that were mentioned by Mr. Jarvis. First of all, June 17th, 1947, and you, having told me that this sulphur dioxide may show itself in a day or two, I would ask you to turn up your detailed daily table for 1947, look for the detailed readings for June 15th, 16th and 17th, and then I may have a question or two to ask.

HIS LORDSHIP: Now, what exhibit will that be?

MR. KEOGH: 1947, will be Exhibit 147, my friend tells me. That is June 15th, 16th and 17th, allowing for those two days that you mentioned.

HIS LORDSHIP: Just a moment till I get it.

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MR. KEOGH: On those three days, doctor, were there any concentrations and durations of sulphur dioxide which would be in any way harmful to growing plants, according to your readings? A. No, sir.

Q. Then I want to turn now to Exhibit 147, to July 31st, and I want you to look at the date of the entries for July 29th, 30th and 31st. A. July 29th, 30th and 31st.

Q. Now, on those three days, according to your readings, were there any concentrations and durations of sulphur dioxide which would injuriously affect growing plants? A. Certainly not.

Q. As a matter of fact, every reading on those particular days is either zero or a trace, is it not? A. Yes, sir.

Q. Then, the next date that I have noted is June 11th as mentioned by Mr. Jarvis, and I want you to turn to that and the two preceding days.

HIS LORDSHIP: June 11th. Are you going backwards?

MR. KEOGH: Oh, I am sorry, my lord. I am in the next year. We will have to get another exhibit, Exhibit 153, my lord. Will you hand the witness Exhibit 153, Mr. Registrar, please? Then, the next date I have noted by Mr. Jarvis is June 11th, 1948, and I want you to turn to that date and to the two immediately preceding dates. A. You mean June 9th?

Q. June 11th, 1948, and the two preceding days. A. June 9th, 10th and 11th?

Q. That is right. Look over those detailed readings first, and then I want to ask you a question. A. I have seen the readings.

Q. Now, according to your sulphur dioxide readings in Exhibit 153, was there any concentration and duration of sulphur dioxide on those three dates which would be injurious to growing plants? A. No, sir.

Q. Then, I have two more dates. The next date is June 26th. Will you turn that up, of 1948, and the two preceding dates? A. June 24th, 25th and 26th?

Q. On those three days, June 24th to 26th, inclusive, 1948, according to your readings, was there any concentration and duration of sulphur dioxide which would be injurious to growing plants? A. There was not.

Q. And the last date that I have noted by Mr. Jarvis was July 7th, 1948. Will you turn that up and the two preceding dates in Exhibit 153? A. July 6th, 7th and 8th?

Q. No, July 5th, 6th and 7th. July 5th, 6th and 7th. A. I have looked at the readings.

Q. Now, according to your readings on those three dates of July 5th, 6th and 7th, 1948, was there any concentration and duration of sulphur dioxide which was injurious to growing plants? A. There was not.

Q. I don't want you to tell me what it was. Were you familiar with the work of Drs. Thomas and Hill in connection with sulphur dioxide injury to growing plants? A. Yes, sir. I have visited the site of their work several times and am familiar with their investigations.

Q. They are over in the States with the American Smelting and Refining Company? A. In the Salt Lake Valley.

Q. Don't tell me what it is, or was, but are you or are you not familiar with the work of Professor Swan on sulphur dioxide injury to growing plants? A. Yes, sir.

Q. And don't tell me what it was, but are you or are you not familiar with the sulphur dioxide greenhouse fumigation experiments conducted by Dr. Crocker of the Boyce Thompson Institute, of Yonkers, New York? A. I am very well acquainted with the work.

Q. And have you been over there and seen some of it going on, without telling me what it was? A. Several times.

Q. Now, we have had some statements here made by at least one of the plaintiff's witnesses, about a chronic or invisible injury from pervading minute quantities of sulphur dioxide, speaking of plants. Do you agree or disagree with that statement, and have you anything to say about it? A. I disagree with that general statement.

Q. And what do you say about this business of chronic or invisible injury, so-called? A. The theory of invisible injury has been discredited.

HIS LORDSHIP: They are two different things.

MR. KEOGH: I thought they were the same thing.

HIS LORDSHIP: No, no, no. There are three different classes. One was the invisible injury, the other was the chronic injury, and then another class of invisible injury. The chronic injury makes itself evident in the deterioration of the plant, or the failure to mature was the other evidence of it. The invisible injury would be manifest in the development of the rings of a trunk of a tree.

MR. KEOGH: My impression was they were divided into acute and invisible.

HIS LORDSHIP: No, no. It is acute, chronic and invisible. Do you understand the three different classifications?

THE WITNESS: Yes, sir.

Q. Have you studied them? A. I have studied them.
Q. The three different classifications? A. Yes, sir.
Q. And you know there are classifications of that sort? A. Yes, sir.

MR. KEOGH: He has not said any such thing now, my lord.

HIS LORDSHIP: He has said now he does.

MR. KEOGH: He says that theory was discredited.

HIS LORDSHIP: I am only taking the witness's answers to my questions and I do not think counsel ought to interrupt when I am questioning the witness. You tell me the witness is not saying what he is saying. Let us get it again. I understood you to say you had studied the three different classifications of injury and one is the visible, the other is the chronic and the other is the invisible. You understand them in those classifications? A. Yes, sir.

Q. Now, it is quite open to you to make any observations you wish to make as to the authenticity in that classification, or to disagree with any one in making such classification. It is only that you know of the problem that we are discussing. A. Your lordship, I have studied the question of acute, chronic and invisible injury and have determined the reality or otherwise of each form of injury.

MR. KEOGH: Then, his lordship —

HIS LORDSHIP: Yes. Proceed.

MR. KEOGH: Then, what observations, if any, did you want to make on this matter of chronic and invisible injury? A. I have come to the conclusion that there is no such thing as invisible injury.

Q. We are dealing now with sulphur dioxide. A. Yes, sir; that the term "invisible injury" is misleading, and that that condition referred to does not exist.

Q. Have you anything more to say in support of that statement, or may I pass on. I do not want to — A. I cannot tell you about the work of others on that point?

Q. No, you cannot tell me what experiments others have done. Well, do or do not any of these authorities that I recently mentioned support you in that view? Do not answer this until his lordship rules on it. Do or do not any such of these authorities as I have recently mentioned, namely, Thomas and Hill, and Professor Swan, and Dr. Crocker —

HIS LORDSHIP: No. I think if you had asked in the sense that the work is published and well-known, that is another matter. I would not rule on that at the moment. You can certainly use authorities in cross-examination, but examination-in-chief, I reserve that. But merely quoting what some person who has conducted experiments may have said —

MR. KEOGH: I do not want to quote them.

HIS LORDSHIP: No, but to say that he supports them on that —

MR. KEOGH: I did not word it properly. I should have said, "does the work of those men?"

HIS LORDSHIP: How do you mean, their work?

MR. KEOGH: Well, I mean the experiments.

HIS LORDSHIP: Oh, no, I cannot permit that. I thought you meant their work as meaning the published book.

MR. KEOGH: Well, I might ask him about the book, but I did not know. He has written a book himself, but I suppose, like lawyers, as long as you are alive, you are not considered an authority.

HIS LORDSHIP: He can speak for himself, without the book.

MR. SLAGHT: "Oh, that mine enemy —"

MR. KEOGH: Do you know of any other published text book, or work of science published on the subject that supports this statement you have just made against invisible injury — put it shortly that way? A. I know of many publications.

Q. Well, give us the names of some.

MR. SLAGHT: No, I object. If he is going to rely on something that he has read somewhere then, after the question is submitted to him, I may have something to say, something to object to, but I do submit to ask him whether he has read something, unless he has got it with him and is ready to quote it, but to have his memory of a secondhand recollection of something he read won't do, and in somebody else's book, I submit is clearly inadmissible.

HIS LORDSHIP: Well, I woud not admit it on that basis. If he has the book here and is saying, "I am relying on this work," I mean in the sense of a book, then that is one thing; but a published article or something like that, — you get all sorts of articles, even on law.

MR. KEOGH: Well, have you any book here — yes, that is right, my lord — have you any book here on which you are relying and which you say supports your statement against invisible injury? A. This is just a method —

HIS LORDSHIP: Just answer Mr. Keogh's question, and we will get on. A. Yes, sir.

Q. What is the name of it? A. I have reprints of articles published in the Scientific Literature.

HIS LORDSHIP: Now, that is not a book.

MR. KEOGH: His lordship does not want papers or articles. Have you any text book or books?

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HIS LORDSHIP: You might get articles written by people who have been active in developing one theory. You might have written on the one side everything by those who have been active in developing that anything is sulphur dioxide injury, and you might get articles written by those who are engaged in trying to show sulphur dioxide won't do any injury.

MR. KEOGH: Yes. I understand that you have not any book with you that supports it? Just say you have or have not. A. I have not got a book of any other author with me.

HIS LORDSHIP: We will have ten minutes intermission now.

——Intermission.

——On resuming:

MR. KEOGH: Q. Are greenhouse plants more susceptible to chronic injury from sulphur dioxide than plants outside? A. No, sir.

Q. Why do you say that? A. I have experimented with plants under greenhouse conditions and I have also conducted experiments with plants in the open air.

Q. And do those experiments support the answer you have just given? A. Yes, sir.

Q. Then, we had it mentioned by some of the plaintiff's witnesses, that a mixture of iron oxide and soot would absorb sulphur dioxide and, later on release it under humid conditions or spraying with water and other damp conditions. What do you say about that? A. I think that that is a highly speculative theory. Any absorption that would take place would be slight. Whatever sulphur dioxide was absorbed could not be released readily. If a small amount of it was released in rain water, the concentration and the effect would be very much less than gaseous sulphur dioxide which enters the stomata of the leaves directly. Sulphur dioxide dissolved in water does not enter the stomata of the leaves. It can only act on the tissue of the plant, which is protected by a waxy layer, and it is very well known that very much larger concentrations of sulphur dioxide are required in the form of solutions in water to cause injury to leaves, than gaseous sulphur dioxide in the air.

Q. I show you Exhibit No. 74 that was filed by Mr. Jarvis, of the gladioli leaves, according to the notation on it, dated June 18, 1947. What do you say as to whether or not that specimen shows injury from sulphur dioxide? A. It does not show injury typical of sulphur dioxide. It shows extensive injury from some other cause.

Q. Then, I show you Exhibit 79, dated July 31st, 1947, and I ask you the same question about that. A. That appears to be similar in character to the injury that you have showed me just before. Again, the symptoms are not typical of those symptoms of sulphur dioxide injury.

Q. Then, I show you Exhibit No. 82, filed by Mr. Jarvis, dated June 26th, 1948, of a specimen of gladiolus leaf. What do you say as to whether or not that specimen shows injuries caused by sulphur dioxide? A. That does not show injury by sulphur dioxide. It shows the same type of injury, to a lesser degree, as was evident in the previous exhibits that you showed me.

Q. Then, I show you Exhibit No. 91, filed by Mr. Jarvis, dated July 7th, 1948, of three gladioli leaves, and I ask you the same question regarding that exhibit. A. That shows extensive injury, not by sulphur dioxide; some other cause; definitely not by sulphur dioxide.

Q. Then, Exhibit 77, dated July 9th, 1947, with the notation "sweet-pea leaf," also filed by Mr. Jarvis. Does or does not that exhibit show any injury by sulphur dioxide? A. That is fairly close to what sulphur dioxide injury would show, which, taken away from its surroundings, I could not state it definitely one way or the other, but this is the first specimen I have seen in which the character of the markings approach those of sulphur dioxide.

Q. Then, we have had some evidence here about terrific draughts of air coming out of the cupolas of McKinnon's. As an expert on sulphur dioxide, what do you say would be the effect of terrific draughts of air in the cupola as to an increase or decrease of the sulphur dioxide emitted by the cupola into the atmosphere? A. I would say that if you greatly increase the amount of air present through the cupola, you are at the same time diluting the sulphur dioxide that is released with the air going through the cupola.

Q. Now, in all of your visits over the years, the latter part of 1944 extending down to the present time, have you seen any evidence of vibration damage to any of the plants and flowers in the McKinnon experimental plot, or in any other of the flower beds at the McKinnon Industries Limited? A. I have never seen damage caused by vibration to plants in that vicinity.

Q. Then, did you give certain wind charts, and wind data, to Mr. McAuley, the plant engineer of McKinnon's, and instruct him to have graphic charts prepared from that wind data? A. Yes, sir.

Q. And were the charts and the information that you gave to Mr. McAuley for that purpose, correct to the best of your knowledge? A. Yes, sir.

Q. Then, I show you Exhibit No. 27, a photograph which has been filed on behalf of the plaintiff and which bears a notation on the back, "August 7th, 1947, first photo of McKinnon Industries trial plot." If you look at that photograph, you will see a certain light discolouration on some of the gladioli leaves. Will you tell me whether or not those discolourations are due to sulphur dioxide injury? A. Those discolourations, not from looking at this photograph, but from my knowledge of what occurred, are not due to sulphur dioxide. I could not answer that question merely by looking at this photograph.

Q. But from your knowledge of the McKinnon experimental plot and from what you saw during the summer of 1947, and your knowledge of the gladioli shown in that photograph, can you tell me whether or not the light markings that appear on the gladioli leaves in that photograph Exhibit No. 27, are or are not due to sulphur dioxide injury?

HIS LORDSHIP: He has said he saw no sulphur dioxide injury on any plants in any of the area in the years 1945, 1946, 1947 and 1948, so now he has covered it.

MR. KEOGH: Yes, I had forgotten that, my lord.

HIS LORDSHIP: In his opinion, the whole area.

MR. KEOGH: Yes. Then, I won't bother about that. I have a few notations of extracts from Mr. Walker's diary. I did not intend to go into them, but I do wish to refer in a little slight detail to a few of them in each year, if your lordship thinks that they might be of assistance.

HIS LORDSHIP: Well, certainly anything that you think will make a contribution to the case, proceed with it.

MR. SLAGHT: You won't forget that he says there is no SO2 during the whole period.

HIS LORDSHIP: If it is just for the purpose of going over that again —

MR. KEOGH: No, I did not want to go over it. I just want to show a few differences between a few items of the diary and a few items in the charts.

MR. SLAGHT: Well, is that not a matter of argument, my lord? Is this witness going to be asked to listen to an item in the diary and then listen to an item in the chart and then say they do not jibe? I think that is a waste of time.

HIS LORDSHIP: Well, I will find out. If I think it is a waste of time, I will stop it.

MR. SLAGHT: We can tell whether they jibe or not.

HIS LORDSHIP: Well, I will find out. I want to see what Mr. Keogh is going to do first.

MR. KEOGH: Q. Will you turn up your detailed records for May 27th, 1946? You have a copy of all the statements filed? A. Yes, sir.

Q. And that is Exhibit 143.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Examination-in-Chief 4th May, 1949 Continued

HIS LORDSHIP: Now, just a moment, Mr. Keogh, so I can get my copy.

MR. KEOGH: May 27th, 1946, and during the first half-hour there was no record for some reason or other according to your Exhibit 143? A. Seven hours and 30 minutes.

Q. That is, there was no record until 7.30 a.m.? A. Yes, sir.

Q. From that time on what was the sulphur dioxide reading on that day? A. Zero.

Q. And then, the next day, May 28th, what was the sulphur dioxide reading the whole day? A. Zero.

HIS LORDSHIP: Well, it is "oil and gas" that is entered here.

MR. KEOGH: Well, "gas."

HIS LORDSHIP: I suppose that is a layman's interpretation of some distressing thing in the atmosphere. Of course, it is all right to point out that the machine did not record any sulphur dioxide on those dates, but we can do that, can we not, Mr. Keogh? As a matter of fact, I had in mind I was going to do it myself some evening.

MR. KEOGH: If your lordship makes that statement —

HIS LORDSHIP: I think you can point out in your argument that that is purely mechanical to indicate on the one exhibit what the record shows and on Mr. Walker's diary what he said about that date. It seems to me that is a purely mechanical operation that we do not need to take up the Court's time with, and if you have some assisant who makes notes on certain days that you want to direct my attention to in argument, and even hand me in a copy of it, it would save me a lot of time.

MR. KEOGH: Well, I agree. then, my lord. All right. Your witness, Mr. Slaght.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949

CROSS-EXAMINATION BY MR. SLAGHT:

Q. You slept well last evening, Dr. Katz? A. Yes, sir.

Q. I want to ask you first your academic qualifications. You are a chemical engineer? You are not a metallurgical engineer? A. No, sir. I am not a metallurgical engineer.

Q. No. Now, just let us spend a moment and try and outline the history of your contact here from the beginning. I will be very brief with you. Tell us. You came in 1944 first, November, was it? A. Yes, sir.

Q. And because the McKinnon general manager had asked your chief for you to be sent? A. He had asked—I don't know whether he asked for me, but he asked for an investigation to be undertaken and I was sent.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949 Continued

Q. Well, then, that covers my purpose. It was because the company asked somebody to be sent, that you turned up here? A. Yes.

Q. And who was that general manager on your first visit? A. I beg pardon.

Q. Who was it, Mr. Walker, or Mr. Cook? A. Mr. Cook is the general manager of McKinnon Industries.

Q. I mean, when you came in November, 1944, because I think there was a change then? A. Yes.

Q. Cook was here, and you say Cook? A. Yes, sir.

Q. And I suppose you sat down with him and with some of the others. First, let me ask when Gaukroger was chief metallurgist,—the man you saw in the box? A. I think he was at that time.

Q. And McAuley was the plant engineer? A. Yes.

Q. And you sat down with those gentlemen, or some of them, and got from them a history of what they could tell you about the evil gas conditions from their plant and any injury, or possibility of injury, to the surrounding country? A. Yes, sir. They would outline the problem to me substantially.

Q. Well, they outlined, yes, but that does not answer what I asked you. They outlined the problem to you, but I added would they give you a history of how they were operating their plant and the troubles that had been complained of by the neighbours? You were here to solve that kind of problem, weren't you? A. Yes, sir. They gave me an outline of the complaints and of their operations.

Q. Yes. And they told you that Walker had claimed he had had trouble with his greenhouse property in 1941? A. Yes, sir.

Q. And that they had paid him $1,128 damages, although they had made no admission whatever of liability? A. They mentioned something to me about damage payments.

Q. You would not remember the amount. A. No.

HIS LORDSHIP. Just a moment. There is one thing I want to get clear. You said that they outlined to you that they had complaints? To what extent did they say that they had had complaints? A. I have to rely solely on my memory, but I recall that I was told that complaints had been made by Mr. Walker that their operations were resulting in a deposit of dust and fly-ash on his property.

Q. Well, were there other complaints than Mr. Walker's? A. I think, as I recall, the main complaint was about dust and fly-ash. There was some mention of smoke, too.

Q. Now, will you listen to my question. I asked were there other complaints than Mr. Walker's. A. Oh, I am sorry, your lordship.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949 Continued

Q. You see, it is really important to listen to the question that is being asked. A. I was not aware of any other complaints made against the company, except complaints made by Mr. Walker.

Q. Very well.

MR. SLAGHT: Q. Then you came in then in 1945? A. In 1945, I came in October and November and I paid a visit in December.

Q. In what? A. In December.

Q. You did not come before October in 1945? A. No, sir, 1944, I am sorry. I understood you to refer to 1944.

Q. Oh, well, I am sorry. I thought I said 1945. I meant 1945. You came in 1945? A. I came in 1945.

Q. I didn't ask you for the details, if you don't want to give them. A. I came towards the end of April, was also present in May.

Q. Never mind. You had many visits in 1945, starting in April? A. Yes.

Q. And you met, of course, Mr. Reginald Williams, chemist and assistant to the chief metallurgst,—probably you met him in 1944, when you first came here? A. I recall meeting him, yes, sir.

Q. And you saw him in the box and heard his evidence here. A. Yes, sir.

Q. That is the man—you recalled him? A. Yes, sir.

Q. And you discussed the problem you were on with him? A. No, sir. I did not discuss my problem with Mr. Williams.

Q. And you learned then, let me ask you this, during your visits in 1945, 1946 and 1947, and throughout the period from then on, did you keep contact with Cook, McAuley, and the appropriate metallurgical people that would have information about conditions here? A. I did keep in touch with Mr. Cook, Mr. McAuley and once in a while with Mr. Gaukroger.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949

Q. And Gaukroger was the chief metallurgist under whom Reginald Williams worked? A. Yes, sir.

Q. And you were here when Williams put in Exhibit 118, dated July 5th, 1945, which showed a series of readings at the charging house before the wash in the cupolas of the gas that went out after the wash, out of the chimney? Exhibit 118. You heard him testify as to that? A. Yes, sir.

Q. And that, in every instance, there appeared to be a certain amount of gas escape and go into the air from the chimney—we won't bother with the quantities—you heard that? A. Yes, sir.

Q. Now then, Williams or Gaukroger, of course, in 1945 told you about that. That was an important investigation. What do you say? A. I do not recall ever being informed of this exhibit that you mention.

Q. I did not ask you about the exhibit. I asked you about the fact that they had— A. No, sir.

Q. —had an apparatus there that took a record before washing and after washing, and found SO_2 all the time coming out the chimney in quantities. We won't discuss just now the amount. They told you that, did they not. A. No, sir.

Q. Well, how can you account for their not telling you that? A. I don't know.

Q. Well, is it your story that you first heard of that investigation by this company in the Courtroom here? A. Yes, sir.

Q. That is your statement? And you perhaps noted that when Mr. Williams was giving us his statement, that the company had made up a record of C.O., which is carbon monoxide, is it not? A. Carbon monoxide, yes, sir.

Q. And you may not have followed the details of Exhibit 118, but I will show you that they had substantial quantities of C.O. before wash and then a percentage of C.O. is shown after the wash? A. Yes.

Q. 3%—3.6 and 3.3? A. Yes.

Q. And 3% of C.O. is 30,000 parts to the million. A. Yes, sir.

Q. I am differentiating the percentage from parts to the million. A. Yes.

Q. So their records, which they thought they should take, of carbon monoxide, showed 30,000 parts to the million? A. Yes, sir.

Q. And carbon monoxide is, first, let us say it is a deadly gas. A. That depends on the concentration, sir.

Q. Yes, of course. And you have read a good deal of the literature on plant injury from gases, have you not. A. Yes, sir.

Q. And you are doubtless familiar with the well-known work known as "Commercial Flower Forcing, Fundamentals and Their Practical Application to the Culture of Greenhouse Crops," by Dr. Alec Lorie, professor of flower culture in the Ohio State University. You know there is a book of this type? A. I have heard of it.

Q. It is a reputed work, is it not? A. Yes.

Q. Because I have in my hand the fifth edition, in 1948, and I see these gentlemen have been publishing this book since back in 1934, 1939, 1944, 1948, and this is the fifth edition. I am going to read you an extract.

HIS LORDSHIP: Excuse me, Mr. Slaght. What is the name of the work?

MR. SLAGHT: The work itself, my lord, is "Commercial Flower Forcing," and the front page says, "Practical Application of the Culture of Greenhouse Crops." That is an aside, and it is Lorie and Giplinger. This is what these gentlemen say and, by the way, you are not a professor in flora culture? A. No, sir.

Q. They say at the top of 249, under the heading, "Injury by toxic gases." "Illuminating gas; this gas usually contains 33% carbon monoxide, and 10% illuminants (ethylene and others), frequently causing injury to greenhouse plants." What do you say as to that statement that these authors make? A. It is true that illuminating gas frequently causes injury to greenhouse plants.

Q. And the carbon monoxide in it is a factor in the gas? A. To some extent, I suppose, yes.

Q. Well, don't suppose. Are you prepared to deny that it is? A. No, sir, I am not prepared to deny it.

Q. No, you are not prepared to deny that carbon monoxide is a factor. And I call your attention to the fact that back in 1944, they were letting loose on the neighbours 30,000 parts per million of carbon monoxide, and I suggest to you that that would be injurious to plants in the neighbourhood. What do you say? A. That is merely a hypothetical suggestion, Mr. Slaght.

Q. From whom? A. You have suggested that to me, and I say that that is a hypothetical suggestion, because we are dealing with concentrations in the stack and not concentrations on the ground, which is a totally different thing.

HIS LORDSHIP: The question Mr. Slaght has put to you is that the concentration being released in the stack, would that not be, I will put it, liable to be injurious to plant life?

MR. SLAGHT: If it reached the plant life, of course.

THE WITNESS: I have never heard of a single case of carbon monoxide being released from a stack that would be injurious to plant life, only when it is released from a broken gas main under a greenhouse, not when it is released from the top of a stack, because there are infinitely higher concentrations of carbon monoxide in smoke released from other types of stack.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949 Continued

Q. All right. Now, having told me that, I ask you this. Are you prepared to deny that 30,000 parts of carbon monoxide released from a stack and diffused in the neighbourhood, cannot injure plants 600 feet from the top of the stack? A. I say that the possibility of that is extremely remote.

Q. Well, how remote? A. I have never encountered a case of carbon monoxide injury to plant life, traceable to carbon monoxide released from a stack.

Q. Well, where did you ever investigate that problem? A. I have studied literature on that problem.

Q. Except for studying literature, did you ever make any tests. A. I beg pardon, sir?

Q. Except for studying literature, did you ever make any practical tests? A. I did not make practical tests with the carbon monoxide in my experiments.

Q. And never have analyzed a shrub, or plant, or leaf which was subjected to carbon monoxide from a stack? A. No, I have not analyzed plants subjected to carbon monoxide.

Q. Then, if Reginald Williams and his chief, Mr. Gaukroger, had disclosed to you the result of their apparatus in the cupolas in 1945, would you have thought that those were of some value? A. It would have indicated to me that sulphur dioxide concentrations in the stack were extremely low and the carbon dioxide concentrations as one would normally expect, and also the carbon monoxide concentration is one which you would normally expect in stack gas.

Q. Then, you heard that Gaukroger, in 1949, this year, April, did a similar operation before and after the wash? A. Yes, sir.

Q. And got as high as nine parts to a million in one of his records? A. Yes, sir.

Q. I have in mind Exhibit 121. And can you account for the vast difference between what Williams was getting in 1945 and the records that they got also in 1949 as the top one? I may tell you in 1948, unless their system of water-wash was less efficient in 1948 than it was in 1945— A. Mr. Slaght, could I have a look at those exhibits that you are mentioning?

Q. You may, if you like, but I am telling you that it is vastly different. A. I just wanted to find out whether these were simultaneous tests conducted by Mr. Williams in 1945, or not.

HIS LORDSHIP: Q. They were not, according to the evidence. The tests in 1949 were.

THE WITNESS: I cannot compare simultaneous tests with tests that were not made simultaneously.

MR. SLAGHT: Well, should they all have been made simultaneously? A. Well, that is the normal way of doing it, is to make simultaneous tests.

HIS LORDSHIP: Before you leave that, there is something I wanted to ask the doctor. If you will look at the Williams test before washing and look at the Gaukroger tests before washing, you will find on the first test, the Williams test is 1.6 before washing, whereas the first Gaukroger test is 24 and the next Williams test is 2.9, the next Gaukroger test is 25; the next Williams test is 2.3, the next Gaukroger test is 14, and then there are several other Williams tests that run 1.8, 3.11 and 8, and the Gaukroger test at 19, and you have said the Williams tests were what you would normally expect— A. Not in—

Q. Just a moment till I get through. You said the Williams tests were what you would normally expect in a stack. Well, now, having in mind what I have pointed out to you about the Gaukroger tests, have you any observation to make? A. Your lordship, what I meant to say, that the Williams tests were normal—what we would expect for carbon monoxide and carbon dioxide on a stack.

Q. Oh, we are talking about SO_2. A. But the SO_2 was very low. Isn't that what I said.

MR. SLAGHT: Yes, that is what you said.

HIS LORDSHIP: Yes, you said it was low and what you would normally expect in a stack. That is what I thought was taken down. You see, when you are giving evidence, you are a scientist, and you are not a layman who may be given latitude to make probably not as careful or precise statements as we expect from a scientist. Now, I will have the Reporter turn it up; unless I am unfair to you—just a moment—I will have the Reporter turn up that question that was put by Mr. Slaght and then we will have any observation you want to make about it.

THE REPORTER: "It would have indicated to me that sulphur dioxide concentrations in the stack were extremely low and the carbon dioxide concentrations as one would normally expect and also the carbon monoxide concentration is one which you would normally expect in stack gas."

HIS LORDSHIP: Now, you were intending what one would normally expect to refer to, carbon monoxide and carbon dioxide? A. Yes.

Q. Then, have you any observation to make as to why there should be such a wide variation in the Williams tests in 1945 and the Gaukroger tests in 1949?

MR. SLAGHT: It jumps from 1, 2 and 3, to 24, 15 and 24.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949 Continued

HIS LORDSHIP: Well, just let me finish with the witness first, Mr. Slaght.

THE WITNESS: There are only two answers, as far as I see it. One, the different manner in which the tests were made. That is, one was a test on simultaneous tests, and the others were based on different tests taken at different times, but not simultaneous.

Q. No, but don't let us get confused. I am dealing with tests taken before the wash. Now, that does not make any difference, as far as I can see it. I can understand and I was pointing out to Mr. Williams what I thought would be the advisability of a simultaneous test, and I am with you completely on that, but why there should be such a wide variation between 1945 and 1949 in the tests before the wash, I should like to know. A. I was going on to say, your lordship, that there is another possibility, that the sulphur content of the coke is not the same now as it was then and, lastly, there is a possibility that one of the tests for sulphur dioxide, one of the methods may not be as accurate as it should be.

Q. Well, had you anything to do with these tests in 1949? A. Mr. Gaukroger told me he was going to make the tests and he also showed me his procedure. I had a look at it and I thought it was all right for that purpose.

Q. Was that before he made the tests that were made in March? You see, he said he made some tests, the record of which was torn up, and then there were these tests made in one day in April, I think, or two days in April. A. Your lordship, in March I was never in St. Catharines. I was away in the United States part of the time.

Q. Did he tell you about the tests he had made in March, the results of which were destroyed? A. I don't recall.

Q. Well, proceed, Mr. Slaght.

MR. SLAGHT: Well, then, just come back to this. We find 24, 24, 19 and so on, high concentrations before the wash in 1949, recently, and altogether out of line with anything they got in 1945, and I suggest that one thing may account for that is what you were fair enough to put to us, that the coke is not as good quality, so that the coke they are using or the way they are using it is throwing off more SO_2 down in the charging beds; that is inevitable, isn't it? Something is doing it? A. Yes, sir.

Q. Now, are you assuming that the tests are accurate, and you told us you approved of the way Gaukroger was going to do it. Assuming the tests are accurate, put forward by the company, have you any explanation as to why this company was throwing off SO_2 by their process which they controlled, before the wash, at such high rates as this. A. Having in mind the

quantity of coke which is probably used in the process, I do not think that those concentrations of sulphur dioxide are high.

Q. Then, that means that there is a large quantity of coke used in the cupolas now? A. Relatively, yes.

Q. The more coke you consume in one cupola, the more SO_2 you are going to throw on the neighbors? A. Yes, sir.

Q. That follows naturally. Now, coming to another matter. Who chose the test plot south of Carlton Street, where we find it on the map? Who chose the spot? A. This spot was chosen by myself and in consultation with the company, after it was found that that was the only suitable location in that area, having regard to Mr. Walker's greenhouse situation.

Q. But you were the guiding genius, I take it, and the company fell in with your suggestion? A. I approved the choice of that spot.

Q. That is good enough, and that is fair. Now, I am going to show you a couple of spots that I suggest would have been infinitely better for your plant recorder and setting up a test plot to find out whether or not the stuff going over Walker's was injurious or not. Will you look at Exhibit No. 11 for a moment. Put it around this way. That's right. Now, you see the cupolas over here? A. Yes, sir.

Q. And the forge shop over here? A. Yes, sir.

Q. We have heard that the prevailing winds were south and southwest and west winds? A. Yes, sir.

Q. And we heard they were 184 days a year in one year, an average of 50% of the winds all the year around were of that type. You heard that evidence from the Bureau man? A. Yes.

Q. And therefore from the cupolas Walker's greenhouses, with a southwest wind, were getting practically a steady dosage while the wind was southwest? A. I don't understand what you mean by a steady dosage. You mean smoke from the cupolas was continuously being deposited on him?

Q. No. When the wind was that way, if there was smoke from the cupolas—and we have never heard of them when there was not—then Walker was in the trail of southwest and south and west winds? A. Yes, sir.

Q. Now then, you see on this map a place—just look at this little place where I put a cross, just south of Manchester Avenue and just— A. Right here?

Q. Yes, that's it. I put a little cross there with a lead pencil and that lot we find was owned by a Mr. M. Ciurhiuni. and I put a cross at the top of Ciurhiuni's lot, just south of Manchester? A. Yes.

Q. If you look above—do you see that? A. Yes.

Q. And see the property across Manchester Avenue, the farm of S. Manesu, just across. I put the letter "Y." Do you see that? A. Yes.

Q. Now, if you had arranged with either of those Armenian gentlemen and put your test house up there and put your small plots there, you would have had practically a perfect condition to test what Walker was getting from your chimneys, wouldn't you? A. No, sir, I don't think so.

Q. Don't you? Well, why? A. I don't think so. One location was in an area that was definitely wider off Walker's buildings, and the other location was off to the northeast.

Q. Well, off to the northeast. He is still right in a line with the southwest wind, isn't it? A. Yes, with a southwest wind.

Q. For your lordship's benefit, will you corroborate the fact that the "Y" I have put on the fruit farm is just above the word "Manasium" farm. The "Y" I have inserted there, just above the word "Manasium".

THE WITNESS: Yes.

Q. Well, are you suggesting that is not right in line with the southwest wind? Your lordship sees the "X"—here is the "X" on the one Armenian, and here is the "Y" on the other, and I am suggesting—

HIS LORDSHIP: Well, that wording is not on the exhibit.

MR. SLAGHT: I am asking from Exhibit No. 11, my lord. You may have one.

HIS LORDSHIP: Oh, yes, it is on there, but I do not think it is in quite the same position as the one you had.

MR. SLAGHT: Well, I thought I had an exact duplicate.

HIS LORDSHIP: Well, I think the lettering is a little over to the right on the Court's copy.

MR. SLAGHT: Well, I am sorry for that.

HIS LORDSHIP: Well, you had better put the "X" and "Y" on the Court copy.

MR. SLAGHT: There is the letter "X", with the Manasium property, just south of Manchester, and here is the "Y" on the Ciurhuini property just above his name and on the north side of Manchester. Now, you are saying you think the "X" spot below Manchester might be wider somewhat from Walker's greenhouses on the days when it was humid and the concentration, with the conditions right for serious injury, that is, the humidity not too high, the wind and temperature and so on, the place marked "X" would have shared with Walker those conditions, and I suggest would have been a likely spot? A. It would have been a likely spot. We offered to put the record recorder right on Mr. Walker's property.

Q. You told us that before. A. Yes, sir.

Q. Did that exhaust your ideas to get a likely spot where conditions would be similar? You never went near any of these Armenians to get a spot up there such as "Y" or "X" where you were bound to have a similarity of condition exactly as Walker was getting,—dust and gases, and whatever they were? Why didn't you do that, witness? A. I was convinced that the present location of our test house was a good one.

Q. I see. But you are not telling this Court it was as good as it would have been at the point "Y", are you? A. I am not doing that, but I am saying that the present location was one of the possible sites and was a good one, and I was told that it was the only spot available for putting the recorder on.

Q. Who told you that? A. Well, that was an impression that this property here was readily available and therefore access could be had to it, and we put the—

Q. Did anybody try these Armenians with $10 a year for a little test hut there, on their plot? Did they? Perhaps you didn't think of it. Is that your story? A. I looked at the area. I looked at the situation of the Walker greenhouses with respect to the plant. I also looked at the arrangement of the plant. We are convenient, ourselves, to this side line, but we also have a plant on this side, too, and I thought, all things considered, that that was a good spot. If we could have got on to Mr. Walker's property, it would have been the best spot.

Q. Yes, but you go a mile and a half south in town and put up one in Dunn's place, there. There was no idea you were getting, at Dunn's, the condition you were getting at Walker's was there? A. I wanted to determine what was the level of pollution in St. Catharines, because it seemed a great mystery.

Q. Well, why not determine that for a year or two and then move your Dunn's recorder over to an available spot on this side of the Walker property where you were getting the same conditions? A. That could be done, too.

Q. Well, why wasn't it done? A. It wasn't done simply because the important problem was here, first.

Q. When you say "here", you are pointing to the test house? A. I am pointing at this area here.

Q. At the test house? A. Yes, the test house.

Q. Now, let me ask you this. Taking your test house, and I am putting my pencil—I have not a ruler but that is long enough—over to the forge shop from your test house; you would have to have, in order for the forge house fumes to go over your test house at all, a northeast wind? A. Northeast?

Q. Yes, from the northeast? A. No, sir.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949 Continued

Q. From what direction? A. The wind from that direction is not northeast.

Q. Well, wait, now. I have got the pencil on here, from the forge shop to your test house. A. Where is your north line on this? Here it is. You put your line approximately like that, and that is not northeast; that is northwest.

Q. Oh, no, but you are not doing what I am doing at all. Well, from the northwest, then? A. That is the conventional way of expressing wind direction.

Q. Then, you had to have a northwest wind for fumes from the forge shop to reach your test plot, where you put it? A. And we do get northwest winds.

Q. I didn't ask you that. You had to have a northwest wind? A. Yes.

Q. Although you knew the prevailing winds were from the southwest, did you not? A. That is a very popular expression. I can show you months when the prevailing winds were not from the southwest. Over a long period of time, I think it is right. Over a year, I would say, that the winds are from the southwest.

—Whereupon Court adjourned until 2.15 p.m.

Wednesday afternoon, May 4, 1949, 2.15 p.m.

CROSS-EXAMINATION OF DR. KATZ
CONTINUED BY MR. SLAGHT:

Q. Dr. Katz, I did not quite complete the history of your contract this morning, and I would like to do that with you now. You said you first came over here for the Research Council? Was it the Research Council, or the Institute? A. Yes.

Q. And then, at a later stage, I thought you said, after you left them, they told you to get your money from the McKinnon Company? A. I left the Research Council to go to another department, in 1947.

Q. Well, what was the date you were told to get your expenses from the McKinnon's, approximately? A. Approximately in December of 1947.

Q. May I take it that, since that time, you have been paid by them, both for the services for these many trips over here and your out-of-pocket disbursements? A. Yes, sir.

Q. I am not interested in how much, but they have been your sole paymaster for the trips you were caused to make in coming here, and the investigation, and the incidental expenses? A. Yes, sir.

Q. Was that same true before December, 1947? A. No, sir.

Q. The National Research Council paid you for the work they did here? A. Yes, sir, and billed the company.

Q. Oh, they billed the company? A. Yes, the National Research Council billed the company up to December of 1947.

Q. Yes, I see, because I would be surprised otherwise. Now then, you learned that a writ had been issued in this case on the 16th March, 1946, by Mr. Walker. This present action commenced then? A. Yes, I did hear of it shortly afterwards, yes, sir.

Q. And I suppose when the Research Council learned that in 1947, they said, "Here, this is not a government job but a lawsuit," and they referred you to McKinnon's and you have been their man ever since? A. No, sir, that is not the case. The National Research Council simply told me to investigate—when I left the National Research Council, it was agreed that I finish the work that I had started.

Q. At McKinnon's expense? A. Yes, sir.

Q. Dr. McKenzie, the head of your Council? A. He is head of the National Research Council.

Q. I know him very well, and I would be surprised if he ran taxpayers in to win a lawsuit for McKinnon's. You do not suggest that, do you? A. No, sir.

HIS LORDSHIP: Well, I am a little surprised to know that that situation was in existence, that an employee of the government was doing investigation work for a company, pertaining to a lawsuit.

MR. SLAGHT: My lord, prior to 1946 that would not be so, but from March, 1947, that would be so—no, from 1946 on, and the witness told me when he first took it up, he understood there was a threatened action. I am just curious to know—I don't know that it is any of my business—

THE WITNESS: Your honour, I was told to continue the investigation—your lordship, I beg pardon—I was told to continue the investigation in response to requests made by the company, that is all.

HIS LORDSHIP: Were you making reports of your investigations conducted throughout 1946? A. Yes, sir.

Q. To whom. A. To the Research Council.

Q. Well, did they go to McKinnon's? A. Yes, sir, they went to McKinnon's.

Q. And did you know a writ had been issued when you were doing that? A. I was aware—I was told that a writ had been issued, yes, sir.

Q. Well, were you being paid anything in addition to your salary, throughout that time? A. In addition to my salary.

Q. I suppose you were on salary with the National Research Council? A. Yes, sir.

Q. Were you being paid anything in addition to your salary, for this investigation? A. I was. In 1946 I was paid something in addition.

MR. SLAGHT: Yes. After the writ was issued? A. Yes, sir.

HIS LORDSHIP: By the Research Council, or by McKinnon's? A. By McKinnon's.

MR. SLAGHT: Well, you see, when you stepped into the box here, you rather left the impression that you were an isolated government man, and just here academically. That is not so. You were their man. You have told me that. Now then, I just want to finish this, but I have discovered two more locations, two more places here which I think would be marvellous had you tried to get a situation such as you would catch, in your detectors, what was going over Walker. I have put a "Z" at the top of a lot just south of Manchester Avenue, owned by Joseph Patterson. Now, if you will take the line from Joseph Patterson's to the forge shop, Joseph Patterson's, through the cupolas, you will find both of them directly over McKinnon's, don't they? A. A straight line of the company's directly over those, yes.

Q. That is my point. So I will put "Z" up in the top of Joseph Patterson's place, just off Manchester. Then, I am intrigued with Solomon Boydgain. He has got a lot there, right next to Patterson, and I have put "AA" just south of Manchester Avenue on the top of Joseph Patterson's place and similarly, we can see, without any rulers, from there to Patterson's and the forge shop to Patterson's, the wind must pass over Walker's? A. If the wind was in a straight line southwest, but the wind direction will swing a number of degrees, and I have watched the smoke and other affluents coming out of the foundry forge shop and so on, and I think that that location of the test house was a good one, bearing in mind all the factors involved.

Q. Well, I don't know what you mean by the word "good". it might have been good for your side. It was not good for us. A. I believe that that test house was just as good for your side as for any other side.

Q. Do you? A. Yes.

Q. Well, would you answer the question I have asked you, which you have not answered at all. Is it not apparent that if the wind was blowing from the forge shop over the Walker property and from the cupolas over the Walker property, that a recorder established at Patterson's and Solomon Boydgain's would be bound to get practically the same dust and gas as Walker was

getting, assume the wind is blowing that way; never mind other winds blowing right over Walker's. A. The smoke and dust and so on, after it leaves the chimneys, fans out in the form of a cone, consequently it cannot fall on any rigid line such as you have indicated.

Q. Is that the best answer you can make to my question? If you say it is, I will leave it. Is that the best answer you can make to my specific question that a wind which was blowing over Walker's greenhouse plant in the main would be bound to blow over both those points I have indicated? Cannot you answer that? A. Yes, sir, I can answer it. I would say that, bearing in mind that a wind is never strictly in a direction that is called, that the smoke would go back and forth from our station to Walker's and so on.

Q. Let me see how far you will go. I didn't ask you anything about your station. Do you mean that if a wind is going over the Walker plant, as I have put to you about four times, and blowing over there—never mind your station—that it would chop off in the 40 or 50 or 80 feet it had to go on to go over these two last points I have indicated to you? You mean the wind would not go over there and catch your test house there? A. I mean that on the average, the smoke would reach our test station about as much as the Walker place.

Q. Now, Dr. Katz, if you were not an educated man I might have to expect that, but you know that is not an answer to my question. My question does not involve your test house at all. It is simple. Do you go so far as to say that with the wind blowing from the cupolas and the forge houses over the Walker properties that it would cut off and not go on the 50 or 60 or 80 feet necessary to go through your recorders had you planted them where I suggest you might have? A. It certainly would have gone on.

Q. Well, I am afraid we have wasted a lot of time on that. Then. why not use a portable recorder instead of these fixed ones? A. A portable recorder would never give the concentration intermittently whenever it was used. It would not give us any idea of the continuous conditions. It would only give an intermittent test.

Q. Well, what do you mean by that? If you did not move it, it would give the same test as the other, would it not? A. If you operated on it day and night, it would.

Q. All right. Then, let us take that. And I suggest to you that higher readings are obtained by portable recorders in these tests than they are by stationary ones? A. I disagree with that, sir.

Q. Do you? A. Yes.

Q. Well, you wrote a book—I am going to read you what the other Katz said about that. Page 48 of your book, "Effect of sulphur dioxide on vegetation." That blue cover? A. Yes, sir.

Q. You know it, and you sell this to the public as something they can rely on? A. I don't sell them.

Q. No, you don't market it, but you get a little royalty? A. I get no royalty on it, sir.

Q. Then, you are responsible for passing it out to the public for something they can depend on from Katz? A. That book is printed under the auspices of the National Research Council.

Q. You did not put false information in it? A. No, sir.

Q. I will read you at page 48:

"As a rule, higher readings were obtained by the portable "apparatus than were found by the stationary automatic "recorder owing to the mobility of the former which could "be transported in the path of a given smoke stream." Do you disagree with that? A. I do not. That is a correct statement, the whole statement; you only asked me part of that statement.

Q. Well, then, take the statement apart, if you like:

"Higher readings were obtained by the portable apparatus." You did not want higher readings in this case, did you, of SO_2?

HIS LORDSHIP: We have not got to that stage yet.

MR. SLAGHT: Q. You know what I mean when I say you did not. You were better satisfied if you got low SO_2 readings? A. Mr. Slaght—

Q. Is that true or not? A. Mr. Slaght, I conducted this investigation fairly.

Q. I will assume that. A. And honestly.

Q. I will assume that. Let me put it this way. Your client's cause would be better off if you got lower readings than higher readings, of SO_2, assuming all the fairness in the world on your part. Is that true? A. That is a general statement.

Q. Then I go back to the other Katz, here, and he tells that as a rule, higher readings were obtained by portable apparatus than were found by the stationary automatic recorder, and I am breaking it up for you. It is just about the middle of the page, Mr. Keogh. A. Might I say that this reference is to an investigation on smoke in a city and that, with that in mind, the statements contained in here are correct. In other words, it is an investigation that was directed to following given smoke conditions as a result of the movement of smoke from one area to another.

Q. Quite so, and is there any other comment you want to make on the truthfulness of that statement, because I am going to leave it? A. I want to explain, too, that, with portable equipment you can go for miles to the point where a gas stream is heaviest, because you can see it; but, here, in this particular case, we have a small area. There would be nothing very much more added to the picture by using portable equipment. In fact, I would have amassed as many high readings, or comparatively high readings, much more from early in the morning or at night, or at a particular time when the person conducting the portable tests would not be there.

Q. Are you serious in that, that nothing would be gained by a portable here? A. Not in this case, no.

Q. Well, take in this case. I suggest to you you could have taken a portable here, after an hour on one side of the cupolas over to the far side of the cupolas, just as you admitted the other day would be far better. What do you say? A. They would only tell us of conditions over a few hours.

Q. Well, had it gone for three years? A. Yes.

Q. What then? A. I suggest that that would be an extremely impractical method of doing an investigation over a season.

Q. Oh, impractical. Had they carried this on a truck, this portable apparatus, what is impractical about a truck driver having it in position at McKinnon's, and then having it on the other side for an hour? Anything impractical about that? A. The equipment required would have to be transported to the laboratory to analyze—either the cylinders would have to be transported to the laboratory to analyze, or else the equipment required would be extremely bulky and could not be transported in that manner.

Q. Well, then, why do you comment in your book, "Portable apparatus is getting a higher rate than a stationary automatic recorder"? A. I have already explained that fact that, with the portable—

Q. All right, then; do not do it again. If you have nothing to add to your explanation, I will take it. A. No, sir.

HIS LORDSHIP: I would just like to get from you this. The only thing you were concerned in was the contribution that McKinnon's were making to the sulphur dioxide in the air? That is the only thing, was it not? A. Yes, sir.

Q. It was the really important thing? A. Yes, it was the important thing.

Q. Well, then, if you were setting up two apparatus, why not set up one northeast of the cupolas and one southwest of the cupolas? That would give you a pretty fair indication of the contribution they were making, that would affect Walker? That

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is what really puzzles me, because there are two ways to conduct an investigation: one to find out really what the fact is, and the other to prepare a case to meet a lawsuit. Now, you say you were approaching it perfectly fairly and I am puzzled about that. It would have seemed to me, a layman on the subject, to be so perfectly obvious that one would have said, "Well, we will put up one each side and settle this thing." A. That would have been—that might have been a possible method.

Q. Well, why would it not have been a good method? The real problem was what contribution McKinnon's were making to the sulphur dioxide in the air that passed over Walker's. Now, the only time it could pass over Walker's was when the wind was in the southwest or thereabouts, north, south, southwest, or in that area. Now, just take and draw a line across Walker's and put your test house to the northeast and take the line down across the alleged source of sulphur dioxide and put it to the southwest, and would not the two readings, as far as the McKinnon operation is concerned, almost settle the thing? A. Well, not as much, your lordship, as putting a recorder in another part of town would do the same thing.

Q. Well, I do not think it would. Now, if I am called upon to exercise judgment on it. There is a point in which one can just decide what is the proper explanation. Now, I am putting a perfectly simple thing. Take and set up your recorder as nearly as you can to catch the fumes that would be passing over Walker's. Now, what is it you want to find out? You want to find out what fumes are passing over Walker's? A. Yes, sir.

Q. Then, set up the recorder in a direct line the same distance either side of the cupolas, and you would have, as far as mechanically possible, with the recorder, a correct measure of the contribution that McKinnon's was making to the fumes that were passing over Walker's would you not? A. It would be possible to do that, yes, sir.

Q. And you would have had, if you did it? A. Yes, sir.

Q. All right.

MR. SLAGHT: Q. Then, Dr. Katz, I put this to you. Did you or not deliberately refrain, over these years, from what seems to me the obvious course of taking recordings both in front and behind the cupolas, or have we got to leave it that you simply did not do it? Was it design that you did no do it, or was it just a fluke, or a mistake that you did not do it? A. It was no design at all. I had this recorder and I put it where I thought was the best place for it.

Q. You mean a mile and a half uptown, at Dunn's? A. Yes, sir.

Q. And what about the third recorder? These are jerry-made recorders. You had a machinist over here that never made a recorder in his life make it, didn't you? A. The mechanical part was made from drawing and specifications.

Q. Well, of course it was, but you had a machinist do the mechanics, who had never made a recorder in his life. Isn't that true? A. Yes, sir.

Q. You could have bought a ready-made wire recorder from the Thomas people, or from the Crow people? A. From the Thomas people.

Q. And you could have bought a portable one from them? A. Yes, sir.

Q. Who was the chief mechanic that made this recorder, a delicate machine, I suppose you will agree with me, from a drawing, plus your instruction to him? A. I didn't know the name.

Q. Would you tell me how long it took him to make one of them? I suggest to you— A. Several months.

Q. And how much of those months were you at his elbow helping him—once a month? A. I came in once or twice to see how it was getting on.

Q. And then the rest you left to an unknown, or rather, an unnamed person, unnamed to you, a mechanic who had never built one in his life? A. Pardon me, the recording conductivity part was supplied. They did not build that.

Q. No. Well, you bought that from whom? A. Leeds and Northrope.

Q. What make was it? A. The recording, Weedstone Bridge galvanometer, from the Leeds and Northrope Company.

Q. Yes, but known by the machine? Was it a Thomas machine? A. Yes, it was a Thomas machine.

Q. Supplied by Leeds and Northrope, who sold you certain parts for it? A. Yes.

Q. But the parts the mechanic built were very important parts as well, were they not? A. Yes.

Q. How many months was he building it? A. I said several months.

Q. Couldn't you tell me how many? Would you say seven? A. I said several.

Q. And several months to build the second one? A. The second one was obtained from the Sudbury investigation after we had no use for it up there.

Q. So that we have one machine which is now being correlated, got from Sudbury. Who built that up there, do you know? A. Built by Thomas.

Q. Oh, yes, that was a real Thomas machine, and this correlation of results as between the Thomas-built machine and the machine built by the mechanic in the McKinnon Industries took you several months? You gave him some drawings. You saw him once a month only and those two are put forward as likely to record some kind of proper results. That is putting the picture fairly, is it? A. They recorded the results properly.

Q. Well, then, would it be fair for me to say over this whole period you took very little interest in the efficiency of the devices inside the cupola? A. I did not concern myself with the efficiency of the devices inside the cupola.

Q. That is what I gathered. You were in the cupola once, inside it. Is that right? I thought you told me that. A. Yes, I made probably several visits.

Q. Probably several visits. A. Yes, sir.

Q. They were not operating when you were inside? A. Inside the building?

Q. Inside the cupola? A. I was never inside the cupola. I was in the part of the foundry where the cupolas are set up.

Q. Well, I am afraid you would have been a cinder if you had been inside the cupola. Now, let us see. You were not inside the cupolas at all at any time when they were not in operation? A. No, sir.

Q. The plant was shut down for two weeks. You could have been inside and examined very efficiently, had you been interested? A. Mr. Slaght, I did this work to the best of my ability and having regard to the time available. I could not do more than I have done, and I therefore could not concern myself with purely company operations.

Q. I see. Well, then, that is your position. We know you did not pay any attention to their efficiency. Then, we get back again, because you did not answer my question, you have never been inside a cupola when it was dead and cold? A. No, sir.

Q. And you have never looked over the chimney to see how it was operating in either of their systems; that circular drip through the pin-holes, nor the present system where it comes through a tube at the top of the cone? You have never seen either of those in operation? A. I have looked over the top once or twice, but I have not paid too great attention to the details of the operation.

Q. Well, I mean looked down in to see. You told us yesterday you had not looked at it. A. I did say that I looked to see if there was a system of nozzles spraying the water out in the form of a curtain.

Q. But you paid no attention to the efficiency or otherwise of its operation? A. No, sir, I did not do that.

Q. And can you tell me anytbody that did it and was required to report to you? You were in charge of this investigation, now, for your clients; anybody report to you that they were making any periodical inspection of these cupolas for efficiency, because, you know, we have had an awful story about March 14th this year. Will you answer? A. There are two questions there, Mr. Slaght.

Q. Yes, you are right. Anybody report to you on a periodical examination, by them, of the efficient operation of the cupolas? A. I only know in a general way that somebody would go up and make an inspection.

Q. That is no answer at all. A. I have no definite report.

Q. I am asking a simple question. Did anybody report to you about it? A. No, sir.

Q. I cannot cross-examine "General Ways". A. No, sir.

Q. Did Reginald Williams tell you in 1945, when you were visiting with him on your visits and he apparently had to do with it, did he tell you that the spray or nozzle was clogging in 1945, from January on to when he left in October, 1945? A. No, sir; Mr. Williams never told me that.

Q. Did Mr. Cook or anybody else report to you there was trouble in the wash? A. I recall Mr. McAuley telling me something about that.

Q. And you were not interested enough to find out what the trouble was; whether, as a result of the trouble, it was an inefficient wash device or not, I take it? A. I was told that they were having trouble with the nozzles plugging up, that somebody was replacing the nozzles, and that the matter was being looked into in a general way, that is all.

Q. Well, then, would you mind telling me if you can—I doubt if you can, but if you can it will make our story run along,—when they changed the nozzle system because of its clogging up? Mr. Williams told us it was for economy purposes; it was too expensive for this firm to maintain or supply maintenance for getting this hole unclogged. Can you tell me when they changed it? A. I cannot give you a definite answer to that question, sir. All I know is what I heard.

Q. Then, a gentleman, an expert called by us, has said that the nozzle system, in his opinion, if it is properly maintained, is superior to the present water system they are using. Are you able to pass upon that or deny that? A. I cannot pass on the relative efficiency of the two systems.

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Q. I expected you to tell me that. Then, you knew that a letter had been written threatening suit and that a writ was in 1946—a letter had been written, Exhibit No. 10, which was back in September, 1945, when you were visiting here, that Walker was not going to wait any longer. He was going to have the Courts decide this case. Did you learn of that about September 7th, 1945? "We are getting tired of waiting. We are going to sue if you don't fix this up." A. Yes, sir, I had learned there was a lawsuit going to be in progress.

Q. Yes. Well, that is fair. Now then, I want to take up a matter that probably you and I will agree on a little more. It is common ground, I hope, and let us see if we can settle a few points first. The McKinnon ovens emit through their cupolas and forge shop gases and organic substances into the air? A. Yes, sir.

Q. Send them out of the chimney in one case and ovens in the other? A. Yes.

Q. And in amongst those gases is SO_2 and CO? A. Yes, sir.

Q. You have found that out? A. I have found out about the SO_2 and I know that they will emit CO, because that is emitted in any process of combustion.

Q. And these gases and these organic solids are carried over the Walker property. Do you deny that? A. No, sir.

Q. You know that they are being carried over? A. Yes.

Q. And that, alighting on the roof of the greenhouses and on the bulbs, plants, shrubs, leaves and flowers are these gases and substances—I cannot say the gases alight, but that the gases pass over and some of the substances alight. Will you deny that? A. No, sir.

Q. You admit it? A. Yes, sir.

Q. And, fourth, that—well, you have already told me that you know sulphur dioxide in the gas is going over the Walker property, and I put it to you, you do not know the quantity of concentration of gases, either SO_2 or the monoxide gas; you do not know the quantity of concentration on the Walker properties at any spot? A. I do not know what is happening on his property. I know what is happening at the test house.

Q. Oh, yes, but you see, how nice it would have been to have thought of one of the Armenians there? A. Well, Mr. Slaght, it would have been nice to have had it on Mr. Walker's property, and we tried that, too.

Q. Now, just as you are mentioning that, making a slur on Walker, you know that McKinnon's, and under your advice, I suggest, refused to let us go into their foundry once without we got a Court order, and we had to get a Court order before they would receive us? A. Mr. Slaght, I am not throwing stones, but do not put my name into that statement, please.

Q. Oh, I see. You had nothing to do with that? A. No, sir.

Q. Then, is it true, or will you deny—I had better put it this way to be fair with you—that iron oxide particles and iron rust land on the roof of his greenhouses and were landing containing quantities of iron oxide particles as high as 43 and 45% by analysis by McAlpine and one by Duncan? A. Yes, sir.

Q. You heard that analysis? A. Yes, sir.

Q. And that manganese is present? A. Yes, sir.

Q. Do you deny the validity of those analyses from the stuff as taken off Walker's roof? A. I do not deny the validity of those analyses.

Q. All right. And are you able to swear that they do not also alight on the plaintiff's bulbs, shrubs and flowers, both inside and outside the greenhouse? Do you deny that? A. I cannot deny that.

Q. Or that ash settles on the roof and the plants? A. Ash may land on the roof.

Q. And the plants? A. It may land on the plants, if it is there.

Q. And dirt lands on the roof and on the plants. Can you deny that? A. If the dirt is there, it will land on both places.

Q. And that organic substances that are oily, sticky and tarry, land on the roof and on the plants. Can you deny that? A. I cannot deny that.

Q. Now then, you have spoken about finding concentrations of, I think your words were, oily tar. I don't think you used the word "sticky"? A. Tarry.

Q. Yes. Well, you are smiling now, and that would be sticky, wouldn't it? That is my word. A. Yes, to a certain extent.

Q. And sticky stuff on the roof would be a great catcher for iron rust and particles of iron and dirt, would it not? A. I think they all go together. I think that anything coming from the cupolas would contain as a composite mixture the iron and other components.

Q. And the oily, sticky stuff, I think you will agree, perhaps, the oily sticky stuff is coming from the forge shop where they burn oil? A. Some of it comes from there, too.

Q. And some of it, you told me, in the gas also from the cupola content? A. Mr. Slaght, I have presented hundreds of figures showing the concentrations of dust and organic matter coming from the plant and from other directions and from the directions of the plant and from other directions at particular times of the day.

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Q. Well, if any does come from other directions I am not immediately concerned with it, but you and I are agreed so far about what does come from the McKinnon plant, and may I add fine droplets of oily substances, as well as oil vapour, and wouldn't they, the droplets, be carried in the air, but you know better than I do? A. Very fine droplets would be carried in the air.

Q. Now, your clients burn oil, bunker and crude, in the forge shop? A. Yes, they do.

Q. And if there was not complete combustion that would account for the oily, sticky substances? A. At certain times they would admit that.

Q. And perhaps a little denser when they first light the fires and the crude oil is not yet heated to a high degree? A. That is right.

Q. That is the history of these oil-burning plants, that you get a dense smoke for half an hour in the morning and it is pretty thick, and, when combustion gets better it is reduced. Have you ever calibrated the quantities of those? A. Calibrated the quantities?

Q. Yes? A. I don't understand that question.

Q. Well, I think you did tell us so—you found there were gases; you did not analyze them, and dust, and you didn't analyze that? A. You mean to ask did I ever break down the dust into its separate components?

Q. That is it. A. Only once.

Q. With what results? A. I have read the result into the record.

Q. It is in the record? A. Yes, sir.

HIS LORDSHIP: I don't remember that. A. I gave an analysis of the dust. It is in the record. It was done in 1945.

MR. SLAGHT: Back in 1945? A. Yes, sir.

Q. And you have not done it since 1945. So this is the year of 1948, when we find that McKinnon's are in their cupolas creating at the charging spot tremendously higher quantities of gas and dust—no, I cannot say dust, fairly, but we do know gas in larger quantities at all events, and you say you did it in 1945 and you have not done it since? A. Yes.

HIS LORDSHIP: I am a little interested to know how you were able to say this morning that you found no dust that would be injurious to plant life, if you have never analyzed the dust to see what its component parts were. A. I observed the effects of the dust on the flowers, your lordship.

Q. Oh, well, that is going about it a different way. As I understood in answer to Mr. Keogh's question, when you were dealing scientifically, not componently, but as a chemist as to the injurious effect of the dust, that you found, that was the part of

the question that was put to you—at least that is as I understood it. Now, if you understood it in a different way—I only want to be fair with you—"during the same period did not find any concentration of dust, including soluble organic material, injurious to plant life." Now, that is the question that was put and you agreed with it. I just wondered at the time, because I recollect you had not analyzed it, and I was wondering how you could say that that dust that was collected was not injurious to plant life. Now, is there any more you wish to say to clear my mind up? A. I would like to say that the constituents of that dust as I determined them by analysis, indicated that there was nothing harmful in them to plant life.

MR. SLAGHT: I did not hear you.

THE WITNESS: Nothing harmful to plant life in the constituents of the dust as I determined them by analysis.

HIS LORDSHIP: That is in 1945? A. Yes.

Q. But you were asked about 1948, the question I just put to you. You were given that same question for each year. The one I just read to you. Now, I have noted for 1946. Now, you answered the question for 1946, the same question for 1947, the same question for 1948. Now, you told me once that you based your answer on observation of the plants. Now, you are changing that a bit and saying you based it on your analysis. A. I based it on all these different things, including the moist concentration in the air and the answer I gave to Mr. Keogh's question was an answer related to these three things; the moist concentration in the air, the observation I made of the flowers and other plants and that analysis, knowing that there was iron and silica and carbon and so on.

Q. Well, but you made no analyses during any of the years 1946 to 1948 to know the proportion of iron, for instance? Did you or did you not? A. I did not, no, sir.

Q. Well, all right then.

MR. SLAGHT: Shall I proceed, my lord?

HIS LORDSHIP: Yes.

MR. SLAGHT: Q. You admit you only ran your recording machine part of the year in 1945, 6 and 7, and that you ran in 1948, you ran it from May to October in those years. Is that correct? A. Yes, sir.

Q. Why didn't you run it the rest of the year? A. It was not considered necessary, because we couldn't have it on Walker's property, and the fact that we already had a full year's record in 1945, there would be no vegetation to compare the results with during the winter and therefore in consultation with counsel, it was not considered necessary to run beyond the growing season.

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Q. I don't understand your answer. You could not have it at Walker's property. You could have it at Dunn's all the year around? A. That would have required two recorders and we had only one available, and the reasons at the time were perfectly sound for not running it any longer.

Q. Well, you mentioned the growing season, and I thought perhaps that activated you. Isn't it true it is always the growing season inside these greenhouses? A. That is true, yes.

Q. What do you mean by that, just being the growing season. It is always the growing season inside a greenhouse in a big concern, isn't it? A. Yes, sir.

Q. And Thanksgiving, Christmas, New Year's Day, St. Valentine's Day in February, Easter and Mother's Day, they were all outside the days you were running your machine, practically? A. Yes, sir.

Q. And those are big days for florists, aren't they? A. Yes, sir.

Q. When it is important that their product should be pure; and then people have birthdays from December till March; people even get married in that time, when flowers are marketable? A. Yes, sir.

HIS LORDSHIP: I think you are getting a little off the subject, Mr. Slaght.

MR. SLAGHT: Yes, my lord. Now, you took up with Mr. Dunn—what is his first name—pretty early in this business, when you were running the investigation to defeat the Walker lawsuit? When did you take up with Dunn? A. I think I first met Mr. Dunn in 1945.

Q. And what is his first name? A. Lens Dunn.

Q. And he is a competitor of Mr. Walker, doing a greenhouse and florist business in St. Catharines? A. Yes, sir.

Q. Good, fruity material; but, at all events, you selected Dunn? A. I did not select Mr. Dunn.

Q. Well, perhaps McKinnon's did for you? A. That was the company's business. I had nothing to do with the employment of Mr. Dunn.

Q. Now then, I want a word about your test house over here. You have told us where it is on the map. Give me the size, the dimension—20 by 16—it is a little place? A. Yes, sir, it is.

Q. Approximately? A. I cannot say that the enclosure —it is probably about 20.

Q. Just the building, is there? A. Oh, the building is there about 7 or 8 feet square.

Q. Smaller than I thought. And the intake, where is that situated as regards the ground, or the roof? A. The intake is situated at a point under the roof—two points.

Q. Two points under the roof? A. Yes, sir.

Q. On the one side or each on different sides? A. There is one intake on the west side; there is another intake on the south side.

Q. And no intake on the north side, nor on the east side? A. That is right.

Q. Why not have an intake on all sides? A. I do not think it is necessary.

Q. Then, take the machine that is inside that house, and tell me first how big are these intakes up near the roof? Just describe it in your own way. A. They are standard size, about 12 millimetre glass tubing.

Q. Can you put it in inches? A. It would be about half an inch in diameter.

Q. How many half inch in diameter intakes are there on each side, on the south—just one? A. There is one on the west side and one on the south side.

Q. A half inch in diameter? A. Yes.

Q. What is the nature of your intake? Do you extend your pipe from the inside, pokes out through the wood? Is that the intake? A. That is the intake for sulphur dioxide, yes, sir.

Q. Well, what other intake is there? A. There is the intake for the dust.

Q. There are two intakes, half inch in diameter? A. On the south and west side.

Q. And what is the dimensions of the dust intake? A. I have it down in the exhibits.

Q. Well, give it to me approximately? A. If I gave it to you, it would only be a guess. I may be out. I would say it would be over—about an inch.

Q. Is it circular? A. Yes.

Q. Again a piece of pipe that comes out? A. Yes, sir.

Q. Was that at the top or bottom? A. Near the top of the test house.

Q. Well, I don't quite understand how you have an intake, you say, for dust, and another for air. Is there a screen on the one? Don't they both take in the same thing?

HIS LORDSHIP: They go to separate machines? A. They go to separate machines.

Q. One is a dust recorder and the other is an air recorder? A. Yes.

MR. SLAGHT: But, aside from that, they both suck in the same product? A. Yes.

Q. And did you ever have any of these machines inspected by a reputable manufacturing engineer of such machines? A. A reputable manufacturing engineer, no, sir.

Q. The Thomas people? You could have had an inspection of them over the three years by an engineer from the Thomas people had you wished to? A. Had I wished to?

Q. Yes? A. I don't know whether they would or not. That would have depended on the company, or on Thomas himself. I am unable to answer that question.

Q. All right. You never had such an inspection. Tell me, is the solution you use a crucial part of the test that the machines are intended to perform? A. The solution I use, the concentration of it could be varied within certain limits, and it is not crucial, because the concentration of the solution is measured all the time and, at the start of every reading, the concentration or conductivity of the solution is indicated.

HIS LORDSHIP: Can you indicate on the roll where that is? A. There is the conductivity of the solution, this line, the thin line represents the conductivity of the solution at the start. Here it is, on the other cell.

Q. Just a moment. A. There it is on one cell.

Q. Wait, you are saying "there" and "there". You are indicating —— A. The vertical line.

Q. At 6.00 p.m.? A. Yes, sir.

Q. What does it show? A. This vertical line shows virtually the same concentration for nearly the 30 minutes, and there is a slight increase here indicating that for that 30 minute interval up to here, the conductivity did not change, and here it changed slightly.

Q. Well, I thought when the line went vertical, that showed that there was no sulphur dioxide in the air? A. That is right.

Q. And if it moved to the right it showed the presence of sulphur dioxide. A. Yes, sir.

Q. Well, what has that got to do with the composition of the solution? A. Because, as the conductivity changes, the concentration of sulphur dioxide in the solution is increased because of the conversion of sulphur dioxide to sulphuric acid in the solution.

Q. Yes, but where is there anything on this to indicate the original position of the solution? A. Right here. This indicates the cell has been drained and then it starts afresh.

Q. Does that mean that the technician has put in a new solution? A. No. The technician only fills the bottle, the stock bottle with solution. The machine itself does the job of draining or filling the cells.

Q. Yes, but it is a question of the filling of the stock bottle that was puzzling me, and I want to understand it. The technician fills the stock bottle with a solution? A. About once a day.

Q. Well, now, we will suppose a technician that wished to get a favourable result. Could he manipulate the solution to that end? A. No, sir; impossible.

Q. Why? A. Because it would — all that it would do would be to move the starting point up here. It could not do anything to the record because the record with no sulphur dioxide in, it would merely show a vertical line over here. That doesn't mean anything, so even if the line was over here that still means nothing. It is only when this line, for instance, starts off from here ——

Q. When it moves to the right? A. Yes, sir.

Q. So it makes no difference what solution you put in — put in any solution? A. Yes, within limits. I could operate the thing in the middle of the chart.

Q. Yes, but I say, you could put in different proportions and it would make no difference? A. Having in mind I have to provide for an excess of hydrogen peroxide, that is all.

Q. Well, I don't know what that means. A. Within wide limits I can vary the solution as long as I have enough hydrogen peroxide to oxidize the SO_2 to sulphuric acid.

Q. I see.

MR. SLAGHT: Q. And perhaps I should have asked you about the dust intake. You told us it was half an inch pipe, you thought? A. I said it was an inch pipe on the exact measurements.

Q. All right, whatever it was. I want to get whether it came out at right angles to the side of the building or was tilted a little bit? A. I believe it was at right angles to the building. I don't think there was any noticeable incline either way.

Q. You mean at right angles to the wall of the building? A. Yes, sir.

Q. And you gave us your instructions to Longhurst, to tell him to put in three litres of solution, ten millimetres of sulphur acid to .01 normal, and one millimetre of 30% hydrogen peroxide? A. Yes, sir.

Q. And he told us that he put in three litres of distilled water, 10 cc. normal of 100 sulphuric acid, and 1 cc. of 30% hyrodgen. A. That is exactly the same statement as you have read back to me and the millimetres is the same as the cc.'s.

Q. Exactly the same? A. For all practical purposes, it is exactly the same. A millilitre is a thousandth part of a litre.

Q. For all practical purposes. Now, then, your first statement to me I just suggest was an exaggeration. Millimetres and cc.'s are not exactly the same? A. Are you talking about millimetres or millilitres.

Q. Millilitres? A. Millilitres are cubic centimetres and are very nearly the same thing, and the instrument that he used to measure was calibrated in millilitres. He used the standard pipette, which was calibrated in millilitres; the common expression for that is cc.'s. If you want to stretch a point, it is millilitres.

Q. And you told us you typed part of your results out here and part of the results at the Government Research Council, that applied to 1947 and 1948? A. It would not apply to 1948, because I had left the Research Council in 1948.

Q. Well, you typed them in Ottawa. I don't care what that is. A. Part of the results were typed in Ottawa and part of the results were typed here, yes.

Q. Using Government typists in 1948? A. No, sir.

Q. A typist paid by you? A. Yes, sir.

Q. Where? Have you got a private office there? A. No, I have no private offiice.

Q. Well, did you go to an outside stenographer? A. Occasionally I went to an outside stenographer.

Q. But in the main, were these not typed by Government girls? A. I would say that the records were typed partly at the company and partly at the Government offices.

Q. At the expense of the taxpayer, of course, in 1948? A. In 1948, as I said before, the records were mainly typed by the company and whatever typing was done apart from that, was paid for by me.

Q. Paid for by you. Then, where did you buy the paper that you used in these machines, this filter paper? A. The filter paper?

Q. Yes? A. Was supplied by the laboratory and ordered from a chemical firm.

HIS LORDSHIP: What laboratory? A. It was supplied by the laboratory of the McKinnon Industries and obtained from a chemical firm, a reputable chemical firm.

MR. SLAGHT: Q. And for the three year period, who ordered it? A. It was a standard weight again; No. 41 paper.

Q. I asked you who ordered it? A. It was ordered through the company, at my request.

Q. And how many consignments would come in in a year of paper — oh, roughly? A. I don't know. One package would supply — would do for a great many tests.

Q. And this type of paper is manufactured in different thicknesses, the filter paper? A. The thickness used to be a standard thickness as said, No. 41, which indicates the thickness of the paper.

HIS LORDSHIP: That was not the question that was asked.

MR. SLAGHT: Are there different thicknesses of this type of filter paper? A. There are different thicknesses and they are indicated by numbers.

Q. Right. And if you got the wrong thickness in, then it would throw the whole value of the tests out, would it not? A. I would not say that; the results might not be strictly comparable with the preceding results, but it would not throw out the whole value of the test.

Q. Well, then, it would make an error in it and you would have to compare them. And then, at times, your recorders were not operating at all, even in the seasons? A. That is true. There are times when a certain amount of servicing is necessary, and so on, as with any mechanical operation.

Q. Quite so. I can understand that. Are there any elbows between the intake and the filter papers? A. No, sir.

Q. And the filter paper itself, when it is inside, I take it it would lie horizontal, stand on edge? A. You mean vertical?

Q. Vertical? A. Yes, sir.

Q. Vertical rather than horizontal, that is right. And on the dust recording filter, if you sucked in some heavy particles of dust, would they hit the paper and fall to the bottom? A. If any particle fell to the bottom it would also be included in the results, because the holder—the holder was taken into the laboratory and the contents carefully swept out with the paper.

Q. Then, Dr. Katz, I want to ask you a few questions of a general type. Would this be a correct statement of injury and diagnosis: "The problem of acute diagnosis of sulphur dioxide injury to vegetation is always of importance wherever this gas is known to be present in the atmosphere, if the concentrations of sulphur dioxide are of sufficient intensity and duration so that markings are severe, the area of damage might be devised without much difficulty"? A. That is right.

Q. That is your statement and you stand by it, I take it? A. Yes, sir.

Q. Then would this be correct:

"However, whether automatic recorders are available or "not, there will be large areas in which the vegetation present "will be the only indicator for sulphur dioxide."

Is that true? A. Yes, sir.

Q. I will read that again:

"However, whether automatic recorders are available or "not, there will be large areas in which the vegetation present "will be the only indicator for sulphur dioxide."

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MR. KEOGH: What page is that?

MR. SLAGHT: 51, about two-thirds down, Mr. Keogh. And I continue,

"It is therefore necessary—"

HIS LORDSHIP: Just a moment, Mr. Slaght.

MR. SLAGHT: I am sorry, my lord.

HIS LORDSHIP: Yes.

MR. SLAGHT: I continue at the same page:

"It is therefore necessary to know the characteristic symp-
"toms which sulphur dioxide produces on different plants
"in order to be able to separate these symptoms from those
"produced by other agencies." A. Yes, sir.

Q. And then, can you tell me whether you stand by this statement on page 54 of your book, paragraph 1, a third down on the page,

"Stoklasa—"

By the way, he is an author, is he? A. He is one of the old authors.

Q. And an author of repute? A. In his day he was an author of repute. I am not saying what the opinion is now of his work, but in his day he was an author of repute.

Q. And you are not saying that he is not still an author of repute? A. I do not think he is considered to be an authority on sulphur dioxide to-day.

Q. Why do you quote him in your book? A. I quote him in my book because this book is a book supposed to refer to everything that has been written in the literature on sulphur dioxide, and therefore I do not discriminate between works of one man or another.

Q. Well, I will read you this:

"Stoklasa in 1923 described three different types of injury:
"(1) acute, (2) chronic, (3) invisible. Acute injuries are
"those brought about by the action of abnormally high con-
"centrations of sulphur dioxide, the characteristic symptom
"of which is the rapid disappearance of the chlorophyll.
"Chronic injury is a slower process involving the gradual
"breakdown of the chlorophyll. Photo-synthesis then becomes
"abnormal, metabolism is lowered, and a retardation in
"growth of the plant. Invisible injury, according to Stoklasa,
"always is present whenever sulphur dioxide occurs in the
"atmosphere, even in the absence of acute or chronic injury.
"It is reflected in a lowering of the photo-synthetic pro-
"cesses. Premature autumnal coloration of leaves, is, in his
"opinion, in many instances, related to the injurious action
"of sulphur dioxide."

Now then, that is in your book from Stoklasa? A. Yes, that is my quote.

Q. There isn't a word to indicate any possible doubt about its accuracy here, is there? A. Not here, but there is in other parts of the book.

Q. Find it, if you will. I want you to find me anything that supports what you said this morning, that there is no such thing as invisible injury, because I find you quoting a man who says there is, tells you what it does, and as far as this page is concerned, you quote him to the public and to your readers, and you do not make the suggestion that you are not giving them something that is at least dependable. Now, if you took him to task, why didn't you do it right there and then under that paragraph? Perhaps you are going to find where you did? I may say I don't find it but I don't say it is not there, if you say it is.

HIS LORDSHIP: We will have ten minutes intermission now to give the doctor the opportunity.

—Intermission.

—On resuming:

CROSS-EXAMINATION CONTINUED BY MR. SLAGHT:

Q. Doctor, you were going to show us in your book where you contend and state that there is no such thing as invisible injury? A. Yes, Mr. Slaght. I want to refer to page 426. The subject entitled "Discussion":

"The experimental fumigation studies described in this "section have shown in detail the effect of a wide range of "sulphur dioxide concentrations on the photo-synthesis and "respirations of alfalfa. The behaviour of this species may "be taken as typical of the reaction of the most susceptible "plants to this gas. Many of the experiments have been "carried out under such conditions of fumigation that either "no visible markings were produced on the leaves or the "symptoms were inappreciable, so that the results have a "direct bearing on the question of invisible injury. It has "been shown by yield studies in a preceding section that "sulphur dioxide does not reduce the yield of crop if the "concentrations during treatment are maintained below the "point at which there is appreciable destruction of leaf tissue. "This was found to apply not only in the case of relatively "short treatments with high concentrations of gas, but also "in prolonged fumigations with low concentrations, the "plants in some instances being treated continuously through-"out the growth of a crop."

May I read a little more or do you think that is sufficient?

MR. SLAGHT: Well, that does not satisfy my mind at all, for you are condemning invisible injury as being non-existent. You can read anything you like if what you think— A. I think

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this answers the question of invisble injury perfectly.

Q. Now, if there is anything else, let us have it, because it does not satisfy me, but I am not the trial judge; only on that point, doctor, for the moment, that you state in your book, where you put it to us there is not such a thing as invisible injury, I ask you to find any comment where you warn people against taking Stoklasa's statement about there being invisible injury? A. Mr. Slaght, you do not write such remarks in a book. You quote a man's work and then proceed to quote your own work and allow people who read the book to be the judge.

Q. All right. And you think somebody reading what you have read us would say that Dr. Katz asserts there is no such thing as invisible injury? A. And other people—there are others like Hill and Thomas whose work I have mentioned in this book.

Q. Well, I am only concerned for the moment with any denials in your book, and that is your prediction on it. Now, you are familiar, of course, with "Heald, Manual of Plant Diseases". That is a recognized work? A. It is a very old book.

Q. And a very reputable one? A. It is on diseases.

Q. Yes. Well, I find this in Heald, and I am still on the invisible injury and on your oath. Page 210:

"In its symptoms and effects, three different types of injury "from sulphurous acid in the air are recognized,"

and I will read rapidly till I come to the particular point.

"Acute. When the amount of gas—"

HIS LORDSHIP: Don't read so rapidly that he cannot hear you.

MR. SLAGHT: I am reading from page 210, "Symptoms and Effects. There are three different types of injury from "sulphurous acid in the air recognized, (1) Acute, when "the amount of gas is abnormally high, being characterized "by the rapid bleaching or disappearance of chlorophyll and "in the most severe form by the death of the entire plant. "(2) Chronic, when small quantities of SO_2 are generally "present, leading to the general depression of the physio- "logical processes, including photo-synthesis, metabolism, "cell division, etc., with retarded growth, exhausted food "reserves, failure to blossom and set fruit, early leaf fall in "deciduous forms or fall shedding of leaves by evergreens, "ending ultimately in death; and

"(3) Invisible, or the reduction of growth increments not "visible to the naked eye but expressed by yields or by "modified composition shown by careful measurements or "by chemical analyses."

Now this author, as you will note, says that is the type of injury from SO_2. A. Where is the quotation from, Mr. Slaght?

Q. It is from page 210 of Mr. Heald's book. A. Yes. And who is the author of the statement you have just quoted?

Q. There is no doubt in my mind that he is. A. Is there a reference to the author?

Q. No, none at all. I will show you the book. It starts, "Smoke injury", on the previous page, and then he makes an historical statement in part from this. Then he goes on in his own text, "Symptoms and effects." A. And it is a part that was taken from Stoklasa.

Q. How do you say that? A. Well, he lists the sources that he has concentrated, Schroeder and Reuss, 1883, Haselhorff and Lindau, 1903, Stoklasa, 1923.

Q. Yes, but he has not Stoklasa here. He is debating, if you like, the same condition as Stoklasa, but this is Heald. A. This is Heald debating these other two authors.

HIS LORDSHIP: Well, before you leave it, with the exception of what he says about invisible injury, do you agree with the author down to that point. A. In a general sense, yes, sir.

MR. SLAGHT: That would be acute and chronic? A. Yes.

HIS LORDSHIP: Q. I want to know if he agrees with what he says in regard to acute and chronic.

MR. SLAGHT: Yes, he says he does, and that is pretty much what Mr. Jarvis told us when he was disserting on three types of injury. You heard Mr. Jarvis say there was the invisible type of injury, didn't you? A. I heard him say so, yes.

Q. You do not agree with him? A. I do not agree with him, no, sir.

Q. Then there is another item here at page 202. This is still the author's text.

HIS LORDSHIP: Just a minute. I want to complete my notes on that.

MR. SLAGHT: Sorry, my lord.

HIS LORDSHIP: Then, the note I have made is that you agree with the statements of the author in regard to acute and chronic injury, but not as to invisible injury? A. No, sir, not as to invisible injury but, yes, in regards to the first two.

Q. Very well.

MR. SLAGHT: He also said, if your lordship thinks it worth while, he disagreed with Mr. Jarvis's statement on invisible injury which he heard sworn to.

HIS LORDSHIP: Yes, I understand that.

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MR. SLAGHT: Now then, at page 214 Mr. Heald says: "The existence of invisible injury has been disputed by "some workers, but Stoklasa and other German investigators "have pointed out the serious injuries which may occur in "the absence of either acute or chronic symptoms. The "action of the SO_2 has a depressing effect on photo-synthesis "and other physiological activities, resulting in a general "slowing down of constructive metabolism."

You disagree with that statement? A. I disagree with that statement, although I have evidence on the lessening of photo-synthesis by relatively high concentrations of sulphur dioxide.

Q. Then, if there is a lessening of the photo-synthesis, that is an invisible injury? A. It is not an invisible injury, because the experiments show a recovery from that effect.

Q. But invisible means that the eye does not see. It is nature, just like a human being has inside internal trouble. A. Invisible injury is really not a scientific term. If you are referring to a lessening of the photo-synthesis at certain levels of concentration, that is a scientific term.

HIS LORDSHIP: Doctor, I want to understand what you are saying. As I understand it, the author is dealing with three classes; one where there would be the acute injury, and another where the concentration would not be sufficient to produce an acute injury but, by repeated doses of a lower concentration, produce a chronic injury. Those are the two things, are they not? A. Those are the two things.

Q. Then, there is a third, and still repeated doses at still lower concentrations, that, he says, would produce an invisible injury. That is the author's statement? A. Yes.

Q. And it is with regard to the latter that you disagree? A. Yes, sir.

Q. Now, what do you mean by the lowering of the photo-synthesis? A. I mean that at certain levels of concentration, the photo-synthesis may be lowered by sulphur dioxide. For instance, I gave you the range as .44 to .50 parts per million. That was the point at which there was the slightest, the very slightest effect manifested in the lowering of the photo-synthesis.

Q. But you say they would recover from that? A. Yes, sir.

Q. But what puzzles me is this. Supposing they have an application that lowers the photo-synthesis and then there is a consistent application followed for a few days, even of a concentration that would not be up to those standards but still would be simply lower, would that prevent them from recovering from the effect? A. No, sir.

Q. You say it would not prevent them from recovering? A. They would recover, and there are experimental works to substantiate that known scientific literature.

Q. Well, I just want to get the process of what you say, because I did not understand what the lowering of the photo-synthesis means, but I suppose it is something of the digestive system of the plant? A. The photo-synthesis means the mechanism whereby carbon dioxide is assimilated by the plant.

Q. It is the digestive system of the plant by digesting carbon dioxide from the air? A. That is right, yes, sir.

MR. SLAGHT: And I read you again from Heald at page 215. This is just something I want to get into the record, if you will let me:

"SO_2 is a colourless gas, with a characteristic suffocating "odour, and is 2.12 times heavier than air."

That is common ground. So if SO_2 gets in a greenhouse through the windows being open, it is in there, being heavier than air it is likely to go down where the plants are? A. No, sir. That is contrary to all the laws of physical chemistry. A gas does not settle out with any other gas. When a gas is mixed with air, it stays as a mixture. Does carbon monoxide settle out of air? Does an oxygen settle out of air? No, and when smoke gets into air, it is mixed with air and only the solid particles separate out. The sulphur dioxide is either absorbed by surfaces such as plants, or water, or soil, or it is mixed with the air to the point where it is diluted to infinity.

Q. Well, I do not think you understand my suggestion. What is air? Give us the formula for air. A. Air contains oxygen, nitrogen, carbon dioxide. It contains about 21—

Q. Never mind. Stick to those three, and this SO_2 is 2.12, more than twice as heavy? A. That is true.

Q. Well, let me put this to you. That is heavier than air and gets into where it is, let us assume, pure air in the greenhouse? A. Yes, sir.

Q. And I suggest to you that it will be finding its way, not necessarily separately from the other air but, in the greenhouse it will be finding its way to the bottom and the lighter, purer air will be up towards the roof. What do you say? A. Mr. Slaght—

Q. Just tell me if that is true or not? A. That is scientifically incorrect.

Q. Well, is it true practically? A. It is not true practically, because you have a body of air, let us assume, coming into a greenhouse.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949 Continued

Q. No, let us take the air in there. Now, we will shut the windows. No air coming in. Don't get off on that. There is some gas twice as heavy as air with the pure air. Are you telling us from a practical standpoint that does not gradually get towards the bottom? A. No, sir, because the molecules of sulphur dioxide like that all, in every case, is free to move in every direction.

Q. Do you think the heavier stuff is going up? A. I said it will go in every direction.

Q. Do you suggest it will go up? A. It will go up as well as down. It will go in any direction. It is as free to move—otherwise, all our laws of physics and chemistry would be wrong and carbon dioxide is much heavier than oxygen. Why doesn't it settle out?

Q. Don't let us get into a discussion. Your thought is that the heavier than air will go up at times and not go down in the pressure?

HIS LORDSHIP: Doctor, I am not just sure I am clear on what you say. Supposing you have a greenhouse that is filled with carbon dioxide and you open the ventilators at the top. Will the carbon dioxide pass out through the ventilators on the top? A. Yes.

Q. Freely? A. Freely, because it is a gas.

Q. I know, because it is heavier than air. I always understood if you wanted to ventilate a room properly, you drew off the foul air at the bottom, but that may be only a layman's conception of it. A. There are various ways of increasing the rate of ventilation.

Q. Oh, well, that is the idea. A. It is purely a mechanical problem.

Q. Yes, but you say it would ventilate just as well by a ventilator at the top, if you had gas in the room. That is, the heavier than air—it would ventilate just as quickly with a ventilator at the top? A. Provided the air was allowed to enter the greenhouse.

Q. Well, you open the ventilator? A. Yes.

Q. It would ventilate just as quickly? Well, why is it the concentration is worse on humid days? The air is lighter on humid days and one sees smoke rise on even clear days when there is little humidity and evaporates away. When there is high humidity, it drops down and drifts along the ground and we have it that the SO_2 is more concentrated on humid days and more dangerous for burns. Now, why is that? A. It is because the rate of dilution may be slower. In other words—

Q. Well, why? A. Simply because the breaking up the smoke screen with air depends not only on the rate of diffusion, but also on the turbulence of the air. The diffusion is slower and of lower pressure than the turbulence.

Q. What do you mean by "turbulence"? The rate of the wind? A. The rate of the wind movement and air.

Q. Don't let us get mixed up with the rate of the wind movement. I am getting at a new branch on this case that I have never heard of before, and that is that heavier gas will rise with air just the same, and I am all confused about it now, because I thought, rightly or wrongly, I had that in my mind as one of the reasons that the sulphur dioxide would be more dangerous on humid days, because the air was lighter and it would tend to drift along low down where the vegetation was. Now, am I right or wrong on that? A. You are partly right on that, your lordship.

Q. Well, I am glad I am partly right on something. Well, why am I right on that? A. Because with the air, let us say, perfectly calm, it takes a longer time for the sulphur dioxide containing the air to be diluted down to lower levels of concentration.

Q. That is because it is heavier, isn't it? A. No, sir; it has nothing to do with the density. It has something to do with the loss of diffusion and with the kind of turbulence. According to the laws of diffusion, if you were to take a glass container and put in a light gas and a heavy gas and let that container stand, you would get with time a uniform mixture of gases. It is like dropping a lump of sugar into a cup of water; it just dissolves.

Q. It dissolves? A. Yes, sir. Now, on the other hand, if you want to speed up that process and stir up the gases, and then you can speed it up so that what may take a few seconds or a few minutes will take place instantly.

Q. Whatever may be the process, it is true, is it not, that on a humid day smoke tends to drop and will drift along the surface of the earth? A. One sees that from a chimney, time and again. One of the things that one is anxious about, the weather. What it is going to be. You look to see whether the smoke is going straight up.

Q. And if it is going down, you do not go out to play golf? A. I would say this, that it forms a sort of dome, and it hits the ground close to the stack. It also spreads upwards, which would tend to get that theoretical cone which you do get with the wind at a certain definite velocity.

Q. Oh, leave the wind out. On a nice clear day when the humidity is low, you will see the smoke rise straight out of a chimney and go up away out of sight. That is true, is it not? A. Yes, sir.

Q. On a humid, close day you will see it come out of the chimney and drop down, and sometimes come right down to the earth, close to the building, sometimes drift away a little further. Is that not true? A. To a certain extent, yes, sir.

Q. Well, to the extent that I have observed it, anyway. It is not a strange phenomenon I am talking about; it is something every child has seen, but how far do you say that what I have said is not true? You say to a certain extent? A. I would say that in very large terms you are right, your lordship.

Q. All right, then. Excuse me for interrupting you, Mr. Slaght.

MR. SLAGHT: Thank you, my lord.

Q. Doctor, take your lump of sugar. You put it in a glass of water. Now, you have told us that ultimately it goes to the bottom and then begins to dissolve and mixes with the water, didn't you? A. I have used the gross illustration, but sulphur dioxide is not like a lump of sugar. It is still a gas.

Q. Well, I am going to take your lump of sugar. Now, the reason the lump of sugar goes to the bottom,—never mind when it gets dissolved—is that it is heavier than the water? Is that right? A. That is right.

Q. And I suggest to you, and nothing more, that when the sulphur dioxide comes into a greenhouse where there is pure air, we will assume beforehand, that the first operation of the sulphur dioxide is to find its way towards the bottom area of the greenhouse. Now, I grant you it may begin to dissolve with the air and ultimately you get an equalized or diffused mixture. But do you still say that it does not operate like the lump of sugar, that is, gradually goes to the bottom of the greenhouse because it is more than twice as heavy as the air? A. Your question is based on a wrong supposition. You have not got sulphur dioxide twice as heavy as air going into the greenhouse. You have got air containing sulphur dioxide and the density of that air is very nearly the same as the density of the air in the greenhouse. Now, if you are suggesting—

Q. What do you mean "very nearly"? You mean that it is heavier than the air in the greenhouse? A. The difference is so slight that the difference in temperature may make the density less in the case of your sulphur dioxide content, so compared with the greenhouse air, the gas will,—it is true that liquid SO_2, or concentrated SO_2, is 2.2 times heavier than air. When you have a mixture of, let us say, one part in a million,

the difference in density between them and ordinary air is almost incalculable.

Q. Then, doctor, I want to call your attention to another statement in your book and, first, may I remind you that you told us in your evidence in chief that .25 was definitely the low figure that would bring injury to plant life. You recall saying that, do you not? Leave your book alone for a minute and answer the question, if you don't mind. I did not mean to be rude to you, but you have said that? A. Yes.

Q. And you stick to that definitely; .25, you are telling the Court, is the low, the minimum that will cause injury to plants? A. For 24 hours, I said. That is what I said.

Q. Now, let me read you what Katz, the author, says at page 32, about an inch from the top—ten lines down. Have you got it:

"From field observations and also experimental data it is "known that the sulphur dioxide concentrations likely to "injure vegetation after prolonged exposure are those greater "than 0.20 p.p.m., and, in particular, those above 0.50 p.p.m."

Now, wait a minute. I will read you what is the pertinent part to me, in view of your oath:

"Concentrations likely to injure vegetation after prolonged "exposure,"

such as 24 hours,

"are those greater than .20 p.p.m."

If .250 was true, why didn't you put that in your book, and that is greater than .25, and you deliberately put in .20. Now, you did not tell us about this the other day. What do you say in explanation of that? A. I cannot carry the contents of this book in my head, but I told the Court the reasonable answer on that point.

Q. Well, now, having, not carrying it in your head, but my having drawn it to your attention, are you now prepared to retract your evidence that .25 is the minimum concentration that will cause injury, and to tell us frankly now, as you read in this book, that it is likely to injure vegetation, very likely to injure vegetation, and this .20 is the figure you should have given us the other day, isn't it? A. Greater than .20.

Q. Yes, which means if they are not greater than .20, they are not likely to injure vegetation, or do not injure it. A. Yes.

Q. Will you withdraw the .25 and put .20 in this case, for me? A. I can put in the statement as I have it in the book.

Q. You won't go any further than that, to correct what you have sworn to several times, that .25 was the irreducible minimum? A. I also have a statement in this book at page 446 which says with treatments of the continuous type there was no effect after 24 hours exposure to average concentrations of

.035 p.p.m., but a temporary decrease was shown after 36 hours.

Q. What has that got to do with .35 under different conditions, or if, say, that .25 in no conditions, or under all conditions was the minimum that would injure plant life? Now, my reading of your extract at page 32 is that you are telling the public here in this book that .20 is the proper point to look at to see whether injury will occur below that, or if it is above .20, that would take in .21, .23 and .24. A. I said greater than .20.

Q. Yes? A. Yes, sir.

Q. Well, .21 is greater than .20, isn't it? .21 is likely to injure? That is what that means, isn't it? A. And I said in a particular case at the .50 parts per million.

Q. Oh, doctor, I do not want any particular. I want to challenge your basic statement, your unequivocal oath of the other day, that .25 was the minimum, and point out to you that that statement means that .21, or .22 would injure. Now, what do you say? Make any explanation and we will pass from this incident. A. I will say that a point greater than .20, as stated in this book, is acceptable to me.

Q. That is, might cause injury? A. Might cause injury, yes, sir.

Q. All right. Now, we are done with it and wouldn't you like to withdraw your oath of the other day that it was nothing lower than .25 will cause it?

HIS LORDSHIP: I don't think you need pursue it any further, Mr. Slaght. You are getting into the argumentative stage, now.

MR. SLAGHT: Yes, my lord. Then, I will get along.

Q. I want to read you another statement, Dr. Katz, and I think I am pretty nearly through with your book. Page 67. Will you turn to page 67. It is one-third down on the page. Got it?

"On June 1, 1935, sulphur dioxide markings were found on
"ninebark and ocean spray close to the border,"

and when you say "were found" and so on, you are dealing with the matters that became apparent in the Trail Smelter investigation? A. Yes, sir.

Q. "—were found on ninebark and ocean spray close to
"the border, extending about two and one-half miles down
"the Columbia Valley. At this point occasional markings
"were also noted on bitter cherry. After June 18, 1935,
"injury was found near the border on ninebark, bitter
"cherry, ocean spray, service berry, mountain laurel, dog-
"bane, willow, birch, aspen and maple. Five miles south of
"this location the concentrations of sulphur dioxide measured
"at the Stroh recorder averaged 0.12 p.p.m. for 12 hours
"with a maximum of 0.46 p.p.m. The next day another

"12-hour fumigation occurred, with a maximum concen- "tration of 0.22 p.p.m. A slight amount of rain fell at the "same time, so that conditions were ideal for injury. On "the mountain side, east of the above mentioned location "where injury occurred, markings were found on mountain "laurel, maple, birch, bitter cherry and service berry, up "to an elevation of 1,900 feet. Across the river at the same "time markings occurred near the border on aspen and "service berry. Counts were made to determine the per- "centage of trees or shrubs injured at several points in the "valley."

Now then, ".12 for 12 hours", on two different days under ideal conditions for injury, are there recorded as the cause of injury in the Trail country. How do you explain that? A. You are applying the fumigation recorded to a location five miles further away. I am giving you the readings that occurred at the recorder during that period.

Q. All right. A. I do not see how you can infer that the region where the injury occurred, that the concentrations were at these levels.

Q. Well, immediately after your recording of the .12 for 12 hours with a maximum of .46 p.p.m. and another .12 for 12 hours, you say that conditions were ideal for injury? A. In the first place I will say that the concentration was .12 for 12 hours with a maximum of .46 at a location five miles south of where the injury was reported. In another case I say it was on the mountain side east of the above mentioned location, and I described the injury, and that is a mountain side east a considerable distance away.

Q. Then, if your lordship will pardon me just a moment. I want to have a word with you about the conditions that you report on page 45 about the investigation in the Detroit and Windsor area. You recall writing that up? A. Page 45, yes, sir.

Q. Were you over there? A. Yes, sir.

Q. And I read at the foot of the page:
"Concentrations of sulphur dioxide in the Detroit-Windsor "area. During the period of March 12 to April 29, 1934, an "investigation was carried out to determine the sulphur "dioxide in the atmosphere in the Detroit-Windsor industrial "area. Measurements were made by means of a portable "apparatus at a number of different locations and also at "two fixed stations by means of a Thomas automatic "recorder."

Now, over there, you used a portable and you used a Thomas? A. Yes.

Q. You did not make any home-made apparatus over there? A. The apparatus I have used in the present investigation is similar to the apparatus I used in the investigation reported here.

Q. I continue:

"The fixed stations were situated at Riverside, a residential "area about four miles northeast of Windsor, and at Sand-"wich, Ontario. The measurements made with the portable "apparatus indicated that sulphur dioxide was present on "18 days out of 30. The maximum and average,"

and so on. I am not going into this. And then, I come over to page 48, if you will, doctor, and may I give you this statement at the top:

"On the night of March 19th calm prevailed and smoke began "to drift slowly over from the Detroit area to Windsor."

Windsor is about three miles from Detroit, is it not? A. Yes.

Q. "This calm was maintained throughout the night and "early morning of the 20th. Sulphur dioxide measurements "were begun with the portable apparatus at 6.20 a.m. and "appreciable concentrations were found to exist in the "neighbourhood of the International Bridge at Windsor."

That would be what—a couple of miles away, or a mile? A. Less than that.

Q. "The maximum concentration found here was 0.51 "p.p.m. The fog and smoke were so dense that the outlines "of the bridge could not be seen. At about 8.00 a.m. the "portable outfit was taken to a new location farther south. "The maximum concentration found here was 1.93 p.p.m. "Sulphur dioxide was present in the air until about 10.00 "a.m. when the fog was rapidly dispersed by east and south "winds. The outline of the smoke or fog cloud could be plainly "seen as it receded to the Detroit side of the Detroit River. "The average of all sulphur dioxide determinations made "during the morning with the portable apparatus was "0.396 p.p.m."

A. I also have a concentration of .1933 p.p.m.

Q. That is the portable outfit at 8.00 a.m. further south? A. Yes, sir.

Q. Then, "The maximum concentration recorded on this "day at the Riverside laboratories station, which is about "10 miles northeast of the point where the highest determina-"tions were made with the portable apparatus, was 0.24 "p.p.m." A. Yes.

Q. Now then, listen, as I read this:

"As a rule, higher readings were obtained by the portable "apparatus than were found by the stationary automatic "recorder, owing to the mobility of the former, which could "be transported in the path of a given smoke stream."

Then, will you drop down to the last paragraph but one and the last two lines:

"At Sandwich the highest reading obtained by the automatic "record was 0.23 p.p.m., at about 2.00 a.m. on April 28."

Are these correct records of what you found causing the trouble over there? A. Correct. They are correct records.

Q. I am nearly through with this, my lord, I am happy to say. Doctor, you were not on the Commission, but you were out and did work connected with the Trail Smelter Commission? A. Yes, sir.

Q. And you are familiar with their decision? A. Yes.

Q. And had a copy of their decision? A. Yes, sir.

Q. I am going to call attention to one or two matters in it that brought in some general restrictions and provisions as a result of their report—didn't they? A. Yes, sir.

Q. Which became binding on the people there by either this or legislation. I am going to page 38 at the foot, and I read you this amongst the restrictions they found:

"(a) If the Columbia Gardens recorder indicated .32 per "million or more of sulphur dioxide for two consecutive "20-minute periods during the growing season and the wind "direction is not favourable, emission shall be reduced to "four tons of sulphur an hour, or shut down completely when "the turbulence is bad until the recorder shows .2 parts per "million or less of sulphur dioxide for three consecutive "20-minute periods."

You read that? A. Yes, sir.

Q. So that that appears to agree with what you now I understand accede to, that if it is above .2 parts per million they ought to shut down dumping any sulphur and, if it is above .2 for three consecutive periods, there is danger. That is the reason for the restriction, was it not? A. That is the reason for the restriction.

Q. I will read the next paragraph:

"If the Columbia Gardens recorder indicates .5 parts per "million or more of sulphur dioxide for three consecutive "20-minute periods in the known growing season and the "wind direction is not favourable, the smelter must shut "down completely when the turbulence is bad until the "recorder shows .2 parts per million or less of sulphur dioxide "for three consecutive 20-minute periods."

So again they take the .20 as the standard. When it is above that for three consecutive 20-minute periods, then they should shut down, or dump any sulphur. Well, they take that as the low point of danger, do they not? A. They do in this, yes sir.

Q. They do in that. My friend points out that they take it out, but it was the danger point they put into the regulations to tell those fellows to regulate it, that I wanted to call your attention to. And turn up to the top of page 39, doctor, of the decision. Item (b), and that again is a restriction and provision:

"In case of rain or sun, the emission of sulphur shall be "reduced to two tons per hour and the regulation shall be "put into effect immediately when precipitation can be "observed from the smelter and shall be continued in effect "for 20 minutes after each precipitation."

Then, (g), just to show you what I regard as the seriousness of it:

"Nothing shall relieve the smelter from the duty of reducing "the maximum sulphur emission below the amount per- "missible according to the tables and the preceding general "conditions and provisions as the circumstances may require "for the prudent operation of the plant."

Do you think those were prudent restrictions? A. They were restrictions applied to this particular problem involving the United States and Canada, and are their restrictions.

Q. Having regard, of course, to the conditions out there. I appreciate we are down here, but I point to that because of the minimum of .2 that they contain. Well, now, then doctor,—just a moment. On the point of the relation of the height of the stack to the distance they may carry or reach the ground, in effect, I think you said something about the big stack, it could not possibly affect at 600 feet away, but I think you withdrew that. But would this be correct, and from the report of the investigation of the United States Bureau of Mines, made by R. S. Dean:

"It will be seen from the latter that the distance is more "than twenty times as high as the chimney concentration "of gases in the atmosphere is in point of height of the "chimney, but the same can be shown to be true for dust."

Now, I take it that means this. The chimney we have here, 60 or 70—we will take 65 feet.

MR. KEOGH: The big one is 175, I think he said.

MR. SLAGHT: Well, I am dealing with the cupolas now, but I don't think I need to. He told me the dust goes through the cupolas, and so did Walker, on to that plant. If your lordship will permit me, I think I won't repeat them. He used certain admissions I got. Oh, yes. On the forge shop, doctor. You were

asked by my friend did you see oil used in the forge shop and you said yes. Did you see a haze, I thought, and you thought it came from the core part of the forge shop? A. I have seen a haze from the operations of the core ovens, yes, sir.

Q. Did you make any investigation to see how the vapours from the core ovens were got rid of? They came from small stacks, didn't they? A. Yes, from small stacks on the roof.

Q. I suggest they had no control whatever in those small stacks or inside the forge shop to impede the evil that might go out upon the neighbours through the vents? That is correct, isn't it? A. There are only these small low stacks on the foundry building.

Q. Yes, I know, but they are the stacks that let it escape, in the same condition that it is inside, without any attempt to treat it? A. There is no attempt to treat the core oven gas, as far as I know.

Q. If your lordship will pardon me—the reason for my slight delay is I covered some matters and generalities which were in his examination-in-chief, and I do not want to trouble the Court by repeating them. Oh, let us have your evidence about this paper mill myth out at Thorold here and Merritton. I am told Thorold is eight miles away, what do you say? A. Merritton is—

Q. You might answer my question. A. Thorold is eight miles away, but I am talking about Merritton.

Q. Why did you tell us it was six? A. I said about. I was pressed to give a distinction, and I indicated in my reply I was not sure.

Q. But you have checked up since and find I am right, have you not? A. Yes.

Q. Merritton is about three or three and a half? A. Yes, that is right.

Q. Now, am I right in assuming that your own proboscis is the only instrument that you used at all to try and connect either of these plants with this evil down here. That is, you smelled something? A. No, sir, I based—

Q. Now, was there any other instrument than your nose that was brought into play about anything that might be coming from either of those plants? A. I indicated, I think, that, when the wind direction was from the southeast, there might be a possibility that sulphur dioxide from those plants might be carried up here.

Q. Of course, there might be a possibility, but you are not swearing that it was? A. I cannot swear that it was, no.

Q. Oh, well, that is the end of that.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949 Continued

HIS LORDSHIP: Doctor, you told me that, in your opinion, the sulphur dioxide you smelled came from those plants and the wind was blowing over the cupolas at the time, and I wondered at the time why you came to that opinion on the information you had, and why did you not assume that it might be coming from the McKinnon's. You did not know the rate of emission from McKinnon's chimneys. Why did you make up your mind and offer it as your opinion that it was coming from these plants? A. Your lordship, with the wind from the southeast, we have observed concentrations of—we have measured concentrations of sulphur dioxide and—

Q. Yes, but the wind was from the southwest when you smelled it. I am not dealing with winds from the southeast. When you said you had smelled the odour that you identified as sulphur dioxide, you said the wind was from the southwest and you made up your mind that it was coming from Thorold and Merritton? A. I did not relate that observation to a southwest wind. I thought I made it clear that that observation was related to the southeast wind.

Q. Well, I may be wrong.

MR. KEOGH: Page 9, December 29th, on Exhibit 135.

HIS LORDSHIP: Wait till I get the note. When you say you smelled it—yes, you said the wind was from the southeast? A. Yes, sir.

Q. That is right. Did you ever smell this smell in other parts of St. Catharines, away from the McKinnon Industries? A. Yes, sir. I have smelled it in the vicinity of the paper mills.

Q. I am not talking about the vicinity of the paper mills. I said in St. Catharines. A. I have, on occasion, detected the odour in other parts of St. Catharines.

MR. SLAGHT: You have again a pretty keen smeller. You told us if it is .30 you can smell it. A. I said I could taste about .30 parts per million.

Q. Oh, can you taste .30? A. Yes.

Q. And I have forgotten what you told us the taste was like, or did you? A. I did not describe the taste.

Q. Well, describe the taste now. We know chocolate and we know tobacco and that sort of thing. Give us what this tasted like? A. I would describe it as a slightly acid taste.

Q. Like a lemon? A. No, not as sharp as that.

Q. Nauseating at times? A. No, sir, it is not nauseating.

Q. You like it, do you? A. I cannot say that I like it. I just know because I have been in sulphur dioxide areas so often that I can—I am sensitive to it.

Q. Now, I want to show you—well, first, I call your attention to the fact that this is a little digression on light, Dr. Katz,

and I won't be long with you. You said when you visited Walker's in 1945, there was some deposit on his glass roof of the greenhouse? A. Yes, sir.

Q. All over all the roofs? A. Yes, sir.

Q. And what was it? A. It looked like dust and soot.

Q. Where from? A. Presumably from the operations of the plant and from St. Catharines.

Q. Presumably—when you say the plant, you mean McKinnon's? A. Yes.

Q. Presumably from the McKinnon's place and from St. Catharines? A. Yes, sir.

Q. Whereabouts in St. Catharines, on June 7th, the date of your visit? A. I don't understand that question.

Q. Well, McKinnon's was running? A. Yes, sir.

Q. And you think it partly came from them, and you say partly from St. Catharines. Whereabouts in St. Catharines do you say it came from, on June 7th? A. I cannot answer that question. You are referring to a deposit history of which I do not know. I said that some of that deposit came from the plant in operation, and some of it probably came from the City of St. Catharines. That is all I can say. I think that is a fair statement.

Q. Well, if that is all you can say, I will not pursue it, but just take it and leave it. And do you agree, while you are not a graduate florist, perhaps, did you ever grow any orchids? A. No, sir. I am not an orchid grower.

Q. Ever have a greenhouse? A. I have never had a greenhouse of my own.

Q. Why do they build roofs with glass on greenhouses? A. It would not be a greenhouse if it did not have a glass.

Q. Well, that is a good answer.

HIS LORDSHIP: I think that is scientifically correct.

MR. SLAGHT: Yes, I think that is just what I wanted. The reason it would not be a greenhouse if it did not have glass is so that it should control the growth and the rays of light, like the infra-red ray and x-rays, would help plants grow up? Isn't that it? A. Mr. Slaght, if you apply yourself to the proper spectrum, I will agree with you, but not x-rays.

Q. Oh, did I say "x-rays"? Well, we will take the violet rays? A. Well, that is different.

Q. Now, on your visit over there you saw all the glass on all the roofs covered with a deposit, and this was your little summary of it. Did you rub any of it off with your finger, or take any samples, or do anything to see how severe it was? A. I was only allowed to go through. I was not allowed to take samples.

Q. Did you tell me you tried to rub some off and were disallowed? A. No, I am not telling you that. I am merely telling you that I was not allowed to take samples.

Q. Again, were you not allowed to rub a piece of glass off? Are you putting it that way? A. I put my hand on some glass, yes.

Q. Well, I want to just read what I took down of what you said about that. You wave it away pretty nicely. You said there was a deposit on the glass, but it was not sufficient to cause concern as far as I could see. Now, whether it caused concern to you or not, do you agree with me that, to some extent, great or little, it kept those rays that I mis-described, and I mean to say violet rays and infra-red rays, that it caused them to some extent to be impeded in their passage through what would have been clear glass? A. Yes, sir.

Q. And you don't know to what extent? A. No, sir.

Q. And we have had tests, not in 1945, but we have had tests in 1949 that I am going to show to you of that, although I do not know that I should bother you with it.

HIS LORDSHIP: The doctor is not claiming to be expert on that.

MR. SLAGHT: No, your lordship is right.

HIS LORDSHIP: Might as well cross-examine any other witness.

MR. SLAGHT: And I think I am hoisted by my own petard.

HIS LORDSHIP: All he can say is as far as he could see it did not cause him any concern, but he was not giving any opinion on how much it might affect the flowers. What I am concerned with, though, doctor, is in your answer you said the deposit that was on the roof you would rather assume that it was caused by a deposit partly from McKinnon's and partly from other places in St. Catharines. In all your investigations, did you ascertain any other places from which there would be deposits of iron oxide? A. No, sir.

Q. So that as far as iron oxide is concerned we could attribute that to McKinnon's? A. Yes, sir.

Q. And oil fairly the same, I suppose, in any quantity? A. Your lordship, I think to be absolutely sure on that point it would have to be shown that there were no other foundries in the area, or that the foundries are far enough away so that their deposits would not be—

Q. Have you, in all your investigations, because, after all, you are investigating this matter for the purpose of deciding whether McKinnon's were depositing, as I understand it, injurious matter on Walker's? A. Yes, sir.

Q. And you have given some opinions about it. Did you find any other places in the district from which oil and this tarry substance would come from? You did find that it would come from McKinnon's? A. Yes, sir.

Q. Undoubtedly that? A. Yes, sir.

Q. Now I want to know, did you find any other place that it would come from? A. I found that we would get similar appearing deposits as regards tarry matter, at the Dunn greenhouses.

Q. No, I am not talking about Dunn's. There is the hospital out there. They emit smoke of some sort or other. I am talking about your investigation at Walker's. Did you find any other source of that sort of substance, because, you see, it is quite plain that, from the evidence in this case, that iron rust congeals and forms a rather tenacious film over the glass? A. Yes.

Q. And that is something I have to consider and, in the first place, you rather agree with me that we could look to McKinnon's for the iron, and, in the second place, is there any place we can look to for the oil and tar?

MR. SLAGHT: He said "no" to Mr. Keogh to that yesterday. That is right isn't it? A. Yes, sir.

MR. SLAGHT: He does not know of any in the immediate neighbourhood, and he told me he had not looked for any. A. All I have done is to measure in exactly the same way the concentrations with the wind in any direction, and I have given the results of that.

HIS LORDSHIP: Well, that is all right. I just wanted to know how far on that subject I had to consider any other probable source of oil and tar and, as far as you are concerned, you know of no other, and we will see how the case develops from there. That is all. A. I know of no other in the immediate vicinity.

Q. Well, that is all I am concerned about.

MR. SLAGHT: Now, Mr. Keogh rises to suggest that yesterday you gave us a reason why you know of no other—that you did not look for any other. Do you say that? A. What do you mean by that? I did not see the test house when the wind was in one direction or other. I operated the test house with the wind in every direction and present the results of identical analyses.

Q. Doctor, that is most evasive. I suggest to you my question is as simple as the sunshine. A. What is it?

Q. You did not look for any other source roundabout, did you? A. I did not move the recorder at the test house and therefore I did not look in the way you suggest, but I did put the recorder on the Dunn place in order to measure the dust and organic matter and sulphur dioxide somewhere else in St. Catharines.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 4th May, 1949 Continued

Q. His lordship confined his question and Mr. Keogh tells me you told us yesterday that immediately after answering any saying you did not know of any other in this vicinity— A. That is right, I did not.

Q. Get this in your head, then. He says you told us and you are telling me to-day you personally did not make an investigation in the vicinity to see other plants that might be helping produce it. A. No, I did not.

Q. Well, don't you think that is a pretty slipshod way for the chief—

HIS LORDSHIP: Mr. Slaght, I think that is not touching on the matter and is a question that should not be put to the witness.

MR. SLAGHT: I think your lordship is right. There is no jury in the case.

HIS LORDSHIP: I think we will adjourn now. It has been rather a long day and I am sure the witness is tired.

—Whereup Court adjourned till 10.00 a.m., May 5, 1949.

Thursday, May 5, 1949, 10.00 a.m.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 5th May, 1949 Continued

HIS LORDSHIP: I wonder if counsel can agree on this. I think it would be an advantage if we had the surveyor put in the directions on Exhibit No. 1 with the centre on the cupolas. If you try to relate the precise directions, north, south, east and west, in relation to the arrow that is on the exhibit, it is a little difficult,—so far away. If he just drew two lines with the centre on the cupolas so that then we have the directions as related to Walker's premises and the test plots—

MR. SLAGHT: We will be glad to have that done. You say two lines; you mean showing the four points of the compass?

HIS LORDSHIP: Well, you can make eight if you wish, showing north, south, east and west; northwest and southwest, and northeast and southeast.

MR. SLAGHT: And carry them clear through?

HIS LORDSHIP: Well, make them as long as you like, but as long as they will centre over the cupolas. As a matter of fact, I did something last night I should not have done. I had Exhibit No. 11. I thought I had my own copy, but I had the Court copy and by drawing parallel lines with the arrow, I more or less did that in a rough sort of way; I should not have marked the Court copy.

MR. SLAGHT: I am sure my friend and I both agree no harm can be done by that.

HIS LORDSHIP: But if the surveyor would just do it, it will be done accurately.

MR. SLAGHT: Yes, that is so. I will see that it is done and perhaps the Registrar will be authorized to lend me the Court exhibit for that purpose.

THE REGISTRAR: It will be Exhibit No. 1 and 11.

HIS LORDSHIP: Well, if you will do it in ink on Exhibit 11, and if there is any way of taking my marks off Exhibit 11. I did use a red lead pencil, thinking I was working on my own exhibit all the time, but see what the surveyor can do to get it so that we can see the precise directions, because it is of great importance in relating Dr. Katz' exhibits to the position of the cupolas.

MR. SLAGHT: Yes, your lordship. Now, your lordship's suggestion brings to mind one extension of that, if my friend and the Court will approve. Let me do the same thing from the forge shop. Just put it over the forge shop in the same way.

HIS LORDSHIP: Well, I rather think if it centres on the cupolas it will be fairly obvious as to the position of the forge shop.

MR. SLAGHT: Except with regard to Dr. Katz' test plot.

HIS LORDSHIP: If there is any advantage to be gained, in the opinion of counsel, by having that clear, there is no objection to that.

MR. KEOGH: The difficulty about the forge shop, while it is adjacent to the foundry it is not expressly shown on either Exhibit 1 or Exhibit 11. It is just the forge shop.

MR. SLAGHT: Oh, yes, it is.

HIS LORDSHIP: I think so, Mr. Keogh.

MR. SLAGHT: That is the forge shop.

MR. KEOGH: Oh, yes. Then, I have no objection to as many direction marks as my friend wants to put on it.

MR. SLAGHT: Thank you.

MR. KEOGH: It will be done by the surveyor in about——

MR. SLAGHT: Oh, yes, I do not think he is in town, but I will get in touch with him some time today or tomorrow.

HIS LORDSHIP: Well, I do not think we will be through tomorrow.

THE REGISTRAR: You have already been sworn, doctor?

A. Yes, sir.

CROSS-EXAMINATION OF DR. KATZ CONTINUED BY MR. SLAGHT:

Q. Dr. Katz, I show you Exhibits 24, 27 and 29 of your test plot, put in to show your test plot and the descriptive conditions.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 5th May, 1949 Continued

HIS LORDSHIP: Excuse me, Mr. Slaght: I have wondered if, in view of your suggestion that there should be direction lines from the forge shop and cupolas, it would save messing up the exhibit and probably be more accurate in any case, if you put the centre of the compass about the centre of Walker's property and simply drew a north and south line through that, because we are only concerned with what might or might not decide just what effect it would have.

MR. KEOGH: I would be agreeable to that, my lord.

HIS LORDSHIP: Either one or the other. I do not like to get an exhibit messed up too much.

MR. SLAGHT: Having regard to that suggestion, I am wondering, my lord, if that won't throw out to some extent the clarity of the chart, for this reason. Visualize that the surveyor is starting to work and that he is putting the points of the compass more or less on the cupolas for the moment and extends them, then, when he extends at the southwest line it possibly will not run from the centre of Walker's property, but that line will go through a portion of Mr. Walker's property in my view and similarly the south one will; but if we pick a point on Walker's property and have him draw a line from the cupola to that, I am afraid that won't give us the exact——

HIS LORDSHIP: Well, probably in view of the fact that the location is—that the trouble comes from the cupola and forge shop, we had better have that as the centre and then we can study it from that point of view.

MR. SLAGHT: Thank you, my lord.

Q. If you will look at those exhibits one at a time, those purport to be a photograph No. 24 of the test plot at McKinnon's showing the gladiolus on the east side of the greenhouses in 1946. Do you recognize that wire fence, and so on, and recognize that as a picture there? A. Yes, sir.

Q. These are gladiolus, and so on? A. Yes, sir.

Q. And it was sworn that the condition of the flowers was bad. We need not discuss what caused it, you and I, but do you agree that the picture indicates the gladiolus are not in good condition? A. I did not swear the condition of the flowers was bad.

Q. No, I am not saying you said it; others have put it in. A. Yes. I agree that photograph represents our plot on that occasion, yes, sir.

Q. Now, take a look at Exhibit No. 27, and that shows the gladiolus on August 7th, 1947, again with some gentleman in the back—I have forgotten who he is, there, and you notice the tips are bleached on them? A. Yes, sir.

Q. And do you think that shows fairly the conditions of your plot at that date? A. Yes, sir.

Q. Then, I show you Exhibit 29, and does that represent fairly on the 5th September, 1947, the conditions there? A. That is a photograph of our plot.

Q. Then, you told us that Mr. Dunn, at your instruction, planted some flowers in your test plot? A. Yes, sir, he planted flowers in the test plot, yes, sir.

Q. Did you bring in any soil, or take the soil as was? A. I cannot tell you about that, because I left all the details of that entirely to Mr. Dunn, he being a grower of plants.

Q. And, when the planting was done, would it be in bulb form? A. I presume he put the plants in bulbs or corms, yes.

Q. Whether or not they were in bloom then, do you know? A. Well, certainly not.

Q. They were not in bloom when planted? A. They were planted from bulbs or corms.

Q. And do you know where he got them? A. The details of that must be left to Mr. Dunn.

Q. Just where he got those—did he get them from his own greenhouse, or did he buy them, or do you know? A. I do not know, sir.

Q. And afterwards you sent some to Saville, and although Saville is not too definite, he was brought here to indicate, subject to his cross-examination, that they were diseased; some of your bulbs were diseased? A. Not the bulbs, the plants.

Q. Not the bulbs, the plants, yes. Did you hear his evidence? A. I personally delivered the plants to Dr. Saville, yes, and I have testified already as to what plants I delivered.

Q. I understand that. And when you took them down there, you told us yesterday you could not tell whether they were diseased or not, or what disease it was? A. I have said that I suspected fusarium yellows and wanted him to confirm or otherwise to tell us what he thought.

Q. You had your suspicions and you took them to the doctor to see if you were right? A. Yes, sir.

Q. Now, if there was a diseased condition it came obviously from the bulbs and plants; it had nothing to do with Walker's in any shape or form? A. Or the soil in that area.

Q. Did you have your soil sent to the O.A.C. for testing? A. I don't recall having the soil sent there, but Mr. Dunn looked after the soil.

Q. I suggest, as far as you know, it was never sent there for testing? A. I don't know anything about that.

Q. Why didn't you send it there for a test, let me put it to you? A. Because Mr. Dunn was in charge of the growing of the plants. I left everything to him.

Q. Is it greenhouse practice in Ontario to send soil to the O.A.C. for testing? A. I understand that some growers do that.

Q. We were told by somebody that that is a good practice. A. Yes.

Q. Now, I want to show you your own exhibits, 161 and 162. If you will hand his lordship the original exhibits—I have copies to show the witness. Give these to his lordship.

THE REGISTRAR: I think his lordship has his own copies.

HIS LORDSHIP: Yes, I have them.

WITNESS: May I see the exhibit you are identifying?

MR. SLAGHT: Table 1, table 2, sulphur dioxide tests. There is nothing to be marked on them, my lord, so your original exhibits will serve your purpose for my examination. Now, looking at 161 first. It is a table that purports to collect and summarize for the growing season of each of the years 1945-6-7-8. Do you find it so? A. Yes, sir.

Q. You have your own in front of you? A. Yes, sir.

Q. And I direct you to the last line of each year's summary. Take 1945 on 161, and the last line is above .25 p.p.m, parts per million, and there you go through the months and you insert percentages. A. Percentages to two decimal places, yes, sir.

Q. And you have got the same item at the foot of 1946 and 1947 and 1948, haven't you? A. Yes, sir.

Q. And that was intended to show the Court how much or what proportion of the tests there were that ran .25 or over? A. As a percentage of the total time of the months.

Q. Because .25, when you made these tests, you took as the minimum concentration that would cause injury? A. Well, this is a standard form of presenting data that I have followed for many years.

Q. I am not quarreling with that and did not ask you anything about that. You took .25, translated it on this form into percentages, because you wanted to show the Court the percentages that were .25 or over, because that would cause injury? A. No, sir. You are putting words—you are implying thoughts in my mind which are not there. I told you that this is a standard form and I summarized the data in that form, because I have been accustomed to doing that for many years, and there is no ulterior motive in the arrangements of this data.

Q. Oh, forget the formula part of that. Is there any reason why you took .25 for that line of summation, except the fact that you wanted to show the Court how much of a percentage, or in a concentration percentage would injure plants? Now, that is the purpose, or is it not? A. No, sir. I showed the Court the duration in percentage from traces, .04, .05, and .11 to .25, and above

.25. I could not break down the readings between .25 and .35 because I would be left with virtually nothing to show, and I report them to the second decimal place, and the actual duration in hours is given in successive exhibits.

Q. Now, you are talking a lot about things I have not asked you. Simply, it was intended to show the Court concentrations as high as .25 and above that figure? A. Yes, sir, that is all.

Q. Now then, you have nothing on this chart to show concentrations above .20? A. Above .20?

Q. Yes. A. You are suggesting that I should have arranged this in a uniform——

Q. I am asking you a question. There is nothing on your charts to show concentrations of .20 and above? A. Not in here, no.

Q. Therefore, I suggest to you that lacking that, in view of your evidence of yesterday that .20 and above .21 and .22 and so on, will cause injury— A. I said above .20. This chart—

Q. Never mind. We have this chart. It was intended as misleading insofar as it indicates to the Court the percentages of the concentration that would injure plants? What do you say? A. These tables are not misleading. They are intended—

Q. Oh, Dr. Katz, don't please start with that again. You understand my question?

MR. KEOGH: Oh, please let the witness answer.

THE WITNESS: Excuse me. I have published, through the King's Printer, Ottawa, ten volumes of stuff dealing with the Trail Smelter Investigation and every one of those tables is drawn up in this form, and not on the .20 basis that you suggest. I am accustomed to doing things in a certain way. I started this system years before I ever heard of the McKinnon Industries.

HIS LORDSHIP: Dr. Katz. A. Yes, sir.

Q. I think we are discussing or putting it in as a guide as to whether or not injury was done by SO_2 fumigations. It is not really of value at all, is it, because it deals in percentages? A. Your lordship, I would not use these percentages as a guide to what has happened.

Q. It really is not of value at all in the problem we have got? A. No.

Q. I think I pointed that out earlier, that it cannot be put forward. There might be great damage done and yet there would be a very small fraction of percentage of the whole it may consume. That is right, isn't it? A. Yes.

Q. Well, let us not take much time on it, because I do not think it is misleading me at all.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 5th May, 1949 Continued

MR. SLAGHT: The only point, witness, is this; that, having changed your percentage from your oath to my friend in chief, from .25 to .20 yesterday, there is nothing on this chart to show the percentage of concentrations above .20, while there is above .25. A. Mr. Slaght, I deny trying to make anything of this. May I have a copy of the decision of the International Tribunal that you showed me the other day? I want to see that again.

Q. Well, you may if the Court says you may, but it has got nothing to do with my question to you. A. It is the very basis of the question.

HIS LORDSHIP: Witness, I do not think you need to get so excited about this matter and I am not going to have either you or Mr. Slaght decide what is going to be the issue or what we are going to get into this record. Mr. Slaght is only suggesting that there is nothing in this table that gives us similar information as to .20 and above. Now, I am not going to permit Mr. Slaght to impugn your motives. He can do so in argument. I do not think that the place to do so is in cross-examination.

MR. SLAGHT: I made that reservation in my question. I was not impugning his motives, but it was——

HIS LORDSHIP: You are quite at liberty to attack any witness as hard as you like in argument, but I do not want any witness to be abused in cross-examination.

MR. SLAGHT: And your lordship will recall what I said, regardless of your having any motive in doing so, I just ask you the fact.

HIS LORDSHIP: It might have been the tone of voice that got you both excited.

MR. SLAGHT: Maybe so, my lord, and the heat in concentration.

Q. Then, Dr. Katz, I want to get along. Were you sent for when you came in July, 1947, that is the time that you found the gladioli turned yellow? A. No, sir. I made it my business once a month to come down here. The date depended on my commitments in the Sudbury area, and I was not sent for.

Q. So you were not sent for? A. No, sir; I just happened to come down.

Q. You said yesterday, I took it, that you saw dahlias in 1945 which were injured, on your visit to the Walker plant? A. No, sir, I did not. I said I saw dahlias; I said they were not injured.

Q. You saw dahlias that were not injured. A. No.

Q. I thought you said they were yellow. A. Not dahlias. I observed lily-of-the-valley.

Q. Well, tell me where you say you saw dahlias, because I am instructed by my clients there had not been dahlias there for 15 years? Are you able to tell me where you think you saw the dahlias? That is in July, 1945, you will recall. A. I put down what I saw then and my impression at that time was I saw those flowers.

Q. Have you got the note where you put it down? I mean where it was originally put down? A. The notes were transcribed to the records. I mean, they were typewritten after I made the visit.

Q. I see. Well then, perhaps you have not your original notation in your notes? A. I have my original notation. It may have been an error, but I just listed the flowers that I put down.

HIS LORDSHIP: Now, witness, I am anxious about this, because I have made a note about that, and it was advanced as of some importance. I wish you would turn up your notes and let us see what you did say about it, because I must be able to judge how far there may be errors, because you, I think, said that dahlias were there and were very susceptible. A. Yes, I said that, your lordship—lilies-of-the-valley.

Q. You said about lilies-of-the-valley too, your diagnosis was it was friction between the lid and the points of the leaves because the top had been left on too long. A. Yes; I mentioned dahlias here and petunias.

MR. SLAGHT: What are you looking at?

HIS LORDSHIP: Oh, I thought you were going to give us the note. A. I said ——

MR. SLAGHT: This is what you said in your report at the time? A. Yes, I have a notation here of dahlias growing in an adjacent plot to the ——

Q. No, just read out what you have. A. "Dahlias growing adjacent plot were found to be in excellent condition, as well as petunias which were growing in plots."

HIS LORDSHIP: A plot adjacent to what? A. To the lilies-of-the-valley.

Q. Is that Walker's lilies-of-the-valley? A. Yes, sir. Dr. Ledingham was with me on that visit. That is what I have in my notes.

MR. SLAGHT: Where are your original notes? A. I don't know where my original notes are, because, when this was typed out in the Research Council report, that is the end of it.

HIS LORDSHIP: Now, that is something that was not brought out earlier in the case in Court,—part of your evidence. Then, you were really reading from your report, were you not? A. I was reading from reports, which were based on notes.

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Q. Yes, but you were not reading from notes made at the time. Of course, it is not permissible to refresh your memory except from original notes, and I am afraid at that point, at any rate, I thought this was a report from notes made at the time. A. It is essentially made very soon after, but I mean ——

Q. But the original notes you made that formed the basis of that report that you are making to Council, or to your principals, were destroyed? A. I won't say that they were destroyed.

Q. Well, where are they? A. They may be in the files. I have moved my place many times. I cannot—I did not make a definite practice of keeping notes, because these notes were written on sheets of paper.

Q. Well, you see, it is a legal maxim. Mr. Keogh, this really gets us into some difficulty just now. Were you aware that he was not dealing with notes at the time?

MR. KEOGH: Yes, I was. I brought it out that he made his report out some six days after he completed his investigation. The investigations ran to September 4th, 1945, and I brought out that he completed his report by September 10th.

HIS LORDSHIP: You see, it is one thing to have a witness refresh his memory from notes made at the time, and it is another thing for one to come into Court and read from a report. I did not know that was the process going on till now. We have a matter that the witness has not any recollection of at all, and he has not got his original notes.

MR. KEOGH: Well, there have been cases, my lord, when lawyers have been allowed to read from docket entries which they dictated within two or three days after the transactions occurred, and I was in one case when Mr. Agar was allowed to do that by Mr. Justice Hogg, the case of Lamport vs. Thompson.

HIS LORDSHIP: Yes, but there is an original note that is read when the lawyer dictates his docket entry, and there is a recollection at that time.

MR. KEOGH: Yes, but it was not notes made on a piece of paper. I think most lawyers make a note in a book, or a scratch pad at the time.

HIS LORDSHIP: Well, I am not going into it too deeply, but it is something that I would have certainly directed that, if the original notes were available, they should be here in case it should arise in cross-examination.

MR. KEOGH: I had understood—I did not get it very clearly—I had understood that they were not available. If I had thought otherwise, I would have had them here.

HIS LORDSHIP: Well, I am sure you would. Well, proceed.

MR. SLAGHT: Q. Then, leaving this report that you wrote there aside, are you able to swear merely from memory definitely that you saw dahlias that day? You need not, doctor, if you are not able to. I am asking you to exercise your memory and tell me.

HIS LORDSHIP: What is the question?

MR. SLAGHT: I am asking him to exercise his memory. Cast it back and then tell us definitely whether you can swear you saw dahlias that day or whether you are not able to? A. I cannot remember, looking back now, whether I saw dahlias. I can remember the lilies, but I can't remember the dahlias.

Q. Now, we will pass from that.

HIS LORDSHIP: You mean the lilies-of-the-valley? A. The lilies-of-the-valley, yes, sir.

MR. SLAGHT: Now, you took your sample to Saville in September, 1947, wasn't it? A. No, sir. The sample I took personally to Saville was in 1948, June. I got it on June 18th and I arrived in Ottawa on the morning of June 19th, and delivered it to him personally at the Experimental Farm, about 1.00 o'clock.

Q. Had he been given samples in 1947 of this same type of plant? Someone else took him one sample? A. Yes, sir.

Q. When was that? A. That was in 1947, but I was not involved in that.

Q. Not in taking the sample, but you were the head of the show, and did you get any report from Saville, or the man who took him the 1947 sample? I understood Saville did tell us that from the sample taken to him in 1947 ——

MR. KEOGH: No, you are not ——

HIS LORDSHIP: You had better wait till Mr. Slaght finishes his question and then any observation you wish to make, Mr. Keogh, you may do so.

MR. SLAGHT: I will be glad to be corrected if I am wrong. I understood Saville to say someone took him a sample in 1947 and you appeared to agree with that this morning, the year before you took him one? A. Somebody did take him a sample in 1947.

Q. Now then, Mr. Keogh, do you want to help us?

MR. KEOGH: I was just going to say it was not this witness.

HIS LORDSHIP: Saville said Dr. Ledingham took him the sample on the 10th of September, 1947.

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MR. SLAGHT: And six leaves; no bulbs cut open for disease; however, that may be. And you got from Saville his suggested report of 1947 that there was disease in the sample Ledingham took, or did you? A. I got the report from Dr. Saville, yes, sir.

Q. To that effect? A. Yes, sir.

Q. Then, you took him a sample of the same flowers, from the same plot, in 1948? A. No, sir.

Q. What plot? A. I took him a sample from the plot in front of the forge shop, near the butain tank.

Q. Was that the plot that Ledingham took him the sample from in 1947? A. Yes, sir.

Q. You are able to say it was not? A. I am pretty sure it was not.

Q. All right. Now then, you told me, I think, that you heard Larry Edwards—these questions are merely leading up to a question I am going to ask you. I am calling your attention to two or three items you heard Larry Edwards tell the Court in his evidence, that he had had several conferences with Walker at Walker's greenhouse and took samples away from Walker's,—Edwards had? A. He was the—I have never met Edwards except in Court here.

Q. No, no. You listened to him in the box here? A. Yes.

Q. He was an employee of McKinnon's and he worked and was asked by the company to look into Walker's complaint? A. Yes.

Q. And you heard him say that he took samples and sent them away and the company got a report? A. Yes, sir.

Q. And they were sent away for a test? A. Yes, sir.

Q. You heard Edwards say that? A. Yes.

Q. And that after he saw the test come back he was satisfied that McKinnon's were injuring Walker's?

MR. KEOGH: No, there was not any evidence of this kind. It was samples of soil, certainly no evidence that I heard, anyway.

MR. SLAGHT: Well, my friend interrupts me to say there was not any evidence of what kind?

MR. KEOGH: That he was satisfied that McKinnon's were injuring Walker's as a result of these tests.

MR. SLAGHT: Whether he was satisfied or not, he said he was satisfied that McKinnon's were injuring Walker. We will change it to that.

MR: KEOGH: I don't agree with that.

MR. SLAGHT: Well, he did say so.

HIS LORDSHIP: Well, I want to make sure what was said, if it is leading up to anything. When did Mr. Edwards give evidence in relation to some of the others? Was he called by the plaintiff or by the defendant?

MR. SLAGHT: By the plaintiff, my lord.

MR. KEOGH: I think it was probably about the 25th or 26th of April.

THE REGISTRAR: The 25th of April, between Beaumont and Tienken.

HIS LORDSHIP: Yes, I have it. He said he reported. He went over to see—he was with McKinnon's from February, 1941, to May, 1944. He examined Mr. Walker's flowers and he reported to the firm. He said there were a number of the orchid leaves were brown and there was an accumulation of dust and dirt on them, and he reported to the firm and was told to investigate the possibilities of diminishing or reducing the difficulties, is the way he put it, and he recommended the chain curtains. He said the changes did not eliminate Walker's troube entirely, that they reduced it about 20%. I think that is the sum and substance of his evidence.

MR. SLAGHT: Yes.

Q. Then, you heard what his lordship read, that he said that the changes did not entirely eliminate Walker's troubles, and I ask you for that report that your company got on that test? A. I don't understand what you mean by my company. I have no company. You mean the McKinnon Industries?

Q. Yes. A. What test, Mr. Slaght?

Q. The test that you have just told us you heard Edwards say was sent away after he took samples from Walker? A. I know nothing about it. I never met Mr. Edwards until he came into Court.

Q. But you told us you were given a history when you first came here on your first visit, by the general manager, of the conditions, and that in that history you had heard that Walker had made complaints and you mean to say that the general manager never told you that he had had a test at the Walker's greenhouses and got a report on it and an analysis, and didn't show it to you? A. I have never heard of this until it was brought into Court by Mr. Edwards.

Q. All right. I suggest you heard Dr. Saville admit—put it this way, in effect that anyone having access to the beds, any expert should not have any difficulty in distinguishing bacterial blight from sulphur dioxide bleach. Do you remember him saying that? A. Yes.

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Q. You did not, in 1946, 1947 or 1948 seek access to the beds, nor you did not go to see the beds? A. I reported that I saw these beds frequently in successive inspection trips.

Q. The beds at Walker's? A. Not at Walker's.

Q. Well, I am speaking purely of Walker's now, witness. A. I beg pardon.

Q. You did not seek access to Walker's beds, nor you did not see them? A. Only the gladiolus that I could see from the sidewalk.

Q. That is peeping from a distance? A. From a distance, yes, sir.

Q. And therefore in view of the evidence you heard from several of my expert witnesses, that these were definitely sulphur dioxide bleaches, do you think you were in a good position, having regard to what Saville says about it, to distinguish bacterial blight from sulphur dioxide bleach? A. On Walker's property?

Q. Yes. A. No, sir. I was not allowed on Walker's property, except by special arrangement for this one visit that I reported on the 7th of June.

Q. What do you mean by "not allowed"? Mr. Walker told us you never asked him and he never refused in his life. Is that not true? A. We asked to have free access to Walker's ——

Q. Not "we". I want you. A. Yes, I even wanted to erect my recorder on his property.

Q. Oh, you have told us that. Did you ask Walker for permission to go on his property at any time to see the beds, after the time you went on with his permission in 1945. A. Not personally.

HIS LORDSHIP: There is one matter I want to ask you about. It has been brought up several times that you requested Walker's leave to put the recorder on his property? A. Yes, sir.

Q. Did you make any effort to put the recorder on the property which should be under the joint supervision of a scientist appointed by Mr. Walker and yourself? A. Your lordship, I never put either of those terms ——

Q. Now, can you just answer that question? A. No, sir.

Q. You did not do that? A. No, sir.

Q. Well, you can easily see that, if a man was allowing his property to be used, he would want some control over how it was being used? A. Your lordship ——

Q. That is reasonable, isn't it? A. Yes, your lordship. The idea behind the offer was that Walker would have free access to all the data, etc.

Q. Oh, that is one thing, to have access to the data, and it is quite another thing having a man in control who was in a position to verify as to how the data was being arrived at. You can realize the difference between them? A. Yes, sir.

MR. SLAGHT: Then, doctor, in defining your refusal to have anything to do with the chimney tests or emissions from the mouth of the cupolas, I suggest you said this, in effect, and I was rather surprised. The concentrations might be high at the mouth of the chimney and low at the area around, or low at the mouth of the chimney and high in the area around. Did you say that? A. I do not recall saying that.

Q. Well, is that not so? A. No. How can a concentration be low in a chimney and high in an area around? I don't understand that.

Q. I was wondering what you meant by that, but wind and weather conditions might be favourable.

HIS LORDSHIP: What are you reading from now?

MR. SLAGHT: I am going to read from the doctor's book now, page 29, doctor, and this is the explanation I have, page 29, just at the foot. This is not quoting anybody but Dr. Katz:

> "There is no correlation between the daily sulphur emission "at Trail and the gas visitations in the field since institution "of smoke control measures. Quite often gas visitations "occur precisely on those days when the emission is low, but "wind and weather conditions are favourable for the accumu- "lation of gas."

Now, that is another way of putting what I suggest you said here in the witness box? A. Mr. Slaght, you are reading something from a text based on a situation in a relatively narrow valley in the Columbia River where one of the greatest smelters in the British Empire operated, and you are translating that condition to St. Catharines. I could take a lot of time to explain precisely what this means, but I can refer you to the original data which showed that, in the case of this smelter gas, mountains rise on each side to heights of thousands of feet, and their stack was over 400 feet high, and they emitted hundreds of tons of sulphur a day, that that smoke rose to about 1,000 feet over the stack and, during the night, would collect and the gas level would not reach the ground so that, if they wanted to institute smoke control measures, they had to do it many hours before the fumigation actually reached the ground to prevent the accumulation of gas in that structure about 1500 feet above the ground, otherwise, as it is shown in the report of the Tribunal—in fact, it is shown in their decision, that you quoted, if you will read all of it, that because of the peculiar conditions of that valley, they had to take

several measures and institute their control measures many hours before the fumigation actually occurred in the field, and these fumigations occurred by a system of vertical mixing. They were dependent very greatly upon the meteorological conditions; in the early morning the sun would hit the sides of the valley and there would be created a condition of turbulence; the warm air would rise from the surface and that would create a sort of swirling and then that would cause inversion and simultaneously at recorder stations many miles apart, 5, 15, and 30 miles apart, we got the fumigations almost at the identical time, because the smoke had spread all through this narrow valley during the night. Now, that is what this refers to.

Q. Now, after all that, doctor, I am just going to read you a few simple words here and let me put it this way. So you did not admit in this answer, that the conditions that you saw existing in Trail, exised out here? Now, I take it as making an admission but, did you not write in your book—first, there is no correlation between the daily sulphur emission at Trail and the gas visitations in the field since institution of smoke control measures. That is one statement of fact. That is true, isn't it, at Trail? A. Yes, of Trail.

Q. "Quite often gas visitations occur precisely on those days when the emission is low, but wind and weather conditions are favourable for the accumulation of gas." Now, isn't that true of Trail? A. Yes, sir.

Q. And if it is true of Trail, how are you able to say that it could not be true here? A. You have not got the same topography.

Q. Topography. Any other reason? A. You have not got tons of sulphur being emitted per hour, as at Trail, with the remedial measures in operation. They are allowed to emit from two to four tons of sulphur every hour; that is sulphur.

Q. But I remind you when you are giving that answer, that your book says, "when the emission is low". A. When the emission is low it is still 10,000 times greater than the emission you have around here.

Q. All right. Then we will leave that, doctor. Your book is recorded in the notes. I want to ask you about this in your book, and then I think it is the last reference to Katz. Page 14, will you listen to this, because I think it is important, the second paragraph? A. Yes, sir.

Q. Have you got page 14? A. Yes, sir.

Q. "In industrial regions where large quantities of soft coal "in particular are consumed there are discharged into the "atmosphere huge quantities of soot and tarry substances, "in addition to the various gaseous products of combustion,

"and it has been shown that the unflourishing condition of "vegetation, particularly conifers, in such areas is due more "often to soot than sulphur dioxide."

That is true, isn't it? A. That is true for these large industrial regions we are discussing here.

Q. Cohen and Ruston, you are quoting them there, and they are favourite authors of yours, aren't they? I mean, you quote them more than once in the book? A. I quote a very large number of authors.

Q. I know, but you quote them more than once. You approve of them as sound? A. I have made quotations from Cohen and Ruston.

Q. Do you approve of them as sound authors? A. That will get us into a prolonged discussion.

Q. No, it need not. You can say "yes" or "no" to that. A. I would say Cohen and Ruston, they are authorities on their subject.

Q. "Cohen and Ruston show that soot and other solid "impurities cause a diminution in growth by reducing the "photo-synthesis of the leaf surface. The stomata of the "leaves become clogged with these solid particles and normal "gaseous exchange is hindered."

That you believe to be a true statement? A. If the stomata become clogged, yes, sir.

Q. Now then, leave for the moment sulphur dioxide, SO_2, out of this case altogether,—nobody had ever mentioned it. Those extracts show that frequently soot and these solids that lodge on greenhouse plants create more often injury than sulphur dioxide does, and create it without any sulphur dioxide at all. Isn't that true? A. Let us get back to Cohen and Ruston. If you believe Cohen and Ruston, they wrote their book on conditions in England. Now, conditions in England, especially at the time Cohen and Ruston wrote their book, were appalling in regard to the tremendous amount of soft coal consumed and the tremendous quantities of soot and other discharges emitted into the atmosphere and, of course, the quotation here is from Cohen and Ruston and their investigations in England under conditions of the tremendous consumption of soft coal in large industries in areas like Leeds, Birmingham, London, and so on.

Q. Now, I asked you yesterday about soot having lodged from McKinnon's on the Walker place, and you told me that you didn't want to take that back? A. Yes.

Q. Leave sulphur dioxide out of this case for a minute. Are you prepared to swear that the soot that lodged on Walker's bulbs and plants and greenhouses did not harm him, as a grower?

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A. I cannot talk about Walker's plants. I was only in Walker's greenhouse once, but we ran experiments on plants in the open at the site of our experimental station in the path of all the gases in this neighbourhood. The flowers were clean, the plants grew well. We got good, tall flowers and spikes. We grew good gladiolus flowers, good chrysanthemums and therefore I saw no ——

Q. Well, not having seen Walker's—a wide host of witnesses say that they found at different times soot on the plants and leaves and accepting for the moment that because you were not there you did not know. If that be true evidence and is believed, I suggest to you you are not able to say that, insofar as Walker's plants are concerned, that that soot might not have caused injury. What do you say? A. I am not able to say that, sir.

Q. I thank you. I think not. My attention is directed in regard to your last answer that the evidence you gave was that the gladiolus turned yellow in 1947 and again in 1948? A. That was the leaves, and we have sufficient evidence to show beyond doubt in my mind that the injury was not due to soot or sulphur dioxide, but to bacterial blight.

Q. Then, doctor, a word about the vents from the core room. You told us yesterday they carried the fumes and gas from the molten metal into the open air with no smoke devices to control them. Do you remember telling me that? A. Those fumes are not from molten metal, they are merely vapours from core ovens and from the pressure used in those core ovens.

HIS LORDSHIP: What do you say—core ovens? A. Core ovens.

Q. What goes on in a core oven? A. Those are ovens where a certain oil is used with the cores and the heat causes a certain amount of combustion of this oil.

Q. Just tell me what the process is first? A. Your lordship, I would prefer ——

Q. What do you mean by the "cores"?

MR. KEOGH: There will be evidence later that a core is inside the moulds to make an opening in the moulds. The cores are of various shapes. They are made of some material that is baked, and then the molten metal is poured around them to make openings in the mould.

HIS LORDSHIP: I will no doubt see the process.

MR. KEOGH: Yes, there will be evidence of witnesses who can explain it much better than I can.

HIS LORDSHIP: Then, you were going to say something about combustion that went on?

THE WITNESS: Certain oil is used in that process and it is the combustion products of that oil which I refer to as the core oven.

MR. KEOGH: I should have told your lordship that sand and oil are mixed together to whatever shape the core is to be and then they are baked in these ovens.

HIS LORDSHIP: What are the combustion products of the oil?

THE WITNESS: Not any different from any other combustion products of oil.

Q. That does not enlighten my mind one bit. I asked you what they were. A. They would consist of gaseous fatty acids.

Q. Oh, tell me what they are. "Gaseous", they may be carbon monoxide or it may be carbon dioxide, or it may be hydrogen. Cannot you tell me? I want to get a more or less technical record of what this is that is given off. We have heard a great deal of talk about a blue haze that comes across and gets into the greenhouses and so on. Now, did you make any investigation to find out the nature and character of the vapour that is given off from the core ovens? A. Your lordship, I did not make a definite analysis of the gas, but it consists largely of ——

Q. Then, you don't know what the gas is that is given off these core ovens. I just want to get some information, if I can, as to what it was that was given off the core ovens, so I can relate it to the complaint of Walker? A. Your lordship, this is a very complex mixture of combustion products, and a large number of these compounds are unidentifiable,—just like the products of smoke.

Q. Are none of them identifiable? A. Only the ones that can be identified definitely; carbon dioxide, water vapour, carbon monoxide, hydrogen and probably very simple hydro-carbons that there are in the rust; it is simply a complex mixture of substances which are similar to the products of combustion of any oil or, for that matter, would not be very much different from soft coal.

Q. Well, is there not a sticky substance given off in the combustion of oil? Do you not get that? A. Your lordship, you get this sticky substance not only in oil, but also in the combustion of soft coal and hard coal.

Q. Oh, yes, I know, but I am talking about oil now. We are in the forge house. Don't let your mind go to developing something that is not asked of you. That is a matter for counsel in the case really to do. I am wanting to get enlightenment on the forge house. I have to try and find out whether this forge house has anything to do with the complaint that Walker has put forward through his witnesses, that there is a sticky substance more or less adheres to the edge of the plants and forms a tarry substance on the roof, and that forms a film. Now, is that the

sort of thing that you would expect to come from this combusion of oil? A. I am not sure, sir.

Q. You are not sure whether you would expect it to come from it or not? A. No, sir.

Q. I touch this orchid leaf, I rub it with my hand and I see how sticky it was. I think I am permitted to do that. Would you agree with me that it was sticky, because I rub off my finger something like a smudge? A. Yes.

Q. And would you agree that from oil burning in a home there is fumes given off, and especially on the large oil burners, where the fumes would come in and would make a sticky film on the window glass and that sort of thing? That was true of the old furnaces and it has been more or less correct now in the new ones? A. Yes.

Q. So is that the sort of thing that you would expect to come from the oil consumption in the forge? I don't know what the answer is. I want yours. A. I am unable to give a definite answer to that, your lordship.

Q. As to whether you would expect it or not? A. Yes, sir.

MR. SLAGHT: Then, doctor, were you down at the plant last night, McKinnon's plant? A. No, sir.

Q. Well, I think you did tell me yesterday that the fumes that came out of the core shop—the core shop is the main foundry? A. Yes, sir, the core ovens.

Q. That they came out of there and you have seen them coming out, whether you say hot or oily or a sticky blue haze? A. I just said a blue haze, Mr. Slaght.

Q. Blue haze? A. Yes.

Q. And you have told us what is burned inside there. I am told there are 12 or 14 ventilators in the foundry there at the core shop, out into the open air. Is that your recollection? A. Yes, sir.

Q. And when this is coming out—you are sort of an authority on smells—what is the smell you get from that stuff, this oily, sticky haze? A. It is a smell that is connected with the combustion of oil products.

Q. I didn't ask you what it was connected with, but can you describe it in layman's terms? A. I would say it is a sort of an oily smell; call it burning oil.

Q. The smell of burning oil? A. Yes.

Q. Well, that is good enough. Now, what I come back to, away from the forge shop for this, you know the core shop is part of the big foundry? A. Yes, sir.

Q. And they have no devices to check this oily smell of the gases, whatever they are; you would not say what they were, but whatever is in them, there is no device there to check this or wash them or minimize the evil effect on the neighbours? A. There is no device there to do anything but to release them as they are being released.

HIS LORDSHIP: Now, are you in a position to tell me whether it is practical to have these minimized? Are there devices that are employed in well-regulated factories for that purpose? If you are not, it may be entirely not your fault. A. I believe that would be the field of a foundry and metallurgical engineer.

Q. I see.

MR. SLAGHT: Then, Dr. Katz, you undertook to tell us yesterday, or, first, just before I leave the smell from the core shop, did you smell any such smell at your test house at Dunn's? A. No, sir, I cannot say that I did.

Q. Then, now, we come to your test house for a moment and you gave me some information yesterday which, on my instructions after I made an inspection last night, were not accurate. I want to be very fair with you and call your attention to it. I am told that on the west side of your test house on the McKinnon property, built under your direction, there is a dust intake which has a brass pipe coming in through horizontally, through the wood of the wall. Is that right? A. I was referring yesterday to our test house at McKinnon's. However, ——

Q. It is the same one we are talking about; the same one, isn't it? A. The McKinnon test house?

Q. Yes. A. And what is your question, Mr. Slaght?

Q. Is the pipe, that is the intake pipe for dust—is that a brass pipe? A. It is a metal pipe. I am not sure brass, or anything else.

Q. I don't care about that. But you did tell me yesterday the dust intake comes out like that, horizontally through the wall and a little bit outside, into the air? A. Yes, sir.

Q. And the dust particles which you would expect to catch would be dust coming downwards from the sky, carried by the wind over your test house? A. The dust particles are in a state of suspension and can travel a long distance.

Q. That is not, again, what I asked you at all. A. And as to whether they are coming down, they are in constant motion. If they strike a surface they will be deposited, and that is the main rule in the disposition of dust, is conduction and striking against a surface.

Q. All right. But you would appear to me to be expecting them to be coming down? A. Yes, striking a surface, they would be deposited.

Q. And if they were coming down into the side of your test house, one surface they would strike would be the side of the round pipe, wouldn't it; the pipe is going right out there, horizontally, and if you say they were coming down and would strike a surface, they would land on there, wouldn't they? A. But we are pulling air through the pipe under strong suction and a measure of dust is a measure of the amount of particular matter suspended in your sample of air and no matter how you do it, your results are still that.

Q. All right. Just what I am coming to, no matter how you do it, I suggest to you a much better way to do it, if you really wanted to catch dust going down, is by having a device inside of this single pipe going out like that, have three pipes, one up, if you like, as you tell me dust will land on top of that. Do you think the suction in here is going to pull dust along a pipe and around a corner and in? A. Whatever dust lands on top is immaterial, or whatever dust is deposited is immaterial, because we are taking dust from the air and that is the dust that is in question; the dust that is carried by the air.

Q. I want to simplify it. If you really want to catch dust in good quantities from the air, would you not get more dust with three pipes, one out, one up at less than 45 degrees, or 45 degrees, and the other almost vertical; then the dust that was falling in the air at that point would be more likely, I suggest, to be absorbed than dust you would get from a high pipe going straight out. Now, what do you say? I will just take your answer and won't argue with you about it. A. I say that the conception of analzing the dust on the basis of the dust falling is used only in the determination of deposits over a prolonged period of time and there they use the deposit catch, which is merely a trough which collects the dust.

Q. You did not use that? A. No, because it could not have related the problem to the exact condition of the prevailing winds, because we would not have known where this dust came from.

Q. Now then, having carried me away to that answer, would you mind answering my question? It is a very simple question. Would you not have expected to catch greater quantities of the dust if you had set your device up along the lines I have shown? A. No, sir, absolutely not.

HIS LORDSHIP: Doctor, I am just a little curious about that, as to whether you could not relate it to the problem, because that is one thing I am very anxious about, is relating it to the problem. If you had a dust collector that was operated on one side of the cupolas, or one side of the foundry and one on the other, and operated each when the wind is blowing over the foundry,

you would have the problem pretty well solved, would you not, if you just took a sample on each side? A. No, sir, the problem is not as simple as that.

Q. Why? A. Because these deposit catches take a long time to get a measurable sample.

Q. Well, I don't think it takes very long to get a measurable sample of dust from a chimney. You can even get a measurable sample on my hat as you are going by—at least, a sample that you feel is fairly measurable.

MR. SLAGHT: Your lordship is thinking of Toronto now.

HIS LORDSHIP: Well, at any rate, you say you did not think you could relate the problem to the cupolas by attempting to take the sample of dust. You know you could have done it when the foundry was in operation and was not in operation, couldn't you? A. Your honour, the dust deposit is a measure of dust that might be carried a great distance; where dusts have come from a long distance.

Q. Yes, I understand that quite well. A. Now, what I have tried to do is to try and relate the dust determinations as closely as possible with one condition, and I think that I have done a good job, because I have given ——

MR. SLAGHT: Well, pause while I pat you on the back, doctor. Go ahead. A. Well, you have not let me finish.

HIS LORDSHIP: All right, we will leave it at that.

MR. SLAGHT: I show you Exhibit No. 59 put in and sworn to be the result of a test of dirt that fell on the snow just west of our greenhouse No. 2 in the winter time, and the sampler took a surface of about 12 inches square, put it in a jar. You heard all the evidence about Exhibit 59? A. Yes.

Q. I am going to show you Exhibit 59, this dirty dirt in here. Take a look at that. A. Yes.

Q. What is it? A. That is dust and soot, but can you swear that that did not become contaminated with soot from Mr. Walker's own chimney?

HIS LORDSHIP: Mr. Slaght is not under cross-examination.

MR. SLAGHT: I will give you a chance to cross-examine me in some other case, but not in this one. And that is dust and soot, it looks to me as though it has got iron and iron rust in it. It is said to have. What do you say? A. I cannot say, but if it is said to have, I will accept that.

Q. Now, did you catch that kind of dust? A. I certainly caught all the dust that was presented in the vicinity.

Q. Would you like to answer my question? You are looking right at it. Did you catch that kind of dust? A. I cannot identify dust of—discoloured dust if of an extremely variable composition. It might have 50 different things in it.

Q. Then, your answer to my question is you cannot say? A. I cannot say, no, sir.

Q. All right, doctor. Back to your test house for a moment.

HIS LORDSHIP: Mr. Slaght, I wonder if you could keep to your place back of the counsel table. It is a little disturbing to a witness to have the examiner right under his nose.

MR. SLAGHT: Yes, my lord. And at the test house, you told us about the metal pipe that comes out. We will pass that, because that was the intake for the dust that we talked about? A. Yes, sir.

Q. Now, on the same side as that, on the west side, there is an intake for air to catch SO_2? A. Yes, sir.

Q. And will you tell me how that—what shape that pipe is in after it goes through the side of the house? A. Bent, in the form of a right angle.

Q. You mean it comes out and then there is another part of it goes down? A. Yes.

Q. So that the mouth of it is facing towards the earth. A. Yes, sir.

Q. Why didn't you tell me that yesterday? A. Why didn't I tell you that?

Q. Yes. A. Because that is the normal way of sampling gas.

Q. No. I was particular to take from you how the pipes came out, the particular angles and their direction, both as to the dust and the SO_2 gas, doctor, and you told me that it came straight out? A. I said that we sampled on the west and on the south side. I was not trying to conceal anything from you. I merely thought your question referred to the sides on which we sampled, and so on. I was not trying to ——

Q. Dr. Katz, you told us very definitely yesterday that all those catch pipes came straight out at right angles to the wooden side of the house. Now, that is not correct, is it? A. Not in that strict sense, no.

Q. Well, strict or not strict, it is absolutely untrue that the intake is out at right angles to the wall in that way, because the shape of your pipe is like this, I suggest. Will you just look at that? Your pipe comes out of the wooden side of the house here and then goes down at right angles and the intake is facing towards the earth. Is that not so? A. There is a short right angle there.

Q. Well, short or long, that is the way the mouth is facing? A. Yes, sir.

Q. And I am told by people who inspected it last night, that the pipes are about the size of this pencil, which I would say is about a quarter of an inch in diameter. What do you say?

A. They are 10 to 12—about 10 millimetre glass tube, standard size; about a 10 millimetre ——

Q. Put it in inches. I am speaking now of the intake mouth. A. Between one-quarter to half an inch.

Q. Now, that little pipe is faced towards the ground? A. Yes, sir.

Q. And why? A. I will tell you why, Mr. Slaght. In the first place it is sampling gas—it is sampling air containing gas. Secondly, we have to protect the intake for a gas sampling apparatus from rain, especially rain and snow, because we do not want water dripping right into the intake. We want to sample the air and not water or anything else, and that is the best way to do it.

Q. All right, now. Except for avoiding that danger, do you agree with me, because my instructions are that if you ran your pipe and ran it up you would have a better chance—now, wait a minute—don't smile for a moment until you hear the question. This is a serious case, not a laughing matter. Just a moment—if it were pointed up that way it would have a better chance to catch the gases that were passing over, we will say in a light wind and came from McKinnon's chimney, than if the nose were down towards the ground. In other words, the gases might be expected to be wafted over your test house when you put the nose down towards the ground. What do you say to that? A. I say that the way we sampled the gas is the proper way to do it and that it will not make any difference to your determination whether you turn the pipe upwards or downwards but, if you keep it downwards, you protect the apparatus from contamination of water, and that is important.

Q. And you do not agree that, with gases passing over your test house and close to the roof, there is a better chance to catch SO_2 if the tilt is up towards the sky, instead of down towards the earth? A. This is not a stationary system. We are pumping air from the system at a high rate.

Q. I didn't ask you that. I understand you to disagree with me. If you do, say so. A. Yes, I do disagree with you, yes, sir.

Q. Did you make any analyses of any deposit on Dunn's roof? A. No, sir.

Q. Or of any deposit collected at Dunn's, on plants or elsewhere? A. No, sir.

Q. No analyses whatever. Why not? A. I didn't do it.

Q. You didn't do it? That is the answer

HIS LORDSHIP: We will take our intermission.

—Intermission.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 5th May, 1949 Continued

—On resuming:

CROSS-EXAMINATION BY MR. SLAGHT CONTINUED:

Q. Witness, you have already told me about Cohen and Ruston. You are familiar with their book entitled "Smoke"? A. Yes, sir.

Q. I have a copy of it and at page 17 I want to read you this, paragraph 6:

"Soot, tar, its amount and its effects."

That is the heading. I read:

"Soot, as we have seen, is not pure carbon but contains "varying amounts of tar. This tar adheres so tenaciously "to everything that it is not even removed by rain, thus, it "is in short a kind of varnish."

Do you subscribe to that, generally? A. Generally, yes, sir.

Q. And pages 20 and 21. Page 20, paragraph No. 7:

"Effects of soot on vegetation,"

running into the top of page 21:

"Soot may exert a detrimental effect on the growth of plants "in three ways: namely, by blocking up the stomata and "thus impeding the process of transpiration by coating the "leaf and so reducing the intensity of sunlight and at the "same time affecting the assimilation of carbon dioxide and "lastly by the corrosive effect of the acid it contains. In "both cases, the tarry deposit plays an important part. The "configuration in figures 7 and 8 are taken from a holly "and laurel leaf growing in the grounds of the University. "From one half of each leaf it has been removed. The green "colours have been blemished, whilst the soot remains intact "on the other leaf . . . to the assimilation, but has a much "more serious effect in permanently blocking up the "stomata."

In general terms. do you agree with that? A. If the deposit is of the nature described, yes.

Q. That is all, doctor, I have to ask.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Re-Examination 5th May, 1949

RE-EXAMINATION BY MR. KEOGH:

Q. Dr. Katz, you told my friend, if I took you down correctly, that the possibility of injury by carbon monoxide is very remote in this case? A. Yes, sir.

Q. What is your explanation for that statement? A. Because, referring to the indicated stack concentrations of carbon monoxide on which the question is based, I presume, in this case that concentration of carbon monoxide would be rapidly reduced by the oxidization of carbon monoxide to carbon dioxide at the temperatures involved, that is, the stack temperatures. Carbon

dioxide is harmless. Furthermore, any carbon monoxide left would be rapidly diluted after it hit the open air. Fourthly, human beings are very much more susceptible to carbon monoxide than plants. I have done a considerable amount of work on the effect of carbon monoxide on human beings and published a work on that subject.

Q. Was that in connection with war work? A. Yes, sir, with war work. I have determined the rate of oxidization of carbon monoxide also in the presence of various cataylists, one of those being a mixture which ——

Q. Well, I don't want to go into details, but you have done a lot of experimental work on carbon monoxide on human beings? A. Yes. Coming back to the questions, if any dangerous carbon monoxide concentrations had reached ground level, people would have been readily killed in the vicinity, because the danger level for carbon monoxide is, in the case of human beings,—the permissible concentration has been set by authorities below 100 parts per million.

HIS LORDSHIP: I do not think the problem is so much what would be fatal concentrations, but what would be injurious concentrations. That is, that things would not be as healthy as they would be under normal circumstances. A. I am trying to indicate ——

Q. Have you considered it from that point of view? A. Yes, sir, and I said that plants could not possibly be injured by the carbon monoxide released from the foundries.

MR. KEOGH: Then, if your test house had been located northeast of Mr. Walker's property as my friend suggested to you, what would have been the desirability of that position as regards McKinnon's power house stack and as regards Mr. Walker's own smoke stack? A. The location northeast of the Walker property would not have been as good as the present one, which is in front of it, because our readings would have been contaminated with the emanations from Mr. Walker's own stack, and would have been less favourably situated as regards the emanations from the McKinnon Industries, having regard not only to the cupolas, but the whole foundry, forge shop and the Delco building, including the power plant.

Q. Now, then, my friend read you a quotation from page 51 of your book. I did not take down all the words, but the words which I took down were, "In large areas vegetation is the only indication of sulphur dioxide." What is the explanation for that statement? A. This is a quotation taken out of the context and which means this, that we were considering a large area miles long by miles wide and ——

Q. This valley at Trail as you have already described? A. It is four or five miles wide and the area involved extended about 40 miles below the smelter. You can only put up a limited number of recorder stations. These recorder stations will tell you of conditions in the area surrounding the station, but there obviously are, as I say, areas, greater areas, large areas in which the vegetation present will be the only indicator for sulphur dioxide, because obviously you would need hundreds of records to cover an area as large as that.

HIS LORDSHIP: Let me see the book. I did not get the passage in full.

MR. KEOGH: Page 51, I believe.

HIS LORDSHIP: Well, that may have been what you intended to say in the book, doctor, but the language does not convey that meaning. The sentence before, "Knowledge of weather conditions and the amount of sulphur dioxide present, it is usually possible to determine the exact time when the discolourations appear and to decide whether the gas the causal agent; however, whether automatic records are available or not, there will be large areas in which the vegetation present will be the only indicator for sulphur dioxide. It is therefore necessary to know the characteristic symptoms which sulphur dioxide produces on different plants in order to be able to separate these symptoms from those produced by other agencies." Now what you say is whether there are automatic recorders available or not, there will be large areas in which vegetation—I suppose your explanation is that even if you had five, there are still large areas where you would have to depend on the vegetation? A. Yes.

M. KEOGH: Q. Then, doctor, how many hours duration would be required for injury to susceptible plants under favourable conditions at concentrations of sulphur dioxide between .20 parts per million and .50 parts per million?

HIS LORDSHIP: Surely that is a very wide spread.

MR. KEOGH: No, it is only about three decimal places, my Lord.

HIS LORDSHIP: I would think that the number of hours would vary a great deal between .20 and .50—probably not? A. It does, your lordship.

MR. KEOGH: That is what I want to bring out. I want him to give that to me at .20, .30 and .40 and .50, that is four.

HIS LORDSHIP: Now, these are under the most ——

MR. KEOGH: Favourable conditions.

HIS LORDSHIP: You mean by that when they would most likely be injured?

MR. KEOGH: Yes, my lord.

THE WITNESS: .20 parts per million, with the humidity minimum, humidity .32.

HIS LORDSHIP: No, maximum. A. And the maximum 76% and the average 57%, 87.5 hours and continuous fumigation, no injury. .24 ——

HIS LORDSHIP: What are these percentages you are giving us? A. .20 parts per million.

Q. I know, but you put in certain percentages. A. After .20 parts per million, minimum humidity 32%. That is the day-time humidity and the maximum ——

MR. SLAGHT: Are you reading from your book, doctor. A. Yes, sir.

Q. What page? A. Page 267. The minimum humidity during day-time, 32%, and the maximum humidity at night 76%.

HIS LORDSHIP: Well, how can you say that is the most likely condition to cause injury? There might be a humidity of 98% in this district in the day-time. A. I was going to give the figures, the highest figures.

Q. Well, now, if you will not get us all complicated with too much data, Dr. Katz, the question was how many hours duration would be required for the fumigation to do injury at .20 concentration, under the maximum condition, that is the most dangerous conditions, and that would take the maximum humidity in the day-time, in bright sunlight. Now, have you got those in ——

MR. KEOGH: In growing temperatures.

HIS LORDSHIP: Growing temperatures, bright sunlight, very little wind and maximum humidity. Now, if you have got anything on it? A. I have .24 parts per million at an average humidity above 70%, after 46 hours they got slight markings.

MR. SLAGHT: My lord, it occurs to me that this is new matter, should have been given in chief. It is not reply to anything I have put in.

MR. KEOGH: My friend opened it up and he read to the witness an extract from his book that damage would be done at greater than .20 parts per million and under .50 parts per million.

HIS LORDSHIP: Yes, but these same questions were asked in chief.

MR. KEOGH: No, not on these figures.

HIS LORDSHIP: Wait a minute. We dealt with .25 at that time as the minimum concentration that could do injury. Now, in cross-examination, Mr. Slaght has brought that down to over .20.

MR. KEOGH: But he didn't deal with the durations.

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HIS LORDSHIP: I know, the durations were not dealt with.

MR. KEOGH: They are just as important as the concentrations. I want to get the durations.

HIS LORDSHIP: But your question is going far beyond that when you are going on to .50. I must restrict you to the development of the durations between .20 and .25.

MR. KEOGH: Well, with great respect, my lord, if you look at page 32 of the book, the quotation my friend reads, he used the words, if I took it down correctly, greater than .20 and not to above .50.

HIS LORDSHIP: Yes, but you did deal with the whole subject in chief of durations and opinions as to there being not sufficient concentration for a sufficient duration of over .25 and that subject was exhausted in chief and must stay there. Now, between Mr. Slaght having got the witness to revise his minimum down to something over .20, you are entitled in re-examination to deal with the question of durations between .20 and .25.

MR. KEOGH: Only between those two points, and not up to .50?

HIS LORDSHIP: Absolutely, because you have already covered the ground of everything over .25 and it has been subject to cross-examination, and I cannot accept it. If you have not got it in now, it is out for good, because I cannot have the case being gone over and gone over. You covered that field about .25 exhaustively.

MR. KEOGH: I covered .25 and I covered .50, I agree, but I do not recall covering points in between.

HIS LORDSHIP: You did, because you took from the witness the opinion that there was no concentration sufficient to do injury at any temperature and on any conditions above .25.

MR. KEOGH: I will still tender the evidence, my lord.

HIS LORDSHIP: He said there were no concentrations of sufficient time to do injury at all and anything below .25 would not do injury. Mr. Slaght has opened a new field and it is perfectly proper you should deal with durations between .20 and .25.

MR. KEOGH: Well, as I say, I am still tendering that evidence, my lord.

HIS LORDSHIP: Well, I am restricting you.

MR. KEOGH: And I am moving it. Now, have you any other duration readings of concentrations between .20 and .25, or is that all? A. Yes, I have.

Q. Well, give us the other? A. .24 parts per million with the average humidity above 70%, duration may produce slight markings and 46 are the hours.

HIS LORDSHIP: Well, we have had that.

MR. KEOGH: Yes, I expect we had that, too.

HIS LORDSHIP: I have got all that down. Let us get on.

MR. KEOGH: Have you any other durations between .20 and .25, or have you not? That is all? A. No, sir, I cannot find any.

HIS LORDSHIP: Now, these were under experimental conditions? A. Yes, sir.

MR. SLAGHT: I think my friend should make it clear, since the doctor has been reading this, that he is reading under a table which had to do with visible markings on growing alfalfa.

HIS LORDSHIP: This is an experiment had by yourself, was it? A. Yes, sir.

Q. On growing alfalfa? A. Yes, sir.

MR. KEOGH: And how does the susceptibility to sulphur dioxide on growing alfalfa compare to the susceptibility of growing gladioli? A. Growing alfalfa is more susceptible than gladioli.

Q. Now, do I understand your lordship to say that you wish me also to ask for the duration for .50, or not?

HIS LORDSHIP: I have been quite clear. You have covered the subject of durations between .20 and .25 and .50 is above .25.

MR. KEOGH: Then, my friend introduced the subject of Merritton. What inspections did you make around the paper mills in there? A. I made frequent inspections around the paper mills at the Alliance Paper Mill at Merritton. I made it my business to go down there once during my monthly trip to St. Catharines.

Q. And what, if any, evidence, did you find in your inspections around the paper mill at Merritton?

MR. SLAGHT: Again, my lord, this is evidence which was offerable in chief. It was not offered in chief.

HIS LORDSHIP: Well, I am not going to restrict Mr. Keogh on this. I think that is a very remote problem and I am not going to waste time on it.

MR. KEOGH: My friend has dealt with his proboscis and other terms, and I submit I am entitled to open it and I am entitled to ask the question what evidence of plant injury did you find on your inspections around the paper mills in Merritton—just briefly? A. Great evidence of sulphur dioxide injury to many species of plants, flowers, trees and vegetation in the neighbourhood. In fact, on one particular occasion the leaf fell from the trees because the extensive injury was so tremendous that the leaves were lying in masses on the roadway, on the sidewalks in a certain area all around this plant, up to the Hayes Steel Company, the environs of the Hayes Steel Company.

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Re-Examination 5th May, 1949 Continued

HIS LORDSHIP: You are not trying to make up another case, are you? A. No, my lord.

MR. SLAGHT: May I make this comment. The witness said to me, "I am unable to swear that any concentrations from the Merriton mill affected Walker's in any way."

HIS LORDSHIP: Well, that is a matter of argument, Mr. Slaght. Let us get on with the case.

MR. KEOGH: I will be through with this with one more question. When did you see that fall of leaves in Merritton? A. I saw that leaf fall at Merritton—I will tell you exactly.

Q. If you could give us the month and the year, that is sufficient for my purpose.

HIS LORDSHIP: Mr. Cohen will be a witness for the plaintiff in the next case.

MR. KEOGH: Mr. Katz, yes, my lord. The month of the year? A. In July of 1947.

HIS LORDSHIP: Of course, you are not suggesting for a moment that any injury that may have been done to Walker came from Merritton? I understand you to say that? A. No, sir. I am not suggesting that there was any injury.

Q. We will leave that to be tried in another action.

MR. KEOGH: Then, what type of manufacture secretes iron oxide in the air? The question of iron oxide was brought up. What type of manufacture? A. Releases iron oxide?

Q. Yes. A. Foundries, and also to a lesser extent, coal-burning operations, soft coal-burning operations.

Q. How many other iron foundries are there in the city of St. Catharines? A. There is the Lincoln Foundry.

HIS LORDSHIP: Now, going into this, why was this not all matter to be brought out in examination-in-chief. You see, you cannot get things in by the back door that you cannot get in the front. If the allegation put forward by the plaintiff was that there was iron oxide deposited on this roof, and there were specimens brought in within a circle, and the circle marked on a map, they were all magnetic and all that and showed how they concentrated around the McKinnon's. Now, when you put the witness in the box and showed dust collected and all that sort of thing, you examined him on that subject. Now, to start to re-examine him on other possible sources of contamination is not proper re-examination. That is for examination-in-chief.

MR. KEOGH: Well, I will bring it out by another witness.

MR. SLAGHT: Furthermore, he said he knew of none, to me, and he never investigated any.

HIS LORDSHIP: Well, it is not a question of whether the witness can give the information. It is a question of whether it should have been developed when he could have been cross-examined on the subject.

MR. KEOGH: Well, I will bring it out by another witness.

HIS LORDSHIP: I do not want to indulge in any red herrings in this case.

MR. KEOGH: Well, I did not consider it a red herring, my lord.

HIS LORDSHIP: Well, I would have thought if it was intended seriously, that the iron oxide that was deposited did not come from McKinnon's, that one of the simplest forms would have been to have had an analysis of the dust made when the wind was in a direction that it would not blow from McKinnon's.

MR. KEOGH: I intended to put that in, my lord.

HIS LORDSHIP: Well, we have not got it.

MR. KEOGH: Then, my friend showed me Exhibit 27, a photograph of the gladioli of the McKinnon plot, taken August 27th, 1947. I just want to ask you in a general way—I know you didn't make it with any precision, but was there an investigation made of that condition shown in that photograph? A. Yes, sir.

Q. And then my friend showed you another photograph, Exhibit No. 29, showing the gladioli reduced in number in the McKinnon plot. What is the explanation for that reduction? A. There were 150 plants collected by Mr. Lens Dunn.

Q. Was this in your presence? A. In my presence, yes, sir.

Q. And that was about when? A. That was about—that was towards the end of August.

Q. The end of August, 1947? A. Yes.

Q. This photograph has a notation on it, "September 5, 1947." A. Yes.

MR. SLAGHT: What was it you said Dunn took?

MR. KEOGH: 250 the latter part of August, out of that plot.

Q. Then my friend asked you about the blue haze. Have you seen that since you have been in St. Catharines for this trial? A. Yes, sir.

Q. Where and when did you last see it? A. I see it every morning from my hotel window and from the outside, facing south over the shores—like, the depression of the St. Catharines area and the background of the hills.

Q. And your hotel is what hotel?

HIS LORDSHIP: You mean you see the haze one sees in the distance looking out the hotel window? A. Early in the morning?

In the Supreme Court of Ontario No. 37 Defendant's Evidence Dr. Morris Katz Cross-Examination 5th May, 1949 Continued

Q. Yes? A. Yes, sir.

Q. Well, one sees a blue haze in the Highlands of Scotland, too.

MR. KEOGH: Unfortunately, I have never been there, my lord. I hope to some day, perhaps.

HIS LORDSHIP: All right, let us go on.

MR. KEOGH: And your hotel, just to finish that, is what hotel? A. The Leonard Hotel.

Q. Then, my friend asked you about the down angle of the glass tubing that took in the sulphur dioxide laden air that was sucked in by the pump and my friend thought that if it was not that way the apparatus might be contaminated by water and you mentioned rain and snow? A. Yes, sir.

Q. In what way would it be contaminated if rain and snow got into the apparatus? A. Well, the water would just run down and be just sucked down in the pipe and therefore it would dilute the reconductivity solution and consequently it would be inaccurate.

Q. Would it get into the conductivity cells perhaps? A. Yes, sir.

HIS LORDSHIP: I want to get a little further explanation of that. I understood you to tell me that the matter of the dilution of the solution was irrelevant to the accuracy of the instrument. A. In this sense, that once the solution is deposited in the cell for 30 minutes, it is very much better to have that conductivity, to have the record of that conductiviy undisturbed, except by the absorption of gas. If you were to add water in the interval, then the galvanometer needle might, the pin would retract several divisions and then start over again and there would be a disturbance of that record, and therefore it would cause us greater trouble to calculate and analyze that concentration at that interval.

Q. That is all.

—Witness excused.

HIS LORDSHIP: Next witness.

In the Supreme Court of Ontario No. 38 Defendant's Evidence Dr. George Ledingham Examination-in-Chief 5th May, 1949

DR. GEORGE LEDINGHAM, sworn,

EXAMINED BY MR. KEOGH:

Q. Doctor, are you connected with the National Research Council? A. Yes, I am.

Q. What is your connection with that Council at the present time? A. I am director of the Prairie Regional Laboratory, at Saskatoon.

Q. And what university course did you take and what degree or degrees do you hold? A. I took science at the University of Saskatchewan, Bachelor of Science and Master of Science, Ph.D. in pathology, University of Toronto.

Q. Perhaps my friend won't mind my leading a little bit at this stage.

MR. SLAGHT: No, not at all.

MR. KEOGH: During the years 1945-6-7 you were stationed, generally speaking, in Ottawa, were you? A. That is right.

Q. And then you have moved to take charge of the National Research Laboratory at Saskatoon just in the last year or so, have you? A. That is right.

Q. Then, how did you first come into contact with the McKinnon and the Walker premises in connection with this matter? A. I actually heard about the difficulty in the fall of 1944. There was some consideration given by the Research Council as to whether to send Dr. Katz or myself down here.

Q. And that was the first you heard of it? A. That was the first I heard of it.

Q. Then, how did you come to be connected with the case a little later on? What was the procedure, or as the result of what did you become connected with it? A. I was requested to come down in the spring of 1945 by Dr. Katz, carrying a message from McKinnon's.

Q. In other words, there was a request from McKinnon's, through Dr. Katz? A. Yes.

Q. And that request was approved by the Council apparently, and you were assigned to come to assist him? A. Yes, that is right.

Q. Then, had Mr. Walker been the first to request assistance from the Council, what would have been the result?

HIS LORDSHIP: Oh, no, that is purely a hypothetical question. He does not know. He was sent by the Council. It is not a relevant question. It is not going to help me in the slightest bit to decide what the facts are in this case.

MR. KEOGH: It is only what my friend said about the taxpayer, that is all.

HIS LORDSHIP: Well, I am not going to decide that.

MR. KEOGH: Well, what experience have you had in the investigation and practice in connection with sulphur dioxide on growing plants? How many years experience and, briefly, what has been your experience? A. Approximately seven years. My work on that started in 1930, 1931, on both field and experimental work, was carried out at that time. Then, in 1934, up until 1942, I think was the last time I was out to Trail. I was out there a great many times; sometimes for most of all of the growing season in those years, but especially until 1937.

Q. For over a period of how many years was your work at Trail? A. Well, that runs through a period of nearly 12 years.

In the Supreme Court of Ontario No. 38 Defendant's Evidence Dr. George Ledingham Examination-in-Chief 5th May, 1949 Continued

Q. Not all the time? A. Not all the time, no; intermittent.

Q. Then, have you written or published any books or scientific papers on the effect of sulphur dioxide injury on growing plants? A. Yes, I am one of the co-authors of this book; "The Effect of Sulphur Dioxide on Vegetation", with Dr. Katz.

Q. That is the book that my friend has been reading from quite a bit? A. Yes.

Q. What other books or scientific papers have you, if any, published? A. Well, on——

Q. I don't want to go into detail, but have you had many of them, I mean? A. Yes. Scientific papers in the field of plant pathology and bio-chemistry, some 40 to 50 papers.

Q. Besides your work in collaboration with Dr. Katz on this book, have you any other published work or scientific paper in connection with sulphur dioxide? A. Only the work that formed the basis for that book. It was printed by the King's Printer. There were many volumes of that.

Q. That was a report of your work at Trail? A. Yes.

Q. Now, you first visited St. Catharines in connection with this matter on the 7th of June, 1945. Is that right? A. Yes, that is correct, about the 5th to the 7th. I think there were a couple of days around there.

Q. And, at the time of that visit, did you make any examination of the native vegetation and garden and orchard plants surrounding Mr. Walker's greenhouses? A. Yes, and we were all around the area immediately adjacent.

Q. Who went with you? A. Dr. Katz was with me at that time.

Q. And did you pay any particular attention to any particular species of plants or vegetation? A. I was particularly interested in a species that I know were susceptible to sulphur dioxide injury.

Q. And what were some of those species? A. Well, lambs quarter was growing in abundance. That is known to be a quite susceptible species. We watched that and, in the gardens, beet leaves are another very good susceptible type of plant and there are also the native grasses and flowers in those gardens, of course.

Q. And having regard to Mr. Walker's premises and the McKinnon plant, over what area did your inspection of the native vegetation extend? I don't expect you to remember in square feet, but generally, can you describe the area around Mr. Walker's and McKinnon's you inspected at the time? A. Oh, we went one or two blocks further up from Mr. Walker's; did not extend far out.

Q. Further on in which direction, east or north? A. North and east.

Q. And did you, in your inspection of any of the plants and grasses and native vegetation and flowers in that area, find any evidence of injury of any of them by sulphur dioxide? A. No, I saw no signs of sulphur dioxide marks of any of the vegetation we looked at.

Q. Then, later on, during that visit from June 5th to 7th, 1945, did you pay a visit to Mr. Walker's greenhouses? A. Yes, I was in some of Mr. Walker's greenhouses.

Q. And you were accompanied on that occasion by some other gentleman, were you? A. Yes.

HIS LORDSHIP: When was that? A. That was, I think, on June 7th; the 6th or 7th.

MR. KEOGH: Was Dr. Katz with you on that inspection? A. Yes, Dr. Katz was with me.

Q. And was Dr. Palmer with you then? A. He was.

Q. And you were shown over the property of Mr. Walker and through his greenhouses, by whom? A. By Mr. Walker, himself.

Q. And can you tell us briefly some of the plants and flowers that you saw? First of all, I should ask you when this—did you take any notice of the roofs of Mr. Walker's greenhouses, the glass roofs? A. Yes, in a general way I looked over the roof.

Q. Did you see anything on the glass in the roof of the greenhouses? A. It was not particularly clean. There was some coal dust and the ordinary smudge that you find in the city.

HIS LORDSHIP: Well, you are saying it is ordinary smudge. Now, what investigation did you make to determine whether it was ordinary or not? There is one kind of smudge that will come off when it rains. There is another that jells on in the way that we see it in this case here now. Now, why do you say it is ordinary? A. I made no particular investigation. I did notice it looked dirty, that was about all.

Q. Well, I just warn you now, you are in the witness box. A. Yes.

Q. You are under oath. A. Yes.

Q. And be careful, because, you see, there is a wide variation between what you actually saw—what you said you saw. I know you do not mean to make a mistake, but just be careful, because we have to be precise in this case. A. Very well, my lord.

MR. KEOGH: Mr. Walker say anything about that dirt on his greenhouse glass? A. I would recall that we were discussing it. He told me it collected cinders in the eavetroughs, and he said something about it was not as bad this time of the year since the spring rains had washed so much off.

In the Supreme Court of Ontario No. 38 Defendant's Evidence Dr. George Ledingham Examination-in-Chief 5th May, 1949 Continued

MR. SLAGHT: Will you ask him to identify Mr. Walker?

MR. KEOGH: Was that the plaintiff, Mr. W. W. Walker?

A. Yes, Mr. Walker.

Q. Then, what were some of the flowers and plants that you saw on this inspection trip to Mr. Walker's greenhouses? A. Inside the greenhouse, one thing I remember most clearly was the large number of orchids.

Q. Yes, what other plants? A. If I may refresh my memory a little.

Q. Well, having regard to what his lordship brought out this morning, have you any notes that you made at the time of what you saw, or, when you say you are refreshing your memory, are you referring to some report that you made up and, if so, when was the report made up? A. I just have here a report, Report No. 14, and this is in 1945, that I put into the Research Council after returning.

Q. Well, how soon after your visit of June 7th was that report made up? A. Well, that would be—that report number gives the date, that is the 14th of the 6th month, June, 1945. It would be about a week later.

Q. That was about seven days after your visit this report was made up? A. That is correct.

Q. Did you dictate the report yourself? A. I have forgotten whether I dictated it, or wrote it out in my notes. It would be done either way.

Q. But in either case, you used as a basis the notes you made at the time of your visit? A. That is correct.

Q. Are those notes still in existence? A. They might be in existence. I generally keep all my field note books. There is a pack of them out in a filing case in Saskatoon. I would not swear they are still there.

Q. If they are in existence, did you bring them with you or did you not? A. No, I did not bring them with me.

Q. I submit, my lord, that for this reason—dictation made up within a week after the visit, recorded from his notes and either written out in longhand and turned over to his secretary, and I would submit he should be entitled to refresh his memory.

HIS LORDSHIP: Do you want production of the notes, Mr. Slaght, for cross-examination?

MR. SLAGHT: Oh, I do not think that I will ask to exclude it.

HIS LORDSHIP: I am just asking if you want production of the notes.

MR. SLAGHT: Yes, my lord, yes.

HIS LORDSHIP: Then they will have to be sent for before the witness is cross-examined.

THE WITNESS: You must remember that I moved——

HIS LORDSHIP: We are not responsible for that. You see, counsel are entitled, if there are records made at the time that this witness is relying on for his evidence, if counsel wishes production of them for the purpose of cross-examination, then I cannot refuse it, because there may be things in the notes that do not appear in the report, I do not know. I cannot exclude it. Saskatoon is not inaccessible.

MR. KEOGH: What I had in mind was that I would ask Dr. Ledingham to telegraph Saskatoon and get them down here by air, probably within the next couple of days, and my friend could go on with the rest of his cross-examination and it could be understood that Dr. Ledingham would remain for any further cross-examination.

HIS LORDSHIP: Well, we will discuss that when we come to it. I do not know how long his examination-in-chief will last.

MR. KEOGH: Well, it won't last quite as long as my friend's cross-examination.

MR. SLAGHT: I am not taking this position just facetiously, but I am instructed the plaintiff was not there at all and did not show him around. It was his son, and he has sworn in a statement to my client there were no dahlias there at all. If he is going to follow Katz—

MR. KEOGH: My friend should not be giving the evidence.

HIS LORDSHIP: No, he is merely explaining the reasons why he is not asking the production of the notes capriciously.

MR. KEOGH: In a lefthand way, he is getting in other things.

HIS LORDSHIP: Well, things that go in in a lefthand way have no effect on me at all. If he does not produce the evidence under oath that he says he will, I am not going to pay any attention to it. But, in the meantime, after the noon hour, you can send off your wires and get your notes down here.

THE WITNESS: My lord, I do not say I am certain the notes are there. I said I thought they might be.

HIS LORDSHIP: Well, you say you keep all your notes?

A. I say I keep these note books and if they can find them, we will have the notes.

MR. KEOGH: Then, speaking from memory, and it is my understanding that you may, while the notes are required for cross-examination—

HIS LORDSHIP: He may refresh his memory from the report that was made.

MR. KEOGH: Q. Speaking from memory as refreshed by your report, what were some of the flowers and plants that you saw on your visit at this place on the 7th of June, 1945,

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through Mr. Walker's greenhouse? A. First of all I mentioned the orchids. There were also carnations, and there is, I think, the orchids, carnations, ferns and begonias.

Q. Now, on any of those flowers and plants during that inspection, did you see any evidence of any sulphur dioxide injury on any of them? A. I did not.

Q. Then, after your inspection of the greenhouses, did you make any inspection of plants growing outside the greenhouses on Mr. Walker's property? A. Yes, I did.

Q. And what took place about the plants that you saw on that outside inspection? The names of them, first? A. There were some—a bed of lily-of-the-valley, and there were a number —there were some ferns along in front of Mr. Walker's house.

Q. Now, first of all, about the lily-of-the-valley. Did you notice anything about their condition?

HIS LORDSHIP: Well, you were going to give us the flowers first. Let him complete the list.

MR. KEOGH: Yes, thank you, my lord. Then, what other flowers did you see outside Mr. Walker's greenhouses? A. Gladioli and dahlias.

Q. Any others? A. Some petunias in flats mainly.

Q. Now then, I want to ask you about the lily-of-the-valley. Did you notice anything in the way of markings on the lily-of-the-valley? A. Quite a severe tip burn on almost all the leaves.

MR. SLAGHT: Severe what? A. Tip burn; tip marking on the back of the tip of the leaves.

HIS LORDSHIP: You call it a tip burn? A. A tip burn is what we usually class this.

MR. KEOGH: Were those tip burns caused by sulphur dioxide? A. No, I do not believe they were.

Q. Did you see anything about the location or the position of the lillies-of-the-valley which would throw any light on the cause of that condition? A. They ran a frame which had been covered with a glass cover, one of these cold frames, and I think that the condition was due to the leaves touching either the glass or coming close to it—the heat through that.

HIS LORDSHIP: Well, was the glass down when you saw them, in June? A. The glass, I do not think, was over them at that time.

Q. Do you know how long it was before the glass had been in contact with the plants, before? A. No, I do not know.

MR. SLAGHT: I did not catch that. Did you say it was not over them? A. I think it was not over them.

HIS LORDSHIP: Because I would certainly be surprised if there was glass over the lily-of-the-valley in June. A. Oh, no, it was not then.

Q. Now, I want to be open in valuing your evidence. When you were asked the question as to whether these burns were caused by SO_2, you hesitated for a moment and then you said, "I do not believe they were caused by SO_2." Are you in a position to give your opinion, under oath, that they were not caused by SO_2? A. I would give that opinion if I may put an explanation.

Q. Well, give it, anyway, with any qualifications or embellishments you like. I want to evaluate your evidence as against any other witness's. Now, what do you want to say about it? A. Well, I would definitely say those tips were not caused by sulphur dioxide, because here is a square frame of a few feet, and practically every leaf mark was uniform on the tip. Now, you cannot have this sort of thing. That would take several parts per million to mark a leaf like that and, over the whole thing, it just does not occur that way.

Q. You are changing it now from saying you do not believe they were, to swearing in your opinion they were not. You are putting it that way? A. That is quite right.

Q. Well, did you ascertain how long it had been that the glass frame had been touching them? A. No, I do not believe I did. We recall asking something about that. That is a possible explanation.

Q. Well, it is the only one you have got to suggest? A. That is the only one. It is the only logical explanation, so far as I can see.

MR. KEOGH: I believe you said you saw some petunias? A. That is correct.

Q. What was their condition? A. The petunias were in excellent condition?

Q. Any markings of any kind on them? A. Saw no markings on them.

Q. Then, you said you saw some dahlias. What was their condition? A. They were free from any marks. They were in fine condition.

Q. Then, you saw some gladioli. Were there any marks on them? A. Just some slight tip marks; lightest brown on the tips of the leaves.

Q. Were these markings due to sulphur dioxide injury? A. No. Those markings, I do not think they were due to sulphur dioxide injury.

Q. Then, you saw some ferns. Were there any markings on the ferns?

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HIS LORDSHIP: Oh, just a moment, we are getting past our adjournment time. 2.10 p.m.

—Whereupon Court adjourned until 2.15 p.m., May 5, 1949.

AFTERNOON SESSION

May 5th, 1949, 2.15 p.m.

EXAMINATION OF DR. LEDINGHAM CONTINUED BY MR. KEOGH:

Q. We were just finishing with your examination of June 7th, 1945. Did Mr. Walker point out any ferns to you outside these that were all outside that we are talking about now? A. There were some in front of his house, just alongside it.

Q. Did he say anything about them to you? A. He pointed out some markings along the edge of the leaves, just small discolourations at the outer edges.

Q. Did he make any complaint about them to you? A. He just pointed them out. He did not say much about them.

Q. I see. And did you examine those ferns that he pointed out to you? A. I did.

Q. And did you see any evidence of sulphur dioxide injury on them? A. No, I did not.

Q. Now, you visited St. Catharines again on August 27th and 30th, 1947 — about — a little over two years later, did you? A. Yes.

Q. And, on the occasion of that visit in 1947, did you see the plot which had been planted adjacent to a small building which has been referred to in the evidence here as the McKinnon test house? A. Yes, I saw that plot.

Q. And what flowers were growing in that plot in August, 1947, that you noticed? A. The gladioli were the flowers ——

Q. Any others? A. That is, the main body of the plot was made up of gladioli. There may have been a few border plants.

Q. Well, did you notice any others in the plot? A. No, I did not.

Q. And what was the condition of the gladioli in this McKinnon experimental plot, when you saw them? A. The gladioli were just at that time coming into bloom, and they were tall plants in good condition, except for some certain ones that had some markings on the leaves.

Q. We will come to those marks in a minute, but did you observe the condition of the flowers? A. The flowers were in excellent condition.

Q. Then, what about a brief description of the markings on the gladioli leaves in the McKinnon plot which you noticed there?

A. They were brownish discolourations at the leaf tips, extending in some cases down alongside of the leaf some distance and along the veins; areas of light brown, getting lighter towards the centre, but reddish brown leaf discolourations.

Q. And were there more than one variety of gladioli in that McKinnon plot? A. There were several varieties.

Q. And were all the varieties equally subject to that mark, or were they not? A. No, they were not. There was some slight, varietal difference.

Q. What was the most susceptible variety? A. As I recall it Aladdin was one of the most susceptible varieties.

Q. And can you tell us the location of the leaves on the plants which were marked in this way? What I mean is whether the inner or outer leaves do you say were marked, or the lower or upper perhaps would be a better description? A. I think they were the leaves towards the middle of the plant, not the very old ones. They were fully matured leaves, however.

Q. Then, did you take any specimens of those gladioli leaves which were so marked? A. Yes, I did.

Q. And how many specimen leaves did you take? A. Probably about half a dozen or a dozen.

Q. And where did you take them to? A. Took them to the Boyce-Thomsen Institute.

Q. Where is that located? A. At Yonkers, New York.

Q. And who did you show them to there? A. To Dr. Crocker.

Q. Then, getting back to your inspection in St. Catharines on the occasion of this visit, did you also examine flowers in a plot on the McKinnon property in the vicinity of the forge shop and the butain storage tank in front of it? A. I did.

Q. And what flowers were in that plot? A. There were gladioli there.

Q. And what was their condition? A. The plants there had these brownish markings on the leaves, very similar to those on the recorder plot.

Q. And did you examine any gladioli across the street at that time? A. There were two or three plants in front of the house just directly across the street from this plot that you just spoke of.

Q. And what was their condition? A. The same type of marking on the leaf.

Q. Then, at that time, without going into Mr. Walker's premises. did you see any of his gladioli growing outdoors on his premises? A. Just from the laneway, the side of his house there.

Q. From the laneway at the side of the house in front of his southerly greenhouse? A. That is correct.

Q. About how far away, in feet, would you be from the gladioli? A. Oh, about, around eight feet, I would say.

Q. That is from this point you were at in the laneway? A. Yes, to the nearest.

Q. To the nearest gladioli. And what was the condition of these gladioli of Mr. Walker's that you saw? A. They were not in particularly good condition. They were dead flower spikes, and they did not appear to be in a thriving condition.

MR. SLAGHT: What did you say — dead flowers, what? A. Spikes, the old flowers, as though they had matured much earlier and the dead flowers were still standing there on the stalks.

MR. KEOGH: Was there anything else about their condition that you noticed? A. There seemed to be some discolourations on the leaves, but I didn't examine them closely. I didn't take any specimens.

Q. You were ten feet away, I think you said? A. Yes.

Q. From what you saw at that distance, how did the discolourations on the gladioli leaves compare with the discolourations you have already described on the McKinnon gladioli? A. I could not tell whether they were the same type of discolourations or not.

Q. Then, did you examine a third plot of gladioli on the McKinnon premises, near the Delco plant? A. Yes, I looked at those.

Q. And what was their condition? A. They had some markings just at the tip of the leaves. They were much smaller plants there alongside the Delco plant and a few of the leaves were marked right in the tips; but they had not as much marking further down the leaves as on the recorder plant of the gladioli.

Q. Then, on the occasion of this visit, in August of 1947, did you make any examination of the weeds and plants and other vegetation in the general area surrounding the Walker premises? A. Yes, I did that.

Q. What weeds and vegetation did you inspect in that area? A. There was lamb's quarter and common garden vegetables in the house gardens along the street.

Q. And any flowers in that area that you examined? A. Yes, there are many different varieties of flowers in the flower beds on the McKinnon property.

Q. No, I am not talking about the McKinnon property now. A. And flowers in the gardens, yes.

Q. Well, can you name a few of them? A. There were petunias, zinnias, asters, the ordinary flowers that most people grow.

Q. And on any of that vegetation in that area, did you see any sign of any sulphur dioxide injury? A. No, I did not.

Q. Then, you reported to Ottawa, did you, after the com-

pletion of that visit? A. After we went to the Boyce-Thomson Insitute.

Q. Do you remember the date on which you went to the Boyce-Thomson Institute? A. It would be around August 30th, I think it was; it was very close to that.

Q. Then, you went back to Ottawa and after your return to Ottawa, did you receive some specimens of gladiolus leaves from St. Catharines? A. Yes, I did.

Q. From what source in St. Catharines? I don't mean from the exact region, but from what company or individual in St. Catharines did you receive them? A. From the McKinnon Industries. They packaged them and shipped them.

Q. And other witnesses will be called on that, my lord. But, in the meantime, what did you do with these specimen gladiolus leaves which you received from the McKinnon Industries? A. After my return to Ottawa, I submitted those leaves to Dr. Saville at the experimental farm.

HIS LORDSHIP: How many did you receive? A. There were some whole plants cut off above the ground.

Q. I said how many—what quantity? A. Oh, the total number of leaves, as I recall, I took about half a dozen or a dozen leaves to Dr. Saville. I had more than that.

Q. That is not the question I asked you. I asked you how many you received. A. I am sorry, your honour. I don't recall the amount of the leaves.

Q. Well, I am curious to know what quantity of leaves were sent down and how many you took to Dr. Saville? Now, have you anything in your report that you can look up and give me as to what quantity you received from the McKinnon's?

MR. SLAGHT: I think Saville said he took them himself, here.

HIS LORDSHIP: Well, Mr. Slaght, you may cross-examine. You will have the opportunity.

THE WITNESS: All I have in the report is that there were —well, the number—

Q. Well, 150 was mentioned here at some stage today. A. Oh, there was nothing like that, but several specimens.

Q. Well, I want to get what quantity. You did not take all that you received to Dr. Saville? A. Oh, no.

Q. There must have been a number sent down for some purpose and you took some down to Dr. Saville? A. That is correct.

Q. Why didn't you take them all? A. Well, there were two or three plants I might have taken of the lot out.

Q. Now, what did you do? Listen, as I reminded you this morning, I am asking questions and I want you to be precise in your answers. You have just told me you did not take them all. Now, you say you may have taken them all. Now, what is it?

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All I want to get is the fact. If you don't remember, don't know, say so, but do not let us patch things up. "I may have done this and I may have done that." A. I know that I pressed a number of leaves, yes, my lord, in preparing their botanical specimens and I used most of the specimens preparing the specimens. I took a number of the leaves out to Dr. Saville to make his microscopic examination. In doing so, he mounts them up or takes little specimens out of them to treat, and, to the best of my recollection I took about a half a dozen or a dozen leaves. I don't remember the exact number.

Q. But you don't remember how many specimens were sent down? A. No.

MR. KEOGH: Then, doctor, I show you Exhibit No. 74, which was filed by Mr. Jarvis, dated June 18th, 1947. Is there any evidence of sulphur dioxide injury on that specimen? A. I would say there is no evidence of sulphur dioxide on those leaves.

Q. Then, doctor, I show you Exhibit 79, which was filed by Mr. Jarvis, dated July 31st, 1947. Is there any evidence of sulphur dioxide injury on that specimen? A. No. I do not think there is sulphur dioxide injury on that specimen.

Q. Then, I show you Exhibit No. 82 which was filed by Mr. Jarvis, dated June 26th, 1948. Is there any evidence of SO_2 on that specimen? A. No, I see no evidence of sulphur dioxide on that specimen.

Q. Then, I show you Exhibit 91, which was filed by Mr. Jarvis, dated July 7th, 1948. Is there any evidence of sulphur dioxide on that specimen? A. Certainly not sulphur dioxide on those leaves.

Q. Thanks. Your witness.

CROSS-EXAMINED BY MR. SLAGHT:

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Q. I will take off in the order my friend took off with you, doctor. Exhibit 74, is that a normal gladiolus leaf? A. About the size, yes. I would say that is quite a good gladioli leaf.

Q. Are the markings normal, and the colouring? A. No, no.

Q. What is the matter with it? A. Its discolouration in various parts of the leaf.

Q. What caused it? A. I do not know.

Q. Thank you. I show you Exhibit No. 79. The same remarks apply to that? I do not want to go over each one. A. Yes, the same remarks apply to that.

Q. You don't know. And Exhibit 82, do you say the same about that? A. Yes.

Q. That one— A. That has the tip burn I was talking about. It is bleached out a bit.

Q. And is the tip burn typical of injury from SO_2? A. You can get tip burn.

Q. I didn't ask you if you could get it. Isn't it quite typical of SO_2 burning? A. Not altogether.

Q. Well, to what extent is it? A. It is one of the types of injury you will commonly get.

Q. And I show you Exhibit 91 and may I take it your same answers are referable to 91? A. Yes.

Q. Of tip burns on that, too? A. Well, very large; it extends half way down the leaf.

Q. Well, the leaves are burned? A. Yes, it is half way down the leaf.

Q. But the tips, the three tips on the three flowers, are burned on Exhibit 91? A. Well, they are discoloured.

Q. Well, would you say they are not burned? A. In explaining this, you would say there was a tip burn on those plants.

Q. All right. A tip burn means the same to me as a burn on the tip? A. Yes, that is true.

Q. Now, doctor, you were in the Walker plant once, as I recall your evidence? A. That is correct.

Q. That is back in 1945? A. Yes.

Q. The first trip up there? A. Yes.

Q. And you were with Katz all the time? A. I was with Dr. Katz.

Q. He didn't tell us—he did not go through all the greenhouses? Is that right? A. I don't think we went in all the different greenhouses.

Q. How many minutes were you at the Walker property? A. Oh, I would think well over an hour.

Q. Well, over 60 minutes. This is Mr. Walker, the plaintiff. I say to you I am instructed that he was not there that day at all and you never saw him, although you have sworn to others that you did. Is the son here? You stand up, John. Now, this gentleman is the son, whom I am instructed showed you through that day. I am telling you that I am informed by both these gentlemen that the father was not there and the son showed you through. What do you say? A. All I can say is I have in my report that I made immediately after returning to Ottawa, that Mr. Walker and his attorney showed us through the greenhouses.

Q. That is Mr. Walker, and he works there. He is the manager. So you are now telling me you are not going to stick to it that it must have been the father, are you? A. I am fairly sure it was Mr. Walker Senior.

Q. Well, will you swear to it after what I have told you, and when all your note is and your answer is that, "My report is Mr. Walker showed us through." Now, are you going to swear it was the father or not? What do you say? A. Well, I am still convinced it was the father.

Q. Are you convinced enough to swear to it positively? A. No, I would not care to swear to it positively.

Q. Well, that is fair. Then, you heard what Mr. Katz said about Cohen and Rustin. They are recognized authorities, aren't they? A. Yes.

Q. With you? A. They have done a great deal of work.

Q. I mean you are not throwing any stones at those authors? A. Oh, no.

Q. This is a book of theirs on smoke. You have read this book, or seen it—familiar with it? A. Yes.

Q. Probably as a student read it during your course, is it? A. Well, you generally don't go into that much detail. I have read it since in working on these questions.

Q. All right. Page 17 now. This is the soot problem. I don't know if you have said anything about soot. You did see something on the roof there, did you? A. Yes.

Q. You did not rub any off nor take any samples? A. No, I took no samples of the soot.

Q. And was it of the nature of soot? Would that be a fair way to put it? A. I would say there was soot there, and dust.

Q. And Katz told us it was over all the glass of all seven greenhouses. Is that your recollection or perhaps you did not see them all, but on any greenhouses you saw this soot was, or whatever it was, was over the glass? A. Yes, that was on the glass.

Q. Now, I will read you, "Soot", and it is at page 17:

"Soot, as we have seen, is not pure carbon but contains varying amounts of tar. This tar adheres so firmly to everything that it is not even removed by rain. It is more a kind of varnish."

You would not disagree with that? A. No.

Q. Then, page 20 and 21.

HIS LORDSHIP: I do not know that that advances the case very far to put to a witness in cross-examination something that has not been disagreed with. I think Dr. Katz has probably approved it and said that he would agree to it, but to say that you do not disagree with it is a negative proposition. What you are permitted to do is to put the question from an authority to the witness and ask him if he agrees with it.

MR. SLAGHT: Q. Do you agree with the authors in this statement? A. Yes, I agree with that.

Q. I am sorry, my lord, I was putting the negative.

HIS LORDSHIP: What we are concerned with are positives here, not negatives.

MR. SLAGHT: That is right.

Q. Then, page 20:

"Soot may exert detrimental effect on the growth of plants "in three ways, namely, by blocking off the stomata and thus "impeding the process of transpiration by coating the leaf "and so reducing the intensity of sunlight and, at the same "time, affecting the assimilation of carbon dioxide and, lastly, "by the corrosive effect of the acid it contains."

Do you agree with that statement? A. Yes, it would be possible to cause all of those injuries to a plant.

Q. Well, that is enough from that. Now then, you do not deny, I suggest to you, after being there that the covering of soot as you have called it, on that glass, would impede the passage of sunlight through the glass, to some extent? A. Yes, that is quite right.

Q. And you cannot tell me, I take it, to what extent or what relative proportion it would interfere with the violet rays, the red rays and sunlight which is so beneficial to flowers. A. Well, I have never made measurements as to how much it would.

Q. So it would only be because you cannot tell me in any way worth while to what extent the soot might have been there so impairing the growth of the plants? A. No.

HIS LORDSHIP: Just a minute. You say you have never made measurements, even in Court, during the evidence in this trial. Did you hear it? A. Part of it.

Q. Were you here during the evidence that has been given by the young physicist, Burgener? A. No, I did not hear his evidence.

Q. Did you hear the evidence as to the extent to which the light was cut down, measured by light metres? A. No.

Q. So that you are not in a position to offer an opinion on the basis of that evidence, because you have not heard it? A. No, I have not heard the evidence.

Q. Well, just give me two or three panes of that glass. There is one with a portion rubbed off the corner there; probably they are not very representative, these few. There is Exhibit 99, that came, I think, from the cloth house, I think they call it. It is the lower one, and the evidence was that being lower, the soot tended to drop there because of the effects of the air. Now, just by looking at that, and that one has got a part that is rubbed off, and this one was taken from the same place, do you notice the character of the material, how it adheres to it? You take your finger and try and rub it off, if you can. It is pretty tenacious, isn't it? A. Yes.

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MR. SLAGHT: What is the other one, my lord?

HIS LORDSHIP: No. 58 and 99. Well, what do you say about that, just looking at it, as affecting the business of carrying on a greenhouse under it? After all, I take it that you put glass in to get sunlight. A. Yes, and protect your plants.

Q. If you were running a greenhouse and that was your business and some one smeared the top of your glass over to that extent, would you, in your opinion only as a scientist—would that affect the growth of your plants? A. I think it would certainly affect them to a certain extent. It would depend much on the time of the year. In the summer time, like when you whitewash over it, you try to keep the sun down.

Q. Oh, yes, but, after all, there are times when you want all the sunlight you can get? A. Oh, yes, undoubtedly.

Q. And other times you want to cut it down? A. Yes.

Q. Oh, yes, I quite understand. Give him two of the others that come from No. 7 greenhouse. These, as I have said, are in a special position.

MR. SLAGHT: Exhibit 100 and 101, both came from No. 7 greenhouse, Mr. Registrar.

HIS LORDSHIP: And give him Mr. Burgener's report. No. 100, that is from the large greenhouse, and No. 101, what would you say about that, witness, affecting the growing of the plants? A. Well, it is very involved. In some cases it certainly could be detrimental; in others, light in general, of course, is there many times in excess—

Q. That is true, but if you are running the business of growing plants, is there any better light than daylight? A. No.

Q. Now, Mr. Burgener gave us a table which showed how the different rays were cut off.

MR. SLAGHT: Exhibit 103, I think, and 104 is his demonstration.

HIS LORDSHIP: Well, I took his evidence down in a little more definite way than his table. What is the date?

MR. SLAGHT: The 26th April, 1949.

HIS LORDSHIP: Now, you have Exhibit 99 there, have you? A. 100 and 101 and 99, yes.

Q. Well, take Exhibit 100. On Exhibit 100, Mr. Burgener's evidence was that 30% of the red rays were absorbed; 30% of the orange rays absorbed; 45% of the yellow; 50% of the green; 52% of the blue; and 63% of the violet. Now, if he is correct in that statement—have you made any study of the effect on the growth of plants of absorbing the various rays? A. Not myself.

Q. You have not made any study of that? A. No. Dr, Crocker would, I think, be able to tell you.

Q. You have not made any study? A. No, I have not studied that, myself. All I know is from my plant physiology.

Q. Just from a general knowledge of it? A. Yes.

Q. I see. All right, thank you.

MR. SLAGHT: Q. Then, perhaps you heard the statement I read from Dr. Katz's book. Were you here when he was cross-examined this morning? A. Yes.

Q. Which indicated that a person examining the whole bed of the leaf tips, and so on? A. Yes.

Q. Actually in the greenhouse, or in the garden, would have a better opportunity than a man looking at an isolated sample to reach a conclusion. That would be correct? Do you agree with that? A. Yes, I think it would be probably true if you have a whole bed of material in front of you.

Q. I would think that you would tell me that; that goes without saying. And then I settled with Dr. Katz on common ground on some matters on which we agreed, and you were here and heard it, and I want to see if you agree with me that it is common ground between us in this case, that these statements are correct; that the defendant, McKinnon, emit from their forge shop gases and gaseous subsances into the air? A. That is what I have heard.

Q. Oh, you saw them when you were here, did you not? A. Yes, I could see the gases coming out.

Q. Both through the cupolas and from the forge shop? A. Yes.

Q. And from the slats, or vents, in the foundry itself near the core shop? A. Yes.

Q. Then, second, that he agreed with me that these are carried over and upon Walker's property at times, when the wind is that way? A. Yes, I agree to that.

Q. And that they alight on the roofs of the greenhouses and on the bulbs, plants, leaves, shrubs and flowers both outside and inside, if the windows are open? A. Yes.

Q. You agree with that. Now, we are getting along famously. Fourth, that sulphur dioxide is in the gas over the Walker property—never mind the quantities? A. From the records I have seen that.

Q. And iron particles and iron rust alight on the roofs of the greenhouses, containing quantities of iron oxide as high as 45%. The evidence and the analyses were put in by a Dr. McAlpine and one by Mr. Tienken of 43% manganese being present. Are the conditions that you saw consistent with that happening? A. I see this much, looking at some of the samples—

Q. Yes, I should—

HIS LORDSHIP: Just a minute. You are interrupting the witness. The Reporter cannot take both down. What was it you were saying? A. Well, I saw various pieces of glass that looked very much like what you showed me, a different place along there.

Q. That is in the greenhouse? A. Yes.

MR. SLAGHT: Well, I thank you for that. You are telling me the samples he showed you, looked very much like the type of the deposit on the greenhouses in 1945 that you saw, whether it is as dense or is not so dense? A. Yes. It is a matter of degree. You could take samples that were nice and clean.

Q. It was the same type of deposit? A. Yes, that is quite right.

Q. Then, we have heard about those iron particles and iron oxide rust and so on. What, in your view—or, would it be consistent that it could be of that type? It has been analyzed and found to be that type. A. I suppose what comes out of the chimney could come down here; what is released in the atmosphere in this area.

Q. That is an old axiom, what goes up must come down. But what you say is consistent that the evidence that we heard that the analysis of this stuff showed iron paricles up to, and iron as high as 45 and 43%? A. Well, not being a chemist, I really don't know the exact amount, but I am prepared to accept those.

Q. Then, perhaps I should not ask you, if you are not competent to pass upon it, but if that sort of stuff that you saw there is alighting on bulbs and flowers and leaves and blooms of plants, I suggest to you it is undoubtedly a detriment to them. What do you say? A. It would all depend on the amount.

Q. Well, amounts such as would colour the glass in the way you have seen on the exhibits? Is there any doubt that that would be somewhat detrimental and would have a detrimental effect on the growing of flowers, plants and leaves? A. Certainly it might have effects; would have effects.

Q. Well, that is very fair, then, doctor. And ash and dirt may, I take it, have the same effect? A. Yes. But we must not always assume those effects may be detrimental. You might get a period of a bit of shading just when it is right and you could have again a period when it could have a detrimental effect. I do not deny that, but it is a very complex subject to work out what the effect of it might be.

Q. Oh, yes, indeed, but let me ask you this. If it were coming 184 days out of 365, there would be plenty to make that detrimental effect seen there, not day by day, but take two days and then skip a day, or then take one day and then skip three,

but, to that extent, during the year 184 days out of 365, getting all the stuff over your plants and flowers, you would say it would have a detrimental effect, would it not? A. I think it would. On the whole, it would not be helpful.

Q. Oh, well, now don't go back to that—"it would not be helpful." A. Well, it is not something desirable, that is certain.

Q. I mean, undesirable from a dollars and cents standpoint, if you are in the business, would it not? A. It would injure your business to some extent.

Q. It would injure the business to some extent? A. Yes, I suppose it would.

HIS LORDSHIP: Well, I will put it in a little different way to you. Would you say, if you were running a business, it would be an interference with the business that you would consider to be somewhat substantial? A. Yes, I think I would prefer to have my greenhouses clean, if it is possible.

Q. Well, I say, would you consider it a consequential interference with your business? A. Yes, I would.

MR. SLAGHT: Q. Then, doctor, we heard Dr. Katz, and you heard him this morning, tell us that fine droplets of an oily substance, an oily vapour, came over Walker's? You heard that? A. Yes.

Q. Would that be detrimental if it landed on plants, leaves and flowers such as orchids? A. I am not sure that it would.

Q. Do you know anything about orchids? A. No, very little.

Q. Well, you do not think that fine droplets of an oily substance alighting on the actual bloom of orchids—have you any doubt about that being detrimental to orchids from a saleability standpoint? A. If they are very, very microscopic, though that is a matter I really did not go into, but it all depends on the scale of the thing. If you put oil on a plant, certainly it is detrimental.

HIS LORDSHIP: Well, let us see those two orchid leaves that were put in. We might as well deal with the effects that the witnesses were examined on, instead of hypothetically. Here are two leaves—they are starting to dry up a bit, doctor, but part of them are cleared off below; that was rubbed off purposely to show the difference. A. Yes.

Q. And I may tell you when these came in first, I rubbed my finger over it and found it to be a sort of smudge that came off on my finger. I don't know, they have dried out now, but what do you say about that, whether that would be detrimental to the plant or not? A. Well, I think it would be extremely difficult to put a definite amount on it.

Q. That is as to measuring the amount? A. Yes.

Q. And if you were in the growing business, would you consider that an interference with your business that was undesirable? A. Yes, I would.

MR. SLAGHT: Those were Exhibits what, my lord—96A and 96B. Your answer has just been made with reference to exhibits 96A and B. You can hand those back to the Registrar now. Now, let me see; you came in 1945. You came again in 1947. That is two visits. Were you here again? A. There were a couple of other very short visits for just a meeting, that I recall.

Q. Not for an investigation? A. No, I put in no reports on it.

Q. So your evidence boils down to a visit in 1945, a visit in 1947, and, of course, meetings, that is, discussion? A. Yes.

Q. I won't bother about that, what you heard, but I am interested in when you came in 1947. You knew there was a lawsuit running, that Walker had sued the McKinnon's in this Court? A. Yes, that is true.

Q. And you came along as a Government man, released by the Government, to come at the request of Dr. Katz? A. Yes.

Q. And may I take it that you were not paid for your trip here by the Government; you were paid by McKinnon's, the defendants, and the investigations and the time you spent, they paid you for, and not the Government? A. No.

Q. Oh, you are paid by the Government? A. I am paid by the Government.

Q. Coming here for giving evidence? A. Yes. I am still on the National Research Council. I am not on leave of absence at all.

Q. Not what? A. I am not on leave of absence from the Research Council.

Q. Then, the Government are paying your expenses here, and not McKinnon's? A. The Government are paying my expenses and they come through the regular Council's channels.

Q. Well, who decided that the Government would pay your expenses to come from Saskatoon? You did come from Saskatoon? A. Yes.

Q. To testify in a private lawsuit on behalf of the defendants? Will you tell me the officer of the Government who decided that course for you? A. The National Research Council, of course, charge the McKinnon Industries.

Q. Oh, they do? A. Yes.

In the Supreme Court of Ontario No. 38 Defendant's Evidence Dr. George Ledingham Cross-Examination 5th May, 1949 Continued

Q. And they do not pay you anything extra for coming? A. No.

Q. And they do not pay you anything extra from McKinnon's? A. No.

HIS LORDSHIP: They do not pay you any extra retaining fee? A. No.

Q. You just get your salary? A. Yes.

MR. SLAGHT: You ought to borrow a leaf from Dr. Katz. He does better than that. Then, doctor, I think that is all, thank you. Just a moment—that is all, thanks, doctor.

HIS LORDSHIP: Just a moment, please. In regard to these specimens that were submitted to you, doctor, had you seen them for examination before they were submitted to you in the witness box? A. I just looked at them down there the other day when I came here.

Q. They were submitted to you before you came into the witness box? A. Yes.

Q. All right.

—Witness excused.

In the Supreme Court of Ontario No. 39 Defendant's Evidence Dr. William Crocker Examination-in-Chief 5th May, 1949

DR WILLIAM CROCKER, sworn,

EXAMINED BY MR. KEOGH:

Q. Doctor, are you a director of the Boyce Thompson Institute at Yonkers, New York? A. Yes, sir.

Q. And is that a Government or a privately endowed institute? A. Privately endowed.

Q. And what type of work is carried on there just in a word or two, generally speaking? A. Well, we work on plants and practically any line of research on plants.

Q. Then, what university course did you take, doctor, and what degrees have you? A. I have a Bachelor and Master's degree from the University of Illinois; a Doctor's degree from the University of Chicago.

Q. Specializing in what? A. Chemistry and plant physiology, or chemistry and botany at the University of Chicago.

Q. And have you had experience in investigations of the effect of SO_2 on plants? A. Yes, sir.

Q. How many years' experience have you had on that? A. Well, we started work on SO_2 in 1930.

Q. And have you carried on—I don't mean every day, but for the period since, have you been investigating SO_2 from time to time? A. Yes, sir.

Q. And over a large part of your time, have you? A. Well, many other gases during that period we have investigated.

HIS LORDSHIP: Excuse me, has the question of Dr. Ledingham's notes been discussed?

MR. KEOGH: Oh, I forgot that. We sent away and I am going to tell Dr. Ledingham, as I have told him already, to remain here.

HIS LORDSHIP: Yes. I still want to know if Mr. Slaght wants them; otherwise, I suppose Dr. Ledingham could be released.

MR. SLAGHT: Well, if your lordship will allow me a moment, I will let your lordship know.

HIS LORDSHIP: Well, you let us know after intermission. We do not want to interrupt this witness.

MR. KEOGH: Q. Then, have you published a book on the growing of plants? A. I published a book on the first 25 years of research in the Institute. Two chapters of that deal with the effect of gases on plants.

Q. What is the name of that book? A. It is "The Growth of Plants of Twenty-five Years Research at the Boyce Thompson Institute".

Q. And it was published when, doctor, A. In 1948.

Q. Then, have you, yourself, conducted any fumigation experiments with sulphur dioxide on plants inside of greenhouses? A. Yes.

Q. Have you conducted experiments of that type on buckwheat? A. Yes.

HIS LORDSHIP: Is that inside a greenhouse, on buckwheat? A. Yes.

Q. Well, what are those plants you are referring to? A. Well, that is one of the plants.

MR. KEOGH: I will come to two or three of the others.

HIS LORDSHIP: Very well.

MR. KEOGH: Q. Is buckwheat more or less susceptible to SO_2 injury than gladioli, for instance? A. I would say it is a little more susceptible.

Q. Have you conducted experiments on gladioli fumigations inside of a greenhouse? A. Yes.

Q. Have you conducted experiments of SO_2 fumigations on grab plants inside of a greenhouse? A. Yes.

Q. And have you conducted similar experiments on other types of plants? A. Yes.

Q. Take for instance gladioli as a result—well, perhaps I had better deal with buckwheat first, as I have named it first. What was the result of your experiments—what have you found to be the concentration and duration of SO_2 which will cause—first, I should put in the word "minimum". What, in your experience, have you found to be the minimum concentration and duration of SO_2, which will cause injuries to buckwheat plants inside of a greenhouse, in your fumigation experiments? A. 0.46 parts per million for 7 hours.

Q. For how many hours? A. For seven hours.

HIS LORDSHIP: Q. That is under what humidity? A. Well, we draw—

Q. And what light? A. Full light.

Q. Full sunlight? A. Yes, in the greenhouse.

Q. Well, tell me what humidity. A. Well, we draw the air that we blow in for the plants, we drew it through water, so it is a relatively high humidity.

Q. Well, you say "relatively high"? A. Well, our measurement would show that it would vary perhaps from 70% to 80%, in that order.

Q. We will say 70 to 80% humidity? A. Yes.

Q. One other thing I want to ask you now. We are told that intense sunlight aggravates the conditions? A. Yes.

Q. If you want the most adverse conditions, it is on high humidity, low wind and intense sunlight. Do you agree with that? A. Well, I could reduce the sunlight considerably and get the same effect as long as the stomatos are open.

Q. Well, will a very bright day with high humidity be the most adverse conditions? A. It would be the best conditions for getting the injury, yes.

Q. Now, if you interpose glass, which cuts off a portion of the sunlight, does that give you the same test as you would get outside? A. I think so, because we have noticed that you have to cut down the light to, oh, say 40% of the bright light before you begin to get a closure to the stomatos and get a reduction of the injury, so that there is quite a range of light.

Q. I suppose the stomatos are the breathing pores? A. Yes.

Q. Now, in all those, I take it that we are talking about acute injury? A. Well, marking.

Q. Well, that is acute injury, is it not? A. Yes.

Q. That is where you have a visible marking? A. Yes.

Q. The term was "injury".

MR. KEOGH: I mean the first sign of visible injury.

HIS LORDSHIP: And I think that is what Dr. Katz, in his examination, was dealing with throughout, wasn't he?

MR. KEOGH: As far as I know, I think he was.

HIS LORDSHIP: Where we were dealing, this morning, with a range between .20 and .25, that examination was directed to the first signs of visible injury.

MR. SLAGHT: He says there is not any such thing as invisible.

HIS LORDSHIP: No, but he does not say there is not a chronic injury. I want to make sure that what is classed as acute injury is where you can see signs of burning.

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Continued

MR. KEOGH: Q. Then, doctor, coming on to the gladioli, which I think was the next thing mentioned, what was the minimum concentration and duration of sulphur dioxide which produced the first signs of visible injury on gladioli, in your greenhouse fumigation experiment? A. In general, when we run gladioli and buckwheat together, and get very little injury on buckwheat, we may get none on gladioli, but if we get much injury on buckwheat for the intensity and duration, we will get some injury on gladiolus, though I wouldn't say what definite limit, but it is in my own readings, sometimes you will get injury on buckwheat and none on gladiolus, but always if you get injury on gladiolus, you will get a little more marked injury on buckwheat. There is not very much difference in the sensitiveness of them.

Q. Oh, I thought you had run separate experiments, but, they were together? A. Oh, we have run separate experiments, but generally, when we run an experiment, we have a number of different kinds of plants in the suspect room with relative injury in the several plants.

Q. Then, you are not able to give me any figure then for the gladioli, as distinct from the buckwheat? Is that so? A. No, I would say it would be a little bigger.

Q. But how much bigger you cannot say? A. No.

Q. And what about the grab plants, would you have any separate experiment for those, or was that in the same series of experiment? A. That is generally in the same series. It has about the same sensitiveness, I would say.

Q. As what? A. As buckwheat or gladiolus; maybe nearer the gladiolus point.

Q. I see. You, Dr. Crocker, looked at these exhibits, I believe, last night after Court adjourned? A. Yes — the night before last.

HIS LORDSHIP: What numbers?

MR. KEOGH: The same ones, 74, 89, 82 and 91. I will take them one at a time. First of all Exhibit No. 74. I do not suppose I need read out the dates each time. Will you look at that exhibit and tell me whether you see any evidence of sulphur dioxide injury on that? A. In my judgment that is not sulphur dioxide injury. The pattern is not correct and the bleach is too brown.

HIS LORDSHIP: What is it you refer to about the pattern? A. You generally get two green streaks running up the leaf and get between the veins an intervenous killing so that there would be some green streaks.

Q. You say you generally do. May you at times not have? A. Well, if it is heavy enough, you kill the whole leaf.

Q. Well, what about this one on the righthand side, where it runs up in ribs? A. Well, the ribs are a lighter colour than it is between the ribs.

Q. Does that indicate anything? A. Generally the ribs stay green, if there is no green left, and generally it is intervenous, between the veins.

Q. Well, you say "generally"? A. Well, if you have a very intense gassy discharge, you kill the whole leaf, especially if it is young.

Q. Well, proceed with the rest. I will probably examine it later.

MR. KEOGH: Q. Then, I show you Exhibit 79. Do you see any evidence of sulphur dioxide on that exhibit? A. No. I don't believe it is sulphur dioxide injury for the same reasons as given in the other.

HIS LORDSHIP: I am wondering, doctor, how far it is possible to judge of a plant that has been cut for nearly two years, or a year and three-quarters, which —— A. That has been cut that long — well, I don't know how much.

Q. I say does that put you in a position to fairly judge as against the one who cut it? A. Well, I would want ——

Q. Has it any effect on it? A. Well, really it ought to be photographed at the time it is cut.

Q. Why? A. In order to preserve all these colours exact.

Q. Well, that is what I want to know. A. But I do not see the intervenous killing there.

Q. Well, I was wondering if, in the drying out of the leaves, I will just put it very frankly to you, I am sure you want to be of any help you can to me. A. Yes.

Q. As against an experienced man who cut these at the time and, as he put it, saw the pattern on the ground. He dealt with some patterns, the finding of other things in the locality which he identified as a sulphur dioxide bleach. Would you be prepared to say that it was not a sulphur dioxide bleach? A. Well, depending on this, I should have to say I do not see the evidence.

Q. No. Would you be prepared to say that this had not suffered from a sulphur dioxide bleach? A. I see no evidence of it now.

Q. But to what extent am I to make allowances for the fact that it has been cut since July 31st, 1947? Am I to accept your judgment or to accept the judgment of another? A. I would say, of course, I can only pass on this. Of course, I cannot pass on another man's judgment. I just pass my judgment on this material.

Q. Yes, but would you be in a better position to judge if you had seen that fresh, when it was cut? A. Yes, I would be in a better position, and I would prefer that.

Q. And do you think it is important to have the pattern in the district? If you just saw not a severe, but what you might think was evidence of a sulphur dioxide bleach but found no evidence of it any other place on any other plants —— A. Around?

Q. Around, would you rather be suspicious that you were wrong — would you? A. Yes.

Q. If you did find evidence on other plants all around, it would rather strengthen your judgment? A. Oh, yes.

Q. I thank you.

MR. KEOGH: Q. Then, doctor, I show you Exhibit 82, which is dated June 26th, 1948. Will you look at that and tell me if you see any evidence of sulphur dioxixde injury? A. No, I cannot say that I see any evidence of sulphur dioxide injury.

Q. And I just have one more. I show you Exhibit 91, which is dated July 7th, 1948, and which, according to my memory, was filed by Mr. Jarvis. Well, there is not any doubt about it, his name is on it. Exhibit 91. Will you look at that and tell me if you see any evidence of sulphur dioxide injury on that specimen? A. Well, some of the bleach looks all right here.

HIS LORDSHIP: Q. What do you mean "looks all right"? A. That is, it is a very light colour.

Q. But what do you mean in that phrase you use, "it looks all right"? A. Well, it looks like the colours; it is darker; it is browner than the colours we get with sulphur dioxide injury, but it is lighter in general in this region here, but the intervenous character, I do not see. It is in blotches.

Q. But I still don't know what you mean when you said, "some of the bleach looks all right". A. Well, it looks more nearly like sulphur dioxide than some of the others, but I do not see the intervenous part. I would not declare that that was sulphur dioxide injury. I do not think it is typical.

Q. You would not declare that that was sulphur dioxide injury although it looks more like it than some of the others? A. Yes.

MR. KEOGH: Q. Now, I am just about through, doctor. Oh, yes. Were you given some specimen gladioli leaves by Dr. Ledingham, about August 29th or 30th, 1947? A. August 29th is my recollection.

Q. And did you examine those specimen leaves for sulphur dioxide injury? A. Yes.

Q. And did you find any evidence of sulphur dioxide injury on any of those specimen leaves? A. No.

Q. Now, then, have you performed sulphur dioxide fumigation experiments inside of greenhouses on orchid plants? A. Yes.

Q. And what did you find as a result of your experiments to be the minimum concentration and duration of sulphur dioxide to cause visible injury to the foliage of those orchid plants? A. Well, we worked on cattlaia especially, and 60 parts per million for 5 or 6 hours did not produce any marking.

HIS LORDSHIP: Q. 60 parts? A. Yes, on the foliage. There are many leaves that are very resistant to sulphur dioxide; the rhododendron are resistant and fig leaves are resistant.

MR. KEOGH: Q. Then, I have one other question. We have had it in evidence in this case that iron oxide, plus soot from smoke, plus an oily sticky substance to pound the mixture together, when that mixture falls on the leaves of growing plants it absorbs sulphur dioxide out of the atmosphere and then, later on, there is a tendency to release it to the injury of the plant under humid conditions such as rain, or spraying with water. Do you agree or disagree with that evidence? A. I would disagree with that, because when your gases dissolve they cannot enter a leaf so readily, and they become less toxic.

Q. When your gases dissolved —— A. Yes, it is in the gas stage that they enter the leaf easily.

Q. And it is the entry of the gas into the leaf —— A. Yes, through the stomatos.

Q. That causes the damage.

HIS LORDSHIP: Q. Well, when the gas dissolved, it would make it sulphuric acid? A. It would make a sulphurous acid, unless it became ——

Q. Would it not become oxidized? A. Well, it is not too easy to oxidize them. They use those things to create it.

Q. Well, now, would not this SO2, or sulphurous acid have any effect on the leaves? A. It would have to enter it through the cuticle, and that is different.

Q. No, but wouldn't a deposit of sulphurous acid have any effect on them? A. Oh, if you got it heavy enough; any acid would burn, but we are talking about low concentrations.

Q. I am talking about any deposit. They say a particle of a carbon will absorb its own weight in sulphuric acid or SO_2? A. Well, I cannot say on that that it would absorb it.

Q. And then, if water is put on, does that become sulphurous acid? A. Yes, until it oxidizes.

Q. Well, is that a desirable thing in the growth of plants? A. No, it is not desirable, but it is less toxic than some of the damage from sulphur dioxide, because it can get in.

In the Supreme Court of Ontario No. 39 Defendant's Evidence Dr. William Crocker Examination-in-Chief 5th May, 1949 Continued

Q. I am exploring a different thing. I am not exploring the question of SO_2 at the moment. I am exploring the question of soot and carbon and oily substances which may absorb SO_2 and then alight on the plant. Has that a detrimental effect on the growth of the plant? A. If they absorb a high enough concentration as acid, it would be detrimental.

Q. Would you take it to be detrimental? They say it will absorb its own weight. Would the effect be a detrimental effect to the plant? A. Well, I think if it absorbed its own weight — it depends on the size of your particle.

Q. Or are you in a position to offer an opinion? A. Well, I would not know about the absorption part. I don't know about that, and it would be rather out of my line to make any statement on that. I say that you might get injury if you had a big enough carbon particle and enough sulphuric acid.

Q. I mean from a lot of small carbon particles? A. Close together, yes.

——(Intermission.)

——On resuming:

MR. SLAGHT: My lord, I have decided, in view of some admissions I got on cross-examination of the gentleman who had not his original notes, that I shall not ask him to wait here until his notes arrive, so my friend might release him.

MR. KEOGH: Well, thanks very much. He has some engagement in Ottawa, I understand.

HIS LORDSHIP: Yes.

MR. KEOGH: I was through in chief, my lord.

In the Supreme Court of Ontario No. 39 Defendant's Evidence Dr. William Crocker Cross-Examination 5th May, 1949

CROSS-EXAMINATION BY MR. SLAGHT:

Q. Doctor, you have been on a little visit in the hall here, in the interval? A. Yes.

Q. Some one trying to persuade you to identify something, and you telling them "I cannot and I won't"? A. I didn't hear anything of that kind.

Q. You didn't hear anything of that kind. Not by my friend, Mr. Keogh. Were you talking with Ledingham out there? A. Yes, I talked to Ledingham.

Q. And did you make the statement, "I cannot identify that"? A. I don't remember of making such a statement. What was the discussion — identify what?

Q. Well, I don't know. You did have a discussion with him about your evidence and what you were going to give now? A. Yes. I believe I said that I cannot identify anything but what I see. That is what I believe is the statement. That is all I can pass on.

Q. The way it came to me, some one was trying to urge you to identify something and you stuck it out and said, "I won't identify them"? A. No.

Q. Well, all right. Then, Dr. Crocker, let me quote you something from Dr. Katz as having a bearing on the identification of injury. This is page 90, Mr. Keogh, of Dr. Katz, who has written a book and also you heard him in the box? A. Yes.

Q. He says at page 90:

"Depending on the severity of the injury and the location
10 "of the leaf, it is possible to subdivide acute markings in "several types as follows."

Is that true, that, depending on the severity of the injury and the location, it is possible to subdivide acute markings into several types? A. Well, I know of marginal and intervenous and sometimes veins and it has killed also a small vein.

Q. All right now. Take the marginal markings on these exhibits you looked at. There are marginal markings on the leaves? A. Well, they are pretty much clear across the leaf, not marginal.

20 Q. Well, some of them are marginal, I think? A. They are not marginal in the sense that we use a narrow margin, actually.

Q. Now, Katz says, "One of the acute markings for SO_2 is marginal". Will you say they are not marginal markings on these exhibits? A. I will say not marginal markings of the type we generally get in sulphur dioxide. The margins are killed here, yes.

Q. Killed margins? A. Yes.

Q. Well, that is a marginal marking, isn't it? A. I would say rather more than marking.

30 Q. Well, when the marking goes so far as to kill — it starts in in a way that perhaps does not kill, and then progressing, it gets enough ultimately to kill. Isn't that what happens? A. Well, yes, it starts and ultimately kills, if it kills.

Q. And are you able to say that marginal markings, even when they get so bad or progress with repeated doses and get so bad that they kill, that they still are not typical markings for injury by SO2? A. If the whole leaf is killed, I do not think you can tell.

Q. If the whole leaf is killed? A. Yes.

40 Q. Well, but if the margin is killed, you cannot say it is not a marginal mark because it goes so far as to kill it, can you? A. It was originally, but I don't see it at this time.

Q. I see. Then, Katz goes on this way — would you agree with this, "It must be recognized, however, that these classes cannot be very definite, as the different types fade into one another, and it is often impossible to clearly separate them." A. Yes, that is correct.

Q. Then, "It has been our experience that the acute marginal markings are the most likely to occur and are invariably found on plots with the other types present." Would you agree with that? A. Yes.

Q. Then, doctor, may I take it that you may recall you and his lordship discussed some phases of the matter with regard to the early Exhibit 74, and you were good enough to tell his lordship that you would be in a better position to judge had you cut the exhibit and seen the bed and seen the surrounding evidences of SO_2. You remember making a statement of that kind? A. Yes.

Q. Would that apply also — this sounds like a useless question, but I take it that would apply also to your observations with regard to Exhibits 79, 82 and 91? A. Oh, yes.

Q. The whole lot of them? A. Yes.

Q. Then, what locality did you take your observations in, doctor? A. Well, much of our work is in the greenhouse with fumigations.

Q. Yes, but where is the greenhouse — in New York City? A. No, it is about 17 miles north of the Grand Central Station. It is out in the country.

Q. Well, yes, that is in New York City and about 17 miles from New York? A. Yes.

Q. Where the climatic conditions are not the same as they are in St. Catharines, or, perhaps you don't know St. Catharines except that it is a nice city to come to? A. Well, there are some differences in climatic conditions.

Q. Very different? A. Yes.

Q. But climatic conditions have nothing to do with the conditions under which plants grow? A. Oh, yes, if they are radical enough different in the conditions in the two places.

Q. And do you know the difference between St. Catharines and 17 miles north of New York? A. Well, I have not made a special study of it, no, but I might describe the results I got with fumigation. I know nothing about St. Catharines especially.

Q. Then, doctor, I think somebody asked you something about soot, or did they? I am going to, anyway. Soot could have a detrimental effect on the growth of plants and flowers? A. Yes. I have made no special study of soot, myself.

Q. Well, I have heard a lot of evidence about soot here on the Walker place, and I want to ask you if you disagree with this. I am reading from Cohen and Rustin's book. They are an authority on it? A. Oh, yes.

Q. Dr. Katz agreed with it; page 17 reads this way, paragraph 6:

"Soot, its actions and its effects.

"Soot, as we have seen, is not pure carbon, but contains varying amounts of tar. This tar adheres so tenaciously to

"everything that it is not even removed by rain, thus, it is in "short, a kind of varnish."

You agree with that? A. Well, I don't know about the varnish. I think it does not harden up like varnish.

Q. Well, leave out the varnish sentence. I think that is a little stiff, myself.

HIS LORDSHIP: I think if the doctor looked at those panes of glass, I think he might agree that it is not very far wrong, without prejudging it at all.

MR. SLAGHT: Well, the doctor tells me that he doesn't know much about soot, so I don't know that I need press it too far. You tell me you are a plant pathologist and spent all these years looking for injuries? A. I did not tell you a plant pathologist. I said a plant physiologist.

Q. And no soot down your way, on the plants you have examined? A. Oh, yes, our big problem is soot.

Q. And soot is very bad for plants? A. In large amounts, yes.

Q. And then I suppose you would agree with this, that soot may exert a detrimental effect on the growth of plants and in three ways, namely, by blocking up the stomato and thus impeding the process of transpiration by coating the leaf and so reducing the intensity of sunlight, and at the same time affecting the assimilation of carbon dioxide, and, lastly, by the corrosive effect of the acid it contains. In both cases, the tarry deposit plays an important part. Would you agree with that? A. I think some authorities consider the blocking of the stomatos ——

Q. Well, do you question it? A. I don't know. I have not made a study of it.

Q. Well, you don't know and are not therefore able to question it? A. No.

HIS LORDSHIP: Q. Well, outside of that, do you agree with it? A. Yes.

MR. SLAGHT: Q. And then, Dr. Crocker, have you been in the Walker premises at all? A. No.

Q. Been down in the McKinnon plant? A. No.

Q. Have not been down at the plant? A. No.

Q. You have been here many days, but they kept you away from the plant. Why didn't you go down and see what was going on? A. There has been nothing said to me about the plant.

Q. They didn't have you look at it, anyway, to see what was going on? A. No.

MR. KEOGH: We have invited you and the Judge to come down and see what is going on.

HIS LORDSHIP: I am going.

In the Supreme Court of Ontario No. 39 Defendant's Evidence Dr. William Crocker Cross-Examination 5th May, 1949 Continued

MR. SLAGHT: Q. At all events, how many days have you been here? A. I came here on Tuesday morning.

Q. And this is Thursday afternoon and, I don't know, but you can tell me perhaps — you know something about orchids? You have made some study of orchids? A. I have studied the upkeep and the gassing of orchids.

Q. And sunlight is desirable for orchids, is it not? A. Yes, if it is not too intense.

Q. I understand what you mean by that, in the dead heat of a hot summer, you do not want to get too much of it in the greenhouse, perhaps because it creates heat in there to too great an extent. Is that one of the reasons? A. Yes, that is one of the reasons, overheating and over-evaporation.

Q. And if substances on the roof interfere with the flower getting its proper dosage of sunlight and the rays that are beneficial, then, that is a real detriment to the grower, is it not? A. Yes, I would say so. I have not made a special study of light.

Q. Just studied the gas question alone. Is that it? A. I have studied the gas question and other questions in plant physiology.

HIS LORDSHIP: Q. What do you mean by that? What does that term imply? A. Plant physiology?

Q. Yes? A. Well, it is the study and explaining the way the plants function, taking up such things as making sure if it has photosynthesis, protein synthesis ——

Q. Photo synthesis is the digestion of the light rays, would that be? A. Well, no, carbon dioxide from the air and water from the soil are transformed to sugar by the sunlight energy, that is photo synthesis.

Q. That is, the sunlight energy is applied to the water from the soil and the carbon dioxide from the air? A. Yes.

Q. Well, if there was a substantial interference with the light energy, it would interfere with the photo synthesis? A. Yes, if it was sufficient. In the summer time there is far more energy than is needed.

Q. Well, I suppose you could not speak of St. Catharines, because you have not had any experience here. But, in your plant in New York, during what months would you say that there is more light than is really necessary? A. Well, the last part of May or June, July and August, and maybe early September, you can reduce the light.

Q. About four months during the year? A. Where there is a marked excess.

Q. It is probably desirable to reduce the light in New York? A. Yes.

Q. Probably be a shorter time here, in view of the fact that we are farther north. Would that be correct? A. Yes, probably

MR.SLAGHT: Q. Doctor, do you agree with the statement that we find in Dr. Katz's book, that there are three types of injury, acute, chronic and the invisible? A. No, I do not.

Q. You do not? A. No.

Q. What is wrong with that?

MR. KEOGH: You say you found that in Dr. Katz's book?

MR. SLAGHT: Yes, I read it to him. "Chronic injury, I think, with the Germans was generally applied to the conifers and that applied to the peony. In the old work the Germans had said there was visible and invisible injury and our best knowledge of the effect of gases on plants has accumulated probably since 1930. The Germans used very crude methods. The newer methods use what we call the continuous flow method. They flow a current of air continuously over the floats with sulphur dioxide in so that the same concentration is held right along, and our knowledge has become very much more exact under these modern methods."

Then there is another thing is important, that Hill and Thomas, or Thomas and Hill and Dr. Katz have worked on the effect of sulphur dioxide on photo synthesis and in low concentrations sulphur dioxide stimulates somewhat the photo synthesis. "In fact, we know now that sulphur is a very essential element for plants so that in low concentrations as the sulphur is given over into proteins and night interferes with the fumigation, because the stomatos close up and not so much sulphur dioxide is taken in, during the night this sulphur is manufactured into proteins, into harmless forms and it is the substance that goes into the proto plasm."

Then, you have mentioned low concentrations, and I was rather surprised when my friend asked you about concentrations on buckwheat and you said .46 for 7 hours from the lower concentrations; at .46 they bring about injury if the duration is there? A. Yes.

Q. And, as Katz says in his book, and confirmed it yesterday in Court, correcting .25 — he says as low as .20, that just above .20 may cause injury. Do you agree with that? A. Yes, if the time is long enough, but it must be there continuously. That is, you must have your dioxide held at the concentration continuously.

Q. What do you mean by that? A. Well, not as he says, 46 hours does not, but for .25, will he hold it there continuously?

Q. No, he does not say 46 hours for .25. .25 is not in here. A. Is it .24?

Q. I don't know whether he has got .24 or not, but what he does say is after a prolonged exposure, that is greater than .2 will cause injury. You agree with that, you tell me? A. Yes, if your exposure is long enough, and you have a delicate plant.

Q. Well, have you any test that you can give me of hours that you can expose it at .21? A. No, we have not run any long-time tests, except on the nutrition effect of sulphur dioxide, and there we use very low concentrations.

HIS LORDSHIP: When you say "very low", what do you mean? A. Well, in the region of five-hundredths, instead of one-tenth.

Q. What is five-hundredths point? A. That would be 0.05.

MR.SLAGHT: I did not catch what .05 was.

HIS LORDSHIP: That is what they experiment with. They take it for beneficial results? A. Yes, we had our soil deficient in sulphur and we were seeing whether the plant could use sulphur dioxide from the air to take care of its sulphur needs.

MR. SLAGHT: Q. Then, may I ask you this? Is it not the case that, in different localities, different kinds of plants have a different susceptibility? A. Yes, and under different conditions in the same locality.

Q. So that the susceptibility or results in one locality are not a sure guide as to what would happen in another locality to the same plant? A. Yes, but it is rather interesting to see how nearly Dr. Katz, and Dr. Hill and Thomas and the people at the Boyce-Thompson Institute, according to all their results worked at three different locations.

Q. Yes, it is interesting, as you say, but it is not a sure conclusion to reach that, in different localities such as New York and St. Catharines, the same effect on plants or the same susceptibility to injury will necessarily follow? You agree with that, do you not? A. Yes, because they have grown under different conditions, the plants that are affected.

Q. That is all.

HIS LORDSHIP: Any re-examination?

MR. KEOGH: No, thank you, my lord.

HIS LORDSHIP: Then, just one or two questions on the

samples that were sent down to you, doctor. Were you able to identify the cause of the burn applied, or the defect? A. No.

Q. Then, look at this Exhibit 77 and tell me whether — examine them all carefully, doctor, whether you can say whether or not they would appear to have suffered from sulphur dioxide? Examine the one up at the corner. The one with the marginal injury? A. It has the intervenous marginal burning. The bleached tissue is a little dark for sulphur dioxide bleach. A sulphur dioxide bleach is very light. I would not want to say whether it was or was not.

Q. You say it has the intervenous —— A. Yes, and marginal burning.

Q. What did you say was a little dark? A. The bleached part is a bit dark.

Q. The bleached part seems to be a little darker on some than on others?

MR. SLAGHT: Is that Exhibit 77, my lord.

HIS LORDSHIP: Yes. You see, the bleached part on the one on the right is quite light. I do not know whether the edge — this has been cut for two years and a half; I do not know whether that would affect it or not. You are not in a position to offer an opinion one way or another? A. No, I would say that was doubtful.

Q. Well, you mean doubtful? Do you mean you doubt it or —— A. I mean, I would not be able to draw a decision.

Q. You are not able to give an opinion? A. No.

Q. Well, that is what I gathered. All right. Thank you, doctor.

——Witness excused.

In the Supreme Court of Ontario No. 39 Defendant's Evidence Dr. William Crocker Cross-Examination 5th May, 1949 Continued

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MARTIN CAHILL, sworn.

EXAMINED BY MR. KEOGH:

Q. Mr. Cahill, what is your occupation with the McKinnon Industries? A. I am director of public relations.

Q. And how long have you been in the employ of that company? A. 24 years, sir.

Q. Are you familiar with the St. Catharines Sports Park located on the south side of Pleasant Avenue? A. Yes, I am, sir.

Q. Look at south part of Exhibit No. 11, you will see marked in red it says, "Poplar trees". Do you see that? A. Yes.

Q. Now, where is this Sports Park located with reference to those poplar trees? A. Your question again, please?

Q. Where is this Sports Park with reference to those poplar trees? A. Well, the Sports Park is contained in an area from Haig Street along Pleasant Avenue to Thomas Street, and up

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Thomas Street to Merrit Street and back around to Haig Street.

Q. And are these trees along one of the boundaries of the Sports Park on Pleasant Avenue? A. They are along the boundary of Pleasant Avenue from Haig Street almost to Thomas Street.

Q. And did you notice this row of poplars before some of them were cut down some time ago? A. Oh, yes, they had been there for quite a number of years.

MR. SLAGHT: Oh, well, let me say this to my friend. Maybe I did not before see the drift of this, but if this evidence is directed to answering anything put in by the witness Gray with regard to the poplars cut down, in view of the evidence Mr. Gray gave, I shall not urge that that is any evidence available for the plaintiff in this case, and relieve my friend from having to meet it in that way.

HIS LORDSHIP: I was going to suggest, Mr. Keogh, that as far as I could see, there had been no evidence adduced from which one could reasonably come to the conclusion that the poplar trees died on account of any injury from the McKinnon plant.

MR. SLAGHT: I do not so regard the evidence as being of any value to the plaintiff for that purpose, and assure my friend that he will hear nothing more about it.

MR. KEOGH: I only brought it up because Mr. Walker referred to it as one of the items of damage.

HIS LORDSHIP: Well, that has not been substantiated.

MR. KEOGH: All right. Well, I won't ask anything more about that.

Q. Then, on Tuesday, April 12th of this year, that is 1949, in company with Mr. Campbell, general foreman of maintenance in the McKinnon foundry, did you climb up to the top of the cupola stacks above the foundry? A. Yes, sir.

Q. And did you look in the water cones in some of those stacks? A. Yes, I did, sir, some of them.

Q. And first of all, which was the first stack, that is having regard to directions from west to east? I believe the company count them from west to east Nos. 1, 2, 3 and 4, and have only three operating. Which was the first stack that you looked into? A. I looked into the second stack from the west.

Q. That would be No. 2, counting from the west? A. No. 2, counting from west to east.

Q. And what time of day was this? A. It was 1.15 p.m.

Q. And what can you tell us about the operation of the water cone when you saw it in that stack at that ime? A. When I had seen it at that time, the water was flowing down along the apex of the cone and flowing all the way around it.

Q. Then, did you look at the water cone in another of those cupola stacks? A. Yes, I did. I looked at the one — I think that we refer to it as No. 3, it was not operating that day, but the one No. 4, which was the first one you would meet when you would come up the steps. There was not very much smoke coming out of it and I stopped and looked at it.

Q. And how was the water cone operating in that one? A. It was exactly the same as the other one. It was operating all the way around and water was running down it freely. You could see that even better than you could No. 2.

Q. Then, did you look at the water cone in No. 1 cupola, that is the most westerly? A. Well, it was a very gusty day and I was up there with Mr. Campbell ——

Q. Did you or did you not? A. No, I did not. We started over toward it and the wind was swirling around us.

HIS LORDSHIP: That would be No. 1? A. Yes, No. 1.

MR. KEOGH: Q. Then, on the morning of Tuesday, August 26th, did you attend with your plant photographer ——

HIS LORDSHIP: What year?

MR. KEOGH: I beg pardon, 1947. Did you attend with your plant photographer, Mr. Dundas, at the office of Dunn Brothers, when certain pictures of gladioli were taken? A. I did, sir.

Q. Now, I show you four photographs of gladioli in vases. I will deal with the same thing — I was proposing to put them in as one exhibit if they are identified.

HIS LORDSHIP: I know, but what connection have they got with this case?

MR. KEOGH: I will have to tie them up with Mr. Dunn. For your lordship's information, these were gladioli that Dr. Katz and Mr. Dunn cut from the McKinnon experimental plot on August 25th, 1947, and they will be proved more fully by Mr. Dunn when I call him; but this witness has a connection with it, too, and I show you these four photographs and ask you if you can identify those.

MR. SLAGHT: Well, will my friend pause while I bring the Court's attention to a submission? My submission is that to accept these photographs is quite wrong, because they are too remote, for this reason. We have not had evidence that Dunn is subjected to the same conditions that Walker is subjected to.

HIS LORDSHIP: No. These are photographs that Mr. Keogh says he is going to prove showing that the gladioli shown on the photographs came from McKinnon's test plot, or came from a plot at McKinnon's. It is just a question of sequence, that is all.

In the Supreme Court of Ontario No. 40 Defendant's Evidence Martin Cahill Examination-in-Chief 5th May, 1949 Continued

MR. SLAGHT: Oh, I missed that. Oh, I thought they were photographs from Dunn's.

HIS LORDSHIP: Mr. Keogh says, and I had forgotten that Dr. Katz gave evidence that he cut certain gladioli and took them to Dunn's.

MR. SLAGHT: I beg pardon.

MR. KEOGH: Dr. Katz said he was present when Mr. Dunn cut certain gladioli out of this McKinnon experimental plot and it will be proved by Mr. Dunn these were the same gladioli.

HIS LORDSHIP: I thought the witness said these were photographed at Dunn's place.

MR. KEOGH: They were photographed at Dunn's place.

MR. SLAGHT: Are they cut flowers?

THE WITNESS: Yes, they are cut flowers in vases.

MR. SLAGHT: All right. I do not object if my friend undertakes to prove they came from the McKinnon place.

MR. KEOGH: I do.

MR. SLAGHT: I do not know why they took them out to photograph them.

MR. KEOGH: Q. Do you identify these photographs. A. Yes, I do.

Q. You were there when they were taken? A. I was there when they were taken.

Q. Of these gladioli? A. Yes.

HIS LORDSHIP: All you know is that you were at Dunn's when there were photographs of several bunches of gladioli taken? You don't know where they came from, yourself? A. No, I do not, my lord.

—EXHIBIT No. 169: A. B. C. and D. Four photographs of gladioli.

MR. KEOGH: Q. Then, were you at the gladioli flower show at Welland on the evening of Wednesday, August 27th, 1947? A. Yes, I was, sir.

Q. And did you see at that show the four vases of gladioli shown in the photographs which you have just referred to? A. Yes, I did, sir.

HIS LORDSHIP: Q. Shown by whom? A. Well, they were on exhibit, your lordship, along with a number of other gladioli in vases.

Q. Was it an exhibit of Dunn's? A. No, it was at a show, your lordship. They were having a gladioli show and these were one of the exhibits being shown.

MR. KEOGH: These gladioli that were photographed were on exhibition at that show? A. They were.

Q. Were you there at the show when the prizes were awarded? A. Yes, I was.

Q. And ——

MR. SLAGHT: Now, we do not know who the judge was.

HIS LORDSHIP: I hope we are not going to waste very long on it.

MR. KEOGH: I am not going to ask you the details of that, but were prizes awarded for this exhibit of gladioli shown in the four photographs, Exhibits A, B, C and D?

MR. SLAGHT: Oh, we do not know whether he was a blacksmith or a plumber or a livestock man, or who was the judge.

HIS LORDSHIP: Well, let it go. You might tell us who got the prizes.

THE WITNESS: I could not possibly tell you who got the prizes.

Q. Well, in whose name were they put in? Whose gladioli? A. Mr. Lance Dunn's, as I understand.

MR. KEOGH: Q. He exhibited them? A. He exhibited them.

MR. SLAGHT: They were not Dunn's at all; they were McKinnon's. A. Well, he exhibited them.

MR. KEOGH: Then, may I see Exhibit 106. I show you Exhibit 106, which has a date on the back of it, April 17th, 1949, and which has already been identified by the plaintiff, Mr. Walker, as a photograph of the north portion of his most northerly or No. 7 greenhouse. Were you present when that photograph was taken by the photographer, Mr. Sinclair? A. Yes, I was, sir.

Q. Then, will you tell me the names of the iron foundries in the city of St. Catharines.

HIS LORDSHIP: Unless you are able to prove where they are in relation to the Walker property, I do not think we are interested; the distance and directions.

MR. KEOGH: I am going to ask him that afterwards. I will ask him that as soon as I get the names. Give me the names first. A. Yale and Towne Manufacturing Company; Anthes Imperial Iron Company; Cunningham & Son; Foster Welch, and the Lincoln Foundry.

HIS LORDSHIP: Now, Mr. Keogh, unless you seriously contend that these foundries emit iron oxide in substantial quantities on Walker's property, I do not want to spend much time on that, because I can easily see that it is a matter that will require a great deal of analysis and discussion and if it is seriously contended that the deposit of iron oxide that is complained of comes from these foundries and not from McKinnon's, then, we must go into it.

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MR. KEOGH: Well, I contend that they are a serious source of iron oxide in the general atmosphere of St. Catharines, which goes over Mr. Walker's premises. I cannot put my finger on any particular piece of iron oxide and say it came from McKinnon's or came from Imperial Anthes. I say they are a source of pollution.

HIS LORDSHIP: Well, of course, you understand the law that more of, or another source of pollution, does not relieve one who substantially adds to it.

MR. KEOGH: Well, substantially adds to it. I understand that.

HIS LORDSHIP: But if you are contending that, I can easily see that we are letting ourselves in for several days' work on this. There has been no evidence adduced in your experiments to indicate iron oxide coming from anywhere, and I wonder how far this is going to be gone into.

MR. KEOGH: Well, I do not see how you could have an experiment which would enable you to trace iron oxide.

HIS LORDSHIP: I am suggesting you could have very easily, with your wind directions and analyses of your dust on different wind directions, had a very good indication of where a substantial amount of iron oxide came from.

MR. KEOGH: Well, I won't be as long with it as your lordship thinks, as a matter of fact.

HIS LORDSHIP: Well, I do not know what it may open up.

MR. KEOGH: As a matter of fact, I won't be very long with this witness at all.

HIS LORDSHIP: Very well. You are down to Lincoln Foundries. Are there any others?

THE WITNESS: Not to my knowledge, your lordship.

MR. KEOGH: Q. Now, you have served on Victory campaigns, going around to the various plants selling Victory Loans? A. Yes, and various drives.

HIS LORDSHIP: Now, you are going to give us distances and directions?

MR. KEOGH: Yes.

Q. Exhibit No. 3. I would like to put Exhibit No. 3 in front of you, which is an old map of the City of St. Catharines.

MR. SLAGHT: It is awfully hard to follow. If we could get a modern map it would be better.

MR. KEOGH: I have a new map somewhere.

HIS LORDSHIP: Do they not publish maps of St. Catharines for sale?

MR. KEOGH: Yes. That is just what they are going to produce. I have here a new unmarked map of the City of St. Catharines. It is on sale here by Beattie Hill Company.

MR. SLAGHT: What is their business?

MR. KEOGH: They are stationers and book sellers.

MR. SLAGHT: Is this made by an engineer to scale, or anything?

MR. KEOGH: Made by a Map Company.

MR. SLAGHT: Well, perhaps, my lord, it has not been proven in any way as a map of St. Catharines, but we might perhaps agree as a matter of convenience and without knowing that it is strictly accurate or the scale — I do not see any scale on it, or direction.

MR. KEOGH: I just want the witness to mark on here the location of each foundry, and then I will ask him to give the distance, so the scale will not be material.

MR. SLAGHT: Well, perhaps it can go in for identification. Ordinarily, it could not go in unless it was proved as accurate. Why don't we agree that it goes in for identification for either side without it being strictly accurate?

MR. KEOGH: I am not asking you to agree to anything, only let me put it in so the witness can mark it.

MR. SLAGHT: I will let my friend put it in on the understanding that it is not being proven. It is going in for identification as a convenience to the Court and to counsel.

HIS LORDSHIP: Put it in in this way as a guide to the location of the streets of St. Catharines. It is no evidence of the accuracy of the distances or of the scale. It is a mere guide. One might get if they went around — travelled around the streets.

MR. SLAGHT: All right, my lord. I think that protects us all.

HIS LORDSHIP: Have you another one?

MR. KEOGH: I will have him call out the streets and have him put a mark on and ask the distance.

—EXHIBIT No. 170: Another map of City of St. Catharines.

MR. KEOGH: Q. Will you take this exhibit as being a copy of 170 and start with the Lincoln — not the Lincoln, I beg pardon.

HIS LORDSHIP: Mr. Keogh, I am awfully concerned about this, going into it. It seems to me we have got to, if we are going into these foundries as alleged as contributing gas to the condition of which Walker complains, you have got to prove the character of the foundry, the sort of process that goes on there, the sort of furnace they have, the height of their chimneys, the distance from Walker's, and all that. We are not in a Royal Commission. We are in a lawsuit and unless you are prepared to do that, I do not see why we should embark on the evidence at all.

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MR. KEOGH: Well, I intend to call witnesses from some of these foundries and possibly from all of them, to prove some of these things, my lord.

MR. SLAGHT: Had not that better be done first?

MR. KEOGH: Well, there are five, my lord.

MR. SLAGHT: A man can come here and say, "I am from So and So Foundry, and it is on a certain street," to identify it, but I do not think it should come in after this witness has given evidence of its location.

MR. KEOGH: I am only asking him the location.

HIS LORDSHIP: But where is it evidence—the location of any building, the city hall or anything else, until it is shown that that is in some way relevant to this case? If you call a man from the foundry and he says, "I have a foundry at a certain location and we discharge into the air large volumes of iron oxide, and we are within five or six hundred yards of Walker's, and when the wind is blowing from the east to the west it should blow over Walker's." Now, there is concrete evidence that we can deal with, and it becomes relevant, but I do not see how the location of any place is relevant until we get some evidence attached to the case.

MR. SLAGHT: I put it to my friend more in supplication than anything else. There is no use Mr. Cahill saying where some of these foundries are because until, as his lordship points out, a man comes here and states where his foundry is—and he can tell us in a moment where it is—it is wasting time, and to tell us the position of five foundries and not know whether we are going to hear from them or not—

HIS LORDSHIP: We do not know what relevance it has to the case and until it has been shown to be relevant— you say you are going to call people from the foundries. Then, why bother with this man at all?

MR. KEOGH. Well, I submit, my lord, if I can show there are four or five iron foundries in the City of St. Catharines, or within two miles of Walker's premises, and there has already been some evidence to the effect that an iron foundry is one of the sources of iron oxide in the atmosphere, I submit that that is evidence contributing to the general pollution of the St. Catharines area which Walker gets over his premises when the wind is blowing from the south and southeast and east.

HIS LORDSHIP: I am not stopping you from adducing evidence to show that any iron foundry emits iron oxide that may reach Walker. I am not stopping you from that, but the mere saying that something that this witness calls an iron foundry proves nothing. I mean, it is not relevant.

MR. KEOGH: It is not what he thinks, because he has been in them, as I understand it.

HIS LORDSHIP: You say you are going to call witnesses from them. Well, now, if you are going to do that, that is the way to go about it. I do not think we should have the record cluttered up with evidence from an employee of McKinnon's who had nothing to do with the operation. I want to get this case on to the rails of what it is really about. You can call any evidence you wish to prove other sources of pollution, so that we can measure them, or get an idea what it is, and to what extent any of their iron oxide may reach Walker's at all.

MR. SLAGHT: And I want it understood, when I interposed the objection to what is going on, I have the same view that you will not hear an objection from me if you bring a man here who knows how he runs his foundry and what he burns and attempts to offer evidence that he has injured Walker; I think that would be admissable, and I do not want to be taken to object to its admissibility, but this is surely not.

MR. KEOGH: Well, the last part of my friend's statement, "attempts to offer evidence that he has injured Walker's premises," I do not agree with that, but I agree with the rest of it.

HIS LORDSHIP: Well, I will dispose of it now.

MR. KEOGH: Just step down, witness.

HIS LORDSHIP: The exhibit has already been marked. You will probably want it later on.

MR. KEOGH: I had another witness here in connection with the poplar trees, and now my friend has said that he is not relying on that and I had to let Dr. Duff go today, because he is taking somebody's examination for his Ph.D. degree today, and he was afraid if he started his examination today he would have to stay, and the people were coming from England to see their son get his degree.

MR. SLAGHT: I did not call on my friend to explain it, but we do want to go on today for a full day.

MR. KEOGH: And I will have to ask the Court's indulgence for the remaining 15 minutes, and there will not be any interruptions tomorrow.

HIS LORDSHIP: Well, do not be too sure there will not be any interruptions. I do not want counsel to commit themselves at all, but it will be of some help to me to have some idea as to when we are likely to conclude this case, because I may say it is causing great congestion in the work of the Courts, and I have to make arrangements ahead.

MR. KEOGH: Well, it is pretty hard to be exact in a case of this kind, my lord. I do not know what evidence my friend is going to call in reply, and I have no idea, but, subject to what reply

In the Supreme Court of Ontario No. 40 Defendant's Evidence Martin Cahill Examination-in-Chief 5th May, 1949 Continued

evidence my friend has, my case would be—my estimate is that I would finish my expert evidence by Monday evening and the rest of my evidence by the end of next week. That would be the best guess I could give.

HIS LORDSHIP: Very formidable. This case was going to last two weeks when I originally made arrangements for it and here we are now. Well, I hope that counsel will not—I do not want them to reduce the evidence if it is going to interfere with their judgment of the case, but make every effort to keep the case directed strictly to the matters that are in issue.

MR. KEOGH: I think the length of time I have been examining witnesses in this case has been comparatively short.

HIS LORDSHIP: I am not criticizing anyone, but it is going to be—this case must go on to a conclusion now. I tell counsel that, no matter what happens, we are not going to interrupt the trial. It will proceed.

MR. KEOGH: Yes. I am trying to shorten it as much as I can. I have already made several attempts.

HIS LORDSHIP: And it will proceed to its conclusion as long as everyone keeps their health. It makes it frightfully difficult for me to make arrangements beyond the end of next week. I was hoping we would finish the whole case next week, arguments and all, but I may say that I have a case definitely fixed in Welland that has been fixed for months, starting on the 23rd of May, and what I can do—certainly on argument I can put a limitation on counsel there, but I won't put a limitation on the evidence, but I will put a limitation on the argument, because after all, this case can be argued in a comparatively short time, I believe. The evidence is voluminous, but the problem will boil down in the long run to be fairly simple and the law is not very complex.

MR. SLAGHT: Now, my lord, since this man has put in some photographs, I can cross-examine him in five minutes.

HIS LORDSHIP: Yes, you can do that.

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CROSS-EXAMINED BY MR. SLAGHT:

Q. You tell us you are the director of public relations for the defendant company? A. Yes, sir.

Q. When did you take on the job of inspector of cupolas? A. Well, public relations in a plant, Mr. Slaght, is sometimes very wide and varied.

Q. All right. You have been up once to peek down two chimneys. Is that the story? A. Yes, I was interested, that is all.

Q. That is all you know about the cupolas? A. I know very little more than that.

Q. Well, very little more than that? Do you know anything more than that? A. Well, I know they have been in operation for some years, but I don't know anything too much about them, no, sir, I don't.

Q. You have been here since the beginning of 1945, I take it? A. You mean—

Q. Since the beginning of 1945? A. You mean at McKinnon's?

Q. Yes, and back of that? A. Yes.

Q. In this case, we are only interested from January 1st, 1945, and on, in one aspect of it. A. Yes.

Q. And you are around the plant every day, practically? A. Quite a bit of it.

Q. And will you corroborate what the witnesses for the plaintiff have said, that smoke, sometimes dense, sometimes lighter, going from the cupola and from the forge shop and from the beds in the core shop— A. I have seen smoke on occasion pass over in that direction, but it is my opinion and that for the amount of industry going on in the area, there is not much smoke.

HIS LORDSHIP: Now, listen, witness. You are not asked to give an opinion on anything. You are asked a question and just answer the question. A. All right, sir, I will try.

MR. SLAGHT: Q. You have seen smoke, have you, coming from those three sources in your plant and, at times when the wind is that way, blowing over the Walker greenhouses? A. Yes, sir.

Q. And, well, you are the relations officer; you don't know what the content of the smoke is? A. No, sir, I do not, sir.

Q. Then, Campbell, you have told us, is what? A. He is foreman in the maintenance—in the foundry, sir.

Q. And so far as your own knowledge is concerned, this is the only visit before or after the date in question when you went up to peek at the cupolas? A. You mean my only visit?

Q. Yes? A. Oh, yes.

Q. And who in the plant, if anybody, is charged with the duty of inspecting the cupolas and being responsible for their efficiency? A. Well, I would not know, sir. That does not fall under my jurisdiction.

Q. You just got sworn in for the day, so to speak? A. Well, I have been around there for 24 years.

Q. No, but to peek in the cupolas. A. No. Somebody sent me down there. I was interested to see them and I went down to look at them. I have done that many times in our many operations in our plants.

Q. Then, if you have, you have heard that 5,000 pound hammer banging away at night? A. I have heard it on occasion, yes.

In the Supreme Court of Ontario No. 40 Defendant's Evidence Martin Cahill Cross-Examination 5th May, 1949 Continued

Q. Do you live as far away as the Welland House is from the hammers? A. No; I live a little closer than that.

Q. And you hear those hammers at night when you are in bed, don't you? A. I have heard them on occasion.

Q. Well, then, how far away do you live from the hammers? A. Oh, maybe between one-eighth and a quarter of a mile, I would say, from McKinnon's.

Q. Yes. We heard Scott, but he lives right on the premises. Well, you have not been in our greenhouses, I suppose? A. No, sir, I never have.

Q. Well, what does this smoke smell like? We have had different smellers tell us what it smelled like. Take that oil smell that comes out of the forge shop? A. I don't think I could qualify to smell the smoke. I do not think I would have the ability to qualify.

Q. So you would not want to pass on that stuff that comes out of the vents in the core shop, either? A. No, sir, I am sorry, I would not.

Q. That is all. Oh, pardon me. You were not anxious to get up at the cupola, were you? A. No, I was just taking a look at the collector, like the rest of us.

Q. You did not take this photograph, Exhibit 106? A. No, sir, I did not.

Q. Did you attend with the photographer? A. Yes, I did, sir.

Q. Did he move around a good deal to get a good sort of angle? A. No, not to my knowledge. I think it took us a total of about—from the time we went down there for the picture, I wouldn't say we were there more than a minute and a half.

Q. Well, then, was the sun good and bright that morning? A. It was a reasonably bright morning. It was a sunny morning.

Q. Now then, this Exhibit 169A, four photographs of gladiolus, you happened to be down at Dunn's when the photographer took this picture down at Dunn's place? A. That is correct.

Q. And you told his lordship you don't know where they came from, of your own knowledge? A. No, I do not, sir.

Q. Well, that was on the 26th of August, was it? It was the day before the exhibit? A. If I remember rightly it was Tuesday, and the flower show was on Wednesday.

Q. And the next night you went over to the flower show? A. Yes, I did, sir.

Q. And did some one lead you up to these, or did you, in going through looking at the exhibits, run across these again? A. Oh, no. I knew Mr. Dunn had put them in as an exhibit. I went with Mr. Dunn.

In the Supreme Court of Ontario No. 40 Defendant's Evidence Martin Cahill Cross-Examination 5th May, 1949 Continued

Q. Oh, you were a party to getting them in as exhibits, and so on? A. Yes.

Q. Do you know who the judges were? A. No, not now, but I knew at the time.

Q. It might have been a blacksmith? A. Well, if he knew enough about gladiolus, it might have been.

Q. Well, I am wondering how a man can just see a man take photographs one day and go over to a flower show the next day and come up to Court some months after and say that the flowers he saw in the show were the flowers photographed? A. Well, I think I can identify them. I think I can tell by the way they were set up and the pictures that were taken.

Q. Perhaps you are relying on the vases to some extent. Did they take the same vases over from Dunn's to the flower show? A. Well, I mean I would not be prepared to argue the fact. I think probably other witnesses will verify the fact that these were the flowers.

Q. That is what I thought. May I take it from you that, while you think these are the same, that you would not be prepared to pledge your oath positively if you were to be questioned about them? A. Oh, no, I would not do that.

Q. That is all, thanks.

—Witness excused.

—Whereupon Court adjourned until 10.00 a.m. May 6, 1949.

Friday, May 6, 1949, 10.00 a.m.

MR. SLAGHT: My lord, I find that Mr. Ure, the surveyor, was out of town yesterday and will be away until Sunday, but he will be here Monday and Tuesday, so that will explain why I am not very promptly getting that task done.

HIS LORDSHIP: That will be satisfactory.

In the Supreme Court of Ontario No. 41 Defendant's Evidence James Horne Examination-in-Chief 6th May, 1949

JAMES HORNE, sworn,

EXAMINED BY MR. KEOGH:

Q. Mr. Horne, you are the group leader of the plumbers in the maintenance department at the McKinnon Industries? A. That is true.

Q. And that is in the maintenance foundry division? A. The foundry division only.

Q. And you have been so employed since what date? A. May 10th, 1941.

Q. Then, did you have anything to do with the cupola stacks until the month of April, 1945? A. No, nothing at all.

Q. Then, from and after the month of April, 1945, you did have something to do with the cupola stacks, did you? A. I did.

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Q. And from that time on what responsibility were you given in connection with the water cones in those stacks? A. It was my duty to inspect them every day, twice a day.

Q. And with the exception of holidays and other holidays when the plant was not working, what was the regularity of your inspection since? A. I inspect them around 7.15 in the morning and again in the neighbourhood of 2.30 in the afternoon, every day.

Q. And when you had inspected them, how many of the cupolas were working? A. Three.

Q. And did that condition continue all the time? A. All the time except occasionally at a time when one has been down and it might be two, but that is very, very seldom.

Q. But there was never more than three? A. Never more than three.

Q. There are four cupolas there, are there not? A. Yes.

Q. And have been ever since March, 1947? A. Yes.

Q. What is the fourth one used as? A. It is used as a relief or stand-by in case anything happens to another one.

Q. Then, at first, there were spray nozzles on these water cones in the cupolas, were there? A. The first system, yes.

Q. That was the first system and how did that work at first? A. Well, it worked very well for, oh, I should say a year and a half.

Q. It worked very well for about a year and a half. Then what did you notice about it after the first year and a half of your inspections? A. Well, the odd one or two of the nozzles begin to get plugged up. Some plugged up completely and probably one or two more just trouble on them.

Q. And in that regard, did you have any tool or implement you used? A. Not me, sir. I didn't do that. I could not, when the heat was on.

Q. And your inspections were during the day time, when they were running? A. During the day time only.

Q. Then, when you noticed, as you say, the odd one or two getting plugged up or a little trouble with them, what did you do about that condition? A. I went and reported it to my foreman, Mr. Campbell.

Q. Your foreman is Mr. Campbell? A. Yes.

Q. Then, how did that condition compare on your afternoon inspections, with regard to, say, the morning inspections? A. The mornings they were always running full, very good, and then, towards the end of the day they would begin to plug up.

Q. And when was the new or present type of water flow cone first installed? A. Well, I am not exactly sure of the date, but I would say around March, 1947; March or April.

Q. And on what number cupola? A. No. 2 first, was the first one.

Q. And that would be the second counting from the west? A. The second counting from the west.

Q. And without going into all the details, can you describe briefly the new type of cone which was installed on No. 2 cupola then? A. The new type of cone is a single cone. The previous one was a water jacket cone. This is a single cone and the water sprays through the free flow nozzle from the top and flows down over the edge of the cone.

Q. And have you had occasion to examine that?

HIS LORDSHIP: Excuse me. What do you mean by the difference between the water jacket cone and the single cone? A. Well, on the previous one, sir, with the nozzles in, the water ran down inside the cone and came out in spray nozzles, that is, two of them on the outer perimeter of the cone.

Q. Well, was the cone inverted—that type, was it inverted and the apex down? A. Yes.

Q. And the nozzles? A. The nozzles were on the base of the perimeter of the cone and the water feed went into the top, at the apex of the cone and down inside.

Q. Was the apex up or down? A. The apex was up.

MR. KEOGH: It was sort of two cones joined together, the first system? A. Just like two cones joined together.

Q. And the water ran in between the water jacket—I will bring it out from the foreman who can describe it better. It was like two cones joined together, the water jacket being between the two of them.

HIS LORDSHIP: Well, one was inverted.

MR. KEOGH: No, both the same. Just like two paper cups, one over the other, only a little bit apart.

HIS LORDSHIP: Oh, I see. But the apex up on both. Well, then, the nozzles were around the base? A. Yes.

Q. And the spray spread up? A. They were joined together and the spray was out of the nozzles around the base. They were joined together at the base to make the container, you might call it, of the water jacket, so the container part was in between the two cones.

Q. Well, would the fumes pass between the two cones? A. No, sir, passed at the bottom and shot out a stream of water, just like a big fan-shaped stream of water, and they overlapped each other, and the fumes passed through that spray.

Q. Well, what function did the cones perform? A. Well, sir, the cone was merely a means of putting the water down into the spray nozzles. It was just like a water jacket.

Q. Well, I am getting a hazy idea of it; probably get it later on.

MR. KEOGH: Q. Then, on the water jacket system, the inside or lower cone was the one that the flames and smoke hit when they were coming up through the cupola? A. Yes, and then they were forced out through the water.

Q. And into maybe just the one cone? A. Into maybe just the one cone.

Q. And on the present system, with just the one cone, where do the flames and smoke coming up out of the cupolas hit? A. They hit just the same way on the underneath side of the cone, and they are forced out through this wall of water.

Q. They hit the underneath side of the single cone and then are forced out through this water? A. Yes.

Q. Now, you started to tell us about the flow nozzle, about the apex of the present cone. Are there two feed pipes leading into that? A. Two feed pipes.

Q. And that is where the water comes from into this flow nozzle? A. That is where the water comes from.

Q. And are those pipes off centre, or on centre? A. They are off centre.

Q. Where they enter the nozzle about the apex of the cone? A. Where they enter the nozzle, about the apex of the cone.

Q. And what effect has that off centre on the flow of water on to the cone? A. Well, that gives the water a whirling motion, one going this way and starts whirling around, and it comes out of the nozzle in just a big whirl.

Q. It gives the water a whirling motion around the apex of the cone? A. Around the apex of the cone.

Q. Then, from the time that this new system was installed on the cone in No. 2 cupola, how has it worked? A. Worked perfectly. Never had a minute's trouble with it.

Q. And you say you have inspected it twice a day on each day that that cupola was operating? A. Yes, sir.

Q. And how has the flow of water over that cone in No. 2 cupola appeared to you, on each of those inspections? A. Just as it was always; a perfect flow of water all around it.

Q. Then, later on, the cones in the other two cupolas were, or the other three cupolas were changed to the present system? A. They were changed to the present system.

Q. Do you know the dates of those changes, or ought I to get that from somebody else? A. No, sir. I couldn't give you the dates.

Q. But they are all on that same system now and have been for some time? A. Yes, sir.

Q. Can you say how long? A. Well, in the neighbourhood of two years.

Q. Then, did you inspect the water cones in the cupolas on the afternoon of Monday, March 14th, of this year? A. Yes, sir.

Q. And at what time did you make that afternoon inspection, that day? A. 2.30.

Q. And what time did you finish it approximately? A. It takes me about ten minutes to make an inspection; go up there and down again.

Q. And what time did you come down from the roof, having finished your inspection? A. Oh, approximately 2.30, probably 2.45.

Q. And when you came down from the roof, did you see anybody around the No. 4 cupola? A. Yes, sir. I saw an inspection party standing in front of No. 4 cupola; I saw yourself and that gentleman with you and Mr. Walker—oh, several. I just don't remember who they all were.

Q. I see. And what were the cupolas that were operating that day? A. 1, 2 and 4.

Q. And in the course of your afternoon inspection that day, did you inspect the water cones in all of these three operating cupolas? A. Yes, sir.

Q. And how was each of them working when you saw them at that time? A. The flow of water over the cones was perfect.

Q. And does that apply to each cone? A. To each cone.

Q. And that as between 2.30 and 3.00? A. Between 2.30 and 3.00.

Q. And what about the water curtain as it left the bottom of the cone? A. You cannot see the water curtain in the day time, sir.

Q. Why is that? A. Well, you have got to lean right over the cupola and the heat would burn you up in a few seconds.

Q. On that same day, namely, March 14th, 1949, did you make an inspection of the water cones about 10.30 a.m.? A. Yes, sir. I was told by my foreman there was going to be an inspection.

Q. Don't say what you were told, but you learned there was going to be an inspection? A. I learned there was going to be an inspection.

Q. And as a result of that you made an extra inspection that morning? A. I made an extra inspection that morning.

HIS LORDSHIP: Q. You were getting ready for the inspection? A. Well, I wanted to be sure, your honour, things were right.

MR. KEOGH: Q. And you did make an extra inspection that morning of the water cones, at 10.30 a.m.? A. Yes, sir.

Q. And that was of the three cupolas that you have already told us were operating that day? A. Yes, sir.

Q. And how were they working when you saw them at 10.30 on March 4th, 1949? A. They were working perfectly. I never saw them any other way.

Q. Then, on the following day, Tuesday, March 15th, did you make your usual morning and afternoon inspection? A. I did.

Q. Of the same three water cones? A. Of the same three.

Q. And how were they working at each of your inspections on the morning and afternoon of March 15th, 1949? A. They were working well.

Q. And what about the flow on each cone? A. The full flow over each cone.

Q. And have you conducted those inspections, those morning and afternoon daily inspections, for how long since? A. Every day—every working day that the cupolas were operating.

Q. And how many days in the week have they been operating, say in the last six months? A. Five days a week, except occasionally when they probably would be down one day.

Q. Well, there might be a holiday, like Good Friday, or something like that? A. Yes.

Q. But with the exception of holidays, they have been running five days a week for the last six weeks? A. Two weeks ago, or the week before the grey iron cupola was down. They didn't work on Friday.

Q. They didn't work on the grey iron cupola last Friday? A. Not last Friday, I think the Friday before.

Q. But apart from that, generally speaking, they have been running five days a week? A. Five days a week.

Q. And do the cupolas work all night? A. No.

Q. And on your inspection since, have you detected any trouble with the flow of water on any of these cones at any time? A. None whatever.

Q. Then, what is your practice regarding inspections on Saturday mornings? A. On Saturday mornings I am able to get right inside the cupola on top of the cupola and inspect the water cones.

Q. That is because it is shut down? A. Because it is shut down and cold.

Q. You say you were able to get in and inspect the water cones. What do you do in that regard? A. Well, I turn on the pumps, start the water flowing, then I go up on top and I climb up on the rim of the cupola and I can look all the way around it. I can walk around it.

Q. You walk all the way around it? A. I walk all the way around it and inspect the water flow.

Q. And is there any difficulty about seeing the water curtain then? A. Not when it is cold, but you have got to climb up on top of the cupola to see it.

Q. And for what length of time have you made those Saturday morning inspections? A. I have always made them.

Q. And on any Saturday morning inspection—first of all, have you ever detected any unevenness or incompleteness in the flow of the water to any of these cones? A. No, sir, I have not.

Q. And have you ever detected any cuts or unevenness in the water curtain as it leaves the base of the cone? A. No, I have not.

Q. Then, what do you do about changing the other cupolas for the following week? A. Well, if I know there is going to be a cupola changed, and I am notified by my foreman—

Q. Then what do you do? A. Then, I change the valves.

Q. You change the valves on the water system? A. I change the valves on the water system.

Q. If you knew the cupola that is going to be used the following week? A. That is right.

Q. And you shut them off on one of the old ones? A. That is right.

Q. According to your foreman's instructions? A. That is right.

Q. And when is that done? A. That is done on Saturday morning.

Q. Before or after making the inspection you have just told us about? A. After I have made the inspection.

Q. Then, do you do anything else in connection with the changing over of the cupolas Saturday morning, for the following week? A. Well, not in connection with the water flow, but I have to change the air pressure recorder in the panel room for the cupolas.

Q. You change the air pressure recorder in the panel room. You change that over to the new cupola that is to be operated? A. Yes, and cut it off the old one.

Q. And switch it off the old one? A. Yes, sir.

Q. Was there a recent occasion when you did not make your regular Saturday morning inspection? Did you make it after Good Friday? A. No, I didn't work the day after Good Friday.

Q. You did not work on the Saturday after Good Friday? A. No.

Q. But, with that exception, has it been a regular thing each Saturday morning? A. It has been a regular job.

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Q. Then, you also put soda into the water in this system, do you not? A. Yes, I do.

Q. And your present practice is what, in that regard? A. I put in 100 pounds at 7.00 o'clock, 100 pounds after that is pumped up, 100 pounds at 7.30; another 100 pounds at 9.00 o'clock; another 100 pounds at 12.00 o'clock; another 100 pounds at 2.30.

Q. That makes a total of 500 pounds. Did you ever put more than that in in any one day?

MR. SLAGHT: I did not hear that answer.

MR. KEOGH: Q. Will you give me those times and quantities again? A. 100 pounds at 7.00 o'clock; 100 pounds at 7.30; another 100 pounds at 9.00 o'clock; 100 pounds at 12.00 o'clock; and 100 pounds at 2.30.

Q. And that makes a total of 500 pounds? A. Yes.

Q. Did you ever put more than 500 pounds in in a day? A. Oh, yes, sometimes.

Q. What does that depend on? A. Depends on the report we get from the metallurgist as to the condition of the tank. If it begins to show too close to the line or even a little acid, I immediately put another 100 pounds of soda acid in the tank.

Q. And you then, you said, pump it up. Would you explain how you pump it up? A. Well, I mix it in a tank, oh, approximately four feet by three, and maybe three feet deep, and I can put it in there and eject the water by pumping, as it is alongside the tank; start the pump and the water running and the pump will pump it from one section of the tank to another, where that is baffled off, and it ejects this soda; makes it a far better mix.

Q. You are speaking of a small mixing tank you have on the ground floor? A. Yes.

Q. And you have a pump connected with that? A. Yes.

Q. And after it is mixed up, the pump pumps it up to a large settling tank which is somewhere between the floor and the ceiling, approximately? A. Yes.

Q. Now, have you always followed that mixing procedure of putting soda acid in the water, in this water in the water wash settling tank? A. Not always.

Q. What was the first procedure? A. The first procedure we used to take the box up to the big settling tank and sprinkle it in by hand.

Q. That is in the form of powder? A. In the form of powder.

Q. And for how long did you continue sprinkling the sprinkling procedure? A. Oh, probably two or three months.

Q. And why did you change over to the mixing, the present procedure? A. We thought it was taking too long that way for the soda acid to dissolve and some of it would settle at the bottom and wouldn't dissolve at all.

Q. So that is why you have used the mixing procedure in the small tank, since? A. Yes, sir.

Q. Now, how soon after the water spray cones were installed was soda acid first put in their water system? A. Oh, it would be a matter of two or three weeks; probably a month.

Q. And during that two or three weeks, or a month, had you noticed anything about the pipes, or any place in the water system? A. Yes, sir, I noticed a corrosion starting.

Q. Corrosion starting where? A. On the thread of the nipples and particularly at the inlet of the pump.

Q. And did you report that corrosion to anybody? I don't want to know what you said, but just the name of the person, if you did report it? A. I reported it to Mr. Bryer; he was assistant at that time to Mr. Campbell.

Q. Mr. Campbell is your foreman? A. Mr. Campbell is my foreman, yes.

Q. Then, after you made that report, did you subsequently receive some instructions? A. I received instructions to begin putting soda ash into the tank.

Q. And it was after you made that report that you were instructed to begin to put soda ash into the tank? A. Yes, sir.

Q. And you have continued that practice ever since, have you? A. Ever since, yes, sir.

Q. Then, I just want to ask you one other question. The spray from the nozzles—I am going back now to the nozzles, the flows which you said you ran each Saturday morning when you turned on the water system of the cupola when it was not running, the spray from each nozzle extends out in what direction, or distance on each side? A. Oh, in a fan shape, probably at the widest part would be probably a foot or 18 inches.

Q. A foot or 18 inches at its widest part, and where do the sides of it go with reference to the spray from the adjoining nozzle on each side? A. Well, it all overlaps.

Q. What I want to ask you is, you have spoken of the occasional nozzle being plugged, or a small drip. If you have that condition, what do you say about the spray on the nozzles on each side? A. Well, they would just overlap if there wasn't too many all in a section altogether.

Q. If you had one? A. If I had one, there would be still quite a big overlap.

Q. Your witness.

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CROSS-EXAMINED BY MR. SLAGHT:

Q. Mr. Horne, let me check with you about our dates. In the beginning of 1945, that was January, the chain system was in vogue? A. Yes, sir.

Q. And I think then you have told me that it was running along until April. And what happened in April, 1945? A. In April, 1945, that was switched over to the new water-wash system.

Q. And then they took out the chain system and in April, 1945, put in the new water-wash? A. Yes, sir.

Q. And that, you say, worked pretty well for one and a half years? A. Approximately.

Q. Yes.

HIS LORDSHIP: Excuse me. Did you put in the water-wash system in all the cupolas, in April, 1945? A. Well, I couldn't answer that, sir, just as to when they were put in, but they were approximately around that date.

Q. It was installed in all the cupolas at the same time, was it? A. The three cupolas, yes. There was only three used.

Q. Yes, all three installed at the same time? A. Yes.

MR. SLAGHT: Q. So that that carried on, if you are right about the time, one and a half years, approximately, till about October, 1946? A. Approximately.

Q. April, 1945, till October, 1946? A. Yes.

Q. And the reason I understand why this system was taken out and the present system put in, was because the nozzles were clogging; what you called the nozzle, the little holes were clogging? A. yes, sir.

Q. And we have been told that the water in the tank was dirty to the extent that it had sediment in it—the water in the tank? A. In the big fly-ash tank?

Q. Yes? A. Why, the water brings the dirt back with it.

Q. Yes. That would be the reason; the water brings back to the tank such dirt as the water was able to collect out of the fumes going through? A. Yes, sir.

Q. I quite understand that. And that was a 5,000 gallon tank, wasn't it, or thereabouts, or do you know the dimensions? A. I don't know the dimensions. I never measured it.

Q. Then, we won't trouble you about that. And Mr. Reginald Williams was there in 1945, from January along through October, you remember? A. I remember Mr. Williams, yes.

Q. And Mr. Williams told us a few days ago in Court here in the witness box, that the nozzles — seemed to me they must have had pretty small nozzles, those small holes were clogging during his time there, part of his time, with dirt from the tank particles, from the dirty water; that would be true, would it not? A. Just when was that date, sir?

Q. That was from January of 1945 to October of 1945, and when Mr. Williams left and went to another company? A. I don't recollect of any plugging during that period.

Q. You don't recollect that? A. No.

Q. Well, will you say Mr. Williams was wrong about that, or could he be right about that? A. Well, I am not prepared to say about Mr. Williams.

Q. No. It is some few years ago. At all events, that is what he told us, and he told us that the reason they changed, he understood was improved later — well, I cannot put that to you, because he was not there. Now then, there was, though, — and you had noticed plugging from the particles in the dirty water? A. Well, most of the plugging, sir, that I have seen, and I don't see very much because I don't clean them, but I have taken the odd one and it was more of a scale.

Q. More of what? A. Scale.

Q. Somebody said slimy water, but whether it was a scale or a slime or a sediment, it caused the little openings to plug? A. Yes, sir.

Q. And I suggest to you that that was the reason that it was ultimately taken out and changed to the present system? A. I wouldn't like to say why it was taken out.

Q. Well, did you tell me just now that it was not your job to clean the holes, or to clean them out? A. No, sir.

Q. That was some other workmen that used to clean the holes? A. Clean them out when the cupola was dirty.

Q. So that they would run better the next shift? A. Yes, sir.

Q. Then, you told us that the present type was first put in in March or April, 1947? A. Just about that time.

MR. KEOGH: No, that was the No. 4, Mr. Slaght.

HIS LORDSHIP: That was the first one.

MR. KEOGH: No, that was the last one.

MR. SLAGHT: No, the present type was first put in in March, or April, on No. 2, first in 1947.

MR. KEOGH: I beg pardon. That is right.

HIS LORDSHIP: He said he was not sure when they completed it.

MR. KEOGH: No. 4 was also built then.

MR. SLAGHT: So you were having trouble, at all events, from the scale, as you put it, or by the particles that were in the water which was used over again from October, 1946, until about March or April, 1947? A. Yes.

Q. And who did the cleaning out of these little holes during that period? A. Mr. Wilcox. He was the night man.

In the Supreme Court of Ontario No. 41 Defendant's Evidence James Horne Cross-Examination 6th May, 1949 Continued

Q. The night man cleaned the dirt out of the holes, and may I take it, then, that it was working not too well in that interval because of the blocking that occurred and having to be cleaned? A. In the afternoons it got so it got blocked.

Q. In the afternoons, yes, and the water would be used over and over again? A. Yes, over and over again, except there is quite a change of water in the tank. We have got fresh water flowing into it all the time.

Q. But there was dirty water in the tank all the time? A. Oh, absolutely, yes, sir.

Q. Because that is what Williams told us; it was dirty all the time. And then the new type, as you explained, the water comes in now in two little pipes, one from each side? A. Yes, sir.

Q. And they are staggered? A. They are staggered.

Q. Give me the dimension of each of the two pipes? A. Three-quarters of an inch.

Q. So you have two pipes of three-quarters of an inch diameter bringing the water in there? A. Yes, sir.

Q. And then, I am interested in this, Mr. Horne. Take a day when it is sultry, and there is no wind at all, I am told that there is a blower down below to accelerate the draught up there? A. Yes, sir.

Q. And that is a very high draught? That is, it comes up, I am told, or escapes from the top at the rate of about 8,000 cubic feet per minute. You would not know the figures? A. No, I wouldn't know that.

Q. But it is a terrific draught up there, is it not? A. It is.

Q. And a terrific heat inside the cupola? A. Yes, sir.

Q. And on a day when there was not wind — we will come to March 14th in a minute — on a day when there was not wind, there is a terrific heat? A very heavy tonnage of coke, the cupola is heated up itself after an hour or two, and that is going up there at a very high rate from the blower. Is that right? A. Yes, sir.

Q. And that heat is terrific, I suppose? A. It is.

Q. It has to be, because it has got to melt the iron down there into a molten mass. Now then, on a day like that, when there was no wind to push that smoke on the six foot outlet of the chimney aside, how can you look down the chimney? A. I said I could not look down the chimney. I stand back on the cat-walk.

Q. And standing back on the cat-walk and making your inspection there, standing back, what would you see? What part of the cupola would you see? A. See nothing practically but the very top opening of the cupola and the cone.

Q. And the cone. And does the cone come up above the top of the cupola? A. Just about even with the top.

Q. And if the cone is just about even with the top, — by that I suppose you mean the water pipes run in just about even with the top? A. Just about three or four inches higher than that.

Q. Now then, standing on the cat-walk you could, on a day like that, you could see the outlet of water from the end of the two pipes, could you, or did they turn and have a pipe go down? A. Well, the nozzle itself faces straight down. There is just one opening.

Q. But do the two pipes from the opposite sides, join together up into a nozzle and go down? A. They join on each side of the nozzle. The nozzle itself is a square block.

Q. And one goes on one side and the other on the other, and they get to revolving there, you told us?

HIS LORDSHIP: A little swirling, not revolving.

Q. Yes, swirling is the term I should have used. Now, that little block is down how far? A. Oh, it is just a hollow block, about that wide and that deep.

Q. About three inches? A. Approximately. I just don't know. I never measured it.

Q. And it therefore leaves a space. If we could put a ruler across the top of the six foot chimney there, put the ruler right across the top, the little bottom of the block that the water comes out of would be how close to the ruler or imaginary line across the top of the chimney? A. Oh, it would be almost even, I would think.

Q. I would think so, from the way you are telling me. That is, the pipes come in within a few inches; the block is three or four inches, and then when it is down it is almost even with a line, or if we drew a string across, or put a six foot ruler across the surface of the cupola, the block would be about even with that? A. About even.

Q. Now then, you, standing on the cat-walk, could not see anything below the level of the block? A. Oh, yes, sir.

Q. You could? A. I could. I could see about three-quarters of the cone. You see, the top of the cupola is only about, — I imagine something like that, on me (Indicating).

Q. Oh, yes, but you are standing to one side and the smoke is coming up? A. Yes. Sometimes there is no smoke. If the wind is not from the west or the southwest, I can stand right close up to it and in front of it.

Q. But there is terrific heat coming out of there? A. And the heat is diffused to a certain extent. It hits the inside of this cone and passes through the water.

Q. And at times there is gas and smoke coming out of there? A. A certain amount, yes.

Q. And I suggest to you that, with that condition, and you having to throw your face back — how close could you have your face to that awful heat and blast that was coming straight up, six feet wide? A. Well, that blast is not going all the time, sir.

Q. No, I know it isn't, but I am taking a day when it is going all the time. It is going all the time the cupola is running, isn't it? A. Oh, no.

Q. It is not? A. No, sir. I would say it is going the majority of the time, but there are times when it is shut down.

Q. Oh, well, never mind the shutting down now. I mean when it is running? A. I mean during the day, when the cupola is running, the blast is shut off.

Q. When the cupola is running the blast is shut off for some little period of time? A. Yes, I don't know how long.

Q. But if the blast is on and you are standing there at the time, you are trying to inspect something, how close can you come to that heat and blast with your face? A. I can stand right close, like this (indicating).

Q. I mean, you are serious about that, are you? A. Yes, sir.

Q. Here is a terrific heat wave going straight up in the air, — that is a day I mean, there is no wind this day, going straight up in the air and you are telling us you can put your face within six inches of it? A. Oh, no, it would not be six inches.

Q. No, well, how far back would you have to be? A. About two feet away, probably.

Q. And I suggest you would have to be further than that. You could not get your face within two feet, surely, of that heat going up at that terrific rate, could you? A. Yes, sir.

Q. You think you could? A. Yes, sir.

Q. And then, being two feet with that heat pouring up there in front of you, such inspection as you made on days like that, would you try and have your eyes tight on the part of the cone you said you think you could see, about halfway down? A. About halfway down, yes.

Q. And you therefore, on a day like that, could not see the bottom of the cone? A. No, sir.

Q. So you would not know on a day like that to what extent the water was coming off the bottom of the cone? A. No, sir, I would not.

Q. So far as your visible looking at it would be concerned? A. That is right.

Q. Now then, on March 14th, we have been told there was quite a wind so that you could get up and look right down at the cone? A. Fairly well, yes, sir.

Q. And you say, or did you see some of the gentlemen climb up the ladder and look down? A. No, sir, I didn't.

Q. You didn't happen to see that? A. No, sir.

Q. Well, where were they when you did see them, if at all? A. They were standing in front of No. 4 cupola, down on the ground floor.

Q. They had not mounted to do their inspecting? A. No, sir.

Q. And where were you? A. I was coming down from making my inspection.

Q. So that if that sequence is right, they apparently climbed up to make their inspection after you had come down? A. Yes, sir.

Q. You are pretty clear about that? A. Yes, sir.

Q. Did you make any daily or weekly reports on the condition of the cone? A. I make a daily report on the way the water is flowing over the cone.

Q. How would those reports read? You don't make them in writing? A. No, sir, I just report them to my foreman.

Q. You report to Campbell, do you? A. Yes.

Q. What would you say to Campbell on a day that it seemed to you it was going all right? A. I would just tell him the water flow was working fine and the flowing was all right.

Q. Yes, and then were the gentlemen who were there in the party, wherever you saw them on the ground floor at No. 4 cupola, were they where they could have seen you come down? A. Oh, I passed right by them.

Q. Then, tell me, you cannot see the chain water curtain, of course? A. No, sir, not while she is running.

Q. So nobody's inspection could ever see the water curtain while the heat is on and while the cupola is in operation? A. No, sir, they could not.

Q. But when they are shut down on a Saturday and you climb up inside, then you can see the bottom of the cone? A. Yes, sir.

Q. But on your inside visits to the cone, they were never in operation. I mean, that goes without saying; a man could not live in there? A. No, you could not.

Q. So when you say inspection each day, you mean inspection of the top that you are describing, that you do such digging as you can do — I don't use that word offensively at all, such looking as you can do, having regard to what the conditions are of the blast coming out of the top of the chimney? A. Yes, sir.

In the Supreme Court of Ontario No. 41 Defendant's Evidence James Horne Cross-Examination 6th May, 1949 Continued

Q. Then, something was said about changing the water in the tank. There is water running off and into the tank all the time, is there? A. Yes, sir.

Q. Do you know the volume of it, either way? A. No, sir, I do not.

Q. But it is not sufficient to take the particles of dirt out of the water which are there, because it is used over again in the water? A. It is screened three times, of course, in the tank.

Q. And you get pretty heavy —— A. Well, I wouldn't know that, because I don't clean it out at night.

Q. That is not your job. All you know is that the water is dirty. You called it something? A. Scaled.

Q. And that is the condition, use the water over again. Having regard to the long period of time they operated the old system, from April, 1945, until March or April, 1947, when they took the nozzle system out, what do you say as to whether or not, if the company had seen to it that clean water instead of used water had gone through the nozzles, it would have not got plugged, would it? A. Well, the inside of that cone forms a certain amount of rust, and what I saw, I thought that is what it was; it was the rust from the inside of the cone.

Q. Yes, but you have told me about particles in the water in the tank? A. Yes, but I don't know whether that went through the screens or not.

Q. Yes. You wouldn't know, and it was not your job. There was a young man who had to clean whatever was clogging the tank. That is all.

In the Supreme Court of Ontario No. 41 Defendant's Evidence James Horne Re-Examination 6th May, 1949

RE-EXAMINED BY MR. KEOGH:

Q. You spoke about scale. Do you know where the scale comes from? A. No, I wouldn't like to say. I don't know where it comes from.

Q. And part of the carbon and the flames hit the bottom of this cone, do they? A. Yes, sir.

——Witness excused.

In the Supreme Court of Ontario No. 42 Defendant's Evidence Cecil Wilcox Examination-in-Chief 6th May, 1949

CECIL WILCOX, sworn,

EXAMINED BY MR. KEOGH:

Q. Mr. Wilcox, you are employed as a plumber in the maintenance department at McKinnon's? A. Yes, sir.

Q. And you are in the maintenance department, foundry division, is that right? A. That is right.

Q. And you have been employed by that company for the last — how many years? A. Six and a half, approximately.

Q. And for how long of that period have you been on the foundry maintenance work? A. About four years.

Q. For the last four years? A. Yes.

Q. Were you in the foundry maintenance department in April, 1945, when these water cones were first installed on three of the cupolas? A. I was, yes.

Q. And the first system was spray nozzles around the bottom of this double cone? A. That is right.

Q. And I don't want you to say in detail, but what responsibility were you given in connection with that? A. I was to inspect them every night and to clean them out to see that they were all right.

Q. You were to inspect them and see that they were all right, and clean them out? A. That is right.

Q. And then, what was your procedure under the first system of the spray nozzles, as to inspection? A. I used to, about 6.30 every night, I would start my pumps and go up top — maybe I am a little ahead of myself there. Start the pump tank first at 6.30.

HIS LORDSHIP: Q. You mean to pump it out? A. Yes, the ash tank, I cleaned that first, and then I went up first and make my inspection. After it was filled up, got in and looked at all the spray heads. If there were any plugged up there I put a wire through them and opened them.

Q. Through every one of them? A. No, just the ones that were stopped.

MR. KEOGH: Q. And how many did you find that were stopped? I mean, when did you start finding that condition, and how many? A. I had no trouble very much the first year and a half, about that; very little trouble.

Q. And then after the first year and a half, what did you notice? A. Well, I begin to find they were stopping up quite a few of them, you know. I could clean them out with a wire as a rule, but the odd one would get stuck.

Q. Now, it is this wire I want to get first. You could clean them out with a wire, some of them. What was your procedure on that? A. Well, just put this wire right through the hole in the nozzle, poke away back and forth.

Q. And some of them you say you could clean out that way? A. Generally I could.

Q. And how many after the first year and a half? A. Well, there would be, maybe, oh, seven or eight, you know, at odd times, and I would take the whole works out there.

In the Supreme Court of Ontario No. 42 Defendant's Evidence Cecil Wilcox Examination-in-Chief 6th May, 1949 Continued

Q. There might be seven or eight odd times that you could not clean with the wire? A. Yes.

Q. Then you would take them out, would you? A. Yes.

Q. And then you said something about taking the whole works out. What do you mean by that? A. There is 62 in the cupola and I took the whole thing out and come down and start up the pump and I would get in there and get a rod and go through every hole and stir it up and the scale and that and let it all flush out and go up and stop the pump and put them in again.

Q. This was scale inside of the water-jacket, was it? A. Yes, sir, inside the water-jacket.

Q. Which would be inside of the nozzles? A. Inside of the cone. It would pile up in front of the nozzles was the reason that the nozzle wouldn't work. The scale would pile up in front of the nozzles.

Q. When you say in front of it, do you mean behind it? A. I guess that is the right word, behind it.

Q. Inside where the nozzle was inserted? A. Yes.

Q. This scale, you say, would pile up in there? A. That is right.

Q. And do you know what caused this scale? A. I think it was the heat from the cupolas, you know, that forms the scale inside. Well, it was hard to get out, you know.

Q. And then, as you say, you would turn on the system, take all the nozzles out, poke it up with the rod and try to flush it out? A. Yes, until every one was running free.

Q. And how successful was that procedure of flushing it out? How much did you flush out that way, by opening up all the holes in it? A. I couldn't give you any estimate of how much come out, but it worked good.

Q. I mean, what was the effect of it, as far as the nozzles were concerned, when you put them back in? A. Oh, it would be good just for a week.

Q. And how often did you do that flushing out business, poking with the rod, as you have said? A. Well, after the first year and a half, approximately, I would do it every week, to each cupola.

Q. Then, any nozzles that you had to take out, that you could not poke out with the wire by putting it in as you have told me, what was your procedure about them? A. I had spare ones. I installed spare ones and took the others down and cleaned them in my spare time.

Q. Then, was that the procedure that carried on up to the time the water cone system was changed? A. Yes.

Q. And I don't suppose you can give us the exact date but take, first of all, the No. 2 cupola. Can you tell us about when the cone system was changed in No. 2 cupola? A. That was in 1947, I think; early part of 1947.

Q. And we have had it described briefly by the last witness. Is that the general description of it? A. Yes, that would be right.

Q. And then, did you continue your nightly inspections of the new system? A. Yes.

Q. And have you had any difficulty with the new system from the various dates on which it has been installed in each of the cupolas? A. No. I have had no trouble whatever with the new system.

Q. Do you know the date at which it was installed on the other three cupolas, approximately? A. No, I don't. I couldn't say.

Q. And then, what inspections have you made of the present system, that is the flow system? A. I make an inspection every night, — possibly every day, night, as a rule.

Q. You say you pump the tank out first. We will come to that after, but your inspection, you go up to the top, do you? A. I do, yes, sir.

Q. And when you go in, what is the first thing you do? A. I generally pump the tank first.

Q. I know, you told us that, but I mean as far as your inspection is concerned. Is the water shut off, or is it not, when you go in at 6.30? A. Oh, no. I start the pumps. I can do that from below, on the ground floor.

Q. And then you go up to the top of each cone on the cupola? A. Yes.

Q. And then you inspect each one, do you? A. Yes.

Q. That had been working that day? A. Yes, sir.

Q. And do you look at the cone's flow of water? A. Yes, I do.

Q. And how many nights a week do you make this inspection? A. Every night except Friday night, I am generally alone. There is no man on the later shift. I have other work to do and I don't generally have time.

Q. You don't do it on Friday? A. As a rule I miss Friday night.

Q. Do you do it on Sunday night or Saturday night? A. No. I don't work Saturday or Sunday.

Q. So that you do it on week nights other than Friday and Saturday and Sunday? A. Yes.

Q. And at that time of the night, it is about what time? What hour of the clock when you make that inspecion? A. Oh, it would be 8.00 o'clock; possibly between, I would say, 7.00 and 8.00; sometimes the time varies.

Q. And how long have the cupolas been shut down then? A. Well, I really don't know just what time they shut down in the afternoon. I am not there.

Q. But are they cold or hot when you make this inspection? A. Oh, there is quite a bit of heat coming up, all right.

Q. Still a bit of heat coming up, but does it interfere with your inspection? A. No, I can get in there.

Q. You get inside? A. Yes, I can.

Q. In the course of this inspection? A. Yes.

Q. And how many nights a week do you do that? A. Four nights a week.

Q. And, as you said, you turn on the water downstairs and then, what sort of examination do you make of each cupola? A. This new system is very easy. All you have got to do is get up on the cupola and you can see all around on the edge of it.

Q. You can see all around what? A. All around the cone.

Q. And can you see the flow of water in the cone? A. Oh, yes, that is very plain to see.

Q. And the water curtain around the bottom? A. Yes.

Q. And on any of your inspections, what difficulty or lack of efficiency, if any, have you noticed, first of all, about the water flow and secondly, about the water curtain? A. Firstly, about the water flow, it could not be any better, I don't believe, and the curtain, if there is a good flow coming from the flow, there has got to be a good curtain.

Q. I don't want you to argue, but how has the curtain appeared to you on your inspections? A. Very good.

Q. Have you ever noticed any unevenness or lack of completeness about it? A. No, I did not. I never noticed any.

Q. And at the time of these inspections, of course, four nights on each week, is there any smoke to interfere with your inspections? A. No, there is no smoke whatever.

Q. Then, did you or did you not make your usual inspection on the night of Monday, March 14th, of this year? A. I did, sir.

Q. And was that the same sort of inspection that you have told us about already? A. Yes.

Q. And what did you observe about the water cones on the cupolas that night? A. They were all right as far as I could see; just as good as ever.

Q. And was your procedure the same as your other inspections that you have told us of? A. Yes, sir.

Q. And what about the water curtains on the cupola cones that day? A. They were all right.

Q. Then I will take you back now to the emptying of the sludge tank in connection with the water system. It has been referred to by various names as a sediment tank, a settling tank, a sludge tank. It is all the same thing, isn't it? A. Yes, that is right.

Q. What do you do about that when you first go to work each evening? A. I go up and open the valve on the sludge pump and start it. It pumps down a little bit and when it gets down below the dividing partition between the other compartments, then I start my circulating pump and we have air also while we are pumping with the sludge pump, we are circulating and getting air going in it and stirring up the sediment in the bottom of the tank by taking the sludge pump, which has a greater capacity than the others, you see, and I have all the sediment all cleaned out.

Q. You said the sludge pump, or the discharge pump, has a greater capacity than the others. What do you mean by that? A. Well, with the free flow of water.

Q. What are you referring to by the word "others"; changing the overflow that is running in? A. That is the circulating pump. I am running that and the other water that is running in, this sludge pump will take care of that.

Q. Then, you get the sediment out in that way and then do you do anything else when you get the tank drained down a little further? A. We have a hoe that we stir it up a little further with, too, and then, circulating, we bring it towards the suction pump on the switchboard; the suction level.

Q. You bring it toward the pump which discharges or gets it down through the sludge pipe? A. Yes, sir.

Q. And then have you an air hose there? A. We have an air hose that we play around in the tank with to push it around all over the bottom, and stir it up.

Q. You say you play your air hose around the tank? A. Yes.

Q. On the rest of this sediment? A. Yes.

Q. And then, what is the final result of all that procedure? A. Well, by the time the tank is empty, we always have it clean. Then, there is nothing left.

Q. There is nothing left in the tank? A. No.

Q. That is in the way of this sediment? A. In the way of sediment.

Q. Then, during all this time, is this overflow of water that you refer to running into it? A. Yes.

In the Supreme Court of Ontario No. 42 Defendant's Evidence Cecil Wilcox Examination-in-Chief 6th May, 1949 Continued

Q. Where does that come from, by the way? A. The electric equipment, transformers, and—

Q. Comes from the cooling coils of this electrical equipment you mentioned? A. Yes.

Q. And it is running into this tank all the time? A. Yes, sir.

Q. And then when you have dealt with the tank in the manner you have described, then, do you do anything more with the tank? A. I just let it fill up naturally with the water from the electrical appliances and I generally go away then for a while and it only takes a short time to fill it and then I make my inspections.

Q. But I mean as far as your general procedure is concerned, that is what you do about emptying and cleaning the tank? A. That is right.

Q. Now, a few nights ago, did you measure the length of time taken by the overflow of the water to fill this tank? A. I did, sir.

Q. How did you measure it? A. I pumped the whole tank dry, every bit I could get out, and then I shut all my pumps off, closed the valves and let her fill up, and I took my time and I let her fill up and I stayed there and watched it.

Q. Let her fill up with what? A. With the free water that was flowing from the electrical appliances.

Q. And you had your watch, had you? A. I had my watch.

Q. And you timed it? A. I did.

Q. And you timed it until it got up to the turn-off valve? A. Till it was flowing out of the over-flow.

Q. And how many minutes did it take? A. 45 minutes.

Q. Your witness.

In the Supreme Court of Ontario No. 42 Defendant's Evidence Cecil Wilcox Cross-Examination 6th May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. Mr. Wilcox, a word about the tank that you have just been speaking of. Did you notice, like Mr. Horne and Mr. Williams, though I suppose you were not here then, that there was a sediment in the tank—in the water of the tank? A. There is a lot of sediment in the end that flows back from the cupolas.

Q. Well, that is natural, because that is collected in the water, at least, it collects a certain part of it and then it brings it down to this tank again? A. That is right.

Q. Instead of running it off, the water that has been through the cone is not run off, but it is run back into the tank? A. That is right.

Q. To use an expression, they use the water over and over again? A. That is right.

Q. And you have an outlet at one end and an inlet at the other, coming in; that is the system? A. Yes.

MR. KEOGH: Excuse me, I forgot to ask the witness where the sludge is pumped to. Perhaps your lordship would permit me to ask that.

HIS LORDSHIP: I think the other witness told us that did he not, but you may tell us now, where the sludge is pumped to.

10 A. It goes down the old Welland Canal, just west of the plant.

MR. SLAGHT: Q. Then, to go back—at least, tell me this: last Sunday were there repairs done to the cupolas by a gang of workmen? A. Last Sunday? I wouldn't know, sir. I don't work Sundays.

Q. They have been repaired recently A. I expect so. There is men working on them. I don't really know what they do, you know.

Q. And when were the men working on them as best you can recall? A. Are you referring to the top part of the cone?

20 Q. Any part of the cupola? A. I don't know, I am sure.

Q. Then, when you say men have been working on them, what prompted you to tell us that? A. I had in mind when you spoke, was the cupola we call them. They repair them, but that is the lower part; that is what I had in mind when you spoke.

Q. When they are not running when you go inside to inspect what do you inspect when you go inside, when the water is not going through? A. When the water is not going through?

Q. I think you told my friend when they are not working you go inside as part of your inspection. What do you inspect

30 when you go inside? A. I look around the cone to see that it is all in good shape, to see that it is not warped with the heat, or such things.

Q. And who adjusts the two spouts at the top that come into the little square box? A. The maintenance gang and the mechanics or welders, the fitters; anything to do like that, they would be doing it.

Q. It would not be your job to make that adjustment if there was anything to be done, it is the maintenance crew? A. Yes, that is right.

40 Q. That is all, thank you.

—Witness excused.

In the Supreme Court of Ontario
No. 43
Defendant's Evidence
James Campbell
Examination-in-Chief
6th May, 1949

JAMES CAMPBELL, sworn,

EXAMINED BY MR. KEOGH:

Q. You are foreman of the maintenance department in the foundry division of the McKinnon Industries? A. Yes, sir.

Q. And, as such, have you charge of the water curtains in the cupola stacks? A. That is true.

Q. And how long have you occupied that position? A. I have been in the position of maintenance foreman in the foundry since 1941.

Q. And before you were on the foundry maintenance, were you on some other maintenance prior to that, in the plant? A. Yes, sir. I was on the general maintenance, excepting the foundry, but for special occasions; special work.

Q. You only went into the foundry for special jobs? A. That is right, sir.

Q. Now, about the early part of 1940, did you do some work on one of the cupolas? A. Yes.

Q. What was the part of it that was in question? A. We had a piece of mechanism that is actually termed the flame arrester; that is, it is its official term, and the supporting lugs on that flame arrester had collapsed.

Q. Just before you leave the flame arrester, was that located on the cupola stack? A. That, sir, is on the top of the cupola stack.

Q. To a layman, would that look something like a cap on top of it? A. May I describe it to a layman, sir?

Q. Yes.

HIS LORDSHIP: This is 1940. We are taking up too much time with the details of things in 1940. There is nothing claimed.

MR. KEOGH: Well, it is not in the period claimed.

HIS LORDSHIP: And there were changes made; a curtain put on.

MR. KEOGH: It may have something to do with my plea of prescriptive right, my lord. It may have something to do with it.

HIS LORDSHIP: Well, direct your mind to the law of prescriptive right, before you take up much time on it.

MR. KEOGH: Well, I think, my lord, maybe I have not altogether the same law, but I have looked it up. I won't be long on this. This was a flame arrester on top of one of the early stacks?

A. Yes, sir.

Q. Do you remember which cupola it was? A. No, I don't think I can do that.

Q. Well, what repair did you make to it? A. The supporting lugs that support that from the cupola had bent and collapsed to this extent, that one spot was lower than the other.

Q. And you fixed one of the supporting lugs? A. That is correct, sir.

Q. Now, at that time was there anything in the cupola stack to arrest or control or wash the smoke coming from the cupola? A. No, sir.

Q. There was just a sort of baffle plate or arrester at the top that the flame or smoke hit? A. Yes.

Q. And they were at the side of them where they went out into the open air? A. That is correct.

Q. Then, were you called on on one occasion to replace the supports of the cap on one of the cupolas supporting the chain curtains? A. Yes, sir.

Q. When was that? A. I believe that would be about 1942, as near as my recollection can tell me.

Q. And how were the chains, the curtains supported? A. The chain curtains, sir, were supported from the outer rim of this flame arrester.

MR. SLAGHT: Well, as to the relevancy of this, I suggest it is not relevant and not admissible, and my friend has no right to put it in, but perhaps the shortest way is to let it go.

HIS LORDSHIP: I think the shortest way is to let Mr. Keogh give his evidence.

MR. SLAGHT: Perhaps it can be received subject to my objection.

MR. KEOGH: We will waste more time. I have only a question about it. Was there anything in the cupola stack at that time to arrest and control the cupola gases that went out into the open air? A. No, sir.

Q. They simply passed through these curtains and chains? A. That is correct.

Q. And were there spaces between the links of the chains? A. Oh, yes.

Q. It was not a solid curtain? A. No, no.

Q. Now, when you were up at that job on the chain curtain, did you notice the roof of the foundry? A. Yes.

Q. And did you notice anything on the roof, any substance on the roof? A. Yes, sir; fly-ash had been dripping downward on to the roof from those chains and the flame arrester and the roof was dirty.

Q. And how did the fly-ash on the roof at the time of the chain arrester compare with the fly-ash on the roof of the foundry since the water curtains were started? A. There isn't anything like that quantity at all, sir.

Q. Can you judge the amount, more or less? A. Percentage, sir? There was 90% and more less than at the time of the chain curtain.

In the Supreme Court of Ontario No. 43 Defendant's Evidence James Campbell Examination-in-Chief 6th May, 1949

HIS LORDSHIP: Well, the effect of the chain curtain was to arrest the fly-ash and drive it really on to the roof? A. Strike it down to the roof, yes, sir.

Q. The effect of the water curtain is to stop it before it gets outside of the cupola? A. That is correct, your honour.

Q. So that there is nothing to drive it down on to the roof in the same sense that it passes through the water curtain and will go out into the air. There is nothing to stop it? A. That will be so.

MR. KEOGH: Q. Then, were the water curtains, that is the nozzle system, first installed in the three cupolas which were then in existence, installed about the month of April, 1945? A. I beg pardon?

Q. Were the first attempt at water curtains installed in the three cupolas then existing about the month of April, 1945? A. Yes, sir.

Q. Do you know the exact dates, or do I get them from some one else? A. That would be engineering.

Q. And that was at that time the three cupolas to the west? A. Yes.

HIS LORDSHIP: Now, Mr. Keogh, on these things, you are going to establish by the proper authorities what was done. Can we just eliminate that? There is a lot of time being taken up by duplication of questions. There cannot be very much contest about such as the date on which the water curtains were established. If we could just get on and have that proved once—I think we must have had it about five times already in this trial, and when you get into a trial that lasts so long, we might duplicate the evidence of something that may not seriously be in issue, and it takes an awful lot of time.

MR. KEOGH: Very well, my lord.

Q. Did you say your men have anything to do with the installation of the water curtains? A. We have the installation of the water curtains, this type.

Q. I am not talking about supervision or inspection. I am talking about whether you actually installed them or not? A. The original water curtains, no.

Q. They were installed by outside men, were they? A. Correct.

Q. You are talking about the original water cone, the spray nozzle type? A. Yes.

Q. As distinct from the present flow type? A. That is correct.

Q. Now, when they were first installed, how did they come to be turned over to you for supervision and inspection? A. It is the practice that the engineering who installs it and is re-

sponsible for the installation, stays with it until such time that they know it is going to work efficiently. After they decide that, it becomes my responsibility to take it.

Q. At any rate, you and the engineering department worked together for a week or so and then you took over the inspection of that after that? A. That is correct.

Q. And then, towards the end of the first couple of weeks or so, did you notice anything about the piping? A. Yes, sir.

Q. What did you notice? A. It was drawn to my attention there was a certain amount of corrosion in two nipples, and I referred that to Mr. McAuley.

Q. Then, as a result of that, did you receive any instructions about soda ash? A. That is correct. We were instructed to put—

Q. Don't say what your instructions were, but as a result of those instructions, after that, did you cause soda ash to be put in? A. We did put soda ash in, yes, sir.

Q. And it appears soda ash has been continued down to the present date? A. That is correct.

Q. Now, one of the plaintiff's witnesses suggested that the water was slimy and that was the reason for the soda ash. What do you say about that? A. That is not so, sir.

Q. What was the purpose of it? A. The purpose of the soda ash is to save our equipment and to prevent it from becoming eaten by acid.

Q. And then, Mr. Horne has described the procedure about that? A. Pretty well, sir.

Q. During the last war did the cupolas operate on the night shift as well as the day shift? A. Yes, sir, sometimes.

Q. And with the exception of the last three or four years of the war, have you operated only on the day shift since? A. In general, yes.

Q. Now, would you give us a little more detail about, first, the type of water cone, that is the double cone with the water jacket. Can you tell us, first of all, how many nozzles there were around the bottom? A. There were 62 nozzles.

Q. And what was the distance around?

MR. SLAGHT: Well, we have had all this.

MR. KEOGH: Q. And what was the distance around the perimeter?

HIS LORDSHIP: We have had the 62 nozzles.

MR. KEOGH: I don't think we have had the perimeter.

Q. What was the distance around the perimeter? A. I am not too sure, sir. I know the nozzles were three inches and something apart; three and some inches apart.

Q. But you do not know the distance—

In the Supreme Court of Ontario No. 43 Defendant's Evidence James Campbell Examination-in-Chief 6th May, 1949 Continued

HIS LORDSHIP: It was six feet in diameter. Let some one figure out the perimeter.

MR. KEOGH: I will prove it by some witness. My instructions are it was 245 inches, the perimeter.

Q. Then, you have had this man, Mr. Wilcox, and Mr. Horne, look after the inspection of the water cones since they were first established, along the lines they have described here? A. That is true.

Q. And they are under your supervision? A. That is true.

Q. And what about the inside of this flow nozzle that is now in use with the two off-centre water pipes leading into it? What is the shape of the inside of that nozzle? A. There is a dome and it is flared against the base of that like as a bell.

Q. The base of the dome is flared like a bell? A. As a bell. The two pipes are coming in from opposite directions, which causes centrifugal action within this dome. It is a copper block and the pumping, the action of the pump or pressure behind that causes the water from the nozzle to flare out in a sort of centrifugal spray. It is actually the same action that you might get on a firework that keeps whirling around.

Q. And it hits the top of the cone in that manner? A. It hits the cone in that particular manner.

Q. Now, what about deviation in the location of the particular nozzle, having regard to the apex of the cone? A. The action—

Q. Is deviation improved or is it not? A. No, sir.

Q. I am talking about within— A. Within certain limits, that is correct.

Q. Within what limits are you talking about? A. I would say within an inch and a half or an inch and a quarter.

Q. Why do you say that? A. Because the cone acts in the capacity more of an umbrella; the spray is directed through the nozzle on to this nozzle which is actually an umbrella for the top of the opening end of the cupola.

Q. Has the apex of the cone a sharp point, or has it not? A. No, it has a rough edge point, probably like the back of my hand, but no sharp peak like the two fingers.

Q. Then, are there control stages in the water-wash system, leading to each cupola cone? A. Yes, sir.

Q. And will you explain about those and what their purpose and location is? A. They are electrical equipment, sir. On their contact with water, they cross between two given points, which lights a light on a control switch on the panel here down on the floor where the cupola is burning there.

Q. What is the purpose of those lights? A. The purpose of those lights is to establish the fact that because they are lit, water must be passing down through the discharge pipes, therefore must be discharging on the cone.

Q. In other words, they are located on the discharge part of the water cone system? A. That is correct, yes.

Q. Have you ever seen those lights out at any time? A. No.

Q. And, apart altogether from the lights, do you know of any time when the flow of water from the water flow in the cupola was ever stopped? A. No, I do not.

Q. And when they were first installed did you personally make any inspection of the spray nozzle cone? A. Yes, sir, I did.

Q. And how were they working when you personally inspected them, when they were first installed? A. They were quite good, sir.

Q. Then, did you make any inspections of the present cupola water cones during the week ending March 17th, yourself, personally, I am talking about? A. Yes.

Q. What inspections did you make that week? A. I made an inspection about twice a day.

Q. About what time? A. Oh, that would be roughly around about 8.00 o'clock and again between 8.00 and 9.00, and again usually directly after dinner, that would be somewhere near 1.00 o'clock.

Q. And what inspections did you make of that on Monday, March 14th? A. I did the same thing, the two inspections, one in the morning and one in the afternoon.

Q. And at each of those inspections, did you look at the water cone in each of the particular cupolas then operating? A. Yes, sir, I looked at the cones and the spray nozzles.

Q. And what, if anything, did you observe about the condition of each of them on each of those inspections? A. I did not see anything wrong with them, sir.

Q. Since March 14th, 1949, have you continued your personal inspection of these water cones? A. Yes.

Q. About the same times of the day? A. Roughly the same times each day.

Q. And have you seen anything wrong with them on any of your inspections since? A. No.

Q. Have you made any measurements on the flow nozzle in the core of the apex of the cone on No. 2 cupola? A. Yes, sir, I did.

Q. About when did you make those measurements? A. I made those measurements about a day after I read in the paper—

Q. Can you give us about the date of the month you read something about this trial in the paper? A. Yes, sir.

Q. And what date of the month was it? Was it this month, or the latter part of April? A. The latter part of last month, sir.

Q. And you made some measurements then, did you? A. Yes, sir.

Q. And what measurements did you make? A. I made measurements to find for my satisfaction how far off centre the location was on No. 2 cupola.

Q. And what did you find? A. I found about five-eighths of an inch was the off section off from centre location of the nozzle from the cone.

Q. And what effect did that have on the flow of water over the cone? A. It has none, sir.

Q. It had none? A. No, sir.

Q. Was there water running at the time you made that measurement? I don't suppose it could be? A. No, it was not.

Q. But you have seen that cone since, have you? A. Oh, yes.

Q. On each of those inspections that you have told us about? A. Right.

Q. And did you make any measurement on the other flow nozzles, on the other cones? A. Yes, I made measurements on them all the same.

Q. And did you find any deviation? A. There is a deviation on No. 3 and I could hardly measure it. One, the first one, was about one-eighth of an inch, on No. 1.

Q. Yes, what on No. 3? A. I would say about a quarter of an inch on No. 3.

Q. And what, if any, deviation on No. 4? A. Rather, I should have said No. 4, sir, instead of No. 3. That is the one that is running.

Q. What was the deviation on No. 4? A. About a quarter of an inch.

HIS LORDSHIP: Q. And No. 1 was one-eighth of an inch? A. That is correct.

MR. KEOGH: Q. No. 1 was one-eighth of an inch? A. Right.

Q. And No. 4 was a quarter of an inch? A. Right. No. 2 was five-eighths of an inch.

Q. And No. 1, you said, was so small you could hardly measure it, or something? A. No. 1 about one-eighth of an inch.

Q. Now, you have seen all those cones operating on your daily inspection, since? A. Yes.

Q. With water running on them? A. Yes.

Q. And have these deviations made any difference to the flow of water around the cone? A. None at all.

Q. What is the cause of these deviations? A. It is excessive heat, sir, that causes contractions and movement, and I believe some of it might be caused by wind directions.

HIS LORDSHIP: Q. By wind directions? A. Yes, sir.

Q. What do you mean? A. The cupola method being found, sir, and a strong wind coming from the north would cause a blowing of the heat to the south. That would create an expansion on that particular radius, which might cause a deviation as to the centre.

Q. It will deviate from time to time, you mean? A. Slightly, yes.

Q. Sometimes there might be greater deviation than others, depending on the wind direction? A. There could be, yes.

Q. Then, when it cooled off it would retract and go back? A. Go back to as near as it could.

MR. KEOGH: Q. Did you get a verbal report from Mr. Horne about the condition of the cones on the afternoon of Monday, March 14th? A. Yes, sir.

Q. And what was that report?

HIS LORDSHIP: No, no.

MR. KEOGH: I beg your pardon. All right. I had forgotten.

Q. Then, my friend brought out from Horne what it was, but I suppose—

HIS LORDSHIP: Mr. Horne is different.

MR. KEOGH: Yes, my lord.

Q. Then, there was something mentioned here a few minutes ago about some repairs to the cupola last Sunday. Do you know anything about that? A. Yes, I do.

Q. What are they? A. We were getting the spray down our No. 4 cupola and the spray that was coming over the cone was bouncing back, which was caused by deviation of the wall and a twisting of the angle iron on top of the cone. It had no effect actually on our operations, but it was difficult for the men to make the lighting operations first thing in the morning.

Q. To start the fire the first thing in the morning? A. Yes.

Q. And the iron, you say, had twisted on the cone? A. No, it was the base of the cupola that actually had leaned over and was catching the drip of this spray, which was swinging out back down to the base.

Q. But whatever the repairs were, they were done at the base of the cupola and had nothing to do with the water supply or flow at the top? A. No, that is not correct.

Q. Well, tell me. A. The repairs were on the mouth of the cupola itself and there is a piece of steel which goes around the mouth of the cupola. It had become warped and it was catching the spray that hits the sides and it was causing the water to go down inside the cupola.

In the Supreme Court of Ontario No. 43 Defendant's Evidence James Campbell Examination-in-Chief 6th May, 1949 Continued

Q. Preventing it from going into the discharge trough, in other words? A. That is correct.

Q. And that would make the dripping down at the bottom of the cupola?

MR. SLAGHT: Well, I suggest my friend ought to ask the question again. He put it directly opposite in the mouth of the witness a moment ago. Why not ask the witness the question?

MR. KEOGH: Q. And what would be the effect of the dripping on the starting of the fire down at the bottom of the cupola? A. Well, we have to start our spray head when we start our cupola so therefore the water would fall down the cupola and make wet wood to start the fire with.

Q. Your witness.

HIS LORDSHIP: We will take ten minutes.

—Intermission.

—On resuming:

CROSS-EXAMINED BY MR. SLAGHT:

In the Supreme Court of Ontario No. 43 Defendant's Evidence James Campbell Cross-Examination 6th May, 1949

Q. Mr. Campbell, just a few questions. We have been told, and you would have it under your observation that, at the top the water brought in to be dropped on to the cone, comes in by two separate little pipes? A. That is correct.

Q. The diameter is three-quarters of an inch? A. That is right.

Q. And then when they come, they do not have a separate drop pipe to put up on the cone, but they come into a little square box, would you call it? What would you call that long square thing that one of the pipes goes in on one side and the other pipe the other? A. It is a block of copper which is machined with a dome in the centre.

Q. It is a block of copper. And then, so as to let the water out on to the cone, it has an outlet of course? A. That is true.

Q. Now, what is the diameter of that outlet? A. I think, sir, that is about one inch and one-eighth at the throat, I think.

Q. That is the exit of the water? A. Yes. It is bell-shaped, goes to the bottom, but I believe that is right, sir.

Q. Well, it is approximately about an inch and a quarter? A. An inch and one-eighth.

Q. So that the water trough, the two pipes has made perhaps a swirl or, at all events, those two streams have come together? A. Yes, sir.

Q. Then, they go downward from gravity and through this copper block, and the inside of that copper block where the water drops on to the top of the cone is one inch and one-eighth? A. I believe that is the figure.

Q. Now, when it gets off centre five-eighths of an inch, what—what gets off centre? A. I believe it is that copper block.

Q. So that that would be five-eighths of an inch, having regard to an inch and one-eighth of an outlet? A. Yes.

Q. That gets off centre to that extent, and I suggest to you that if that outlet, the copper block, gets off centre, being only an inch and one-eighth, five-eighths of an inch, it has got 50% off centre, so to speak. Five-eighths of an inch as comparable to one inch and an eighth would be a little more than 50% off centre? A. That would be right.

Q. What causes that block to get off centre to that extent? A. A movement by expansion on the pipe and a cerain amount of deviation because of being in close proximity to the heat.

Q. And so your inspections might, when you did see it—you were not the regular inspector—but when you would see it it would be off centre in some cases, at least you are giving us an instance here to the extent of five-eighths of an inch? A. Yes, sir.

Q. And the water therefore would be going down off centre to that extent from where it was originally placed and where it ought to be? A. Yes.

Q. Well, do you suggest that that being so that that water when it reaches the cone, would not be unequally distributed over the whole of the ridged part of the cone? A. I do, sir.

Q. It would not make any difference? A. It would not make any difference.

Q. Well, when you found it off centre that way on inspections and was running, of course, it would be running when you would see it? A. Yes.

Q. You didn't stop the water in order to stop the process to readjust it? A. No.

Q. Let her run right through the day if some one's inspection showed it off centre? A. Right.

Q. And what steps, then, after you shut down the cone, after the nine hour run, would you take, if any, to correct the deviation off centre? A. We did not take any. I do not believe there was any correction made.

Q. You just let her go for the next day? A. That is right.

HIS LORDSHIP: Q. Did you know that it was off centre until you read it in the newspapers? A. Oh, yes, sir.

Q. Oh, you knew it? A. Yes, sir.

MR. SLAGHT: Yes. That is what surprised me. You have known ever since it was installed that it would get off centre? A. There is certain deviations and the reason why we could not move it is because the nozzle is over six inches above the cone top, and the cone is spreading the water in this manner, and—the nozzle, rather, is spreading the water in this manner, and the cone is purely and simply serving a function as an umbrella.

In the Supreme Court of Ontario No. 43 Defendant's Evidence James Campbell Cross-Ex-Examina-6th May, 1949 Continued

Q. All right. Now, I wanted to get it; it does not give the umbrella function, Mr. Campbell, because the rain is going all parts of the side of the umbrella, and that is nature from Heaven. A. Yes.

Q. But your stuff comes at the apex of the cone, don't forget, and I do not follow through your argument about the umbrella, the cone being built somehow to show a deviation, would make a difference in the distribution of the water. But there is one point I was anxious to get clear as to the method of the outlet and the copper block, or square, of where the water has to drop to a certain distance till it hits the apex of the cone. What is that distance? A. About six inches.

Q. Now then, were you there when the copper block was first set into its proper position over the cone? A. I do not believe that I was. I could not swear to being there.

Q. When the installers of the system left it, they left it sitting true right over the top of the cone, did they not? A. I presume they would, yes.

Q. Well, of course they would, and then this deviation has been going on all through the months since it has been installed —I mean the deviation is not a matter of the last few weeks? A. I could not say that, sir.

Q. Well, you are the man who introduced the deviation with us and told us there was a deviation up to, on one instance, and you gave samples properly enough, of five-eighths of an inch of deviation from the manner in which it was first set? A. That is right.

Q. And you did not take any steps to correct it. Now, does that five-eighths inch deviation, or such—at times it was less— but the deviation such as it was, I want to get it from you so far as your story indicates, that that has been going on since the new system has been working? There has always been some deviation? A. A certain amount of slight deviation there would be, yes, sir.

Q. All right, call it "slight", if you like, but that deviation has been going on since and during the entire working of the system? A. It could.

Q. Well, you are telling us about it. You say it has not? A. No. The question I would like to answer is this.

Q. Would you like to answer mine first, and then I will let you tell me anything you like. My suggestion is a very simple one. You have been good enough to give us figures of deviations you have observed when you have seen it in operation and no steps taken to correct it. Now, that is not just the last two weeks that

you have noticed slight deviations. There has always been a slight deviation, as you put it, from the heat? A. Yes.

Q. And this is my question, that covers from the time when the thing was first installed down to the present time? A. No, sir.

Q. Well, then, give me the date when the deviations came about? A. Deviation within the first period would not exist because there had not been sufficient heat applied to that pipe to make it move.

Q. Oh, well, perhaps we misunderstand one another. I did not mean from the morning when the nine hour shift starts in the heating of the core. I am speaking of deviations which you have seen yourself and described. I think, very fairly, that type of deviation is not just the last two weeks. It has been a general thing more or less over the system A. It has been going from zero to five-eighths, as it is now.

Q. Yes, over the period that it has been working there. So we have from zero to five-eighths of an inch deviation which you have described and clearly, I think, going on from the installation of this new water-wash, whenever it was, down to the present time? A. Yes, exactly.

HIS LORDSHIP: Now, I want to know what the witness means by that. Do you mean that it varied a particle from zero to five-eighths of an inch, or that it has been growing progressively —starting off at zero and it has been deviating progressively? A. I would say that is the answer.

Q. Until it has got to be five-eighths of an inch? A. That is the answer I was trying to make.

Q. Well, I asked you the question if you knew whether it had deviated, prior to having read it in the paper that there had been evidence given in this trial that there was a deviation, and you said you did. Probably you could tell us when you first observed that it was that there was a deviation? A. Yes, sir. I believe I noticed the first deviation—would be around about Christmas of this—last Christmas.

Q. That is when you noticed it first? A. About that time, sir, yes.

MR. SLAGHT: Then, there is just one other point, Mr. Campbell. You were speaking to Mr. Keogh of the old system, not the chain but the nozzle system—no, no, you were speaking of the chain system which, by its very make-up, the chains would drop a deposit that was going on to your roof, from the chimneys? A. Yes, sir.

Q. And then you explained that this new system, you did not get more than, say, 90%; at least, it is 90% less drops on the roof under the new system than under the old chain system? A. I have noticed about 90% less dirt on the roof, sir.

Q. Well, then, the dirt that goes on the roof. Now, how did you get it off? Did you shovel it down from roof to roof, the way you did before? A. I could not answer that question, sir.

Q. But it piles up there, the dirt, on the roof? A. I could not be truthful in my answer, because I did not do that job.

Q. Well, you must have seen the piles now and piles they swept down on the asphalt off the roof and down to the other roof and so on, under the old system, and you must have dirt there now to give a 10% estimate against 90%? A. Yes.

Q. You have seen dirt there? A. Yes.

Q. Well, is there a wheelbarrow full at a time? A. I would say I have seen as much as a wheelbarrow could collect into one area.

Q. That is all I wanted to know, that there is substantial droppings near your chimneys—at least, some dropping still. It has not all discontinued? A. Dirt on the roof.

Q. That is all, thank you.

HIS LORDSHIP: Now, just one question I want to ask. You said you had been making inspections twice a day since the 7th of March? A. That is so.

Q. Why did you start to make those inspections twice a day at that time? A. I had been making periodic inspections, sir, and it was intimated to me that there would be an inspection by a Court Injunction, and therefore I put a little more emphasis on my efforts.

Q. Why were you putting on more emphasis because there was going to be an inspection under an Order of the Court? A. Well, sir, I believe like everything else I am asked more questions at that time and I would want to have more answers.

Q. No, but was it that you were apprehensive that when they inspected under the Order of the Court, they might find something wrong and you wanted to make sure they didn't? A. I didn't know what I could do about it. I just wanted to satisfy myself when my superior asked me questions, I have been there a lot and I wanted to be truthful about saying, "I have done this myself."

Q. I see. All right. That is all. Any re-examination?

MR. KEOGH: No, my lord.

—Witness excused.

RAYMOND L. CAVANAGH, sworn,

EXAMINED BY MR. KEOGH:

Q. Mr. Cavanagh, you are an associated Fellow with the Ontario Research Foundation. Is that right? A. I am what you call a Research Fellow.

Q. A Research Fellow, I beg pardon. And what university course have you taken and what degree do you hold? A. I hold a degree in applied engineering from the University of Toronto.

MR. SLAGHT: A degree of what? A. Bachelor of Applied Science, University of Toronto in Engineering.

MR. KEOGH: Q. Then, in the course of your research work at the Ontario Foundation under this Fellowship, you have been specializing in what type of research? A. I have been doing research on my Fellowship for the Algoma Steel Corporation, but I have had some previous experience before going to the Research Foundation with oscilloscopis and types of dust associated with oscilloscope work and this has been known to Dr. Ellis and from time to time I have been asked to do work on vibrations and sound by Dr. Ellis, which I have done.

Q. You say you had some previous experience with this equipment before going to the Ontario Research Foundation? A. Yes.

Q. And where did you have that experience? A. I had occasion to work with the Dumont Laboratories in New Jersey, who manufacture oscilloscopes and other types of electrical testing equipment.

HIS LORDSHIP: An oscilloscope, is that an instrument for detecting vibrations? A. Not necessarily. An oscilloscope is what they call a cathode ray oscilloscope. It is a type of ink instrument; it is used primarily to indicate electrical impulses of one kind or another. It is generally used to examine electrical wave forms, but it is used in vibration studies in what they call the vibration pick-up. This vibration pick-up produces an electrical impulse which is indicated on a screen of the oscilloscope.

MR. KEOGH: Q. Then you came to St. Catharnes at the request of McKinnon Industries, to the foundation, to measure vibrations, did you? A. Yes, sir.

Q. You came first of all on the 24th of September, 1947? Is that right? A. I would say it was in September. I don't recall the exact date.

Q. Well, have you your notes that you made at the time?

MR. SLAGHT: Well, that is close enough for me, September.

MR. KEOGH: Q. Then, you made measurements and also in October, 1947? A. Yes, sir.

Q. Then, before you started your measurements, did you inspect the forge shop of the McKinnon Industries Limited? A. Yes. Our first move was to go over to the forge shop on the day when the forges were not in operation, which I believe is a Saturday morning the last week in September. We took our test instruments with us and went through the shop and the surrounding area to try to gain some preliminary idea of the layout.and as well to take preliminary measurements of the normal vibration without any forging hammers in operation.

Q. Then, did you inspect the location of the various forging hammers? A. Yes.

Q. Did you obtain from McKinnon Industries a drawing of their forge shop and the surrounding area on which you calculated a scale and plotted the location of each of these hammers and made certain half circles on them? A. We obtained this drawing here which is not a scale drawing, from the McKinnon Industries, and on it we measured off various points which we were interested in, and located our test points by number and lot. We made photostatic copies of these at slightly reduced scale, which is marked on the photostatic copy. I have the original here.

Q. But the scale that you located on the drawing, by actual measurement on the scene, was one inch to 62.8 feet, as written on the top of that drawing? A. That is correct.

Q. And that also appears on the top of the photostats? A. Yes, that is correct.

Q. This is a photostat of it, my lord, being very slightly reduced in size.

MR. SLAGHT: Does that apply to the original document or the one on the reduced scale? A. That scale marking is according to the drawing you have there.

—EXHIBIT No. 171: Original drawing of forge shop area showing location of hammers.

MR. KEOGH: Q. Then you show on that drawing to the left side in the forge shop certain lines A, B, C and D and so on? A. Yes.

Q. And then on the righthand corner of the drawing you have inscribed a legend which corresponds to those letters, have you? A. Yes.

Q. In the righthand upper corner? A. In the righthand upper corner, yes.

Q. In other words, they refer to the various sizes of hammers? A. That is correct.

Q. And each letter represents a hammer of a certain size? A. Yes.

Q. Corresponding to the letter shown to the left of the drawing in the forge shop building? A. That is correct.

Q. Then, you have inscribed on this drawing Exhibit 171, certain half circles at varying distances from the forge shop. What do they mean, and what are the distances? A. We merely scaled off a portion of a circle for 100 feet, starting from the closest hammer to the greenhouses in question, to give us a reference later for our various test locations.

Q. And are those circles according to the same scale? A. They are on the same scale as the drawing in which they appear.

Q. And within those circles is shown the distance of each? A. Yes.

Q. The distance of each from the nearest hammer in the forge shop? A. Yes.

Q. Then, you have certain markings on there such as "T.H.5" and "F.S.1" and so on. We will come to that in a little more detail later, but, generally, what are they? A. They refer to the test locations at which we took measurements of vibrations.

HIS LORDSHIP: Now, just a moment, this scale would be correct on the photostat, would it?

MR. KEOGH: It was changed by type on the photostat to correspond with the original.

HIS LORDSHIP: What is the scale on the original?

MR. KEOGH: The original scale is one inch to 50 feet.

HIS LORDSHIP: Well, you see, that would be on the record hardly correct.

MR. KEOGH: I thought that had been done, my lord. Thank you. The photostat while similar bears some scale typed in on the top of it.

MR. SLAGHT: I understand, relatively.

THE WITNESS: Yes.

MR. KEOGH: Then, you prepared a table, did you not, showing various locations at which you took vibration readings, in the fall of 1947?

HIS LORDSHIP: Well, before you go to that, I want to get to understand Exhibit 171 a little better. You have on the upper righthand corner, the index, the size and location of the forge and some hammers at the forge shop at McKinnon's. Now, that refers to the different hammers? A. Yes.

Q. And you have got "K" and "L" to be removed, 6,000 pound hammer and a 3,000 hammer and a 5,000 hammer to be installed. A. Well, I am not too familiar with McKinnon's plants on the hammers.

Q. Well, it is on your scale that you are putting in, and I want to know what it means. A. I understand hammer "N" was in operation when we took the tests. We knew where the various hammers were in operation on all the tests we took.

MR. SLAGHT: "K" was in operation? A. Yes.

Q. That is the 5,000 pound? A. Yes, and "K", I believe —I am quite sure was never operated while we took tests; was removed, or in process of removal when we got there.

HIS LORDSHIP: This is dated June 13th, 1947. A. This listing here is McKinnon's listing of their original drawing.

Q. Oh, I see. This is something that they prepared for you? A. Well, not necessarily for me, but I believe—

Q. Well, it was prepared and given to you? A. Yes, sir.

Q. And you are not responsible for anything except the circles on it? A. I did mark in the test location and these distance circles. Those are the only additions we made to the drawing.

Q. But you say the 6,000 pound hammer that you indicated here, was not in operation? A. No.

Q. But the 5,000 pound hammer was and what about "L"? Was it in operation? A. I believe it was in operation. I don't recall offhand. I could check that quite quickly, I think.

MR. SLAGHT: And what date is that chart about the removal, and so on, that you speak of? Is that of the date you inspected it in September, 1947, or another date?

THE WITNESS: Well, I did not prepare that information. That is McKinnon's information on that section.

HIS LORDSHIP: Then there is something else on here about hammers of Canadian Warren Axle & Tool Company. What about that? A. I know nothing of that, sir.

Q. You don't know anything about that? A. Well, I know they have hammers.

Q. Yes, I know, but you don't know anything— A. I am not familiar with the plant.

Q. And you did not do any tests? A. I took tests near their plants, but I never talked to anyone of the Canadian Warren Axle about their forge hammers. I know nothing about that.

MR. SLAGHT: Then, my lord, that information ought to be striken off the record, or off this exhibit. You cannot prove it against me in that way.

HIS LORDSHIP: What about that?

MR. KEOGH: I have no objection to it being stricken off there, my lord. I did not notice it, myself.

MR. SLAGHT: Now, how can we strike it off—by scratching a pen over it?

MR. KEOGH: It will be understood as though he never heard of it.

MR. SLAGHT: Very good.

HIS LORDSHIP: Then, I want to see what else is on it.

MR. KEOGH: The same thing applies.

HIS LORDSHIP: Just a moment till I get through. I am not suggesting that this is done with any impropriety but—

MR. KEOGH: There is a list in the lefthand corner that could come off. Just draw your pencil through it, the list of instruments in the lefthand corner.

HIS LORDSHIP: Then, I think we had better have it fixed now before the witness goes on. Will you just strike out this part as I have indicated on the lower righthand side and make a note that it is no part of the exhibit, and strike out the part on the lefthand side and make a note there that that is no part of the exhibit. It could almost be cut off, without danger.

MR. KEOGH: I have no objection to it being cut off.

HIS LORDSHIP: I think if we just cut it off altogether, cut off that table on the lefthand side and just cut out the table on the righthand side.

MR. KEOGH: Mr. Pond has scissors here.

HIS LORDSHIP: Well, the Registrar can do it at noon, he says.

MR. KEOGH: Q. Then, you prepared a table listing the various locations of your pick-up probe, as you call it? A. Yes.

Q. At which you took vibration readings during these tests in the fall of 1947? A. Yes.

Q. And is this a table, the original of which I now hand you, a copy for your lordship and a copy for my friend? A. It is.

—EXHIBIT No. 172: Table of vibration tests, September, 1947.

Q. And does this table—you have a copy of it in front of you? A. Yes, I have.

Q. Does this table correctly set forth the locations of your pick-up probe at the times you took the various vibration readings during these tests? A. It does.

Q. There are some printed words at the bottom, which I will also have cut off, that the Ontario Research Foundation is not responsible for contingencies.

HIS LORDSHIP: Oh, yes, we will have that cut off.

MR. KEOGH: Q. And then, witness, you prepared a table of the vibration data which you obtained from these various tests that you took in the fall of 1947, at the locations shown, Exhibit 172, as indicated on this vibration table? A. I did.

Q. And is that table, the original of which I now hand to you, the one that you saw prepared? A. Yes, it is.

—EXHIBIT No. 173: Further table of vibration data from 172.

HIS LORDSHIP: Now, so I may understand this table, you just tell me what it is? A. Well, briefly, if you consider the top line recording the data, the time at which the reading was taken

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at a certain location, the location which is marked on the drawings supplied and next the numbers, 10, 20, 30, 40, 50 and so on, refer to instrument settings of the oscilloscope. These settings are actual amplitude settings and they mean as they increase, that the sensitivity in the instrument for a certain signal is increasing. In other words, the maximum sensitivity for a certain amplitude of vibration is the maximum at a setting of 100.

MR. KEOGH: Well, does the increase in columns indicate an increase or decrease in the amount of vibration registered? A. It will increase the signal. It multiplies the signal in amplitude.

HIS LORDSHIP: Now, just try to get us down to a layman's language and see if you can answer Mr. Keogh's question in the same way he put it. A. I am sorry. If you had a signal, for example, of one setting that looked that big and you increased this control I am speaking of, it would go like that; it would increase in size.

Q. What would increase? A. The signal or reading which you are taking on the instrument.

Q. Well, let us see if we can translate all this into plain language that a jury could understand. Now, start on September 20th. What did you do there, and just follow that line through? A. Perhaps if I described the type of indication I am speaking of it might be a little clearer.

Q. No, just let us do it our own way. We are not trained scientists, you know. On September 27th, I can go this far, that you had your instrument set up at "F.S.1", which is a station inside? A. Inside the forge shop.

Q. How many hammers were running? A. That was taken on a Saturday morning and no hammers were operating.

Q. No hammers were operating. And then you have column 10. What is that? And under it you have "2", what is that? A. That refers to the reading instrument goes on that beyond.

Q. Well, what did that mean, that there were some slight vibrations? A. Yes, there were very slight vibrations.

Q. Very slight vibrations at 11.15 in the morning? A. Yes.

Q. Were they constant vibrations, or spasmodic ones? A. Well, vibrations in a certain area, when you pick them up with this type of instrument, they will fluctuate, but there is a general constant level and that is the reading it shows.

Q. Well then, under "20", what does that mean? A. That means that the same intensity of vibration which is shown under "10" is a greater reading for a more sensitive setting of the instrument.

Q. Oh, you set the instrument to pick up more, so that it is more sensitive and you pick up fainter vibrations? A. That is so; we are feeding the same vibration signal and increasing the sensitivity of the instrument, that is all we are doing across the line.

Q. So then from 10 down to 100 indicates different settings of the instrument? A. That is so.

Q. And these are the readings on those settings? A. Yes, sir.

Q. But in any case, it is a very faint vibration? A. Yes, sir.

Q. Then have we got one when the different hammers are running? What about September 24th? A. September 24th, we show some light hammers operating there.

Q. Light hammers — what hammers? A. "A", "B", "G", "H" and "J". "A" is the 2,000 pound; "B" is the 2,500 pound; "G" 1,500; "H" 1,500; and "J" 1,000.

Q. Were they operating all at once? A. They operated very spasmodically but there are periods occurred when they all produced a vibration at the same time.

Q. Well, is your reading taken so as to give —— A. We observed it for a period of time and got the maximum vibration which would occur when the hammers all operated simultaneously.

Q. So that as far as No. 10 is concerned, you got the same vibration when they were all operating simultaneously as when they were operating one at a time? A. That is at the lowest sensitivity of the instrument.

Q. Yes. Can you give me any description of what that would mean, if you were just trying to describe it as a layman, going in and standing where the control instrument was set up? A. Well, in that portion of the forge shop you would feel a fairly heavy vibration on your feet, from the floor, at that point.

Q. Well, does the reading of "1" indicate a greater vibration than a reading of "2"? A. No, sir, but at that particular setting the instrument is very sensitive and one division is a very small change in reading.

Q. Yes, I know, but at that setting, when there are no hammers running, you have got a reading of "2", and when all these five hammers were running you get a reading of "1". That is, there was not as much vibration with the hammers running as there was when they were not? A. No. I think perhaps I should have pointed out before that the pick-up used on that first line we checked and we have described the reading on that, we make a note on that at the bottom of the page and I believe you might find the readings for the next series of tests would be more reasonable.

Q. Well, you see, after all, if I have got to judge a case on an instrument that makes bad mistakes, — there is one thing I can judge, a witness to a certain extent, whether he is telling the truth or not, but I cannot judge an instrument that tells lies, because I cannot see it, but I could go through these — just what is the explanation that on September 24th with five hammers running the instrument did not show as much vibration as on September 20th when there were none running? A. I mentioned that we checked this pick-up used on September 20th and considered it defective.

Q. Well, why was it defective? A. It had a loose connection. We checked this at the Research Foundation, because we were suspicious of it.

Q. You got a little suspicious of the same thing that I did? A. Yes. By the way, we used two different vibration pick-ups and we have tested these before every time we have taken such readings.

Q. Then, at 2.25 on September 24th you say, "M" started. "M" was the 4,000 pound hammer? A. The 4,000 pound hammer, yes.

Q. And you didn't get any vibration on setting 10 or 20? A. We did not bother taking those readings at lower sensitivities, because they did not mean too much. We were more or less trying to get some idea of the amplitude of the vibration we are dealing in in these first two tests, and the readings are there on the screen and we have similar settings before these, and there seems no particular point in taking the lower settings.

Q. Well, then, at 70, which is the more sensitive setting, the maximum vibration you got at 50 while the 4,000 pound hammer was running, and the maximum while nothing ran is 50, so I suppose that induced you to feel there was something wrong with the machine? A. Yes, it certainly did.

Q. And then we go to October 2nd, at 1.30. Now on this we have the 2,000 pound, two 2,000 pounds, "B" is 2,000 pounds, "A" is 2,000 pounds; "E" is 2,000 pounds; "D" is 1,500; "H" is 1,500; "J" is 1,000; "N" is 5,000, so that you had seven hammers in operation ranging from 1,000 to 5,000 pounds. Now, you have shown on this date a maximum reading of 5 at 10, or 50 at 40. Now, have you got any data to compare that with where there is any machinery operating? A. I think you can compare that fairly directly with the first line in each case, but this first line—

Q. I thought you had a loose connection on the first line? A. No, not on the readings on October 2nd. There are two lines there of readings on October 2nd.

Q. Oh, I see. On October 2nd there is no machinery running. The first line shows no machinery running? A. The first line represents the average vibration level when there is no machinery operating, generally speaking.

Q. Well, no hammers operating? A. Yes; I should have said no hammers.

Q. All right. Your first line is no hammers; the second line is when all these seven hammers are operating? A. Yes.

Q. Well, you don't carry that out to the other degree of sensitivity? A. Well, we reach a maximum reading possibly of 40, 50 plus, represents a reading that is off the screen. We cannot read higher than that.

MR. SLAGHT: You mean the machine doesn't go any higher? A. That is true.

HIS LORDSHIP: Then, I understand that now. Then, you come back in the next one to September 20th again? A. That is at a different location.

Q. But that is the day when the machine had a loose connection? A. Yes, sir.

Q. So we rule that out again, and September 24th, you said that went out both the 20th and 24th, that loose connection? A. No, the 20th, I believe. Yes, that is the only one. I have marked that here.

Q. I see.

MR. SLAGHT: I am afraid I don't understand the September 20th. Is that the defective reading—that should be disregarded? A. Yes, sir.

HIS LORDSHIP: That is the only date that should be disregarded? A. That is the only date, but it shows at more than one location?

Q. Now, Mr. Keogh, I have interrupted you, but I am getting to understand it a little better. If you will proceed.

MR. KEOGH: Thank you, my lord.

Q. In addition to the readings shown on this table, Exhibit 171, there are certain statements of fact stated in the last column as opposite certain of those readings. Are those statements all correct? A. Yes, sir.

Q. I notice on the second page, for instance, as "against fence post in ground on centre ground; train passing on Carlton tracks," and so on. Those statements are all correct, and you made notes of them at the time, did you? A. Yes, I did.

Q. And they were made up from your notes at the time? A. Yes.

HIS LORDSHIP: Now, I want to get these various locations. "F.W.2" was where? A. That is on the west side, beside the foundry storage building.

Q. "F.S.3" is out on the corner of Ontario Street? A. Yes.

Q. "T.H.", where is that? A. The "T.H." one is, of course, the test house, out there south of Carlton.

Q. Yes, I see. "T.H.2"? A. Is also very close to the test house.

Q. These are all around the test house, I suppose. "T.H." means "test house"? A. Correct.

Q. All located in close proximity to the test house? A. That is correct.

Q. Then, when you get to "T.H.1" on October 7th, you say you did not pick up any of the hammers at all? A. Well, this "T.H.1" location, the probe is held against the base of the test house wall itself, and I have noted there the motor in the test house was operating and this obscured any smaller vibrations which were in that radius, which means there is nothing definite showing through.

Q. Well, the 5,000 pound hammer was apparently running at that time? A. I believe they started it after 3.00 o'clock, if I recall. It is not shown operating at that point.

Q. It was not operating at 1.20? A. I don't believe so. I think that was our first experience with that hammer and, if I remember correctly, we had to wait some time before we got it.

Q. I see. "M" is the 5,000 pound hammer. If you look over the page at 7, October 7th, at 1.30, at test house, you indicate the 5,000 pound hammer running at that time? A. So I do, yes.

Q. What about that? A. I must have been wrong in my other statement, then.

Q. Well, the fact that when it was at "T.H.1" the instrument was against the wall, could it be the fact that it would not be reliable on account of the motor running inside? A. Yes. Well, let me explain this sir. That is at a much lower sensitivity setting, and we indicate a reading of 60 at a sensitivity of 50 on October 7th with this motor operating in the test house. Over here we are operating at a much higher sensitivity of 100, without the motor in operation, and we are picking up a much smaller indication than we picked up back here at half sensitivity approximately, so you could see if we did have an indication of that amplitude as shown on October 7th at 1.30 p.m., it would not show through the higher indication caused by the motor.

Q. You mean that from that you are to deduce that the vibrations from the 5,000 pound hammer were not as great as the vibrations of the motor—that it was making on the wall of the test house. A. That is so.

Q. Did you feel any vibration from the 5,000 pound hammer —feel it in the ground? A. I tried to feel the vibration from the hammers. I could not truthfully say that I could feel the vibration from the hammers at that point.

Q. Well, did you at any point, when you were outside? A. Not at that distance.

Q. That is not as far away as the test house? A. No, sir.

Q. We have had witnesses, several of them, who have sworn that it would cause plants in Mr. Walker's greenhouses to move; they could see them vibrating on the bench, see the pots vibrate. A. Well, I would say that I never observed anything approaching that condition at the test house location.

Q. That was in 1947? A. Yes.

MR. SLAGHT: You were never in Walker's greenhouses? A. I have never been in Mr. Walker's place, no.

MR. KEOGH: Q. And is the test house what is referred to as the test plot on the map, Exhibit 1, already filed in this case? Look at that. I just want to tie it up. A. Yes.

HIS LORDSHIP: Well, we will rise until 2.15.—Whereupon Court adjourned until 2.15 p.m.

Friday, May 6, 1949, 2.15 p.m.

EXAMINATION-IN-CHIEF CONTINUED BY MR. KEOGH:

MR. KEOGH: I did not want to interrupt your lordship.

HIS LORDSHIP: No, I am through. Proceed.

MR. KEOGH: Very well, my lord. There are three or four statements on the right hand column of Exhibit 173, that I just wanted you to explain. Starting at the top of page 2, that says, "Very little pick-up of motor." Oh, that is the entry we may disregard—I beg pardon. Then the third entry from the top, "Against fence post." Was that fence post shown on your drawing, Exhibit 171? A. This fence post is on the north side, toward the test house enclosure. I believe the exact fence post is described in a report.

Q. Then, going down five items, "Centre road". Is that the centre road between the test house and the Warren Pink property? A. It is.

Q. That is shown on your drawing? A. Yes.

Q. Then, the next item—

HIS LORDSHIP: Now, just a moment. There is something I want to get clear there. That is September 20th, that is one of those you can disregard.

MR. KEOGH: Oh, yes, that is. I forgot that date.

HIS LORDSHIP: Because there was something in it I thought did not look very reliable.

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MR. KEOGH: There is another September 20th on that page, too, my lord.

HIS LORDSHIP: There are three of them altogether on that page.

MR. KEOGH: Yes, and then the next item, "Footsteps on centre road"; is that the same centre road? A. Yes, sir.

HIS LORDSHIP: That is the same date? A. Yes, sir, that is the 20th as well.

MR. KEOGH: Q. Then, two items down, "Carlton tracks." Those are the train tracks on Carlton Street, are they? A. Yes, sir.

Q. Then, page 3, the fifth item from the top, "Concrete road." Is that the concrete road on Carlton Street? A. Yes.

HIS LORDSHIP: That is another one. There are two there of September 20th, or three altogether? A. Yes.

MR. KEOGH: Oh, yes, thank you, my lord. We can disregard that. Then, October 7th, "Car passing." On what street is that referring to? A. That is—

Q. Up above that you have, "Truck passing on Carlton." Oh, that is a date you can disregard. A. Oh, yes, that would be on Carlton Street, yes.

Q. And what about the next item, "Two cars." First of all, what kind of cars and where were they? A. They would be on Carlton and they would be the ordinary light passenger car.

Q. And then, two items down, still under the same date, October 7th, "Heavy truck." Where was that? A. That would be those—two items down?

Q. Yes, October 7th, "Heavy truck." A. That is also on Carlton.

MR. SLAGHT: Well, whereabouts on Carlton, can you tell us? A. Passing the location, "T.H.7", which is north of the test house.

MR. KEOGH: Q. "T.H.7", that is shown on your drawing, Exhibit 171. Then, the next item, still under October 7th, "Footsteps on the concrete road at 20 feet." Which concrete road and at 20 feet from where? A. That would be Carlton Street concrete, and the distance referred to is the distance of the footsteps from the vibration pick-up.

Q. At the vibration pick-up, at what location on your drawing? A. At "T.H.7".

HIS LORDSHIP: Q. What do these averages mean, the average in maximum? A. The average is the normal vibration level picked up by the instrument. For example, where it shows a car passing at average level is the normal vibration level before that car comes within range.

Q. But what is "normal vibration"; for instance, when the vibration from these hammers came down and then there would be a period when there would be no vibration, and then they would come down again, and another vibration, what is normal vibration level? A. There is always a small vibration present. We say the road surface there surrounding the traffic, not necessarily on the same road. You cannot give the specific figures. You can merely say it would cover a small range.

Q. Well, on October 7th, why is the normal vibration level at 146, when at 2.00 o'clock it is 1? A. This is at a different location. That is at "T.H.5", on the centre road, and the other is on the concrete.

Q. Oh, yes, I see. Well, if those hammers are running, how can you get a normal vibration level? A. The vibrations from the hammers are quite sporadic; they are not occurring all the time.

Q. Well, if you have eight hammers running— A. And some of these you get no pick-up from on the light hammers at that particular distance, you get no observable pick-up. The difference is due to light hammers, they are hardly discernible as a reading. The main deflections due to hammers at this location near the test house are due to the heavy hammers, what we show as an average reading. It is true there might be a light hammer operating at the time, but taking that reading, it would be very unimportant as far as the reading is concerned.

MR. KEOGH: Well, then, October 7th, 2.40 p.m., location "T.H.8", "heavy truck". Where was that truck? A. This would be on Carlton Street.

HIS LORDSHIP: You get far more from the truck than you do from the heavy hammers? Is that right? A. That is at that particular location.

Q. Where is that—on Carlton Street? A. "T.H.8", is in the test house encloure. That would be at the west corner.

MR. SLAGHT: Well, is it on Carlton Street, or not? A. It is in the test house enclosure.

Q. Well, that is not on the street, is it? A. No, it is not on the street.

MR. KEOGH: Q. Then, what were your conclusions as to the vibration from the results of these tests in 1947?

HIS LORDSHIP: What is—

MR. KEOGH: Or perhaps I should say what was the result?

HIS LORDSHIP: He tells us what—this is the result, is it not?

MR. KEOGH: Well, perhaps I should say what did these results mean, in layman's language?

MR. SLAGHT: Well, they mean what they say. I don't think anything means a thing. I think my friend has got to get closer to the point than that.

HIS LORDSHIP: I think that would be asking the witness to exercise judgment on the case.

MR. KEOGH: Well, I don't want to do that. Your location "T.H.5" was approximately 425 feet from the 5,000 pound hammer "M". Is that right? A. Yes, sir.

Q. And the nearest of Mr. Walker's greenhouses was 475 feet from the same hammer, according to your measurements? A. Approximately that, yes.

Q. And how would the vibrations—I know that you did not record any vibrations at the nearest greenhouse, 475 feet,—but would that extra distance of 50 feet have any appreciable increasing effect on the vibrations recorded at "T.H.5"? A. I do not see how it could increase the vibration.

Q. It would be 50 feet further away? A. Yes.

Q. And how did the vibration readings that you received at location "T.H.5", when the McKinnon's heaviest hammers were operated, compare with the vibrations that you received at the same location from the electric engine pulling and hauling freight cars? A. The vibrations received from the hammers at location "T.H.5" were very slightly less than those produced by the electric train passing on the Carlton Street tracks and some few of the heavy trucks which we took readings upon on the same street.

Q. Were, you say, very much less? A. Slightly less.

Q. And you mentioned both the train and the heavy trucks? A. I believe that is so.

Q. Then, you made some more tests for vibration on February 13th and February 17th, 1948, did you not? A. Yes, sir.

Q. With the same equipment, and following the same general procedure? A. That is so.

Q. And is this a table which you made up of the locations of your pick-up probe during February, 1948, tests? A. That is.

Q. And does that table truly and completely set forth all locations of your pick-up probe during those tests? A. It does.

—EXHIBIT No. 174: Table vibration test at defendant's, February, 1948.

Q. Then, during that same period, covering the 13th and 17th February, 1948, did you make similar vibration tests in the vicinity of Dunn's greenhouse on Queenston Street, St. Catharines? A. We did.

HIS LORDSHIP: You have given us the result of these, Mr. Keogh?

MR. KEOGH: I beg pardon?

HIS LORDSHIP: Had you not better complete the result of the tests at the location shown in Exhibit No. 174, first?

MR. KEOGH: Yes. The very last page of this table—he made up a table of three pages.

HIS LORDSHIP: Oh, I see. It is a composite table.

MR. KEOGH: Yes, the last few entries in it are tests at Dunn's. Did you make up a table of the results of all of your tests in February, 1948, and attach to it the sketch showing the locations of your pick-up probe already described in a preceding exhibit, at Dunn's, and also an additional location on Manchester Street, known as "M.9", in the vicinity of McKinnon's? A. I did.

Q. It is really hardly a sketch. Is that the sketch you made up? A. Yes.

Q. And is that the table, the original of it I now hand you, and a copy of the sketch attached to it? A. It is.

—EXHIBIT No. 175: Table of vibration data as in 174 at Dunn's test house, February, 1948.

Q. And does that table and sketch, Exhibit 175, truly and correctly and completely set forth the results of those vibration tests which you made on those two days? A. It does.

Q. Then, do the statements of fact set forth in the right-hand column of his table, correctly and truly set forth the facts at the times of those various tests, as shown in that table. A. I do.

Q. And there are a few entries I want to have you explain, and I am referring now to Exhibit 175, the last table, the third entry from the top, "Street car passing", on what street are you referring to there? That is February 13th? A. Yes.

Q. And what street was the street car passing in that particular item? A. This is the street car which passes to the west of the foundry, the storage building down below. That is taken at location "F.W.2", at the south end of the foundry storage building.

Q. And is that shown on your sketch Exhibit 171? A. It is.

MR. SLAGHT: On which street is that near.

MR. KEOGH: Can you describe the street? A. That is not a street. It is just a street car line slightly downhill from the side of the plant there, there is a street car line goes by.

MR. KEOGH: Are you referring to between the west side of the plant and the canal. A. Yes. I don't know what the proper name of it is.

Q. There is a line of railway tracks there? A. Yes.

Q. And that is what you call the street car line? A. Yes.

Q. Can you tell us how far that test location was from Walker's? A. Roughly 700 feet.

Q. 700 feet approximately due west, would that be right? A. Slightly south of west, yes.

Q. Then, does the reference to outhouse in this table, Exhibit 175, also refer to the outhouses of McKinnon's test plot we have already described? A. They do.

Q. Then, the entry of February 13th, at location "T.H.3", "electric train", on what street was that electric train? Above it is entered as "Carlton Street". Is that the same street? A. Yes.

Q. That is the third last entry on the first page. Then, the seventh entry on page 2, under date of February 17th, location "T.H.7", "clear surface of road". What road is referred to? A. That is Carlton Street.

Q. And it says, "25 feet away". Away from what? A. From the point, "T.H.7".

Q. Then, three entries further down, under date of February 17th, appears to refer "location M.9", "blow of one-pound hammer on road at 20 feet". What road is that? A. That is Manchester Street.

Q. And 20 feet from where? A. From the point "M.9".

Q. Which is located on your sketch, attached to this exhibit? A. Yes, sir.

Q. Then, the two last entries on page 2, under date of February 17th, refer to "Water circulators operating". What water circulators are those? A. Those are greenhouse water circulators, operating in Dunn's greenhouses.

Q. And the same thing applies to the reference to water circulators in the next item, at the top of page 3, does it? A. Yes, sir.

Q. Then, these tests in Exhibit 175 were taken in the winter season, were they? A. That is so, yes.

Q. And how do they compare at the same locations, "T.H.4", "T.H.5" and "T.H.3", with the vibration amplitudes obtained at the same locations in the previous fall, generally speaking? A. Generally speaking they were slightly lower in the winter season.

HIS LORDSHIP: Would there be any reason for that? A. Well, there is, certainly—must be some reason for it.

Q. Well, do you know of any reason? A. Well, I could not ——

Q. Is there any reason known to science why there would be less vibration when the ground was frozen than there would be when it is not? A. Well, depending on the character of the ground; freezing could facilitate or hinder the transmission of sound.

Q. I am not talking about the transmission of sound. I am talking about vibration. A. Well, vibration.

Q. I think it is a different thing from the transmission of sound, is it not? A. It is essentially the same. I should have said vibration, of course.

Q. Well, it is different from the transmission of sound. Well, sound is transmitted by certain wave lengths, set up on the air? A. Yes.

Q. And vibration is through the solid particles of the earth, whatever the substratum may be? A. Yes, that is true. I should have said vibration. It is possible to have a dimming effect, or an affect which diminishes the amplitude of the vibration passing through the ground. This can happen by freezing. I would hesitate to make an official statement of just what happened in that case. We know nothing about the ground in detail there. I just have a general idea of the type of ground area. I could not make a definite statement of the exact reason it is less. The amount of difference is very slight.

MR. KEOGH: Q. Then, if it is slight, we will pass on. Now then, the amplitude you obtained at location "M.9" on Manchester Street from the heaviest hammer of McKinnon's, how did that compare with the vibration amplitude caused by trucks on Carlton Street at locations "T.H.5" and "T.H.4"? A. This was approximately one-half the amplitude of the vibrations at "T.H.4" and "T.H.5".

HIS LORDSHIP: That is at what station? A. At "M.9".

Q. Where is "M.9"? A. That is on Manchester Street, on that small scale.

MR. KEOGH: It is shown on the small typewritten scale attached to 175, my lord.

MR. SLAGHT: It is not shown on your original chart at all.

HIS LORDSHIP: No, it is shown on this additional scale.

MR. SLAGHT: Which exhibit is it shown on, my lord?

MR. KEOGH: On Exhibit 175 and in connection with this typewritten scale attached to Exhibit 175. And this location of "M.9", you have a measurement of 100 feet approximately near the line, with two arrows on it, running from a square called "greenhouse" to the location "M.9". What is that 100 feet—what does that distance mean? A. That means that the location "M.9" is approximately 100 feet in a direction shown by that arrow from the closest greenhouse at Mr. Walker's property.

Q. In roughly a northwest direction—would that be correct? A. I believe that works out east. That is almost east, is it not?

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Q. No, but I mean "M.9" is roughly northwest? A. "M.9" is roughtly west of the greenhouses.

Q. West and slightly north of the greenhouses as shown by that arrow? A. Yes.

Q. Then, what would you expect as to vibrations from the heavy hammers of McKinnon's in the area between the test locations "M.9" and "T.H.5", that would take in Mr. Walker's property, from the tests that you have made on each side of it? A. I would expect the vibrations to be very similar.

Q. Then, how did the vibration tests which you made of the water circulators in the Dunn greenhouses compare with the test that you made at location "T.H.5" of the vibrations from the McKinnon hammers? A. The figures obtained on a vibration due to water circulators operating in Dunn's greenhouses are considerably higher in the one building at—those are in the two small brick greenhouses, there were very heavy vibrations due to the water circulators which would be roughly—oh, five times what were obtained from the trucker trucks at "T.H.5" on Carlton Street.

HIS LORDSHIP: Q. Did you say that one standing on the sidewalk could feel the vibration of a truck going by? A. In certain cases, yes, sir.

Q. Well, a heavy truck that is going along, you feel the vibration in your feet. Were these water circulators such that you could feel the vibration in your feet? A. I did not take any notice of the vibration in my feet, sir.

Q. I am just wondering how far your instrument really measures the problem that we have got here, and that is the nature of the vibration and its results. It seems to me amazing that from a water circulator there should be the amount of vibration that would be five times as great as a truck passing and not shake the building down in the course of a year, because if you had the same nature of five times a truck passing at that distance, we know something of the vibration a truck makes, if you increased that by five and eleven continuous during the time that the water circulator is running, I would think it would shake all the putty out of the glass and that sort of thing; screws would become loose and hinges on doors. Wouldn't you think so? A. I doubt that, sir, on the particular greenhouse in question. The readings we took, the ones in which I was particularly ——

Q. I am not suggesting your readings are not right, but I am wondering if it measures the character of the vibration. A. It measures the amplitude of the vibration.

Q. Well, that is a large order. I don't know what it means, but I mean the character, so that one can tell the result. You are sitting in your house and feel the vibration of a truck going by. Now, if you multiply that, what did you say, by 12? A. I believe I said five.

Q. If you multiply that by five and keep it on going steadily day and night inside a greenhouse, I would think that it would shake the place; even the vibration of a truck on the road would, going on all the time to that extent, and would have a very detrimental effect on a greenhouse or any other kind of greenhouse. A. Well, perhaps, sir, if I put it this way. The amplitude we are dealing with is not very great in any case. I think all of the amplitudes which we have taken for comparison are taken at the maximum sensitivity of the instrument where we are comparing these test house locations; that is, the top sensitivity of the instrument which we are using, which means that the reported figure is not very great.

Q. Yes, I understand that, but I am trying to translate into my mind, as a layman, and get away from minute mechanical technicality, what it all means. I know something about what the vibration a truck will make means when it passes along the road, and multiply that by five and put it in a water circulator, it surprises me that it would not be causing trouble. I may have a distorted idea about it. A. Well, these readings are all comparative, and our reasons for taking readings on such things as vibrations due to a water circulator, was to get something to compare other readings against.

Q. Yes, but I want to compare that against my own knowledge of the vibration that a truck makes going along the road. However, I understand, but I was just wondering if you were in a position to say that this mechanical instrument gives us the effective result of the vibration. I can understand the measurement in a way, a comparative way, probably. A. I think perhaps what you are trying to get at is the amount of force that a certain vibration produces—damaging force.

Q. Yes, that is what I have got in mind. You have put it correctly. A. Then, perhaps this might help. If you have a strong vibration in a structure such as, say, a window pane, which would compare to a section of a greenhouse which we are testing at that point, where we get this high indication, it is much more pliable than, say, the base of a building, and the vibration caused by this water circulator motor operating will be higher, and I believe would cause less damage in a pliable structure than in something that is of a solid structure.

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Q. Well, I don't want to have it apply to glass alone, as you cannot do that, because the glass is joined, and we have had evidence of this character, that in a house nearby Walker's greenhouse, the screws on the storm windows, due to the vibration, were worked loose, and they had to putty the glass in the window frames, whereas before it was not necessary to embed it in putty, and that these things would move around and could be seen to move and creep along the shelves. You could see the vibration in the greenhouses and, standing against a stanchion or something of that sort, you could feel it. Now, would your investigations rule all that out—that those stories were all fiction? A. I would say this, that, at the points at which we took vibration tests in the vicinity of the test house and over on Manchester Street, there was not enough vibration to move anything out of position.

Q. Well, I do not think that they meant that. I think they meant that it sort of crept, by continuing movement. You would not see it move at the time, but it would be at one place one time and it would creep along to another place. It would not move enough or fast enough to see it move. A. Well, that is something I could not give a definite answer on. I have not tried it, but I would say that, to the best of my knowledge, the amount of vibrations we are picking up would not do that, but I could not prove that without trying it.

Q. Would you say that the vibrations you picked up were not sufficient for anyone to sensibly detect them? A. I would say not.

Q. So if a man says that the noise of the hammer kept him awake at night, that would be pure fiction? A. Noise is something else.

Q. Hearing it? A. Yes.

Q. That is distinct from vibration? A. That is distinct from touching a piece of ground and saying that vibrates while it is being produced. Those are two different phenomena.

Q. All right.

MR. KEOGH: I will be very brief now. You made some more tests at location "M.9" on December 7th, 1948, when the ground was not frozen? A. Yes, sir.

Q. And these tests were all made at that one location at this date. A. That is correct.

Q. And did you compile a table of the amplitude readings on that date, at that location, the original of which table I now hand you? A. I did.

—EXHIBIT No. 176: Further table of test data in vicinity of Defendant's Plant, December 7, 1948.

Q. And you made up that table truly and correctly from the readings and tests that you made at that time, at that location? A. Yes. I notice that you have included the oscilloscope sittings. I don't know if they would be of any value to the table.

Q. Well, if you do not think they would be,—it is a mathematical calculation, is it? A. No.

Q. Cathode ray oscilloscope at the bottom? A. No, it is merely mostly for our own information and to check back on the other reports, that is all.

Q. Well, it is immaterial to me. They do not do any harm. Now, I think this is all clear with the exception of the last item in Exhibit 176. I do not mean—I should not have used the word "clear"—fully explained. The last item is "One-pound hammer blow at 20 feet on fresh gravel surface". What gravel surface was that, and 20 feet from where? A. That is the freshly gravelled surface on Manchester Street, and that is 20 feet from "M.9".

Q. And is that an ordinary house hammer you can buy in any hardware store? A. Well, it is a mechanic's type of hammer.

Q. And how do you know it weighed a pound? A. Well, I just know that it is a one-pound hammer. They call them a one-pound hammer. I have never weighed one.

Q. It felt like a pound, I suppose. Now, these results obtained at "M.9" on December 7th, 1948, confirm or not confirm the results obtained earlier at the same location? A. They confirmed the results we obtained at that location in the previous report.

Q. That is the previous table filed as an exhibit? A. Yes.

Q. And the number of the previous one was Exhibit 175; the previous one with the sketch attached to the back of it? A. Yes.

Q. Now, you were assisted in making this sketch by a technician from the Ontario Research Foundation, were you? A. Yes.

Q. Is that Mr. Riendeau? A. Yes.

Q. Is he in Court? A. He is.

Q. And he had to do with the locating of what or what did you have to do? A. He aided me in setting up the instrument and locating the test probe which picks up the vibration and all phases of the work. He worked with me quite closely.

Q. And who did the readings and made the tabulations? A. I did the majority of the readings, and these were also checked by Mr. Riendeau and I made a majority of the notes on the proceedings.

Q. And it is my understanding that you did the majority of the readings and made the majority of the notes and Mr. Reindeau had to do mostly with the sticking in of this pick-up probe? A. That is true.

Q. I see. Well, we will call him. Your witness.

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CROSS-EXAMINED BY MR. SLAGHT:

Q. Now, Mr. Cavanagh, a truck passing one of your reading stations travelling 30 miles an hour, would go about 60 to 70 feet a second, wouldn't it? A. I don't know offhand if that is the figure.

Q. Well, you don't know the automobile speed tables, but if it did pass in a second in that way, would that be comparable at all to the matter of possible injury to delicate plants, like orchids? You don't have to answer this if you don't think you are capable. A truck that would run by in a second, is that comparable to an hour or an hour and a half thudding of a 5,000-pound hammer? A. I don't think I could answer that question, sir.

Q. Or take the case of the orchids? A. Well, I know very little about orchids, or flowers of any kind.

Q. Well, we have heard the statement that, "Steady dripping wears away a stone." That is true with water dripping on stone, isn't it? A. You are just saying it.

Q. I wonder if you would assert that a steady succession of blows from a 5,000-pound hammer continued for two or three hours, if that would be comparable in its effect on either the human being or a plant, to that of a street car or truck passing in a second or two? A. Well, that is rather an indefinite question, is it not, sir?

Q. Perhaps it is. A. I cannot see how I could answer that.

Q. Well, it is too indefinite for you to answer, is it? A. I believe so.

Q. Well, what about the steady jarring, even though the effect is slight for the moment, we will take it slight for this question, is not a steady jarring repeated for two hours, with just intervals of fractions of seconds, more noticeable and possibly has a greater effect on a human being, let us say, than a single second passing of a truck and its vibrations? A. Well, I think it could only be answered by saying what is the intensity of this jarring you are speaking of.

Q. Well, what do your points of intensity run? What is your highest figure for intensity? A. In what?

Q. On the heavy hammer? A. Well, the highest figures we obtained would be right in the forge shop.

Q. And what are they in figures, so that we will have something to talk about? What is the heavy hammer's high in the forge shop? These figures are all relative? A. Yes, they are. They are not absolute figures. The maximum figures which we obtained in the forge shop would be an off-screen reading of the sensitivity of—plotted on the sensity setting of the instrument.

Q. Now, supposing the hammer went on and was plotted for two hours? A. Yes.

Q. And the truck passed—what is the reading for the truck passing? A. The truck passing on locations which we are considering at the outhouse, would be the order of 10 to 20; somewhere in that neighbourhood, at an amplitude of 100, or rather a sensitivity of 100, which is roughly twice the sensitivity of the previous setting I mentioned, which is very much lower.

HIS LORDSHIP: Now, can you just relate that to my mind and say how much more vibration you found in the forge shop than you did with the truck passing—4, 5, 6 times as much? A. Oh, let us see, now. This is purely relative, you realize that?

Q. No, cannot you get it mathematically there? A. Well, they are approximately—it would be five times—five to seven times; somewhere in there. That is a very approximate figure.

MR. SLAGHT: And your test location near the street car passing was quite nearby, was it not? A. You are speaking of the street car?

Q. Yes. A. The street car test location would be—the tracks at that point are approximately—oh, they would be about 75 feet, roughly; that is only an estimation.

Q. Well, now, the forge shop—I don't know how many feet you got away from the heavy hammers, but it is close by the street car. Now, if the hammer is five times as great in each blow it strikes in its effect on vibration of or the cause of vibration and it is repeated in two hours hundreds and hundreds of times, would it not have a more adverse effect on either the human or a plant that was possibly subject to that vibration? A. Well, I would not speak with any authority of its effect on humans, or plants, but I would say if you are considering a point within the forge shop, you are taking the vibration you get from the forge hammer, I would say point "F.S.1", which is very close to the hammer in the shop, if you are comparing that to the effect of a passing truck a few feet away on a concrete road, naturally the vibrations produced at that point would be much heavier. That is quite logical.

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Q. Well, I thought we got past that. Perhaps I didn't understand. You told his lordship it would be five times heavier? A. Yes.

Q. Well, leaving out the density or intensity, perhaps, of the vibration, what do you say as to the repetition of vibrations for a couple of hours as affecting anything? A. Well, there again I mean, you have to qualify them in some way.

Q. All right, let us take this point. Are you telling us that, standing in the forge plant, yourself, you felt no vibration in your body? A. I have not made any statement about feeling vibration in my body. I said I could feel the forge hammers in my feet, when standing in the forge shop.

Q. Oh, well, I misunderstood you now. I understood you to say you felt it in your body. The feeling in the feet goes through the body? A. I could not say I felt anything at all in the rest of my body.

Q. You felt it in your feet. What do you mean? Describe what you mean you felt it in your feet? Was it a stinging, or a tickling, or what? A. You just felt like a tap on the bottom of your feet.

Q. Well, when you were taking these records when the street car was moving, did you feel anything on the bottom of your feet there? I suggest you didn't. A. I don't remember making any statement whether I did or not.

Q. I don't know what you said, but I invite you now to make it to me. A. I don't know. I may be wrong, but I have taken measurements with an instrument—

Q. Now, don't get away to that, please. I am taking your "M.9". That is where you got the street car vibration, or the truck, was it? A. I don't believe there were some instrument readings taken at "M.9".

Q. Well, what station did you get your truck reading? A. I think you are speaking of the locations around the test house, are you not?

HIS LORDSHIP: I think he got them both places.

MR. SLAGHT: Q. Now, I suggest you did not have any feeling in your feet? You did not feel that vibration in your two feet. What do you say? A. I would not say. I would not make any statement on that. I was not very aware of any vibration in my feet. I was not looking for vibration in my feet, sir.

Q. No, but you were aware of vibration in your feet in the forge shop, whether you were looking for it or not, weren't you? A. Yes, I would say so, and when I was in close proximity to the hammers, yes.

Q. Now then, is there any similarity to the vibrations caused by this heavy hammer that creates the disturbance on the surface of the earth, and in the structure of the earth—is that right? A. They create a wave.

Q. Well, the wave travels where, not in the air, that is a noise. But the wave that we are speaking of created by vibration travels through the crust of the earth, if I can put it that way. Is that right? A. Yes, if you were considering the crust of the earth, yes.

Q. Well, that is what I am putting to you, and is it somewhat similar to vibrations that are felt when an earthquake occurs? A. Well, I have never felt the vibrations from an earthquake, but you might get similar ——

Q. I thought you were a student of this problem. I suggest to you that earthquake vibrations and vibrations by a heavy blow, such as you have described, create a disturbance to the crust of the earth of a somewhat similar character. Do you assent to that? A. I consider that I do not know enough about earthquake vibrations to compare the two directly. I would say the vibrations you get from a forge hammer do enter the ground and they do travel, and I do not know how they compare in wave form or frequency to an earthquake.

Q. All right. Then, you have not studied earthquake vibrations at all, apparently? A. I have not been asked to study earthquake vibrations.

Q. And would it not be true of hammer vibrations that the particular character and the particular part of the earth's surface through which the shock is travelling to a given point, is dependent to some extent upon the earth's formation in the line in which the frequency is travelling? A. You mean by that the structure and composition of the earth in the path of your shock?

Q. Yes, is a factor in the severity with which it will be felt at a point a distance away? A. I would say that was so, yes.

Q. And is it also a fact that vibrations of this kind may be felt, of a more severe character, at 1,000 feet than at 500 feet, may be felt, having regard to the structure of the earth in each instance? A. I would say that in a very special case it might be, yes, dependent on the structure.

Q. I suppose a little lighter? A. I would say that in a special case where the formation of the earth was available, that could be so.

Q. And you, of course, did not get any tests from the Walker greenhouses? You told me you were not on the Walker premises? A. No, I was not on the Walker premises.

In the Supreme Court of Ontario No. 44 Defendant's Evidence Raymond L. Cavanagh Cross-Examination 6th May, 1949 Continued

Q. Your "M.9" station was as close as you got, was it? A. I believe that was as close as the other points.

Q. And is it possible or not, having regard to your last answers to me, that the vibrations in the Walker greenhouses might differ to some extent to the vibrations tabled at point "M.9"? A. There is always a possibility, yes, I would say that. I do not know the character of the earth in the vicinity of Walker's greenhouses.

Q. That is a very fair answer, witness. I think I expected you to make it. Then, why didn't you take a vibration right outside at the door at the Walker's greenhouses? A. I was not asked to do that, sir.

Q. Somebody else plotted these spots and points for you? A. No, sir, but I was not asked to do any measurements on Walker's property.

Q. No, but you could get on the street without going on to Walker's property? You could get within a foot or two from his nearest greenhouse. You didn't do that, at all events? A. No.

Q. Wouldn't that have been a better test, I suppose, from the evidence we have had here, although you are not responsible for that, if you had made a test right on the street, about a foot away from Walker's door, which I understand was right up to Manchester Street. A. It would have been a better test. I could not argue that.

Q. And you did not make it? A. I did not make it. I felt that the points we took are representative of the area, as far as our information goes.

Q. It took an awful lot of tests down at this outhouse. What good was that? What were you doing down there? A. We felt that that was a good location to operate from. We had electrical power from everyone, and it was very convenient.

Q. Oh, I see. And that helped you—easier in the making of the tests? A. Yes.

Q. Now then, you have given me figure 50 in the forge shop of the vibration, and what was your similar figure for the truck, 20? A. I believe 20 was the maximum.

Q. The maximum was 20?

HIS LORDSHIP: But those are not on the same —— A. No, they are not at the same points.

Q. No, neither are they —— A. No, they are not at the same sensitivity.

MR. SLAGHT: And you have already been fair enough to tell me that you don't know anything about the particular surface of the earth at these various points where you made your tests on? A. I have only the information that the ground is fairly soft in the vicinity where the foundations for these various buildings were put in and at the point —

Q. And how —— A. Pardon me.

Q. Go ahead. A. And I was just going to say we only know of the test points where we have taken readings.

Q. And how deep below the actual surface of the earth is the earth agitated by the heavy hammers? A. That is a question I could not answer.

Q. Well, I could not help you with it, I am free to say, and does the foundation of a building have anything to do with to what extent vibrations in the building will occur? A. Well, in what way do you mean that, sir?

Q. Well, if there is—if a foundation is against a cement floor, that is an illustration, has that got anything to do with what you would expect the vibration to be on shelves, or plants, with leaves,—the character of the foundation of the greenhouses I am thinking of? A. I see. You are thinking, then, if you have a concrete floor, say, in a greenhouse, as compared to an earth floor, you would have—you want me to give an opinion on what the difference would be?

Q. Yes? A. Well, I am not really too sure, because it would depend on the type of ground which you would have in a non-concrete floor, or that would influence it, and it would depend also on the design and depth of the concrete foundation.

Q. Well, perhaps that is a very fair answer. Then, let me ask you this. You felt in your feet vibrations in the forge shop. How about outside the forge shop, on the cement sidewalk? A. I never noticed them, sir, particularly.

Q. And, as you got farther away, did you notice any vibrations in your feet, whatever that means? A. No, sir, not that I would associate with the forge shop. Perhaps I was not particularly aware at the time, but I was not, of course, looking for that sort of thing.

Q. No. Well, I can understand that. Which hotel do you stay at, the Welland or the Lincoln? A. I am not staying at a hotel.

Q. And is the ground at the test plot filled with ashes or cinder, do you remember? A. I believe I made a note of the material there—the filling within the enclosure?

Q. Yes? A. I have it noted as some type of gravel.

In the Supreme Court of Ontario No. 44 Defendant's Evidence Raymond L. Cavanagh Cross-Examination 6th May, 1949 Continued

Q. If there was shale under Walker's greenhouses at a distance of 30 inches below the earth, could that or not have any effect in intensifying the vibrations that one might feel inside the greenhouses? A. Well, there again I am forced to be indefinite. I do not want to be indefinite, mind you, sir, but that would depend very much on the way it occurs, how it is stratified, how it is broken up in any way. I could not give a very good answer on that.

Q. And which type of shale would tend to create a more intense vibration in the greenhouses, the broken up or the stratified or the solid? A. Well, I would have thought the more solid rock would be a more logical conductor of a vibration than a broken rock.

Q. Then, I think you told his lordship that noise is a different phenomenon from the vibrations, so perhaps if some of us think we hear a noise a good way off, that might not have much to do with the resultant vibration. Is that your idea, as a scientist? A. I would think so.

Q. Then, I won't go into noise, or we will get into perhaps a glorified phenomenon. But let me ask you this. According to your observations, I am going to sum it up this way and ask you whether or not you would be prepared to pledge your oath that, bearing everything in mind, there could not be, from the big hammer, some slight vibration of leaves on delicate plants in Walker's greenhouses? A. Well, you are asking me something I cannot give an answer on, because I have not made tests in Walker's greenhouses.

Q. I know, but you have made a lot of elaborate investigations.

HIS LORDSHIP: You have asked him a question and you asked him if he were in a position to pledge his oath, and he said he could not say. He says he is not. Why do you want to argue the point with him?

MR. SLAGHT: Well, perhaps your lordship is quite right. I have been doing a wrong advocacy there and, as his lordship puts it, you are not in a position to pledge your oath that such occurrences did not happen in Walker's greenhouses, such as the waving of leaves, because we have heard many people say they did. A. I am not prepared to say that, because I did not take tests in the greenhouses.

Q. Quite so, Mr. Cavanagh. That is all.

—Witness excused.

DOUGLAS RIENDEAU, sworn

In the Supreme Court of Ontario No. 45 Defendant's Evidence Douglas Riendeau Examination-in-Chief 6th May, 1949

EXAMINED BY MR. KEOGH:

Q. You are a technician on the staff of the Ontario Research Foundation? A. That is correct.

Q. You were present in Court and heard the previous witness, Mr. Cavanagh, giving his evidence? A. I did.

Q. You assisted him in the matter of these tests? A. I did.

Q. And whatever work you did in connection with them, you did correctly and truthfully? A. That is correct.

Q. And any readings—he did most of the readings, as I understand it? A. Yes, that is correct. I assisted in placing the probe at spots designated and agreed upon by Mr. Cavanagh and myself, and we carried the instrument around, set up records, and so on, and running around determining which records to run and at what time and helped him actively to do so, and generally assisted Mr. Cavanagh. He was senior man in charge of the investigation.

Q. And whatever work you did in connection with it is truly and completely recorded in the tables which Mr. Cavanagh has filed here to-day and the other information which he has given to the Court? A. That is correct.

In the Supreme Court of Ontario No. 45 Defendant's Evidence Douglas Riendeau Cross-Examination 6th May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. You heard what I put to Mr. Cavanagh that, assisting in all these tests and running all around, knowing something about it, I suppose you would pledge your oath from the tests you made that the plants in the Walker greenhouse might not be affected by the big, heavy hammer and its vibrations, to the extent that their leaves might slightly tremble? I am asking you whether you can swear that could not happen? A. I cannot swear something I did not see, since I was not in the Walker greenhouses. I cannot make any statement concerned with regard to the Walker greenhouses.

Q. No. Well, all right. You did a lot of the work all around there.

HIS LORDSHIP: Well, you put a question to the witness and he answers it, and you seek to scold him. I do not think there is any occasion for that.

MR. SLAGHT: Well, I shall not do that, my lord. The reason I was tempted, this young man said, "Well, I cannot swear to anything I did not see."

HIS LORDSHIP: Well, if you want to refine it, all right, but do not scold him because he answers it the way he did.

MR. SLAGHT: That is all.

—Witness excused.

—Intermission.

In the Supreme Court of Ontario No. 46 Defendant's Evidence Owen W. Ellis Examination-in-Chief 6th May, 1949

—On resuming:

OWEN W. ELLIS, sworn

EXAMINED BY MR. KEOGH:

Q. Dr. Ellis, you are director of the Ontario Research Foundation? A. Director of the Department of Engineering and Metallurgy.

Q. Of that foundation? A. Yes.

Q. You were in Court and heard the procedure of those tests described by the last two witnesses, Mr. Riendeau and Mr. Cavanagh? A. I was.

Q. Are they members of your staff? A. Yes.

Q. And, from a scientific standpoint, was the procedure for measuring vibrations as described by them scientifically correct, or was it not? A. I would say it was scientifically correct once the apparutus was placed in good condition.

Q. You are smiling when you say that. That is about that first entry of September 20th you are thinking now? A. It is a thing that happens in research work on any number of occasions. We have to get our instruments in order before we can get the truth.

HIS LORDSHIP: Instruments can fail to tell as well as a witness —— A. The truth.

MR. KEOGH: Then, don't answer this question till his lordship rules on it. Can you tell me the high and the low limits of iron oxide in soft coal ash? A. Roughly, between 25 for the high and 5 for the low. Those are the results based on work done in the United States Bureau of Mines, for a large number of years.

HIS LORDSHIP: Five for the low? A. Those are the approximate limits.

Q. And what does that mean? Is that a percentage, or how do you express that scientifically? A. That is the percentage of iron oxide present in ash.

MR. KEOGH: Your witness.

In the Supreme Court of Ontario No. 46 Defendant's Evidence Owen W. Ellis Cross-Examination 6th May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. And in coke, Dr. Ellis? A. The percentage would be slightly higher due to the fact that coke made from a particular coal would have some of its volatile elements removed from it.

Q. Then, oil as a fuel, bunker and crude, do they contain a percentage of iron oxide? A. If they do they must be extremely small; they are not important.

Q. Oil itself in combustion, is not absolutely perfect. It creates a tarry, oily smoke or fumes? A. It can do so.

Q. That is the effect of it in non-combustion? A. True.

Q. What is the percentage of iron oxide in iron rust? A. Iron rust?

Q. Yes, pig iron?

HIS LORDSHIP: Give us one thing at a time. You have asked him a question about iron rust. A. On iron rust, that would vary according to the proportion and the extent to which the rust was hydrated in its drier form and, if you like to call it such, the content in hydrate,—it would run about 70% of iron, not iron oxide; it would be on iron oxide.

HIS LORDSHIP: Can you give us the range? I understood you to say that the range in the soft coal was from 25 of a high to 5 of a low of iron oxide. A. Yes, F.E.203.

Q. In the iron rust? A. Iron rust in certain circumstances. If nothing else but F.E.203, 100%.

Q. But there is a suggestion, and I think we have evidence—yes, we have evidence that upon the scrap iron being put in the smelter, the force of the draught carries the iron rust from it up the chimney, up the cupola. We have evidence to that effect. I am not asking you to comment on that evidence. I am not asking you to say what percentage of iron oxide would be contained in that. A. In other words, what percentage of iron oxide would be contained on the surface of the pigs that are charged into the cupola?

Q. No, it is not the pigs. It is the scrap iron that lies outside and gathers rust. A. Well, that could vary very considerably, according to the thickness that is the charge.

Q. Now, listen, Dr. Ellis. There is something wrong with my ability to make things clear, it seems to me, to witnesses. I spoke of the iron rust; that we have evidence of the rust being carried up the cupola. A. Yes.

Q. And the rust that is flaked off, being carried up the cupola with the strength of the draught. A. Yes.

Q. Is that 100% iron oxide. A. Is that rust 100% iron oxide?

Q. Yes? A. I would say once it gets into the cupola, it is converted into 100% iron oxide.

Q. It is what goes up the cupola I am concerned with. A. Yes.

Q. You were thinking I was referring to it in its place on the metal? A. Yes.

Q. All right. Proceed, Mr. Slaght.

MR. SLAGHT: Just, I think, another question arising perhaps out of your lordship's. We have heard in this case from some scientists that 600 feet away on the roof of Walker's greenhouses they found deposits containing an analysis 45% of iron oxide. That is consistent with what you are telling us? A. I would expect to find 4% of iron oxide in any dust in any city.

It would vary in amount according to the place in the city.

Q. But 45% we have found, and it is not inconsistent with your scientific knowledge? A. I would think it not inconsistent.

Q. Thank you.

HIS LORDSHIP: I am going to ask another question. You are speaking of ash having 25% of a high. Would that be the usual thing that it should be so high,—soft coal? A. It varies considerably, but I really could not quote an average value for all coals.

Q. You cannot quote an average? A. No, I think it would be unfair, because it varies so considerably from mine to mine.

Q. Would the fly flash that is carried from that coal be magnetic? A. It could be.

Q. Would it be likely to be magnetic? A. It is quite possible.

Q. Would it likely be magnetic? I am not asking you about possibilities of a rare thing. But if you went out and collected outside this Courtroom, laid down a sheet and took a collection of what might fall on it? A. I would say that a fair proportion of the material that was picked up, would be magnetic, but what proportion, I don't know.

Q. If you laid a sheet out in the park or outside the Courtroom here now, would you expect the dust and material gathered on it to be 45% iron oxide? A. I am not prepared to answer that. I could not answer that.

Q. Well, I guess you cannot help me very much. I thought I was going to take advantage of your being here to assist me in some of the things I have to decide before this case is over, but I guess I will have to rest there. A. I am sorry.

MR. KEOGH: That is all, my lord.

HIS LORDSHIP: Ten minutes.

MR. KEOGH: Before your lordship makes that announcement, I was going to start now on another branch of the case, the history of the plant and, in view of the heat, and so on, I am just wondering whether your lordship wanted to start a new branch of the case this late in the day. I have the witnesses here.

HIS LORDSHIP: Oh, yes, we do not want to lose the next hour and a quarter.

—Intermission.

THOMAS COLEY, sworn,

EXAMINED BY MR. POND:

Q. Mr. Coley, I understand that you are presently employed by the McKinnon Industries Limited, in the capacity of general foreman of the moulding room? A. I am.

Q. When did you first go to work for the predecessors of McKinnon's? A. I went in 1907, the spring of 1907.

Q. Was that at the same plant, on Ontario Street? A. At the same plant situated where I am now.

HIS LORDSHIP: Q. What was the name of the company you worked for? A. McKinnon Dash at that stage, when I went in there.

MR. POND: Q. The McKinnon Dash and Metal Works Limited, I believe, my lord.

HIS LORDSHIP: Very well.

MR. POND: Q. Then I understand you went away for a few months and then returned in 1908. Is that right? A. That is correct.

Q. And we will start off with 1908. In what capacity were you employed at that time? A. I was employed as a moulder.

Q. Now, I want you to—working as a moulder, you would be working in the foundry? A. At that early age when I first went in there, the foundry was small and the McKinnon Dash was small and the foundry being situated, the furnaces being in the middle of the building and all on one floor, the foreman or moulder even had access around there, all around that ground floor, and he seen all around that part.

Q. Well, are you familiar with the foundry as it was in 1908? A. 1908, I am familiar with that.

Q. Yes: and having regard to the westerly extension of Carlton Street, where did the foundry building start? A. The foundry building started—there was what you would call the end of Carlton, being on the north end, and there was a space through of a few feet and there was a street car track and a few feet from the street car track there was what we call the annealing oven and where the stack was placed was the boundry line of the annealing room.

Q. And these annealing ovens, where would their location be compared with the cupolas at present at the north end of the foundry? A. Myself, I think there is very little difference with those cupola stacks; look to me that they are just about the same place as what the stacks on the annealing ovens were, on the boundary line.

Q. Now, just describe these annealing ovens. A. Well, at that time as they went on, there was four at one time, and there was a brick stack was pulled down at this early age and that run for a few years, that is, the ovens, to come in from the top and two from the bottom into that one chimney, but that was later pulled down and the oven was enlarged from 1936, and then there was installed under that Act steel stacks which consisted at the time, they was running right on to three stacks and there was more ovens built and there was eight ovens leading on the boundary line on that same Carlton Street at that time and fed on to the three stacks, the brick stack being removed.

Q. How many annealing ovens—you say there were eight at one time? How many in 1908 would there be? A. I think I went, I think there was three, and I think the fourth one was put in right after.

HIS LORDSHIP: What is an annealing oven? A. An annealing oven, it is just a spare building built and there is flues at the back; that is, a firebox in front of the fire, so the fire, the flue went over the top of the annealing stands, which the stands was back in. There was a fire over the top of it, down under the flues, and underground, travelled underground right straight past, underneath the firebox, right back to the wall, and then under and through the stacks.

Q. It is to make hard iron castings? A. It is to make hard iron castings. We make malleable; hard iron is the first stage and it is made into malleable.

Q. Well, it is to temper them so they won't be so fragile? A. Yes, that you would not be able to break them; that they would stand up.

MR. POND: Q. And approximately what year was it that they erected the eight annealing ovens along that line? A. We started to get more power after we had several slack spells, and the eight of them come into play after '20; leading up to, say, three, four or five.

Q. Just give me the year. A. Well, you can say between four to six at a time, running as close as eight before we got the last two in.

Q. Well, what do you mean by "eight"? A. 1928.

Q. By 1928 you had the eight ovens? A. Eight ovens would be going in at that time.

Q. And by what year would you have had six ovens in operation?

MR. SLAGHT: I think you are a little wrong there. I think he tried to tell you in 1920 he had the eight.

HIS LORDSHIP: Had eight by 1920?

THE WITNESS: No, eight by 1928.

MR. POND: Q. And about 1920 how many ovens were there? A. I think there was about four running there; four or five.

Q. And can you tell me how many tons of coal were used when you had eight ovens? A. Well, when you had eight ovens all eight ones, there was just a few occasions with the eight would be four tons as charges.

HIS LORDSHIP: I suppose this evidence is directed to your plea of prescriptive right, is it?

MR. POND: That is true, my lord.

HIS LORDSHIP: Well, I hope counsel has given careful consideration to the law on it and considered whether there is a real, legal basis for evidence of this sort. If you feel seriously about it, why, I am not going to limit you, because you may argue any question of law you like; but if you are not serious about when there is a complete changed condition and a new process starts in 1938, if you think that an annealing oven process has any relation to melting scrap iron and pig iron, why, I am not going to stop it. I hope, unless it turns out to be a real legal foundation, you do not take too much time on it.

MR. POND: I will try and shorten it, my lord, but there is this point, that the extent of the prescription may be subject to argument.

HIS LORDSHIP: Well, it has to be a prescriptive right to do the thing that is complained of. There is no complaint about anything up until 1938 in the pleadings, or anything else. It is the process and the process that is alleged is the injury, by reason of the operation of the cupolas. However, I do not want to deprive you of any factual evidence that you think may give you a foundation for a legal argument, by any means.

MR. POND: We feel that it may be—

HIS LORDSHIP: Well, if you feel you have some legal authority that will carry you through on the relation of the two, I am certainly not going to deprive you of it.

MR. SLAGHT: I don't suppose anything I will say may change your mind, but may I point out they could not make grey iron.

HIS LORDSHIP: Well, there is no use of arguing it at all, Mr. Slaght. I am merely pointing out what the case is about, and the case is about the operation that was commenced by the erection of the cupolas. All right. Proceed.

MR. POND: Q. How many tons of coal were used in the annealing ovens, do you think, let us say, Mr. Coley, when there were eight? A. Well, you would run—

Q. Just give me an approximate figure. A. They would run, say, between 30 and 45 ton for the eight, or less, according to whichever of the fires went down.

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Q. You mean if there were eight in operation, you would use 30 to 40 tons? A. Yes, and several went down and so there would probably be five that would come up to certain stages and hold at certain stages and then they went down and coming up was the heaviest time at the first, 42 hours fired.

HIS LORDSHIP: Q. You would get your fire up and as it was coming up you used more, and keeping it at that temperature? A. Yes, and then they would drop down.

MR. POND: Q. How long would the annealing ovens be kept hot until you took out the contents? A. There would be 42 hours coming up and then hold them up for 36 and then there would be a process of cooling down for probably 30 hours.

Q. How long cooling down? A. If they wanted cast and break it open a bit, anywhere from 25 to 30, and cooling down the other way.

Q. How many annealing ovens would there be actually being fired at any one time, on an average? A. Eight was the most that was fired at one time.

Q. You said somewhere in the process of cooling? A. Because after they was enlarged, the little one didn't fire so much, and we kept the bigger ones, because it was much easier, because it got more pots in.

Q. When you had eight in operation, you had a certain number being cooled out. How many were in actual operation as far as being fired is concerned? A. In operation, you could count a little over—you could count eight on the wall and there was the other two after that. You see you would probably have four or five working at one time, that would be steady. You could count on four or five working steady.

Q. And how was the smoke from the firing exuded? A. At that stage they was fired by shovel; fire in for half an hour. The fire was important and a fire with a natural draught going through at that time.

Q. How did the smoke get out of the oven? A. It went right up the stack and out in the air.

Q. And how many stacks were there? A. There were three on that wall onto Carlton Street, on the northerly wall.

Q. Were there any wash or arrester devices in the stack, do you know? A. None whatever.

Q. I am producing to you a photograph. Would you please identify that, if you can? A. I identify three stacks.

Q. Just tell me what it is a picture of? A. Of the three stacks on Carlton Street.

Q. No. What is the whole picture? A. That is the McKinnon, or the General Motors now. It is the McKinnon. I always called it the McKinnon.

Q. And about what time was that picture taken? A. I would say anything from '30, to '34.

Q. And can you point out—

MR. SLAGHT: Well, I don't know that that is evidence, my lord, "'30 to '34."

HIS LORDSHIP: Oh, that is sufficiently close for the picture.

MR. POND: Q. And can you locate the three stacks from the annealing ovens? A. The three stacks is on there and it looks like—

HIS LORDSHIP: Now, this is a picture of what? A. Of the foundry.

Q. The foundry belonging to whom? A. To General Motors.

Q. No, I want to know. A. McKinnon.

Q. I want to know to whom this foundry belonged, for one thing.

MR. POND: Q. Is that a picture of the plant operated by the McKinnon Industries? A. That is operated by McKinnon's, where I was employed.

Q. Just a moment.

MR. SLAGHT: The last name we had was the McKinnon Dash Metal Works Limited.

MR. POND: That was in 1907, my lord.

HIS LORDSHIP: When did it become the McKinnon Industries?

MR. SLAGHT: There was an intervening company between the two, also.

HIS LORDSHIP: Well, if we have not the evidence given about what one person did and then evidence about what some other person did and still evidence about what some other person did, although they are the same person, it is all very confusing. There might be certain legal results flow, I don't know, but I want to know when you are giving evidence about an operation, what corporation was operating during that period.

MR. POND: Yes, my lord. The corporation was dealing with the McKinnon Industries at that time.

HIS LORDSHIP: If there is any intervening one, as Mr. Slaght says, can we get now the dates of the incorporation of the various companies? We start off with the McKinnon Dash Metal Works Limited. How long did they carry on business at this location?

MR. POND: I can read that out to you, my Lord.

HIS LORDSHIP: Well, if you will I will make a note of that. I do not think there will be any dispute about this.

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MR. POND: The first company was the McKinnon Dash and Metal Works Company Limited, 1901.

HIS LORDSHIP: Yes.

MR. POND: Then the McKinnon Industries Limited, 1917; the McKinnon Industries Limited, 1925.

HIS LORDSHIP: And that is the defendant?

MR. POND: That is the defendant, my lord.

HIS LORDSHIP: There has been no corporate change, then, since 1925?

MR. POND: That is correct, my lord.

HIS LORDSHIP: Very well, then, the period the witness was discussing would be the McKinnon Industries Limited?

MR. POND: That is correct.

MR. SLAGHT: May I point out, my lord, the witness apparently did not take this photograph. He is in doubt about when it was taken. He ventures to think that it might have been taken between 1930 and 1933, and I point out to my friend that is very dangerous to introduce a photograph on such a shallow foundation as that.

HIS LORDSHIP: Oh, I do not think there is much going to turn on this photograph, Mr. Slaght.

MR. SLAGHT: I do not either, but I have to make that comment about it.

MR. POND: Other photographs will be put in on a similar basis.

—EXHIBIT No. 177: Photo of McKinnon Dash Company taken between 1930 and 1933.

MR. SLAGHT: What does the witness say about the date of it?

MR. POND: He says it would be taken between 1930 and 1933, and you have given us up to 1928. What was the operation carried on with respect to annealing ovens from 1928 until the new foundry was built and the cupolas were installed? A. Up to the change of the pulverized coal, it was hand-fired. When the pulverized coal came in it was changed over to pulverized coal, the powdered coal.

Q. Did you carry on with these core ovens, or did you not, up until the new foundry was built in 1935? A. We carried on with these till 1937, when the new ovens was built.

HIS LORDSHIP: So you were doing your annealing until 1937? A. At that time.

MR. POND: No, there were other operations in the foundry, my lord.

Q. Now, you have mentioned until the pulverized coal system was installed, before you used the pulverized coal what type of coal did you use in the annealing ovens? A. Soft coal.

Q. And when was the pulverized coal system installed? A. I think that come in around about 1928-1929 and '30; I couldn't be sure to a few months.

Q. Could you pick out on Exhibit 177 the location of the pulverized house where the coal was pulverized? Where was it located? A. It was located on the northwest corner, just a little west from the main end of the foundry, on the northwest corner.

Q. Was it located north of the annealing ovens? A. North of the annealing ovens.

Q. In the northwest corner? A. In the northwest corner from the annealing ovens.

Q. Then you said from that time on they used that powdered coal? A. They used powdered coal from then on.

Q. Until 1937? A. Until 1937, till the present system was installed.

Q. Now, when you first came to the plant in 1907 or 1908, what type of melting furnaces were in use? A. What they used to call the old camel-back furnace, fired by your soft coal.

Q. Fired by hand? A. The shovel.

Q. And where was it located with respect to the annealing ovens? A. The furnaces was located in the centre of the foundry; could be about 200 feet from the annealing oven.

Q. Would that be south? A. That would be south from the annealing ovens.

Q. And what was the melting capacity of that furnace? A. On the small furnace, we used to call it a ten ton.

Q. And how much coal did you use on an average, each day, in that furnace? A. If we had two heats, it would run around 20 tons. If we had two heats which we had at that time and if there was a little tonnage, there would be more coal took along with the fire according to the tonnage of coal used; it figured about ton for ton; might vary a little bit, according to draughts.

Q. You mean a ton of metal to a ton of coal? A. Yes.

Q. And what would be your average run each day? You said some days you made two heats; sometimes didn't make only one? A. Well, as the years and trade, business called for, there was some slack times, as our metal was needed, our castings was ordered, that is what we worked to for that next day or the next week, whatever was required.

Q. And in 1929 when the better coal system was installed, was that used on this No. 1 melting furnace that you have been speaking of? A. Yes, on No. 1.

Q. And was the same system used from that date until the new foundry was built, in 1937? A. Right straight till the new foundry was built.

Q. Were there any other furnaces added after 1908? A. The No. 2 was in operation then. It was made a little larger there, but those two was in force there right at that date, No. 1 and No. 2 were always called off right till the change to the present foundry, 1937.

Q. And what was the capacity of the No. 2 furnace? A. Well, it would vary. If we was stuck for work, I have seen on one heat we have had 30 ton, that the wall will be built higher or the bottom fixed or the breach wall re-altered.

Q. Is that 30 tons in one heat? A. When we could run three heats, and it could be reduced or altered to take 20 tons, or whatever was required. The breech wall was changed to meet the bottom of the oven, and the breech wall was changed.

Q. What would you say the average run for the day would be, during that period? A. Well, we have run three heats and we have run four. We have run—I remember the first time we got up to 60 ton a day and then we got up to 65.

Q. If you ran two heats a day you would run how much? A. If we run the big furnace we could get out about 40 ton, 45. If we run the little furnace No. 1, we have got out from 30 to 35.

Q. Now, you have already told us the No. 1 furnace used about a ton of coal to about a ton of metal? A. Yes.

Q. Would that same amount apply to the No. 2 furnace? A. Just about the same; that would be on the odd coal fire, and I had no knowledge to keep what we burned when the better coals come in. I am just speaking of when we used to pitch the coal in and it come in by car. When it come to pulverized, I was moved and I had other work to do. That was changed over for the pulverized, and the weight was kept from the other end.

Q. And how did you get rid of the smoke from the No. 1 furnace? A. Went up the stack and out into the air.

Q. And how high was that stack? A. I think that stack, it could run, I would say, around about 50 feet.

Q. And how did you get rid of the smoke from the No. 2 furnace? A. Same way as No. 1; went up the stack.

Q. How high was that stack? A. It might vary a few feet. I don't think there was ten feet difference in them.

Q. You think the stack from No. 2 would be a little higher or lower? A. It might be a little bigger around. I think the No. 2 stack was.

Q. Can you tell us whether or not there was any washing or dust arresting equipment in those two stacks? A. None whatever.

Q. I think you have already told me that the use of No. 1 and No. 2 furnaces continued on until 1937 when the new foundry was built? A. Yes.

Q. Now, when you first came into the McKinnon Dash Metal Works Limited in 1908, where were the core ovens located? A. They was on the southwest corner of the foundry.

Q. And I think it has already been stated that the cores were made of sand and some iron and then taken back to the oven and made into mouldings? A. Sand and oil and pig.

Q. And can you tell us anything about the method in which the smoke and fumes were exhausted from the core ovens when you first came there? A. They just went outside.

Q. Was there a stack? A. A small stack, just kind of a dome to pull it off and just in there through the roof.

Q. And did that continue down to 1937? A. That continued down to 1937.

Q. And can you tell us whether or not there was any water wash or arresting equipment on the stacks from the core ovens? A. I never seen any.

Q. I am going back to the annealing ovens. Can you tell us anything about the smoke that came out of the stacks? A. Well, it was fired natural, going up. We had to fire her good. When you are firing by soft coal, there is always a smoke, and it had got to travel over and it would certainly travel up the field. It would blow across the field there, blow west. The west wind seemed to drive it over there. There would always be smoke hanging there when these annealing ovens was running any day, seven days a week, whatever number was required. There was always some annealing ovens running. It was never stopped.

Q. Can you tell us whether there was considerable smoke from the annealing ovens? A. The smoke would travel across that field, yes, would travel up for four or five hundred feet.

Q. And in connection with the smoke from the stacks of Nos. 1 and 2 furnaces, can you tell us anything about the smoke from those stacks? A. Yes. Nos. 1 and 2 furnaces was built so as if it was fired for a length of time and we could get the heat through to the top, there was a damper on No. 1 and No. 2 was closed and the flame and the heat could be transferred over to the Weeks boiler. It would be transferred over to there after we got all the smoke and we got the heat, the flame had to be brought up to there before that damper would be dropped and transferred over.

Q. And transferred over to the Weeks boiler, was the smoke then exhausted through the stack, or how did it get out? A. The smoke would still be going up on the Weeks boiler stack. On the top of that stack, the Weeks boiler, the Weeks boiler was a private stack much taller than the others.

In the Supreme Court of Ontario No. 47 Defendant's Evidence Thomas Coley Examination-in-Chief 6th May, 1949 Continued

Q. And where was that stack located, having regard to the two furnace stacks? A. That stack would be located on the top of the Weeks boiler, and the three stacks would be right in between No. 2 and No. 1, and the boiler would be right in there and the connection would be made just right at the head.

Q. The three stacks would be all together? A. Would be all together.

Q. And can you tell me whether or not there was any dust washing or dust collecting equipment on top of the Weeks boiler stack? A. None whatever.

Q. Now, during this period from 1908, can you tell us anything about the dust collecting equipment in any of the stacks? A. Yes. Around, leading—just coming on to 1920—maybe 1918 and '19, we installed a little sand blast system over in the annealing room to take care of the cleaning of castings in the annealing room after they was dumped from the ovens on to the floor. That was put first up in the annealing room. There was one little double sand blast on; after '20, that was removed and we brought two more later models into there and they was installed there and the dust from that went outside into the dust bin.

Q. Where was this dust bin located? A. That dust bin was located, I would say, about 80 feet—could be 80 to 90 feet west of Carlton, south of Carleton, going on Ontario, and about 40 to 50 feet off the sidewalk, in between the annealing room and right ahead of the compressor room, and that was outside.

Q. Would that be on the west side of Ontario Street? A. On the west side of Ontario Street.

Q. And you have said about 80 or 90 feet from Carlton Street? A. It was the length like what we call the shipping room and come this way, on south.

Q. And can you tell us anything about the dust from this dust bin that you call it? Would it be carried out over the neighbourhood? A. That was put into this tank and then two or three times a day a man would go out. He would wind the crank and that was dropped on to the ground.

Q. What was dropped on to the ground? A. The dust that was poured from the sand blast; the sand that was used for sand blasting the castings.

Q. How much dust would there be? A. Well, probably get one to three barrows some days; just depend, according to the volume of work he was putting through, the amount of castings what was being cleaned. It was a wheel-barrow—what we call wheel-barrows now, but they was called sand blast barrows at that time.

Q. And when this dust tank was emptied, what happened?

HIS LORDSHIP: Q. How close was it to the ground? A. That would be—where they dumped was four or five feet to the bottom of the tank, where the dust dropped down.

Q. And the bottom open? A. Yes.

Q. And the dust dropped down? A. Yes.

Q. Well, now, how has that anything to do with this case at all? We don't want to get into all those details of the minute operations of this tank over a period of the last 40 years.

MR. POND: Q. Can you tell us anything about this dust, when the bottom of the tank was dropped? Would it blow away? A. Well, it did blow away. It would be cleaned up. It might be two or three days before the truck would take it away and it was exposed to the weather and to the wind, and it blowed away, certainly.

HIS LORDSHIP: And I suppose some dust off the road blew on to it? A. Well, dust would blow any place. The more wind, the more dust.

MR. SLAGHT: Didn't throw any in your eyes, though? A. I used to try and watch.

MR. POND: Q. Now, I understand at the present time you live on Pleasant Avenue. Is that so? A. That is correct.

Q. And how far from Ontario Street? A. I would say I live about 350 yards from Ontario Street, up on Pleasant.

Q. How long have you lived there? A. I have lived there 24 years.

HIS LORDSHIP: Where is Pleasant Avenue?

MR. POND: That is the street where the poplar trees were cut down.

HIS LORDSHIP: Oh, yes. All right.

MR. POND: Q. And what means of locomotion do you use to get to your work each day? A. I walk.

Q. You have been doing that for 25 years, have you? A. Between 24 and 25 years.

Q. Now, can you compare the amount of smoke that you have observed coming out into the atmosphere from the McKinnon plant, after 1937, when the new foundry was built, with the amount of smoke that was coming out before the new foundry was erected? A. I don't meet any smoke now, because the smoke, the annealing ovens is done away with; the stacks is done away with and the only stack what is left in operation burning coal is from the big new stack what is there and that seems to be high enough that that is carried all away. I encounter no smoke now.

Q. Your witness, Mr. Slaght.

In the Supreme Court of Ontario No. 47 Defendant's Evidence Thomas Coley Cross-Examination 6th May, 1949 Continued

CROSS-EXAMINED BY MR. SLAGHT:

Q. All clear, fresh air now? A. Feels better.

Q. Well, I mean on your walk to work and back? A. Yes, sir.

Q. Then, just a word, Mr. Coley. You are an old-timer, and will you cast your mind back for me to 1908 and a little before. Where did you live then? A. First, in 1907, I lived in Thorold.

Q. Where? A. In Thorold. That is about five miles from St. Catharines.

Q. And in those early days, I want to see if your memory is as good on some of these things, right near the McKinnon place there was the old Woodruff mansion or palace, where Colonel Woodruff lived? A. Yes, sir.

Q. That, we are told, was a 35 acre home on rather a grand scale? A. Yes, sir.

Q. The old gentleman had a mansion or a manor there and he had a gardener's house and grew flowers and plants, and that sort of thing? A. Yes, sir.

Q. That was next door to the McKinnon Dash? A. That was two or three—you crossed over the railroad tracks.

Q. And that has been cut up now into subdivisions, and there are many homes there now? A. Yes, sir.

Q. Then, besides the Woodruff place there, George Robinson had a farm there. Do you remember his home? A. He was away below McKinnon's.

Q. Was he north or south? A. He would be going north.

Q. Well, now, fix McKinnon's in your mind and then Robinson's farm north of McKinnon's. You say he was going north? A. McKinnon's—he would be going north away from McKinnon's.

Q. But close by? A. Well, quite a little distance now. It is several hundred yards down the road.

Q. A couple of hundred yards? A. Oh, several hundred yards.

Q. Did he grow fruit? A. Yes.

Q. And peaches and grapes and that sort of stuff? A. Yes—

Q. And then, besides George Robinson there, there were some other small farms near Robinson's there also; some other small farms, you remember? A. There was. The nearest farm I remember, I knew the man up there, Mr. Deteche's place.

Q. And where was he? A. He was situated on the right-hand side of Ontario Street, going north; just before you get to Robinson's farm.

Q. Oh, yes, he would be about a quarter of a mile away from McKinnon's? A. Well, maybe it would be.

Q. Now, do you remember that Ricardo farm? A. I never knew those people on the farm. There was a farm with a big house right beside George Robinson. I never knew the name, but I knew the farm.

Q. And they grew peaches and flowers there? A. They grew good fruit, the same as the other one.

Q. Then, there is the William Codemery farm. That may be the man you don't remember. Do you remember the Codemery place there? A. I wouldn't know anyone down past Robinson's and the Industrial Home.

Q. And before the Warren Pink plant was erected there, there was a fruit farm there, I understand? A. Well, before that, there could have been a few peaches on that big field. That field was all garden. It was all open.

Q. That is what I wanted to know. It was all gardens and all open and then, did Mr. Walker live there? A. Mr. Walker lived there.

Q. He had a house right there, too. A. Yes.

Q. And there were other homes around there where people lived? A. Other homes around past Mr. Walker and before you got to Mr. Walker's.

Q. Before or after? A. Yes.

Q. I went over with him the other day—I don't want to go over it with you—but he gave me about 50 or 60 people who had lived just in that little neighbourhood there. Would that accord with your idea of it? A. Well, there wouldn't be 50 or 60 dwellings. I don't know how many people lived in the houses.

Q. No, I mean dwellings? A. Oh, there couldn't have been 50 or 60 dwellings, not on that edge.

Q. Well, about how many would you say? A. I couldn't say at that time; I couldn't be sure. I will give you an estimate, because there has been several built up to the church. It looked to me, whether you would go much further, 15 houses up to that time, till a few years ago.

Q. But it was that kind of locality where small homes, except for the Woodruff's manse, they were rather people in moderate circumstances? A. Yes.

Q. Small homes, and they had their little gardens there? A. Yes.

Q. And it was what you would call a residential area except for this industry that came in? A. Yes.

Q. Then, just this. When they made the change over in 1937, they put the cupolas up for the first time? A. Yes.

Q. You stayed on with them? A. I stayed on.

Q. And they made grey iron for the first time? A. Yes.

Q. You made malleable in the McKinnon Dash, did you not? A. And we still made malleable.

Q. And the present plant makes malleable and grey, too? A. We make three kinds of iron.

Q. And there was no grey made by the McKinnon Dash, because they didn't have the equipment? A. They didn't have the equipment.

Q. And then the forge shop, the foundry itself was really enlarged in 1937, at the same time the cupolas were put up? Made a much bigger plant, did they not? A. Well, all that I know of the forge shop is that I see from my part out. I have not been in the forge plant, not six times since it has been enlarged, because if I had to go up to see anyone, it is very seldom. I have not been in six times.

Q. Well, taking the six times you have been into the forge shop, did you get the same sweet, fresh air as you get when you walk home? A. I got the same as I get around the foundry. I don't expect to breathe as pure air in the foundry as I breathe outside.

Q. How do you like the big, heavy hammers there? A. They make no difference to me whatever there.

Q. Do you hear them? A. It takes me all the time to hear them where I work, because the foundry, since 1937, we have come to modern times and foundry life has changed complete, and there is more machinery and the machinery keeps me busy to—understand to keep the machines running, and what is wrong and what is right. I can go from morning till night and wouldn't hear the hammer.

Q. Before 1936 or 1937, south of Carlton Street, was there a coal yard? A. South of Carlton Street?

Q. Yes? A. Yes, used to unload coal off the cars.

Q. And it would be south of Carlton and west of Ontario Street? A. It would be south of Carlton and west of Ontario, yes.

Q. And then south again of that and beyond the coal yard was the McKinnon Dash plant foundry? A. The foundry would be just south of that again.

Q. Is the coal yard there now with the new plant extension? A. No, the coal yard there, no.

Q. The McKinnon present plant occupied the coal yard as well as the old foundry site? A. It did, farther away from that on the south side of Carlton. No, it changed that it could be unloaded inside, to the annealing oven, to save the wheeling.

Q. But what I want to get at is, the coal yard is not there now, that was there, and the McKinnon plant I am instructed, with their foundry, are partly where the coal yard was and partly on the old site of the McKinnon Dash? A. Yes, that end of the foundry would be.

In the Supreme Court of Ontario No. 47 Defendant's Evidence Thomas Coley Cross-Examination 6th May, 1949 Continued

Q. And on Carlton Street as well? They closed Carlton Street? A. They closed Carlton Street.

Q. So that the McKinnon foundry is now located—goes quite somewhat farther north than it did in the old Dash days? A. The foundry and the melting equipment.

Q. Well, the plant? A. The plant would be just a storage bin, what they are unloading, and where the cars runs in.

Q. All right, Mr. Coley.

HIS LORDSHIP: Now, you say they closed Carlton Street? A. Yes, your lordship.

Q. And what has been erected on the portion of Carlton Street? A. The overhead crane, what unloads the cars of pig iron and coke and sand and they also were dumping scrap castings there to be re-loaded and put into bins for charging the cupolas.

Q. Where was the coal yard before? A. It was right where they used to unload some of the coal; was right on the boundary of Carlton Street South.

Q. Was that owned by McKinnon's? A. That was owned by McKinnon's.

Q. And they came up to Carlton Street before? A. Yes. The fence was right there. There was no fence at the start, and the whole plant was fenced in and that was right on the border.

Q. All right.

—Witness excused.

WILLIAM HENRY CAMERON, sworn,

In the Supreme Court of Ontario No. 48 Defendant's Evidence William Henry Cameron Examination-in-Chief 6th May, 1949

EXAMINED BY MR. POND:

Q. Mr. Cameron, I understand that you first came to the McKinnon Dash Metal Works Limited in 1904? A. That is correct.

Q. And in what capacity did you work? A. Oh, assistant foreman for two years there, and then I was foreman of the core room.

Q. Assistant foreman where? A. In the McKinnon Dash.

Q. Yes, but what part? A. In the core room, and part of the foundry.

Q. You were assistant foreman in the core room? A. Yes, that is right.

Q. And how long did you continue as assistant foreman? A. About two years.

Q. And then what happened? A. I was made foreman.

Q. Foreman of what? A. The core room.

Q. And how long did you continue as foreman of the core room? A. Till 1911.

Q. And then what did you do after that? A. I was assistant superintendent of the foundry.

Q. And then? A. Then later I became superintendent, about 1912-13.

Q. And what happened after that? A. I took over the superintendent of the core room again about 1914.

Q. And from 1914 on, did you remain in that post? A. I remained in that post till 1941.

Q. And then I understand you retired? A. Well, I retired from that job.

Q. Are you still employed by them? A. I am still employed down there.

Q. Now, when you first came to the plant in 1904, what core ovens were there? A. They were gas fired.

HIS LORDSHIP: Are you just going over this to corroborate the last witness?

MR. POND: No, there is some additional information, my lord.

THE WITNESS: They were gas fired.

Q. How many were there? A. Four. No, hold on. Yes, four. I think it was four. Then there was some more added on.

Q. And did that continue—how long did that continue? A. Well, we added four or five more to them and then we moved the core room around about 1920 and we built the brick core ovens; the double brick core ovens.

Q. What do you mean by double brick core ovens? Is that four ovens? A. Well, it is practically four ovens; we could shut half of them off.

Q. How were they fired? A. They were firstly fired by coke and then when they put the pulverized system in, we used crushed coal, fired with an "iron fireman."

Q. And the core ovens that you have described, were they then operated down till 1937? A. Yes.

Q. Were any more built? A. No, not up till 1937.

Q. And before the brick—what you described as two double brick core ovens, before they were built, how was the smoke and fumes exhausted from the gas fired core ovens? A. Well, we had small stacks on them.

Q. And after the brick core ovens were built, I think you have said in 1920, how was the smoke exhausted from those? A. Well, we had two iron stacks on it.

Q. And do you know whether or not they contained any water wash or dust arresting equipment, the stacks? A. No, there was not any there at all.

Q. Now, will you please tell me something about these cores that you make in the core room. What are they made of? A. Well, they are a combination of banked sand and sharp sand.

MR. SLAGHT: My lord, we have had this four times already.

THE WITNESS: And in their green condition, why, you have this banked sand to stand them up before they are baked and put in the oven.

MR. POND: Q. I think there has been some evidence they used a binder of some kind? A. Yes.

Q. And what did you use as a binder? A. Well, they used oil and resin and, oh, different ingredients; mostly oil today, but, in those days, it was resin and some oil, linseed oil.

Q. When you first got the core shaped, what did you do with it? A. Put it on a pipe; stand it on a pipe.

Q. And then what did you do with the pipe? A. Well, you filled it up with cores and then it goes to the core oven and it is baked.

Q. Now, can you tell me whether or not these cores, before they are baked, whether or not they are fragile? A. Oh, yes, they are fragile.

Q. And what can you tell us about your experience while these cores are sitting on the pipe, have you ever had the experience of any of them collapsing? A. Oh, yes, you did have some. If they are not properly rimmed, or made, they will fall down, or any jars in the shop will upset them, but we didn't have that at all, very much.

Q. If you bumped the place with your elbow as you are walking by— A. They would all upset.

HIS LORDSHIP: What in the world has this to do with the issues we are trying?

MR. POND: The question of vibration, my lord. I am just coming to that.

HIS LORDSHIP: Well, the hammers were not in there when he was there. The 5,000 pound hammer was not there. To restrict counsel—but, really, to literally spend hours on this sort of evi-

In the Supreme Court of Ontario No. 48 Defendant's Evidence William Henry Cameron Examination-in-Chief 6th May, 1949 Continued

dence—really, if this case had been in England, it would have been tried in ten days or less; probably even tried in four or five days, but here we seem to have to wander and wander and wander on matters of evidence. It is perfectly plain what the issues are now. How in the world the cores broke down while this man was there can have anything to do with it, I cannot see. However, I won't take up any more time with it, but we are going to sit nights next week if there is not going to be some attention paid to relevancy of matters and that might probably wear counsel down a bit.

MR. POND: My lord, it is my submission that it has quite a bearing on the question of vibration. This core room is close to the forge shop.

HIS LORDSHIP: You can deal with the cores in the foundry as it is at the time covered by the claim, not ancient history.

MR. SLAGHT: My claim bears date the 1st of January, 1945.

HIS LORDSHIP: However, I will not restrict you, but probably it is getting late on Friday afternoon and I am a little more impatient. Let us get on, if you think it is going to be useful.

MR. POND: Q. Now, what can you tell us about the effect of any vibration that you have noticed in the frame while you were on these cores, before they were baked? A. Well, we didn't have much vibration to put up with. If we had much vibration, it would show up in the cores in their green state.

HIS LORDSHIP: They did not have the 5,000 pound hammer in operation? A. Well, I was pretty close to the forge.

Q. Did you have the 5,000 pound hammer in operation? A. No.

Q. Well, let us get on to conditions as they are today.

MR. POND: That is all.

HIS LORDSHIP: Mr. Slaght?

In the Supreme Court of Ontario No. 48 Defendant's Evidence William Henry Cameron Cross-Examination 6th May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. Mr. Cameron, where do you live now? A. 62 York Street.

Q. You are not in the plant now? A. Yes, I am in the plant, on Pleasant Avenue.

Q. What is your job now? A. Security officer.

Q. I don't know how sensitive you are. Do you feel the vibrations up at home, on York Street, when the big hammer—when she goes "bang"? A. No, I don't feel it.

Q. That is all.

—Witness excused.

HIS LORDSHIP: We will adjourn now until 11.15 a.m. Monday morning.

—Whereupon Court adjourned until 11.15 a.m., Monday, May 9th, 1949.

Monday, May 9, 1949, 11.30 a.m.

In the Supreme Court of Ontario No. 49 Defendant's Evidence Dr. George A. Duff Examination-in-Chief 9th May, 1949

MR. FERGUSON: Mr. Slaght, my lord, will not be here until noon today.

HIS LORDSHIP: Very well.

DR. GEORGE A. DUFF, sworn,

EXAMINED BY MR. KEOGH:

Q. Dr. Duff, what is your occupation? A. I am professor of plant physiology in the University of Toronto.

Q. And you are on the staff of the Department of Botany there? A. That is right.

Q. What university degrees do you hold, doctor? A. Bachelor and Master and Doctor of Science degree, University of Toronto.

Q. How many years experience have you had in the investigation on the effect of sulphur dioxide on vegetation? A. About 20 years since I first began to take an interest in the subject.

Q. I am not going into the details of it since it is before the period that Mr. Walker is claiming on, but in 1941, did you make an inspection of Mr. Walker's greenhouses? A. Yes, I did.

Q. Then, the next inspection, I believe, was in June, 1945, approximately? A. July, I think; the 3rd of July.

Q. And at the time that you visited St. Catharines on the 3rd of July, did you first of all make an inspection of the vegetation in the area in the vicinity of the McKinnon plant and of the Walker greenhouses? A. On the 3rd of July?

Q. Yes? A. Yes, I made such an inspection.

Q. And would you mind describing to us briefly the boundaries of that area? You started at the McKinnon plant, did you? A. Yes, and went along Carlton Street, out Carlton Street to Garden Street and northward along Garden to Manchester and then returned right across over in that vacant land there.

Q. And went east to Johnston Street? A. Yes, and back along lots 21 to Ontario Street and across Ontario Street to the orchard that lies north of the Company's plant, north of the forge shop and up back.

Q. And then down the east bank of the canal? A. Down the east bank of the canal.

Q. And this is not to scale, my lord, but did you make on a section of the map of the city a crayon outline, in yellow, showing the area that you have just described? A. Yes, a rough sort of hand drawn map.

—EXHIBIT No. 178: Map of area near defendant's property made by Dr. Duff showing area inspected by him and coloured in varied colours.

Q. Then, in what condition did you find the vegetation, generally speaking, in that area? A. Oh, I thought it was in a strikingly good condition.

Q. Did you see any evidence of sulphur dioxide injury on any of it in that area? A. None.

Q. At the time of your inspection, what were the moisture conditions? A. They had been very good indeed. There had been plenty of rain and moisture. I think the vegetation was extraordinarily lukewarm and, being in that state, it would be at its maximum susceptibility to sulphur dioxide injury.

Q. Then, on the same day, did you inspect the garden plants growing in the flower beds on the company's premises? That is, the test plot? A. There was no test plot.

Q. No, it was not started till the following year, but the other flower beds? A. The company's buildings are north, all surrounded by borders, and I made a careful examination of all these borders and certain flower beds and of all conditions such as those near the power plant and the flowers were in excellent condition. I saw nothing at all.

Q. Did you say the flowers were in excellent condition? A. Yes.

Q. Then, I interrupted you. You saw nothing at all? A. I saw nothing whatever that suggested a damage that might be attributed to sulphur dioxide.

Q. Then, was it on this date also that you saw, or was it later that you made an inspection of Mr. Walker's greenhouses? A. That was on August 13th, Mr. Keogh.

MR. FERGUSON: What year? A. 1945.

MR. KEOGH: Q. And when you made the inspection of Walker's greenhouses on August 13th, who were present besides yourself? A. Dr. E. F. Palmer—I am not sure whether I recall whether Dr. Katz was present or not, but I think he was.

Q. And what about Mr. Walker? Who were present with him? A. Mr. Walker himself and his counsel, Mr. Schiller, I think it was.

Q. And was that Mr. Walker Senior, or his son? A. Mr. Walker, senior.

Q. And did he accompany you and the others through this tour of his greenhouses? A. He accompanied us through the greenhouses, yes. He withdrew when we went out of doors to examine the garden.

Q. Then, on that occasion, you inspected Mr. Walker's nursery garden to the east of the greenhouses, did you? A. Yes.

Q. And were there gladioli growing there? A. There was.

Q. And in what condition did you observe them? A. I thought they were in poor condition. The leaves were affected by this red brownish discolouration, thrips; the insect thrips was numerous on the plants, not only on the leaves where it was adding to the general picture of ill being, but also in the flower buds, which is very serious in a way. Where an insect damages the petals before the flowers open, it leads to deterioration of the flower as a product—a marketable product.

Q. Did you observe anything as to how the gladioli were planted? A. Pretty densely.

Q. Then, did you see any carnations on the outside? A. Yes. There was more ground given over to carnations than to anything else. These carnations were of several varieties.

Q. And what, if anything, did you observe about their condition? A. The varieties were not nearly thriving, but I saw nothing of them that suggested sulphur dioxide injury in any way.

Q. And were there some onions there? A. Yes, a few.

Q. What did you observe about them? A. Onion mildew was present on these onions. That leads to a die back of the tip of the leaf.

Q. Were there any insects on the onions? A. Yes, there were thrips on the onions, too.

Q. And what was their proximity to the gladioli? A. I do not now recall.

HIS LORDSHIP: Q. You don't remember where the onions were? A. No, except they were in the garden to the east, but the exact position of the garden, I am afraid I did not note down.

MR. KEOGH: Q. Then, did you see tomatoes in Mr. Walker's garden? A. Yes, a few tomato plants.

Q. What was their condition? A. Quite normal.

Q. Did they have any foliage markings or symptoms of any kind? A. None.

Q. Then, did you observe another outside planting of gladioli south of the south greenhouse? A. Yes.

Q. And what, if anything, did you observe about its condition? A. Its condition was extremely poor.

Q. First of all, what, if anything, did you notice about the planting of this patch of gladioli? A. I thought it was very similar to the one to the east.

Q. And what did you notice about the flowers on these gladioli? A. There was very little flower and the leaves bore rather more severe red, brown discolourations than those which were present on the gladioli to the east of the greenhouse.

Q. What difference was there, if any, between the number of flowers on the plants with the red brown discolouration and on the plants without discolouration? A. Not every gladiolus plant was severely affected; in fact, there were some that were hardly affected at all by this leaf marking, but those which were not affected were not superior to those which were, in the matter of flowering.

Q. Did you notice any other insect manifestation on those gladioli? A. Well, the thrips was very destructive here, on this particular gladioli.

HIS LORDSHIP: Now, doctor, I wish—I see that you have before you something that you apparently are referring to extensively? A. Yes, sir.

Q. What is it? A. That is my report.

Q. Well, a report to whom? A. To counsel.

Q. Made when? A. Dated August — immediately after that visit over here. I thought it was August 23rd, to be exact.

Q. Did you have any original notes? A. Yes, I did, but I cannot produce those now.

Q. You cannot produce your original notes? A. No, I lost those. My little notebook was lost in 1946 up in the forest, showing the two occasions of my visit in St. Catharines, in 1945.

Q. You see, it is one thing to have original notes from which a witness refreshes his memory. A. Well, I don't need that.

Q. Just a moment, please. Will you not interrupt me — and it is another thing to have a report prepared for counsel that a witness practically reads from. You do not know when this report was made? A. My memory is August 23rd, ten days after I had visited the greenhouses.

MR. KEOGH: Q. Did you dictate it from the field notes which you made in the fall, at the time? A. I wrote it by hand from my field notes. I won't refer to it, sir. I don't think I need to.

HIS LORDSHIP: Well, if you can recollect matters without referring to it, that is the way that the evidence ought to be given. If you find it necessary to refresh your memory in regard to some details, I will hear counsel as to that matter when it arises, but it is much better that you give your evidence from your recollection of matters. A. Yes. I think I was really referring much less than I might have seemed to be, sir.

MR. KEOGH: Q. Then, you have told me that there was a heavy showing of thrip on this second planting of Walker's gladioli, south of the most southerly greenhouse? A. Yes.

Q. At the time of this inspection on August 13th, 1945? A. Yes.

Q. Did you open any of the buds of those gladioli in the patch? A. Yes, I stripped back the sheaves from occasional buds and found the thrips insect numerous inside.

Q. Then, did you see any evidence in that gladiolus planting of mineral treatment of any kind? A. Yes, mineral fertilizer had been put on the ground in what seemed to me to be very large amounts, and big lumps of unincorporated fertilizer material were lying about in the soil.

Q. Lying about on the ground? A. Yes.

Q. Then, did you see any evidence on this second gladiolus patch of any sulphur dioxide injury? A. No.

Q. Then, you made, on the same day, an inspection of Mr. Walker's greenhouses — you were conducted around by him? A. Yes, I was, Mr. Keogh.

Q. And were you in all the greenhouses, or only such ones— A. I think all.

Q. And can you tell us from memory now, generally, what plants or flowers you saw in the greenhouses as you passed through? A. No, I think I would only be guessing if I attempted to enumerate the different kinds of plants that were there then.

Q. Well, did you glance, or did you look at them as you went by for markings from sulphur dioxide? A. Oh, yes.

Q. And did you find any sulphur dioxide markings in any of the plants in Mr. Walker's greenhouses? A. No, no suggestion like that — none.

Q. Then, following your inspection of Mr. Walker's greenhouses, did you make an examination of the gladioli in plots on the McKinnon property? A. Yes.

Q. Did you see the plot near the power station? A. There was a small bed of gladioli growing there.

Q. And were there any markings on them? A. No.

Q. Of the character that you have described on Mr. Walker's gladioli? A. No, there was not.

Q. Were there any other markings on the McKinnon gladioli in that plot? A. No, sir.

Q. Then, later on, on the 13th of August, 1945, did you or did you not repeat your inspection of the vegetation in the surrounding area that you have already described? A. I did, Mr. Keogh, yes.

Q. And did you cover that area again pretty well as you had covered it before? A. Carefully, yes.

Q. And did you see any evidence anywhere, on the vegetation or garden plants or orchards in that area of any injury by sulphur dioxide? A. I did not.

Q. Then, on the 6th of June, 1946, were you in St. Catharines again? A. I was.

Q. And on that occasion did you examine the McKinnon test plot in the vicinity of this outhouse, north of the power plant? A. Yes. The test plot had been established by that time.

Q. It was started that year? A. Yes.

Q. And had any gladioli in the plot emerged as yet, at that time? A. No, they had not.

Q. What other flowers in that plot were growing and visible? A. There was geraniums, petunias, and a little border plant known as egeratum.

Q. And did you see any evidence on those three species of any sulphur dioxide injury? A. No.

Q. What was the condition of the plants in those three species, as to normal or abnormal growth? A. They were very good.

Q. And did you examine into the vegetation in the vicinity of the outhouse of the McKinnon's plant, on this occasion? A. Yes, I did, Mr. Keogh.

Q. And how did you find it? A. Normal.

Q. Did you again examine the vegetation in the gardens and along the roadside on Carlton and Garden Streets, which you had gone over previously? A. Yes, I always did that.

Q. And did you observe any evidence of sulphur dioxide injury on any of that vegetation? A. No.

Q. Then, were you again in St. Catharines on June 26th, 1946? A. Yes, I was.

Q. And on June 26th, 1946, did you make any inspection of the flowers in the McKinnon test plot? A. Yes, I did, Mr. Keogh.

Q. Were the gladioli up then? A. Yes.

Q. And what was their appearance? A. Let me see — I wonder if I may just refer to my notes.

Q. You are referring to notes you made at the time? A. These are my field notes.

Q. To refresh your memory? A. Yes.

Q. That is permissible, I take it?

HIS LORDSHIP: Yes.

MR. FERGUSON: Original notes?

MR. KEOGH: Yes. He did not have them for the previous year; he lost them. A. Two plants in the gladiolus bed were showing leaf tips with brown discolourations, otherwise the gladioli were in a perfectly normal condition.

Q. And was there any sign of any injury on the other plants in the bed, that is the geranium, petunia and egeratum that you have already spoken about? A. No, none at all.

Q. At that time did you notice any seedlings of weeds appearing in the outhouse plot? A. Yes; weeds came up there as they did everywhere and I noted seven or eight different kinds of

common weeds, all in their seedling stage, all of which were entirely normal.

Q. On this occasion did you again examine the vegetation of the gardens and the orchards that you have spoken of already, in the area surrounding McKinnon's and Walker's? A. Yes, Mr. Keogh.

Q. And did you find on that vegetation any evidence of sulphur dioxide injury? A. No, I did not.

Q. Did you see any of Mr.Walker's gladioli from the sidewalk, on that occasion? A. Yes, I usually observed them.

Q. And did you notice anything out of the ordinary in connection with them? A. They had red brown discoloured leaves.

Q. And how did the discolouration that you saw on Walker's gladioli on that occasion compare with the red brown discolouration you have already described to us on one or two of the McKinnon outhouse gladioli? A. Well, the two plants in the outhouse plot ——

Q. I just mean as to general appearance, that is all. A. Oh, general appearance, their condition was not as good as that on the outhouse plot.

Q. The growing condition was not as good? A. The general condition of the plants.

Q. Pardon me. The general condition was not as good? A. That is right.

Q. And I also wanted to ask you what was the general appearance of the reddish brown markings on the two McKinnon gladioli and the reddish brown markings that you saw on the Walker gladioli? I am talking about colour and situation. That is all I am talking about at the moment. A. The McKinnon gladioli, the two leaves were red brown for a very short distance back from the tip, but the Walker materials on the other hand were affected for six inches back.

Q. Six inches? A. Yes.

Q. Then, were you again in St. Catharines on the 22nd of July, 1946? A. Yes, sir.

Q. And on that occasion did you again inspect the company's outhouse plot? A. Yes, I did.

Q. And what did you observe about the gladioli in it at this time? A. The leaves of the gladioli had become widely— a great many of them had become discoloured by this red brown marking which looked generally or similar to that which I could see across the street in Mr. Walker's premises.

Q. And, on this occasion in July, for what distance did those markings extend from the tip of the McKinnon gladioli? A. I don't know that I want to commit myself to an exact statement of dimensions. They were well marked; four inches; perhaps something of that order.

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Examination-in-Chief
9th May, 1949
Continued

HIS LORDSHIP: Just pause for a moment, Mr. Keogh. Yes.

MR. KEOGH: Q. Now, on this occasion on July 22nd, 1946, what was the condition of the petunias, the geraniums and egeratum at the company's test plot? A. Quite normal.

Q. Then, did you again on that occasion, examine the vegetation in the area you have already previously described, surrounding McKinnon's and Walker's? A. Yes, I did.

Q. And did you make a similar inspection at this time of that vegetation? A. Yes, I always did, Mr. Keogh.

Q. And did you find in that vegetation any evidence of sulphur dioxide injury? A. Nothing that I would attribute to sulphur dioxide for a moment.

Q. Then, were you back again in St. Catharines on August 20th, 1946? A. Yes, Mr. Keogh.

Q. Was the McKinnon plant operating or closed on that occasion? A. May I just look at my note on that subject? The plant was closed down, presumably for inventory.

Q. And did you again inspect the McKinnon test plot? A. Yes, sir.

Q. And what was the condition of the gladioli at that date? A. The red brown discolouration had progressed since my previous visit on July 22nd.

Q. Are you able to say how much it had progressed, generally speaking? A. Well, yes, I am able to make a fairly precise statement about some particular leaves which I marked on July 22nd, labelled, and which I observed again on August 20th.

Q. And how much had the lesion—is that the technical term for it? A. Yes.

Q. How much had the lesion progressed on those marked leaves? A. The lesion had not progressed at all on some of them and, on others, it had progressed up to within three times its original size.

Q. And you have said you had marked some of the leaves? A. Yes.

Q. When did you do that marking? A. On the 22nd of July.

Q. And how did you mark them? A. I outlined the lesion exactly with an India ink mark and then placed a number on the leaf, also in India ink, in the green, unaffected portion. Then I examined these leaves on August 20th.

Q. Then, dealing first with these marked leaves, what condition were their flowers and flower buds on August 20th? A. Excellent.

Q. Just before we leave the test plot on August 20th, what about the rest of the flowers and the weeds in it? A. They were unaffected by anything at all.

Q. Then, on August 20th, 1946, did you examine the gladioli growing in the company's flower bed in front of the forge shop? A. Yes. They were affected in much the same way as were those in the test plot.

Q. Then, you made certain other inspections outside of St. Catharines, that we won't go into. Then, the next time you came back was June 27th, 1947. Is that right? A. Yes, sir.

Q. That was the following year? A. The following year.

Q. Then, on June 27th, 1947, did you again inspect the test plot of the company? A. Yes.

Q. And was there anything about that that you noticed; first of all, I would ask you, is that early for gladioli, June 27th? Were they showing then? A. Moderately. They ought to be showing, I think, by June 27th.

Q. And what you saw of the gladioli on that date in the test plot, what do you say about their condition? A. I saw nothing but normal plants in the plot, on that date.

Q. And were the petunias and the geraniums further advanced than the gladioli at that time? A. Oh, they always are. They are put out from pots and sometimes already in flower.

Q. And what was the condition of them in the test plot on June 27th, 1947? A. Quite normal.

Q. And on that date, did you repeat your inspection of the vegetation in the area surrounding the McKinnon's and the Walker premises? A. Yes, sir.

Q. And did you see any evidence of sulphur dioxide injury on any of the vegetation in that area? A. No, sir.

Q. Well, then, doctor, you returned to St. Catharines on July 22nd, 1947. Is that right? A. Yes, the 22nd of July.

Q. And did you on that date make another inspection of the test plot of the company? A. Yes, I did.

Q. And what, if anything, did you observe about the gladioli that was in that plot at that time? A. They were again affected by red brown discolouration.

Q. And as far as the general appearance of those discolourations in July, 1947, went, how did they compare with the discolourations you have already described the previous year? A. I thought they were the same thing.

Q. Apart from the gladioli, what about the other flowers and weeds in the company's test plot, on July 22nd, 1947? A. They were quite normal.

Q. And on that date did you again repeat your inspection of the surrounding area, the vegetation in the area previously described? A. Yes; the gardens and roadside vegetation, and all that kind of thing, I always examined and inspected.

Q. And you repeated it along the streets and in the area you have previously described? A. That is right.

Q. And did you see any evidence of sulphur dioxide injury on that occasion, in any of the vegetation in that area? A. No, sir.

Q. Did you see any vegetation on Ontario Street, across from the company's plant? A. Yes. There were a few plants set out in front of one of the little houses there, and they were affected.

Q. Just before I ask you that, where would they be located with reference to the forge shop, for instance? A. Just across the road.

Q. On the east or west side of Ontario Street? A. The east side.

Q. And what did you observe about the gladioli in that patch? A. They were affected with the red brown discolouration, as were those on the test plot and in the flower bed across the road from them.

Q. Then, from the street did you observe the outdoor gladioli in the Walker's south patch, that is south of the southerly greenhouse, on this visit on July 22nd, 1947? A. May I just see what I have noted here? Yes. I noted that they were similarly affected.

Q. Similarly affected. Is that what you said? A. Yes. Perhaps not quite so severely as previously in the year before.

Q. And when you say similarly affected, you mean what? A. They had red brown discolourations on their leaves.

Q. Then, doctor, did you visit St. Catharines again on the 25th of August, 1947, the same year? A. Yes, Mr. Keogh.

Q. And did you examine the gladioli in the company's experimental test plot? A. Yes, sir.

Q. And how did their condition then compare with their condition in the previous month? A. There had been advance in this red brown discolouration. A large number of plants and leaves were affected, and the degree to which the leaves were affected had intensified; had got greater.

Q. What was the condition of the flowering spikes on those affected gladioli? A. They were very beautiful.

Q. Were there any markings on any of the other vegetation in the test plot on that occasion? A. No, none.

Q. Then, I understand that you did not make any inspections in 1948? A. That is correct.

Q. Then, I show you Exhibit No. 74, filed by Mr. Jarvis, dated June 18th, 1947. In your opinion does that show evidence of sulphur dioxide injury? A. No, sir.

In the Supreme Court of Ontario No. 49 Defendant's Evidence Dr. George A. Duff Examination-in-Chief 9th May, 1949 Continued

Q. Then I show you Exhibit 77, dated July 9th, 1947, filed by Mr. Jarvis. In your opinion, is there any evidence of sulphur dioxide injury on that specimen? A. That is much more like sulphur dioxide injury.

Q. Are you able to say definitely about it? A. No, but the symptoms approach those of sulphur dioxide injury much more closely than do those on the gladiolus.

Q. But are you able to make a definite statement about it, one way or the other? A. No, I prefer to leave that.

Q. Then, I show you Exhibit No. 79, a specimen of gladiolus leaves, dated July 31st, 1947, filed by Mr. Jarvis. In your opinion, does that specimen show evidence of sulphur dioxide injury? A. No, Mr. Keogh.

Q. Then I show you a specimen of gladiolus leaf, Exhibit 82, filed by Mr. Jarvis, dated June 26th, 1948. In your opinion, does this specimen show evidence of sulphur dioxide injury? A. Comes a little closer to it than some of the others in its aspect, I think, but I would not care to diagnose it as sulphur dioxide injury.

HIS LORDSHIP: Well, would you say that it was not? A. I would not know what to say about that. You see, it does not look quite the same as these red brown discolourations we have been talking about, and I think, being one leaf by itself, I would rather not pronounce upon it.

MR. KEOGH: Q. Then, I show you Exhibit 91, a specimen of three gladiolus leaves, dated July 7th, 1948, filed by Mr. Jarvis. In your opinion does that specimen show evidence of sulphur dioxide injury? A. No, sir.

Q. Your witness.

In the Supreme Court of Ontario No. 49 Defendant's Evidence Dr. George A. Duff Cross-Examination 9th May, 1949

CROSS-EXAMINED BY MR. FERGUSON:

Q. Dr. Duff, I understand you to say you are a plant physiologist? A. That is right, Mr. Ferguson.

Q. You are not a plant pathologist? A. Not professionally, no.

HIS LORDSHIP: Probably you can tell me, doctor, what the difference is? A. Well, my job is studying the life processes of plants.

Q. Well, what do you mean by that? A. What makes them tick; what goes on inside, the chemistry of the proceedings, and that kind of thing. A plant pathologist is a student, of course, of the diseases of plants, how they are affected by parasitic attack, and so on.

MR. FERGUSON: Q. The plant pathologist just studies diseases of plants? A. That is right.

Q. And I understand you had something to do with the investigation of sulphur dioxide injury out at Trail, B.C.? A. I did.

Q. Was that in the early days of the investigation out there? A. Yes, the first two years of the investigation.

Q. And that was all the experience you had in Trail? I am not saying that that is not sufficient. A. Yes, Mr. Ferguson.

Q. Then, after that, your connection with the Trail inquiry ended? A. Terminated, yes.

Q. And would that be when your studies of the effects of sulphur dioxide in a broad way started? A. That is right.

Q. And then you went back to your work at the University, after that? A. I did.

Q. And you have since had some experience, have you not, in investigating sulphur dioxide injury in this Peninsula? A. Yes, and in the Sudbury district.

Q. And I understand you had carried on quite extensive investigations into the sulphur dioxide injury out at Grimsby, a few years ago? A. I was there, yes.

Q. And testified in the case which was tried in this Courtroom, just ten years ago now? A. Just about, I think.

Q. Now, in that case, doctor, I think you told us, and you told us in this case what you say are typical markings of sulphur dioxide injury? A. Yes. If you want me to be very precise about it, I would have to name the species and discuss it in that sort of detail, Mr. Ferguson, but if you wish me to just put a broad—which is it? A broad statement?

Q. Yes. A. Designed to cover all kinds?

Q. Yes. What are typical sulphur dioxide markings? A. They are either marginal or intercostal, or both.

HIS LORDSHIP: Q. Intercostal? A. Yes, or intervening.

MR. FERGUSON: Q. You mean between the veins? A. Yes.

Q. Maybe between the veins or marginal? A. Yes.

Q. Or both? A. Yes.

Q. Is it so that you are very likely to find intercostal markings on the broad leaf plant? A. I doubt that very much. I think you are less likely to find marginal on the narrow leaf plants, perhaps.

Q. But you saw red brown markings sometimes marginal and sometimes involving quite large proportions of the leaves? A. No, I didn't say red brown.

Q. You didn't say red brown? A. No.

Q. What did you say? A. Well, that depends on the species of the plant. Some plants, like the alfalfa plant, the marks are whitened out to almost a pure white colour. In others, like the apple, for instance, the marks tend to darken up and be brown to even brown black in colour, but the colour of the markings is typical of the species, so that one would be surprised to find white marks—in fact, I have never seen white marks on an apple, or brown coloured marks on an alfalfa leaf.

Q. What about peach leaves, then? What are typical markings? Do they have any colour? A. They vary.

Q. Any red brown? A. They might have a margin of colour around them.

Q. Because I was looking at the transcript of your evidence in the McNevin and Crawford case, in which, do you remember setting forth four classes of leaves, four classes of markings on plants which these peaches—well, of plants, definitely? A. Not of those particular peaches.

Q. And your class 2, or type 2, are leaves on which "we found red, brown marks, sometimes marginal, sometimes involving quite a large proportion of the leaf area." Do you remember that? A. Yes.

Q. And do you remember saying that that type resembled sulphur dioxide markings on vegetation? A. It approached it, yes.

Q. You were asked what resemblance, if any, did those bear to sulphur dioxide markings, and you answered, "Those leaves resembled sulphur dioxide markings on vegetation." That was your answer, was it not, in that case? A. I take it it is.

HIS LORDSHIP: Well, it seems to be all kind of mixed up at present; both you and the witness know more about it than I do. Just what markings now has the witness agreed they resemble sulphur dioxide injury? You were going very fast, Mr. Ferguson, and I was not able to gather it all.

MR. FERGUSON: I beg your lordship's pardon.

HIS LORDSHIP: Well, you put to the witness just a moment ago some markings that he agreed with.

MR. FERGUSON: I was reading from elsewhere a transcript which the witness agreed with.

HIS LORDSHIP: Well, ask it again.

MR. FERGUSON: "Type 2 were leaves on which we found red, brown marks, sometimes marginal, sometimes involving quite a large proportion of the leaf area", and then you were asked, "And what resemblance, if any, did those bear to sulphur dioxide markings?", and you answered, "Those leaves resembled sulphur dioxide markings on vegetation." That was your answer, was it not? A. That is all right.

HIS LORDSHIP: Just a moment.

In the Supreme Court of Ontario No. 49 Defendant's Evidence Dr. George A. Duff Cross-Examination 9th May, 1949 Continued

MR. FERGUSON: Q. And I point out to you, doctor, that the words "on vegetation" were not the words of counsel or the Judge, but were your own words? A. Yes, that is all right.

Q. Now, do you agree, Dr. Duff, with the witnesses who have testified here, that the sudden occurrence of markings is one of the typical things about a bleach of SO2? A. It is characteristic.

Q. And depending, I suppose, on the severity of the bleach? A. But it comes quite suddenly and does not gradually progress.

HIS LORDSHIP: I want to interrupt you there, doctor. You say—I suppose you mean by that, if there is one bleaching, then that will have its effect and there will be no further progression as long as it does not get another dose? A. Yes, that is right. I think the two separate inflictions of injury are quite readily distinguished in this, that they happen in a matter of a very few hours or a few days of one another.

MR. FERGUSON: And you recognize, of course, that there is such a thing as acute injury? A. Yes.

Q. Which occurs usually over a period of a short time? A. Yes.

HIS LORDSHIP: I take it you have been discussing acute injury of fruit, when you say you find no evidence of injury, you mean acute injury? A. That is what I mean.

MR. FERGUSON: Q. Did you recognize from your investigation any other class of injury, besides acute injury? A. Yes, I think there are chronic injuries by sulphur dioxide.

Q. I see in the Crawford and McNiven case, you referred to a type of injury which I have not heard of before, chlorotic injury? A. It is some people's word for "chronic injury".

Q. And do I understand you to say then that chronic injury — that the plant leaves may be damaged somewhat and they recover? A. May or may not recover.

Q. And does that evince itself in a paling of the leaves? A. Well, it evinces itself, I think, in many ways, so much so that it is impossible to use "chronic injury" as a means of diagnosing sulphur dioxide. Very difficult to distinguish it from malnutrition, and so on, you see.

Q. Yes, I see. A. I think the best example one can think of and bring to mind of chronic injury by sulphur dioxide is the foliage of a pine tree. Living in the city, we all see trees like that, uneven and discoloured and generally pretty poor looking, but you won't find on it the acute markings of sulphur dioxide at all.

HIS LORDSHIP: Doctor, that is something I have been wanting to ask some experts, out of curiosity, during this case. It is a well-known fact you cannot grow a cedar hedge in a city? A. Well, some kind of conifers certainly you cannot.

Q. Well, the ordinary swamp cedar will grow luxuriantly in the country? A. That is right.

Q. I happen to have a little personal knowledge. I have tried to plant them and grow them in the city, and they won't. A. Yes.

Q. Is that because of the chronic injury in the sulphur dioxide of the ordinary smoke in the city? A. You put the question to me in very precise terms, and I should like to give a precise answer, but I had better qualify it.

Q. Well, it is merely curiosity. A. I think sulphur dioxide is the most important constituent of the city gases which affect these conifers, but I am afraid other things are added, soot and other constituents.

Q. Yes, but the conifers seem to be particularly susceptible to that sort of thing, are they not? A. They are, and especially our native pines.

MR. FERGUSON: Q. I understand that in the Trail smelter investigation you found that the pine was one of the mose sensitive of the conifers? A. No. I think the most sensitive conifer in the Columbia Valley was the Douglas Fir.

Q. Is barley a particularly sensitive plant? A. Yes. I regard that as generally the most sensitive of the cereals.

Q. Would you put it in a class with alfalfa? A. Oh, I think I must, yes.

Q. And, speaking of the acute injury on the barley, what are the distinguishing markings of acute injury on it? A. Well, I have seen it varying in severity from a whitening of the whole leaf from tip to base, to just a series of small marks which are in between the veins of the barley.

Q. And in the tips of the leaves? A. Sometimes at the tips, too, yes.

Q. I will show you what has been marked as Exhibit 86 in this case, Dr. Duff, which is, I think, a sample of barley taken by Mr. Jarvis on June 26th, 1948. Will you take a look at that specimen? A. I don't know quite where the injuries are supposed to be, Mr. Ferguson. I cannot make anything out of it at all.

Q. Do you see the tips of the barley leaves? A. Here? Where?

Q. Well, there is one broken off, I see, on the paper, and then there are some others here. A. No. I am sorry. I would not care to make a comment on that. Anything might have been the cause of that; a small dying back of the tip of the barley plant.

Q. Then, is it possible that SO_2 might have?

HIS LORDSHIP: He says he does not care to make any comment on it.

In the Supreme Court of Ontario No. 49 Defendant's Evidence Dr. George A. Duff Cross-Examination 9th May, 1949 Continued

MR. FERGUSON: Very well, my lord.

Q. Now, Dr. Duff, if you were diagnosing injury to plant life for SO_2, you would, of course, look for some source of SO_2, would you not? A. I think we should.

Q. And would you recognize a foundry as a source of SO_2? A. It produces some SO_2, certainly.

Q. From the coke and the pig iron and the scrap iron? A. From the coke and a little, I suppose, from its oil fires, if it has any.

Q. And assuming that you find plants with markings in that area, would that be a factor for you to consider? A. Oh, it would be, yes.

MR. KEOGH: That is a double type question.

HIS LORDSHIP: Well, it has got into that type of thing and that is what I have to take into consideration.

MR. KEOGH: Isn't it also the same thing as saying if you find sulphur dioxide markings, do you find sulphur dioxide?

HIS LORDSHIP: Well, it is like putting to the witness that there are a series of circumstances the Judge has to take into consideration and decide what the real fact is, and then you are putting to this witness, "Well, if all these things agree, what should be the result?" I cannot see—I do not want to stop you in your cross-examination, but unless it is really developing something ——

MR. FERGUSON: Well, I hope I have some point.

HIS LORDSHIP: I hope you won't put this witness into my function, at any rate.

MR. FERGUSON: Well, doctor, as a scientist, you came to investigate the condition around the Walker premises, just as you did at Trail, and just as you did at Grimsby? A. Yes, Mr. Ferguson.

Q. Now, in order as a scientist to determine if there was injury by SO_2, what facts did you take into consideration in your investigation? A. Well ——

Q. In making your observations? A. I did not take any factor into consideration, excepting the aspect of the vegetation.

Q. Excepting the aspect of the vegetation? A. Yes. That is what I looked at and that is what I recorded and made notes on and gave evidence on.

Q. Then, in giving your answers to Mr. Keogh that the exhibits which you were shown, Exhibits 77, 79 and 82, showed evidence of sulphur dioxide at all, did you base that on your observation of the specimens? A. Yes, that is right. I am trying to forget there is or is not certain amounts of sulphur dioxide in the atmosphere and give my evidence on the show of specimens, as best I can.

Q. Then, you are trying to forget there is a McKinnon Industries in the area, too? A. I am trying to put that out of my mind.

Q. But if you had the typical markings, plus the presence of the source of the sulphur dioxide, would you not think that that was conclusive? A. Well, I don't know.

MR. KEOGH: The same point in another dress.

HIS LORDSHIP: Oh, yes.

MR. FERGUSON: What would you say, doctor? A. Typical? You mean to say that you could see on the markings themselves that it was sulphur dioxide?

HIS LORDSHIP: No, Mr. Ferguson's question is this. If you see the typical markings, you can say those are typical of sulphur dioxide. If you have a source of fumigation, then you might conclude that they were sulphur dioxide. I think this is what he is really putting to you. A. Well, I think that is a little bit more easily answered.

HIS LORDSHIP: I think that is probably my function—maybe.

MR. FERGUSON: Well, with those two factors together, doctor, would they impress you as a scientist? A. Yes. There would have to be a substantial source of SO_2.

Q. Just let me read to you the answer in the case of McNiven vs. Crawford where you were being examined by Mr. Bench. I have to read this first question, my lord, at page 1825 of your examination, and I am starting to read at line 28:

"Q. And do the virus diseases always follow a specific form,
"or are they variable in their appearance and results?
"A. Oh, they often occur together in their host of plants'
"diseases, results in the presence of two viruses, and where
"such diseases occur, the symptoms, of course, are exceedingly
"variable.
"Q. Then, Dr. Duff, there was a question arose in his lord-
"ship's mind yesterday, about—there was some discussion
"took place with you as to what bearing your conclusion had
"or has the topography of the situation which was under
"your observation. Perhaps you will recall that his lordship
"was inquiring as to whether or not that was important.
"A. Oh, I remember. I said I thought there were two ques-
"tions involved, the first being is the specific cause of this
"agency sulphur dioxide, and the second does this sulphur
"dioxide come from the suspected source; and I think the
"essence of the second question is, is the suspected source an
"effective source? For, after all, there is only one suspected
"source in this area. But what I wish to say about this is
"that I am prepared—I should be prepared to find, on the

"vegetation alone, that the specific cause was sulphur dioxide "provided there were no important features of the occurrence "which was strongly atypical of sulphur dioxide. Then I "should think it would be a matter of indifference in this "present situation, the proof of the guilt, so to speak, of the "suspected source would be conclusive. But if there are "important features of the vegetation, evidences which are "strongly atypical which have no recognized relation to the "sulphur dioxide injury as we have seen it elsewhere, as "anyone has, then I think that the evidence of the vegetation "alone must be supported by evidence of the source inde-"pendently of the vegetation, and if the source was shown "to be an effective one, I think the vegetation—the features "of the vegetation which are atypical of sulphur dioxide, we "would then be compelled to accept as typical or as possible "sulphur dioxide injury."

Do you remember making that long answer? A. I feel very sorry.

Q. Then his lordship said to you:

"What I understand you to mean is this—that, if your indi-"cator crops and the native vegetation sensitive to sulphur "dioxide had shown damage along with the peach trees, the "fact that Mr. Maconachie gives evidence here to indicate "that the brickyard is not an effective source would still "allow you to blame the brickyard for it, if it were not for "these other? A. Yes. Having satisfied myself from the "evidence of vegetation in the manner you have suggested, "that it could not be anything but sulphur dioxide. There "is only the one source possible, but I consider that the "atypical characteristics in this case are particularly im-"portant, and that it is impossible to come to that decision "or conclusion. That is the way I formulated the problem in "my own mind when I first came to it."

Now, do you remember engaging in that discussion and making those answers? A. Remotely, yes.

Q. Which boils down to this, that if you have the technical markings, plus an effective source in your mind, that was conclusive of the sulphur dioxide injury? A. Yes.

Q. Now, doctor, in this foundry we have evidence that, inside the cupolas as the gases go up to where they are emptied into the air, that there are as high as 24 parts per million of sulphur dioxide, by volume? A. Yes.

Q. And we have heard evidence that on occasion there is emptied from the cupola as high as nine parts per million, by volume. Now, do you agree with me that that foundry, therefore, is an effective source of sulphur dioxide? A. No, not necessarily at all.

HIS LORDSHIP: You say not necessarily. Have you scientific knowledge to answer that question? A. Well, I am basing my answer, not on this analysis of flue gases, but on Dr. Katz's measure of the gases on the ground.

Q. No, no, please do not do that, because then you are entering the function of appraising the weight of Dr. Katz's evidence. Please just answer the question as put to you and independently of the fact that Dr. Katz has given evidence. A. I did not realize it was intended to exclude other considerations than those.

Q. The question that is put to you is this. The possible emission of SO_2 from the chimney at the rate that Mr. Ferguson has outlined, which has been given in evidence, together with the finding of typical SO_2 burns, would it be a fair conclusion then that they were SO_2 burns? A. No, I do not think so, sir. Actually, 24 points per million in flue gas is so very small, when you compare it with some flue gas concentrations that one is accustomed to weigh—everyone will agree that sulphur dioxide is injurious.

Q. Well, have you any knowledge of the scientific aspect of the relation of the emission of the gas to the actual burning? A. Well, no, I am not an engineer.

Q. Well, I would not have taken that you were from the qualifications that you outlined, and there is not much use of getting into a scientific discussion if one is not qualified to enter upon it. A. No. I would not want to pronounce with authority on this question.

HIS LORDSHIP: I think, if I may suggest, you ought not to cross-examine the doctor on branches of the case concerning which he has not assumed to give evidence, and concerning which his qualifications would not indicate he was scientifically qualified to give it.

MR. FERGUSON: I won't go any further with it, my lord. But you spoke of other places? A. Yes, Mr. Ferguson.

Q. When you were at Trail, British Columbia, you were dealing with injury as far away as 40 miles from the source? A. Yes.

Q. And up at Sudbury, you dealt with it 15 to 20 miles away? A. Much more than that.

Q. And here you are dealing with it at five-eighths of a mile from the source.

HIS LORDSHIP: Well, the doctor has not said anything about that. Those are all things that are really for me, and I do not know why you are insisting on cross-examining the doctor on something he has not offered any opinion on.

MR. FERGUSON: I might extract an opinion, or something.

HIS LORDSHIP: Well, you might.

MR. FERGUSON: Q. Doctor, did you have anything to do with the establishing of the test plot in front of Mr. Walker's place? I am referring to the McKinnon test plot and not Mr. Walker's. A. Yes. I wanted to see it put there, Mr. Ferguson.

Q. Did you give any other instructions about the soil? A. No. I left that to the gentleman who established the plot.

Q. I see. You left that entirely to him? A. Yes.

Q. Well, that was the start of the year, I understand, in the spring of 1946? A. Yes.

Q. And it was in the summer of 1946, was it, that you first discovered the markings on the plants in the test plot? A. Yes, it was.

Q. And you heard Dr. Saville, of Ottawa, testify here and I have no doubt you heard it before, that the yellow markings on those plants in the test plot were a fusarium yellow?

HIS LORDSHIP: He did not testify to any such thing. He testified on the samples sent to him, but I do not have it as fusarium yellow; and that was in 1948.

THE WITNESS: And those were not from the test plot, if my memory serves me.

HIS LORDSHIP: I think we will adjourn until a quarter after two, or were you about through?

MR. FERGUSON: Not quite through.

HIS LORDSHIP: Then we will adjourn until a quarter after two.

—Whereupon Court adjourned until 2.15 p.m., Monday, May 9th, 1949.

Monday, May 9th, 1949, 2.15 p.m.

CROSS-EXAMINATION OF DR. DUFF
CONTINUED BY MR. FERGUSON:

Q. Dr. Duff, you told us about having visited St. Catharines on the 20th August, 1946? A. Yes, sir.

Q. At whose request did you come to St. Catharines? A. On that particular occasion?

Q. Yes? A. Nobody's request.

Q. No one's request? A. No.

Q. Did you come over just on your own? A. Yes.

Q. Well, what prompted you to come? A. I cannot say now. My practice was to come when it was convenient.

Q. But I thought you came with Dr. Katz on that occasion? A. Or am I mistaken about that?

HIS LORDSHIP: Will you give me that date again?

MR. FERGUSON: The 20th August, 1946, and the 22nd July. A. I beg pardon.

Q. On the 22nd of July 1946, you were over here, too? A. Yes, I was.

Q. At whose instigation did you come on the 22nd of July? A. No one's, and I never, I think, on any occasion, came with Dr. Katz. I sometimes found him here when I came.

Q. Well, then, on the 27th of June, 1947, you were over here? A. Yes.

Q. And you were again here on the 22nd of July, 1947? A. Right.

Q. At whose instigation did you come on those dates? A. Again, no one's.

Q. Well, did you pay your own way, and that sort of thing? A. Yes, I paid my own way and I charged it up after the event.

Q. To whom? A. To McKinnon's.

Q. Then, I take it when you charged it to McKinnon's, you had some prior arrangement about coming over? A. Oh, yes. I was asked to come and make a report to them on the vegetation.

Q. You were asked by McKinnon's to come? A. That is right.

Q. Then, when you came in July and August of 1946, you must have known there was a lawsuit pending between Walker and McKinnon's? A. Oh, I think so.

Q. That is the suit we are in here, now? A. Yes, sir.

Q. And you would know the same thing, that an action was still running, in July and August of 1947? A. Yes.

Q. And did you expect to be called as a witness in this case? A. Oh, yes, I did.

Q. And you expected to be called as a witness when you were examining those plants in 1946 and 1947? A. Yes.

Q. And again, I suppose I am safe in saying, McKinnon's were looking after your expenses and paying your time? A. Yes, certainly.

Q. Was it on the occasion of the visit of 1946, or 1947—I just want to get this clear—when you used the India ink on the leaf? A. 1946, Mr. Ferguson.

Q. That is all, thank you.

MR. KEOGH: Thank you, doctor.

HIS LORDSHIP: You have no re-examination?

MR. KEOGH: That is right, my lord.

In the Supreme Court of Ontario No. 49 Defendant's Evidence Dr. George A. Duff Cross-Examination 9th May, 1949 Continued

HIS LORDSHIP: One or two questions I want to ask you, doctor. In the case of chronic injury that we were discussing this morning, that is a gradual injury that is not manifest as it progresses until it has progressed to some extent to show some impairment of the development of the plant, I suppose? A. Yes.

Q. If a plant is suffering from chronic injury and is being subjected from time to time, with various degrees of fumigation from SO_2, what do you say as to whether or not a lesser degree of concentration and duration might produce an acute injury, then, in a plant that has not been suffering from chronic injury? A. Oh, the lesser concentration will produce acute symptoms, oh, yes.

Q. Thank you doctor. That is all.

—Witness excused.

LANCELOT DUNN, sworn

In the Supreme Court of Ontario No. 50 Defendant's Evidence Lancelot Dunn Examination-in-Chief 9th May, 1949

EXAMINED BY MR. KEOGH:

Q. Mr. Dunn, you are a florist in St. Catharines. Is that right? A. I am, sir.

Q. And your greenhouses are located where? A. On Queenston Street, St. Catharines.

Q. Between what streets? A. Between Frank and Thorold Road.

Q. And how many years' experience have you had in the growing of plants? A. Between 20 and 25 years.

Q. On instructions from Mr. Cook of McKinnon's, did you commence an experimental plot for the company, at the outhouse, in June of 1946? A. I did, sir.

Q. And the first year, what flowers did you plant in it? A. Gladioli, geraniums, petunias and egeratum.

Q. The egeratum was a border? A. A little border plant.

Q. Then, the next year, in 1947, what flowers did you plant in that experimental plot? A. Gladioli, geraniums, petunias—I do not think there was any egeratum in 1947.

Q. Then, the third year, in 1948, what did you plant in the experimental plot? A. I grew cloth house chrysanthemums.

Q. The cloth house is a structure on poles, covered with cloth? A. To allow you to shade it, to bring them in earlier dates.

Q. So you grew only chrysanthemums in 1948, in that plot? A. Yes.

HIS LORDSHIP: This is the test plot at the outhouse?

MR. KEOGH: At the outhouse.

Q. Then, I show you a photograph which I am instructed was taken on September 6th, 1946. What is that a photograph of? A. Of the gladiolus in the McKinnon test plot.

MR. SLAGHT: What year? A. September 6th, 1946.

—EXHIBIT No. 179: Photo of gladioli in McKinnon test plot taken September 6th, 1946.

Q. Then, I show you another photograph, which I am instructed was taken on the same date. Of what is that a photograph? A. The whole—practically the whole area of the bed with geraniums, petunias and egeratum.

Q. And gladioli is in the back part? A. In the centre.

HIS LORDSHIP: Is that taken the same date?

MR. KEOGH: The same date. It is a little fuller view.

—EXHIBIT No. 180: Photo showing gladioli and other flowers in McKinnon test plot, September 6, 1946.

Q. Then, I show you a photograph which I am instructed was taken on August 25th, 1947. Of what is that a photograph? A. The gladioli, geraniums, petunias in the McKinnon test plot.

—EXHIBIT No. 181: Photo of gladioli and other flowers in defendant's test plot, August 25, 1947.

Q. On August 25th, 1947, did you cut any gladioli from the plot shown in Exhibit 181? A. August 25th, 1947?

Q. Yes? A. Yes, sir, I did.

Q. Approximately how many flowers did you cut. A. 30 to 36.

Q. And was this photograph, Exhibit 181, taken before or after you cut them? A. Before we cut them, sir.

Q. And what did you do with the gladioli that you cut from that plot on that day? A. Took them back to my own store, put them on refrigeration.

Q. I show you four photographs which have already been filed as Exhibit 169A, B, C and D. Will you look at those, please, and tell me of what they are photographs? A. Photographs of the gladioli cut from the McKinnon test plot on August 25th.

Q. 1947? A. 1947.

Q. And then what did you do with those gladioli, that day or the next day? A. I took them to Welland and entered them in the flower show.

Q. What was the flower show? A. It was a joint show between, I believe it is called the Niagara District Gladioli Society and the Welland Horticultural Society.

MR. SLAGHT: My lord, as I did once before, I suggest to the Court if my friend intends to show some prize-winning qualities, that that really is not evidence. I suppose the shortest way is to receive it for what it is worth.

HIS LORDSHIP: Well, then, I will receive it for what it is worth.

In the Supreme Court of Ontario No. 50 Defendant's Evidence Lancelot Dunn Examination-in-Chief 9th May, 1949 Continued

MR. SLAGHT: I do not want to shut anything out that may be evidence, but it does seem to me ——

HIS LORDSHIP: You will have an opportunity of dealing with it at another time, if you do not want to shut it out. Let us go on.

MR. SLAGHT: All right. I think one witness said the judge was a blacksmith, or he didn't know if he was.

MR. KEOGH: Q. Did you win any prizes for gladioli in that show? A. I did, sir.

Q. What prizes did you win? A. I won the best vase in the show, the grand championship vase and, with two other entries in another class, I won second and third ties.

Q. All for gladioli? A. All for gladioli.

MR. SLAGHT: Were they all off McKinnon's? A. All off McKinnon's test plot.

MR. KEOGH: Q. Did you have any of your own gladioli in this exhibit? A. No, sir.

Q. And is this a photograph of the vase and the prize ribbons you won for that McKinnon gladioli? A. They are, sir.

HIS LORDSHIP: Do you think that adds anything to it, to show a picture of the ribbons?

MR. KEOGH: I do not think so, my lord. All right. I won't put it in.

HIS LORDSHIP: Doesn't make much difference what the ribbons look like.

MR. KEOGH: Then, in June, 1948, was a test house established by Dr. Katz, on your greenhouse property? A. It was, sir.

Q. And is this a photograph of the test house and one of your greenhouses? A. Yes, sir, it is.

Q. The test house is shown at the right-hand side of the photograph, is it not? A. Right, sir.

—EXHIBIT No. 182: Photo of test house and greenhouse at Dunn's June, 1948.

Q. Then, I show you a photograph which I am instructed was taken on August 15th, 1948. Of what is that a photograph? I beg your pardon. It should be October 15th, 1948. A. Chrysanthemums in the cloth house in the test plot at McKinnon's.

Q. What type, large or small? A. What is called the commercial chrysanthemums, the large varieties.

—EXHIBIT No. 183: Photo of chrysanthemums in test plot at defendant's property, October 15, 1948.

HIS LORDSHIP: Is this from the test plot?

MR. KEOGH: Yes, my lord, in the cloth house.

HIS LORDSHIP: Q. You had a cloth house erected on the test plot, did you? A. Yes.

MR. KEOGH: He has already said he erected a cloth house on the test plot for chrysanthemums in 1948.

Q. Then, I show you another photograph which I am instructed was taken on August 20th, 1948. Of what is that a photograph? A. Commercial chrysanthemums in bloom, pretty near ready for cutting, in the McKinnon test plot.

Q. And are those the large variety already shown in the previous photograph? A. That is the large variety, yes, sir.

—EXHIBIT No. 184: Photo of chrysanthemums in defendant's test plot, August 20, 1948.

Q. Then. I show you a photograph which I am instructed was taken on October 20th, 1948. Of what is that a picture? A. A picture of the single variety of chrysanthemums, in the McKinnon test plot.

—EXHIBIT No. 185: Photo of chrysanthemums in defendant's test plot, October 20, 1948.

HIS LORDSHIP: Were these set out in the spring? A. Yes, sir.

Q. When were they set out? A. Early June.

Q. When you say "early June", what do you mean? A. Oh, I would say from the 2nd to the 5th of June.

MR. KEOGH: Then, I show you another photograph of October 20th, 1948. Of what is that a picture? A. The single varieties of chrysanthemums, just about ready to cut, in the McKinnon test plot.

Q. These are the flowers and the varieties shown in the last exhibit? A. Yes, sir.

—EXHIBIT No. 186: Photo chrysanthemums, defendant's test plot, October 20, 1948.

Q. Then, I show you a photograph taken, I am instructed, June 4th, 1948. Of what is that a photograph? A. The young chrysanthemums, right after planting in the McKinnon test plot.

Q. That is the setting out of them, as you have just told his lordship about? A. Right, sir.

—EXHIBIT No. 187: Photo June 4, 1948, showing young chrysanthemums in defendant's test plot.

Q. Then, I show you a photograph which I am instructed was taken March 21st, 1949. Of what is that a photograph? A. A cleaned and uncleaned pane of glass in my greenhouse—one of my greenhouses.

Q. Who cleaned the clean pane? A. I did, sir.

Q. In which greenhouse? A. In what we call the forcing house, directly south of the test house on our property.

—EXHIBIT No. 188: Photograph showing a clean and unclean glass in Dunn's greenhouse, March 21, 1949.

In the Supreme Court of Ontario No. 50 Defendant's Evidence Lancelot Dunn Examination-in-Chief 9th May, 1949 Continued

Q. Then, I show you a photograph which I am instructed was taken on March 21st, 1949. Of what is that a picture? A. A cracked pane of glass in the forcing house in my greenhouses.

Q. The same greenhouse? A. The same greenhouse; a cracked pane.

—EXHIBIT No. 189: Photo March 21, 1949, showing cracked pane of glass in Dunn's greenhouse.

Q. On or about the 7th of September, 1947, did you pull any gladioli leaves from the McKinnon test plot? A. I did, sir.

Q. How many did you pull? A. I believe I pulled about four bulbs, complete plants out, and there would be a dozen, possibly, leaves on those bulbs.

HIS LORDSHIP: You mean a dozen on them all? A. Approximately a dozen leaves altogether.

MR. KEOGH: And what did you do with those leaves? A. I sent them to Dr. Ledingham, at Ottawa.

Q. Did you see Mr. Walker's north greenhouse on the early evening of Tuesday, April 26th, of this year? A. I did, sir.

Q. And what was the condition of the glass roofing on it? A. It was during a rain, and the glass looked very clean.

HIS LORDSHIP: April what?

MR. KEOGH: April 26th, 1949. Your witness.

In the Supreme Court of Ontario No. 50 Defendant's Evidence Lancelot Dunn Cross-Examination 9th May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. Mr. Dunn, Mr. Walker and you have been competitors in business here? A. Yes, sir.

Q. He has been a serious competitor of yours, perhaps, and you of his? A. That is a matter of opinion, sir.

Q. What is your opinion? A. Very good competition, sir.

Q. That is what I thought and, that being so, you appear to have taken a real active part to defeat his claim in this case? A. I would not say that, sir. I was hired to do a job by McKinnon's.

Q. Well, I hope the workman is worthy of his hire. But were you hired by the day or by the job A. There was no mention. I was just to send in my bill for my work.

Q. Which you have done? A. Which I have done, sir.

Q. And have been paid? A. Yes, sir.

Q. How many years have you been billing them? A. For four years, sir.

Q. Well, that is a nice job. Then, tell me this, Dunn, you took on, under Katz, at the request of Cook, I take it, the setting up of a test plot for what is called the McKinnon test house? A. Yes, sir.

Q. And what year did you plant? A. In 1946 for the first time, sir.

Q. And in the soil that was there? A. No, I brought in soil.

Q. Where from? A. I had a trucker bring it in who had been bringing me in soil for years. A man by the name of Ell—(?), and he knew the type of soil I wanted and he got it.

Q. Where had the soil come from? A. I couldn't tell you that, sir.

Q. No idea? A. Other than that I told him I wanted pasture land.

Q. There is a lot of pasture land around here, but you don't know where it came from? A. No, sir.

Q. Now, that is 1946. In 1947 you again planted flowers there? A. Yes, sir.

Q. In the test plot only, and I may tell you I am speaking of the test plot next the outhouse. A. Yes, sir.

Q. And did you bring in any soil in 1947? A. In 1947 I did not.

Q. Or 1948? A. In 1948 I did, sir.

Q. Where did that come from? A. The trucker who is now bringing me in soil, a man by the name of Cherney.

Q. Do you know where it came from? A. No, sir.

Q. Somewhere around the country? A. That is true, sir.

Q. And had you sent to the O.A.C. at Guelph the soil you used there, in any of those years? A. No, sir.

Q. Why not? A. Because we test our own soil.

Q. You test your own soil. This was not your own soil. This was brought in there. A. We tested that soil.

Q. Where did you test it? A. In our own laboratory.

Q. Who did the tests? A. An employee of mine.

Q. I am told that it is good practice for florists, on top of their own tests, to send the soil they are going to use to the O.A.C. That is considered good practice in Ontario. You know that, don't you? A. Yes, sir.

Q. Why didn't you send this soil that you were getting ready, perhaps to destroy Walker—and I am not using that in any unfair sense—why didn't you send it to the O.A.C. to be tested? A. Because we felt we can do a more competent job in our own plant than they do at the O.A.C.

Q. What do you know about the O.A.C.? Were you ever a student there? A. No. That is where I learned to test soil, at the O.A.C.

Q. You went up and took a refresher course? A. No, sir. I went up on various days to learn to do testing.

Q. And you came away disgusted? A. No, sir.

Q. Well, you are telling me they don't know how to test soil? A. I am not suggesting that at all, sir; all I am saying is we can take a more accurate test and can do it, rather than send

it through the mail to the O.A.C. You can check at the O.A.C. and see if that is true.

Q. Then, of course, you would not plant in diseased soil out there? A. Unless you sterilize your soil, you have no complete assurance that disease is not in the soil.

Q. All right. And you know that the soil that you tested and refused to send to the O.A.C. had disease in it and produced diseased bulbs? You heard Saville say they were? A. Sir, that is ridiculous. A soil test is for nutrients, not for disease in soil.

Q. Then, who bought the bulbs you planted there, that you say got diseased? A. I bought the bulbs.

Q. Who from? A. Reputable growers.

Q. Who are they? A. The first year, Professor Palmer, at the experimental station at Vineland.

Q. And the Professor is in Court. What kind of bulbs was it you say had disease? A. That was in another plot, sir, in 1945, that Professor Palmer sold to me, and I bought off Ness, Niagara Glad Gardens, large growers in the St. Catharines area, for 1946.

Q. Well, I missed that. You bought, you told us, bulbs of what flowers, from Palmer? A. Gladioli bulbs.

Q. And they became diseased? A. No, sir, this is 1945. That is entirely different.

Q. I thought you told me in 1945 they were diseased. I may have misunderstood you. A. No, 1946 and 1947.

HIS LORDSHIP: I thought it was 1948 they were tested in Ottawa.

MR. KEOGH: Both years, my lord, 1947 and 1948.

HIS LORDSHIP: I think we have only had one witness who gave evidence of disease.

MR. KEOGH: Dr. Saville mentioned two of them, one in 1947, a bacterial blight, and one in 1948 of the fusarium yellows.

MR. SLAGHT: Now, what is the first year that the bulbs you selected and bought and planted got diseased either in your test plot, according to you, that they were diseased? A. 1946, sir.

Q. And you bought those from Palmer? A. No, sir, I bought them from Ness.

Q. Did you test them for disease? A. I don't know of any known test. I am not a plant pathologist. I would have no way of knowing that. I bought them from a reputable grower, presumably clean.

HIS LORDSHIP: Just before we go any further. I don't recollect any evidence of any bulbs that were diseased, in 1946.

MR. KEOGH: Except that Dr. Duff said there were a few reddish brown markings.

HIS LORDSHIP: Oh, I know.

MR. KEOGH: He did not say what they were. There is no definite evidence of it.

HIS LORDSHIP: I know of no evidence of diseased bulbs, and I think bacterial blight is not necessarily a disease in the bulbs; but there was evidence of diseased bulbs in 1948, as I recollect it.

MR. SLAGHT: Q. Now, according to your theory of disease, do you tell us that in 1947, any of your bulbs planted in your soil are suggested to have been diseased? A. I would not know, sir. I took the advice of Dr. Katz and Dr. Duff, that they were diseased. I could not tell you.

Q. I only want to straighten the year. I take it that any bulbs sent to Ottawa were taken with your approval, perhaps under your supervision, out of your test plot? A. In 1947 was the only time that I sent any bulbs away.

Q. Now, what did you do with them when you took them out? A. I took them back to my shop and packaged them up and sent them to Ottawa.

Q. You didn't know what was the matter with them? A. No, sir.

Q. You didn't know whether it was SO_2, or perhaps disease? A. Not the faintest idea, sir.

Q. And what were the markings on them and on your flowers? A. Well, they were gladioli and they were all—the tips were slightly brown with markings extending down the side; brown markings.

Q. And tips discoloured? A. Tips — their tips discoloured.

Q. Did you hear the evidence of Mr. Jarvis that that was a typical SO_2 marking? A. I did, sir.

Q. Are you prepared to deny it? A. No, sir. I don't know what an SO_2 marking is.

Q. Well, I thank you for that. Then, anyway, the Dunn-selected bulb in the Dunn-selected earth you think showed disease, if Saville should be right, in 1947. What about 1948? A. 1948 there were chrysanthemums planted.

Q. And there were samples taken?

HIS LORDSHIP: Did you not have anything to do with the planting of gladioli in 1948? A. No, sir.

Q. You had nothing to do with the planting? A. No, sir. There was no gladioli planted in 1948 in the test plot.

MR. KEOGH: Perhaps I might enlighten your lordship; they were on the forge plot, and they were some specimens Dr. Katz picked up in front of the forge plant.

In the Supreme Court of Ontario No. 50 Defendant's Evidence Lancelot Dunn Cross-Examination 9th May, 1949 Continued

HIS LORDSHIP: Well, you had nothing to do with any gladioli in any plots that were on the McKinnon property, in 1948? A. No, my lord.

Q. Well, then, we have got that.

MR. SLAGHT: Q. Then, you had two cooks at the broth. I think Katz told us that he put this planting and reaping and tending in your charge, as the head gardner. Is that not true? A. No, sir.

Q. Well, were you present when these were planted at the forge shop? A. No, sir.

Q. Otherwise we have not had anybody who told us how he did it, or where he got it? A. No, sir.

Q. You cannot help us on that? A. I know who planted them.

Q. By being told by somebody? A. Yes, sir.

Q. Well, we won't trouble you for that. Then, in 1948, you did plant some chrysanthemums yourself, did you? A. My men planted them under my supervision.

Q. And that is in soil that was not tested by the O.A.C., and did they go wrong, apparently? A. No, sir.

Q. Well, they came out all right? A. They went 100% perfect.

Q. Then, not knowing anything about SO_2, I suggest to you that light is a very important factor in a successful florist's business? A. At certain times of the year, sir.

Q. Yes, and in the winter time? A. Winter time, yes, sir.

Q. And that is why greenhouses have glass roofs? A. That is right, sir.

Q. To get sunlight through. Is that right? A. That is true, sir.

Q. You know enough about it that there are hours when the sun—I am not going into chemistry with you—that are very valuable in helping the growth of flowers? A. In the winter months, sir.

Q. Now I am a little puzzled about this Dunn's greenhouse and Walker's greenhouse and all this inter-mixing, but let me ask you this, Mr. Dunn: do your greenhouses or greenhouses—have you more than one? A. Yes, sir.

Q. During 1946 and 1947 and 1948, have you any substantial deposits of iron on the glass? A. That I wouldn't know, sir.

Q. You wouldn't know? A. No, sir.

Q. Well, don't you examine your glass each winter and keep track of it? A. We see the glass all the time, but I don't know whether there is iron on it; I never analyzed it.

Q. Well, did you ever sample the kind of stuff that cluttered your glass? A. Just by observation.

Q. You could have taken samples of it and had it analyzed for iron? A. Yes, if I found it necessary.

Q. Now, you spoke of having to wash your greenhouse roofs, the glass; you told us about washing? A. I didn't tell you about washing, sir.

Q. I understood you to say that you showed a sample of washed and unwashed greenhouse glass? A. Just one pane of glass.

Q. Oh, I see. Then you just washed one pane of glass? A. That is right, sir.

Q. At your greenhouse? A. For this particular picture, yes.

Q. What about other than this picture? You never wash your greenhouse glass? A. We scrub off the whitewash.

Q. But aside from that? A. No, sir.

Q. Never wash the greenhouse roof? A. No, sir.

Q. If anybody lodged iron on your roof, thick enough to interfere with flowers getting light in the winter time, you would feel you had to wash it, wouldn't you? A. I would think so, yes, sir.

Q. And that, of course, would be a nuisance to you? A. Of a minor nature.

Q. A nuisance of a minor nature. Well, then, do you know whether SO_2 fumes ever pass over the bulbs, plants and flowers in your greenhouses? A. No, sir.

Q. You mean by that you don't know? A. I don't know, no, sir.

Q. You don't know whether SO_2 ever bothered you or not. Did soot ever bother you? A. Yes, sir.

Q. And is soot a nuisance? A. Yes, a minor nuisance.

Q. You grow orchids? A. No, sir.

Q. Well, when it gets on your delicate flowers that are in bloom, how do you get the soot off? A. It just drops off. We make no effort; just in the cutting and normal handling of the plants, it drops off.

Q. Just drops off? A. Yes, sir.

Q. Then you don't get the kind of soot that—

HIS LORDSHIP: Isn't that pure argument? I cannot see the value of cross-examining on that. That is pretty much presenting argument to the witness.

MR. SLAGHT: Perhaps so, my lord. I do not want to trespass, and I am going to shorten it right up. Perhaps I will take another turn.

In the Supreme Court of Ontario No. 50 Defendant's Evidence Lancelot Dunn Cross-Examination 9th May, 1949 Continued

Q. Is it your story you are coming here to tell us that, with these large amounts of soot and other things on your roof and on your bulbs and plants, they were never any trouble to you at all? A. Oh, on a very, very—it is just a small nuisance value.

Q. And how does it create this small nuisance value? A. Well, it doesn't make the flowers look quite as nice.

Q. I see: and therefore they are not as readily saleable? A. No, sir. It has never affected our sale of any flower.

Q. Well, don't you have discriminating customers that would prefer to buy flowers that look nice, rather than flowers that do not look nice? A. I do. What I mean by that, sir, in the handling from the greenhouse, when they are cut, by the time they get into the store there is no dust or dirt left on my flowers.

HIS LORDSHIP: All the witness is saying is that the type of soot he has is not bothering him. I do not know why you need argue with him at length about it.

MR. SLAGHT: No.

Q. This Exhibit 189 intrigues me a little, March 21st, 1949. What is the picture of, Dunn? A. That is a picture of a gutter pane of glass, right down at the gutter, a cracked pane, showing the dirt on my glass.

Q. That is a pretty dirty looking piece of glass? A. It is, sir, and if it rained that night, it would be clear tomorrow.

Q. Oh, you think so? A. I know so.

Q. And if it didn't rain for two weeks, it would not be clear till it rained, would it? A. No, sir.

Q. You think it would be good to have your flowers robbed of sunlight for two weeks, because the heavens didn't let down rain?

HIS LORDSHIP: Well, now, that is just argument. We can spend a long time in this case arguing these very points that are not relevant to the issue.

MR. SLAGHT: I had very cheering news at noon, and I am just trying to get through as quickly as I can.

HIS LORDSHIP: Well, I am trying to help it as much as I can, to get through.

MR. SLAGHT: That is all, thank you.

HIS LORDSHIP: Have you any re-examination?

MR. KEOGH: No, my lord.

HIS LORDSHIP: One or two questions I want to ask you. You said that the cleaning off the whitewash once a year, that was the cleaning that you found necessary, all the cleaning that you found necessary, otherwise the rain would take off any deposit that would occur? A. Yes, sir.

Q. And in taking off the whitewash, what would you do? A. We scrub it. We use the ordinary scrub brush and a pail and it is scrubbed back and forth and water is used to blow off the surface.

Q. You blow water on? A. Yes.

Q. You scrub it with a brush and blow water on it? A. Yes.

Q. And you find that is satisfactory? A. That is the usual procedure.

Q. Now, you spoke about the test plot, when you cut these gladioli for show purposes? A. Yes, sir.

Q. I show you Exhibit No. 25, which is a photograph taken at the test plot. I think it is the 5th of September, which would be about ten days or eleven days after you cut your glads. You notice there seems to be quite a lot of burning on the tips? A. They are very bad, sir, in that picture.

Q. It had changed between the time you cut your glads and the time that you— A. Yes, sir. May I explain that, sir?

Q. Yes. A. When we won at the show, I carried on till the end of that week. The show finished on a Wednesday and on Saturday I went to Mr. Cook. We had taken 156 blooms out of that patch, and Mr. Cook said this was the evidence that we wanted, and I asked him if there was any need of my going down and cutting three or four or five gladioli as they came out. Mr. Cook said, no, to discontinue the bed.

Q. Yes, but what I am talking about is the discolouration on the leaves. A. Yes, sir.

Q. That occurred between the time you cut your glads and the 5th or 6th of September, did it? A. No, sir. I think you will find these cut glads all had markings on about that high on the older leaves that came out.

Q. Were they discoloured? A. They were discoloured.

Q. There is evidence given that this discolouration occurred in a very short time; that it was not there and, in a few days it was there. Now, are you denying that? A. No, sir. There were markings on in these pictures of gladioli for show. We didn't even cut those bottom leaves off.

Q. I am not talking about cutting anything. You are mixing up the two things. I am not talking about cutting the bottom leaves or anything else. I am just interested in whether you can throw any light on the fact that it is said there was a general discolouration that took place in a very short time and I understood you to say that whatever took place, took place after you cut your leaves for show? A. No, that is wrong, sir.

Q. Well, were they discoloured before that? A. Yes, sir.

In the Supreme Court of Ontario No. 50 Defendant's Evidence Lancelot Dunn Cross-Examination 9th May, 1949 Continued

Q. Generally? A. Generally, yes, sir.

Q. Extensively discoloured? A. I would say extensively, yes, on the lower leaves.

Q. And then, on the 9th, it was all dug up. Did you have anything to do with that? A. No, sir. After I finished at the end of the week, we did not cut any more.

Q. After you entered them for the show? A. That is right, sir.

Q. Now, I am going to ask you this question. Did you ever cut a large number of leaves and send them to anyone, any responsible person, for the purpose of ascertaining what was the matter with them? A. Not a large quantity, about a dozen leaves.

Q. I know there were about a dozen cut on one occasion, but there was no large cross-section submitted to anyone to ascertain what was the matter with them? A. No, sir.

Q. And in 1948 you had no connecion whatever with the gladioli beds? A. No, sir.

Q. So what was done, then, that year, you had nothing to do with? A. That is right, sir.

Q. And if there was anything the matter with those gladioli, you never did find out what it was? A. I never knew, sir.

Q. All right.

—Witness excused.

In the Supreme Court of Ontario No. 51 Defendant's Evidence Edward Jackson Examination-in-Chief 9th May, 1949

EDWARD JACKSON, sworn,

EXAMINED BY MR. POND:

Q. Mr. Jackson, I understand that for many years you have been gardener around the McKinnon plant? A. That is right.

Q. And that you were gerdener in 1945, 1946-7-8? A. Correct.

Q. And that you ceased to be gardener since January of 1949? A. That is right.

Q. And I understand also that around the McKinnon plant there are flower beds along the fronts of the buildings; is that so? A. That is correct.

Q. And those are the beds which you had charge of? A. Yes, sir.

Q. Now, do you recall pulling up some glad plants around June 18th, 1948, in the round bed outside the forge shop? A. That is right.

Q. And how did you come to be pulling up those glads? A. The reason them glads was pulled up, sir, is this; them glads had been in the bed three years running; that was the third year.

Q. How many of them were there when you were pulling them up? A. Well, altogether to take the full bed, there would be nearly 200, but I didn't take all out at the first day.

Q. No, no. You have said you were pulling some glad plants up in the round bed near the forge shop? A. Yes.

Q. And how many plants did you pull up? A. Well, that day I would pull up about a half a dozen.

Q. And had anyone instructed you to pull those plants up? A. No, sir. I was in full charge.

Q. And in what condition were the plants? A. Well, they was—what I pulled up was running rather weak. That was the oily condition, being in the ground so long.

Q. Were there any markings on the tips of the leaves? A. Well, there might have been just at the tips, but no other marking. The plant was pretty good.

Q. You know Dr. Katz, do you? A. Yes, sir.

Q. And did you know that he had pulled up several plants and sent them away? A. I knew that.

MR. SLAGHT: Well, no, no.

MR. POND: Q. Now, it was suggested by Mr. Walker in evidence in this case, that the glads planted in the circular plot in 1948 were potted plants? A. Well, I am afraid Mr. Walker is wrong there. When them plants was planted they was planted with the bulb, unforced.

Q. And you said they were in the plot for three years? A. Yes, sir.

HIS LORDSHIP: Q. But they were not left outside for three years? If you have that idea in your head, because you would not get much of a glad the next year. A. Well, the glads I left inside, they was like on the shelf inside the building.

Q. Yes, but you put them out every spring? A. No, sir, I think every two years let them lay in.

Q. These plants? A. Yes, sir, and Dr. Katz, I believe it was 1947, saw some of them in bloom, what had been in for two years.

MR. POND: Q. Now, can you tell us whether or not you had any trouble in raising flowers in all these beds in front of the buildings of the McKinnon Industries Limited, while you were gardener? A. Only on one occasion and that was in the end of 1947. They had the window cleaners out and they had been cleaning windows with some acid and the acid come down on to the plants and spoiled them, and I also had a little trouble with cut-worms.

Q. What date was that where you had trouble with the acid? A. Well, this bed along Ontario Street, beside what we call the electric door.

In the Supreme Court of Ontario No. 51 Defendant's Evidence Edward Jackson Examination-in-Chief 9th May, 1949 Continued

Q. Is that south of the power plant and on the east side of Ontario Street? A. No, it would be on the west side.

Q. Now, did you have anything to do with the test plot bed, the outhouse on the Warren Pink property, in 1946, when it was first put in? A. Test plot?

Q. Yes? A. Yes, sir. Mr. Dunn, he planted them, everything in the bed, and then I had full instructions from time to time to keep them watered, sprayed and weeded, which I done.

Q. And were you able to produce good flowers from that bed? A. Yes, sir, we had good flowers.

Q. That is all.

In the Supreme Court of Ontario No. 51 Defendant's Evidence Edward Jackson Cross-Examination 9th May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. Well, are the ones that Dunn planted—were they the ones that got diseased? A. Yes, sir.

Q. Well, where were the plants that were supposed to get diseased? A. The plants was not diseased when I put them in the ground.

Q. No, but Dunn's story is that he took them out and sent them to Ottawa because they had markings on them. You know that, don't you? A. Oh, I know he took some markings but I thought you meant the bulb was diseased when I put them in.

Q. Well, Dunn put those in? A. Dunn put them in. That is all he done with them.

Q. And there was a disease on them when they came out. Well, were there markings on these gladioli? A. Yes, there was a few marks on the glads.

Q. And was it you that dug up the flowers? A. That was me.

Q. Wait a minute till you hear my question. In September, just after Walker had potographed the bed, did you dig that bed up? We have seen a shot of it dug up, about the 5th of September. A. I have not seen no pictures of that yet.

Q. Never mind the pictures. Did you dig some up? A. I dug some up.

Q. And who else dug them up? A. Nobody. I was in full charge of that. I dug it myself.

MR. POND: He didn't have anything to do with the test plot after 1946, Mr. Slaght.

HIS LORDSHIP: Well, just a moment. He has just said that he did. We will find out what the witness says about it. Did you dig up the gladioli in the test plot in 1948? A. Yes, sir.

Q. Or 1947? A. No.

Q. In 1948 there were chrysanthemums in the test plot.

A. 1947.

Q. The last year they were there, did you dig them up? A. Yes, sir.

Q. You dug up the glads? A. I dug them up.

Q. Did you dig them on your own? A. I dug them on my own.

Q. You got no instructions from anyone? A. No instructions whatever.

Q. Why did you dig them up on September 9th? A. I couldn't tell you certain the date, but I was cleaning up my beds for the winter.

Q. Well, that is a little early to clean up a bed on September 9th. We have a photograph that they were all cleaned up by September 9th. A. Well, I couldn't say the date I dug them up, but I dug them up with no instructions.

MR. SLAGHT: Q. And is your idea of a good gardener to leave glads out all winter and then the next winter? A. I done that for an experiment, sir. I know people done the same thing before and had good flowers and the first year I done it, I had good flowers, but the second year I wasn't so successful.

Q. Now, what was the matter with the flowers the second year? A. They was worn out, like we do, when we get old.

Q. Well, speak for yourself; and they were weak and the tips might have had markings on them, you told my friend? A. Yes. Well, I put that down through watering in the very hot sun, instead of watering down at the roots, which I should have done.

Q. You are a practical gardener? A. No, I am not a practical gardener.

Q. Oh, you are not a practical gardener? A. No, sir.

Q. Well, what do you know about gardening? A. Like the rest of people, what I learn in books and from what I pick up and read in papers.

Q. Well, from what you learn in books and have picked up, are you able to say these defects you found were not due to SO_2, sulphur dioxide? A. Well, that is where you get me, because I don't know.

Q. No. You are saying you don't know. That is very fair, Jackson. That is all.

HIS LORDSHIP: Q. Where was this bed that you say you attributed difficulty to acid and cleaning of windows? A. That is on the bed what we call the electric door; that would be on the west side, going up Ontario Street.

Q. On the west side? A. Yes.

Q. Is it near the forge house? A. No, sir. It is just by the office; between the office and the chain company.

In the Supreme Court of Ontario No. 51 Defendant's Evidence Edward Jackson Cross-Examination 9th May, 1949

Q. And what sort of trouble did the acid give it? A. Of course, the window cleaners cleaning the windows and some of the windows got a little iron rust on them and the window cleaners had some acid in the water and that splashed down on these glads and as soon as ever it came down, of course, it gives you ——

Q. What did it look like, the injury with the acid? A. All withered up.

Q. What colour did it turn? A. A greenish colour.

Q. Well, they were green to start with. A. Yes. Well, you know, it is lighter, where the spots come down; everywhere this here stuff drops on it, it turns kind of a light green.

Q. Would you say it would fade? A. Fade.

Q. It would be lighter than the other part? A. Oh, yes, it was.

Q. And how do you know it was the acid from cleaning the windows? A. By the spots on the leaves.

Q. And you came to the conclusion that it was from cleaning the windows. Is that right? A. Yes.

Q. All right.

——Witness excused.

In the Supreme Court of Ontario No. 52 Defendant's Evidence Donald Thom Examination-in-Chief 9th May, 1949 Continued

DONALD THOM, sworn,

EXAMINED BY MR KEOGH:

Q. Mr. Thom, you are assistant comptroller of the McKinnon Industries Limited? A. Assistant comptroller and assistant secretary.

Q. And, as such, do you have charge of the production records, including the foundry? A. They come under my supervision.

Q. And at the request of my friend, I have asked you to make up a table on the subject of the quantities of A, pig iron; B, scrap iron and scrap steel, per day, for the years 1940, I believe, to 1948 inclusive. Have you that table in front of you? A. I have that table prepared from our records.

HIS LORDSHIP: That is the average quantity per day of pig iron, scrap iron and production of steel?

MR. KEOGH: No, my lord, the averages of A, pig iron; B, scrap iron and scrap steel included as one commodity, as my friend suggested, and the average per day for the total of all cupolas operating each day. In other words, it is not according to individual cupolas. It is the daily average total of those commodities for all those years, and you have prepared that truly and correctly from the actual production records of the company, in your charge? A. I did.

EXHIBIT No. 190: Table of daily averages of pig iron, scrap iron and steel used by Defendant for the years 1940 to 1949 (first quarter).

Q. Your witness.

CROSS-EXAMINED BY MR. SLAGHT:

Q. Well, you have others, Mr. Thom, because your company furnished Mr. Walker's solicitors with a schedule which shows a good deal more than this. It showed the annual average for certain years. Perhaps you have your statistical records there, because I would suspect you made others out for Mr. Cook and furnished them to him and I want to see if you have got the table which shows 1945, 1946 and 1947, with the tonnage weight of the scrap steel and the scrap iron. You have that, haven't you?

HIS LORDSHIP: That is the total for the year?

A. I have some other figures.

MR. KEOGH: I discussed this with my friend and his associate, and I understood this was what he wanted. I did not instruct the witness to make it in other tables.

MR. SLAGHT: I should have given it to my friend in writing, but this table is already made up and in the possession of your company.

THE WITNESS: I may have what you are asking for, but if you are asking me for it precisely, I will see what I have.

HIS LORDSHIP: Just a moment, Mr. Slaght. If you will make known to the witness what you want, I will have a ten minute intermission and see if he can get it. Just make known to the witness what it is you want and we will see if he can get it.

MR. SLAGHT: Just take the sheet and mark it down. We got, I am instructed, from your company the weight of scrap, then the word tonnage is over all three years. Then, scrap steel 1945, 1946 and 1947, if you can make it in a set-up like that. A. Just scrap steel? Is that all you want?

MR. SLAGHT: No, we want pig iron as well. A. You want scrap steel and pig iron? You are being precise, now, because that is what I will bring you.

Q. Well, that is what we want, scrap steel and scrap iron. A. Oh, and scrap iron?

Q. Yes. I thought you were reading this. A. Is that the full tonnage you want?

Q. Yes, and only two of them are here, that is steel and iron, and I have no doubt you have over in the next one, I am instructed you furnished the total tons per year of metal, dated 1937. You gave us 14567. A. I have as far as the total tons, but you are stating —

Q. In 1937, I am giving you what are supposed to be your own figures, and you will check 1938, 21580, 1940, 56,390. See, there is a big jump there. Now, I want to know how much coke you burn there annually in your three cupolas. You can give me the coke used for 1946, 1947 and 1948, if you will. A. How much coke we burn in our cupolas annually?

In the Supreme Court of Ontario No. 52 Defendant's Evidence Donald Thom Cross-Examination 9th May, 1949 Continued

Q. Yes, and if you don't have it in tab form for annually, you can put it on an average per month, and then we will multiply by twelve. Then, another item I want is the oil that you use in the forge shop per annum. Do you use oil anywhere else there in any quantity? A. First of all it is the oil we use in the forge shop?

Q. Yes, per annum.

MR. KEOGH: To save time I might tell my friend that the next witness will have the information about the oil.

MR. SLAGHT: Well, if that is true, strike out the oil. We don't want to get from you what we will get from somebody else. Then, you will be back, will you, Mr. Thom? A. Yes, sir.

HIS LORDSHIP: Then, if that is all you want now, we will rise for ten minutes.

——(Intermission.)

——On resuming:

MR. KEOGH: Mr. Thom is still working on the figures, my lord.

HIS LORDSHIP: Well, we had better probably give him a few more minutes. I will just rise, and let me know when he is ready.

CROSS-EXAMINATION OF MR. THOM CONTINUED

BY MR. SLAGHT:

Q. Mr. Thom, I understand you have the desired information. A. Yes, sir.

Q. It was furnished to me in table form. Now, what will you give us first? A. I will handle them in the order in which you asked for them.

Q. Heading? A. The first heading was weight of scrap annual tonnage 1945, pig iron, 10,641.4975 net tons. Scrap steel, 15,730.9340 net tons. Scrap iron, 1945—

HIS LORDSHIP: Does that include steel? A. No, sir. Scrap steel is the figure I have just finished giving. Now, I give the total of scrap iron. The total is 23,533.0430.

MR. SLAGHT: Yes. I don't believe we need the decimals. A. 1946 pig iron, 9734.1660.

HIS LORDSHIP: Oh, I do not think we need the decimals at all.

THE WITNESS: Scrap steel, 11,514 net tons. Scrap iron, 17,174. 1947, pig iron, 14,127; scrap steel 13,451 net tons in 1947. In 1947, scrap iron, 22,178. Those figures I have just read off cover our—are expressed in net tons and reflect the above ingredients in the mix in the cupola as per our books of account.

MR. SLAGHT: Q. That is all the pig that was used? A. Yes.

Q. The only one I missed was the pig iron for 1945. A. 10,641.

Q. Now then, have you the totals of metals for the three years? A. You ask me for the total tons per year of metal treated? I have the answer to that question readily available.

Q. Yes, and for 1945, what is it? A. You did not ask that question for 1945, you asked it for 1937, 1938 and 1940.

Q. All right. I wonder if you have there the totals of the three types of metal treated for 1945, 1946 and 1947. I have added them up. Have you your figures right here? Will you check with me and then his lordship will have the totals.

MR. KEOGH: My friend says "your figures" there, not his figures. There is something came out on Mr. Cook's discovery—

MR. SLAGHT: Well, he is giving them to me as the company's figures, or else I don't want them.

HIS LORDSHIP: Well, that requires the addition of pig iron, scrap steel and scrap iron.

MR. SLAGHT: Now for 1945, it is 45,905, 10,641, 15,731 and 25,533? A. You are correct.

Q. Then in 1946 the total is 37,272 tons? A. 37,972, unless I am adding wrong again.

Q. Right, 37,972, and 1947 perhaps we will both be right, 49,756? A. Correct.

HIS LORDSHIP: You have not the figure for 1948?

MR. SLAGHT: No, I did not ask for 1948. Have you any idea how 1948 would run comparable to these? A. Oh, I would know precisely.

Q. Well, just give us the totals for 1948 then.

HIS LORDSHIP: We have the averages.

MR. SLAGHT: Give us the total for 1948. A. In 1948 the pig iron was 8956; the scrap steel was 9093 tons; the scrap iron was 17,954.

MR. SLAGHT: That is 36,003? A. 36,003 net tons of those three grades of metal charged into the cupola for the calendar year, as per our books of account.

Q. Now then, your next problem was dealing with coke? A. No. In the order you asked the question, the next question you asked was the total tons per year of metal treated. That was your No. 2 question.

HIS LORDSHIP: Well, what does that mean? What do you mean by "metal treated"? A. Well, the expression "metal treated" is all the metal that is used in the foundry melting process, in the production of malleable and grey iron of the types we make.

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HIS LORDSHIP: Well, would you treat metal in addition to that melted in the cupola? A. Well, I mean there is—yes, added in the pouring ladles.

MR. SLAGHT: What you mean is there would be the slag products mixed up, part slag and fluorspar and limestone, and so on? A. Limestone and fluorspar would not come in under the metals treated.

Q. Well, these three being metals treated, I take it now, if he may, my lord, give us the total tonnage of the metals treated for each of the three years? A. 1937, 14,561; 1938, 21,580; 1940, 56,390; those figures are expressed in net tons and reflect the metal treated in our foundries in the above years, as taken from the books of account.

Q. And do you agree with me that you stepped up the totals enormously in 1940, because it was four times as much, you treated in 1940, as when you were beginning in 1937? A. I am slightly confused. Are you asking me a question?

Q. Yes, I think I am asking you the question. A. Would you mind repeating it?

Q. Apparently we have heard they stepped up their products in 1940, and I see that in 1937 they had 14,000 odd, and 1940 56,000 odd. That works out just about four times as much metal treated in 1940 as in the starting year of 1937? A. I would say if the 1940 figures are 56,390, they exceed the 1937 figures of 14,561 by approximately four times.

Q. Yes. That is all I wanted to comment on.

HIS LORDSHIP: 1937 is the first year the cupolas were in operation, is it? A. No, sir.

Q. Were they in operation before that? A. I cannot answer that question, your lordship. I think the technical man would have to answer that. My recollection is rather that the re-hearthening of the foundry was in 1936 and '37 and finished early in 1938. I would just as soon not make that point.

MR. SLAGHT: My own view said 1937, but my friend and I can doubtless agree on that.

HIS LORDSHIP: Well, there will likely be a witness that can establish it definitely.

MR. SLAGHT: My friend said he would produce one for me, and I am looking forward to him. Now, the next is coke? A. You asked how much coke we burned in our cupolas only in the years 1946, 1947 and 1948. In 1946, 6,896 net tons; 1947, 9,127; 1948, 6,820. Those figures are expressed in net tons and reflect the usage of coke in our cupolas from our books of account.

MR. SLAGHT: Thank you, Mr. Thom. Oh, did I ask you for oil? Oh, no, we summed it up.

——Witness excused.

GORDON MacAULAY, sworn,

EXAMINED BY MR. KEOGH:

Q. Mr. MacAulay, you are plant engineer at McKinnon Industries Limited? A. That is correct.

Q. And how long have you occupied that position? A. Five years.

Q. The last five years? A. Yes, from 1944.

Q. And, prior to that time, what was your position with the company? A. I was electrical superintendent for 27 years.

Q. Then, on the 2nd of April, 1945, was the first type of spraying nozzles scrubber installed in the cupolas? A. That is correct.

Q. And the first one was the No. 1 cupola? A. That is correct.

MR. SLAGHT: Mr. Keogh, I wonder if you would like to correct an indefinite statement that, prior to 1944, for 27 years he was electrical superintendent for this company. The way that reads, would you like to correct that?

THE WITNESS: For the McKinnon Industries.

MR. SLAGHT: No, it doesn't go back that far.

WITNESS: For the McKinnon Dash.

MR. SLAGHT: Well, I just mentioned the names of the companies during that 27 years. A. I could not name all the different companies. There is quite a few different companies involved there, but I knew it as the McKinnon Dash Company, and when I became plant engineer, the McKinnon Industries, subsidiaries of General Motors.

MR. KEOGH: And then the last change from 1925 on the word "S" was added?

MR. SLAGHT: Well, now, I don't like that word "S" was added.

HIS LORDSHIP: Well, I do not think—

MR. KEOGH: And I was about to say a new company was incorporated.

HIS LORDSHIP: Mr. Keogh gave us the dates of the incorporation of the various companies on Friday. I thought that was taken as settled, that matter.

MR. SLAGHT: Well, I had not so regarded it, because I had not checked it.

HIS LORDSHIP: Well, subject to checking, I think we could get it more specifically from some other witness than Mr. MacAulay.

MR. KEOGH: My friend has filed two or three certified copies of Charters and I am quite willing to accept those.

HIS LORDSHIP: Well, don't let us waste time with Mr. MacAulay.

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MR. KEOGH: Q. Then, that was installed by outside workmen, was it? A. That is right.

Q. And we have had some evidence in a brief way describing it as two cones, one above the other, with a water jacket in between? A. That is correct.

Q. And I am not going over the details of that, but what was the flow in gallons per minute on that first installation. A. 200 gallons.

Q. Then, what was the diameter of the pipe through which the water entered that water jacket? A. Four inches.

Q. Then, we have already had evidence that it was discharged through nozzles around the bottom? A. That is correct.

Q. And what was the distance around the circumference of the water jacket? A. In inches?

Q. Yes? A. Just offhand I could not be able to tell you that, but the nozzles were spaced approximately four inches apart, and there were 62 nozzles.

Q. And what was the opening in each nozzle? A. 3/16 of an inch.

Q. And what was the diameter of the cone across its base? A. Right across the point, 7 feet 6 inches.

Q. And then was a similar nozzle spray scrubber installed in No. 2 cupola on April 9th, 1945? A. That is correct.

Q. And a similar installation in No. 3 cupola on April 30th, 1945? A. That is correct.

Q. Then, up until what date did you handle the three cupolas? A. Up until what—

Q. Until what date did you have only the three cupolas? When was the fourth one put into operation? A. In 1947.

Q. Was that in March, 1947? A. That is correct.

Q. So that up until the end of March, 1947, you have only three cupolas in operation? A. That is correct.

HIS LORDSHIP: Were these three all operated at the same time, or was one used as a spare as you— A. No. We were running fairly continuous three cupolas at the time we had the three.

Q. I see.

MR. KEOGH: Q. Then, in the early part of March, 1947, what change, if any, was made on the scrubber in No. 2 cupola? A. Would you repeat that again, please?

Q. In the early part of March, 1947, what change, if any, was made in the type of scrubber on No. 2 cupola? A. Well, that was when we went to the single cone, with an open spray nozzle on the top, and done away with the side nozzle.

Q. That is the cone as presently used? A. That is the one that is being used at the present time.

Q. And when you changed to that cone with the single nozzle on the top of it, you did away with the second cone and the water jacket underneath, as I understand it? A. That is right.

Q. And the diameter of the single cone that you used in that new types of scrubber, across its widest part at the base, was what distance? A. Eight feet.

Q. And the flow nozzle located at the base of the cone from which the water flowed under the cone, was what distance above the apex of the cone? A. Six inches.

Q. Then, we have already had a description of that flow nozzle and one of the earlier witnesses pretty well described it. Oh, I do not think he gave the diameter of the pipes flowing into it.

HIS LORDSHIP: Yes, three-quarters of an inch.

MR. KEOGH: Q. Then, what was the flow of the water through this other nozzle No. 2 you have now? A. There was never any change in that. It was 200 gallons per minute.

Q. And then, what is the inside diameter of the steel shell surrounding the cupolas, No. 2, 3 and 4? A. 2, 3 and 4 is six feet six.

Q. And what is the inside diameter of the same shell surrounding cupola No. 1? A. Five feet six.

HIS LORDSHIP: Which is six feet six?

MR. KEOGH: No. 2, 3 and 4. No. 1 is five feet six. Then inside the steel shell again, you have a lining of firebrick? A. That is correct.

Q. The cupola stacks we are talking about? A. That is right.

Q. And what is the approximate thickness of that lining of firebrick on the inside of this? A. This firebrick itself, I wouldn't know. I don't know that thickness.

Q. Well, you may not have gone inside and taken a ruler. A. But I believe it is eight inches, though.

Q. Well, that is close enough. Then, at the end of March, 1947, No. 4 cupola was completed? A. Yes, sir.

Q. And you have already said it was installed with a new type of flow and the scrubber you have just described? A. Yes.

MR. SLAGHT: May I ask you, the six feet six figure he gave us is the inside diameter of the steel shell. Does the stack reduce the net diameter?

MR. KEOGH: The firebrick, it is eight inches off each side.

MR. SLAGHT: Well, can you give us the net figure? That is 16 inches off six feet six?

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MR. KEOGH: It is just a matter of calculation.

Q. Then, in the month of December, 1947, was the present type of flowing scrubber installed in No. 1 cupola? A. I believe that is correct, yes.

Q. And was the same installation of the present type made on No. 3 cupola in February of 1948? A. I believe Mr. Campbell—I believe he was in charge, or he made that change; I believe he gave that.

Q. I think he said the early part. A. Well, I think that is about right.

Q. Then, my lord, I have a model I have shown to both my friends, Mr. Ferguson this morning, and Mr. Slaght this afternoon, of the top of one of the cupolas which is to scale in two parts. This cupola base is to scale as was described, and is one inch, and the nozzle and pipes on top are slightly to a different scale, because you could not get the pipes long enough and they will be to scale. Then, I also have an actual nozzle which was taken off No. 4 cupola which was not being used to-day, the flow nozzle, and also a model to scale of the settling tank for the sediment, all to scale, with the exception that the pipes in it are not to scale, because you could not get the pipes small enough to correspond to scale, and I would like to produce those now—they remain under the supervision of the witness.

HIS LORDSHIP: Well, the witness can get them. There is one question. On February 4th, 1948, the present type of scrubber was installed on Nos. 2, 3 and 4. Is that ——

MR. KEOGH: No, just No. 3.

HIS LORDSHIP: Well, when was it installed on the others?

MR. KEOGH: No. 1 in December, 1947.

HIS LORDSHIP: February on No. 3?

MR. KEOGH: The early part of March for No. 2.

THE WITNESS: 4 was installed at the time the other cupola was installed.

MR. KEOGH: 4 was when it was built, March 31st, 1947.

HIS LORDSHIP: Is February, 1948, the present type one? A. For No. 3.

Q. It was the nozzle type until February, 1948? A. That is right.

Q. And March, 1948, for No. 2? A. That is right.

Q. And then No. 4 was installed when? A. When it was built, March 31st, 1947, and No. 1 was changed to the present type in December, 1947.

Q. Yes, I have that now. You may get your models.

—EXHIBIT No. 191: Model of cupola stack showing water wash system.

THE WITNESS: This model was made under my supervision, your lordship, and this is a model to demonstrate the principle that we could not maintain. The only point, we could not carry out the same to scale on account of these tubes, and so on.

MR. KEOGH: Q. First of all, I want to ask you, is the tin or galvanized part of the model to scale? A. It is.

Q. And to what scale? A. One inch per foot.

Q. And then the flow nozzle and the pipes crossing the top are to another scale, are they? A. Three and a half inches to a foot.

Q. Now, the only part of the model that is not to scale, as I understand it, are the two brackets on each side which are holding up the pipes across the top? A. Yes. On each side, up at the top, we have an angle iron welded on here with a U-bolt fastening the iron pipe.

HIS LORDSHIP: When you are saying "on here" you are pointing to the outer shell of the cupola and we consider the iron bar is fastened on with screw bolts? A. Yes.

Q. Well, now, the position of the apex of the cone with relation to the rim of the cupola, is that to scale? A. Yes. This whole sheet metal fixture is to scale.

Q. And the distance between —— A. In that ——

Q. Wait till I get through, now. The distance between the—what is it you call this? A. The flow nozzle.

Q. The distance between the flow nozzle and the apex of the cone is not to scale? A. No, I would not say that. That would be possibly approximately.

Q. Yes. That is Exhibit 191.

MR. KEOGH: Q. Then, witness, the sort of tapering semi-circular thing below the top of the cupola shown on Exhibit 191, what is that? A. That is the charge trough going around.

Q. That is the discharge water trough? A. This comes off here and goes into an eight-inch ——

Q. And when you say "this", that water trough is connected with pipes not shown on the model, which lead to the sediment tank? A. Yes, that is right.

HIS LORDSHIP: Give me the scale of the flow nozzle. A. The scale of the flow nozzle is three and a half inches equals one foot.

Q. And then the side brackets are not to scale? A. No, the side brackets are not to scale.

MR. SLAGHT: Now, he told everything before except the diameter of the flow nozzle, in which I am interested.

MR. KEOGH: I am producing a very nice exhibit, taken off one to-day, that I will produce.

—EXHIBIT No. 192: Flow nozzle from No. 3 cupola at defendant's plant.

Q. Then, you are producing as Exhibit 192, an actual flow nozzle which was taken off No. 4 cupola early this afternoon? A. No. 3, to-day.

Q. This morning or early this afternoon? A. Yes.

Q. And No. 3 cupola was not operating to-day, I understand; that is how you were able to get it off? A. That is right.

MR. SLAGHT: Now, can he tell us the diameter? A. An inch and one-eighth at the throat.

MR. KEOGH: Q. Then I would ask you to produce a model which I understand was also made up under your supervision to scale, with the exception of the pipes in it, of the sediment settling tank, which is part of this water scrubber system? A. Yes.

Q. Will you produce that, please, and show it to his lordship? A. (Produced.)

Q. Now, the pipes shown on this model of the tank are not to scale, because I understand you cannot get pipes small enough? A. And the screen.

Q. And the size of the screen is not, but, apart from that, is the rest of the model of the tank to scale? A. That is correct.

Q. And what is the scale? A. One inch per foot.

Q. Now then, you have tags on certain items, and perhaps you would be kind enough to explain each of these items which are tagged, what they are, and what their purposes are, and, Mr. Slaght cannot see very well.

MR. SLAGHT: I think I understand it. Go ahead.

THE WITNESS: The pumps are located and these are intakes for the outgoing.

MR. KEOGH: Q. Well, you will have to refer to these pipes, or something. A. That is, those are connections to the pipes. They are all tagged here, and the water is pumped up through the pumps, up through the scrubbers and goes down this pipe, which is ten inches.

HIS LORDSHIP: We can get at it this way, that the three pipes leading through the end of the tank are the pipes through which the water passes out of the tank? A. Yes.

Q. Going toward the cupola? A. That is right, being pumped through the cupola, and it goes back down through this pipe here and it is a ten-inch pipe.

Q. And it goes down the large pipe in the centre, at the other end? A. That is right, and this is where the droplets is. We have these baffles so we will cut down the droplets as it goes over the screen.

MR. KEOGH: You are indicating three sheets of tin running crosswise across the tank, which you say are baffles in it. A. Yes.

Q. And you have indicated that the water flows over the top of them all, 1, 2 and 3? A. Under here and over here.

Q. Under the two at the ends and over the centre baffle? A. That is right.

Q. Then, there are three pipes at the end leading toward the cupolas, three small pipes coming in from the corner of the tank. What are they? A. That one there is from the annealing ovens; waste water from the annealing ovens.

Q. That is, the one right in the corner is waste water from the annealing ovens, and the one next to it is what? A. The city water line.

Q. And the third in that line is what? A. Waste water from out the electrometal transformer.

Q. Now, does the water in those three pipes continually run into this tank? A. No. The city water is off at all times, unless they need more water. These other two are continually going.

Q. And what are the names of them? A. Waste water from the annealing ovens and waste water from the electrometal transformers.

Q. That is, the centre pipe of these three does not continually run in, but the other two, the one in the corner being —— A. Waste water from the annealing ovens.

Q. And the third one? A. Being from the electrometal transformers.

HIS LORDSHIP:

Q. What is the electrometal? A. Those are electric furnaces for the metal.

Q. Now, can you just answer a question for me right there. That is the fresh water coming in? A. Yes.

Q. What is the diameter of those two pipes? A. The waste water from the electrometal is three-inch standard pipe; the city water is two-inch standard pipe, and the waste water from the annealing ovens is a two-inch standard pipe.

Q. What is the diameter of the three pipes that lead to the cupolas? A. Those are actually from the pump and that is a four-inch line going up, feeding into the top of the cupola; that is continuous.

Q. Yes, but you have three pipes coming out at the end? A. Yes.

Q. What is the diameter of those? A. These are four-inch pipes. Those had not been marked, but they are four-inch.

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MR. KEOGH: They lead from the end of the tanks to the pumps and pump it up to the scrubbers? A. That is right.

HIS LORDSHIP: That is the three pipes would have a maximum diameter—of course, the water may flow at different rates through the same sized pipe, that depends on the pressure? A. That is right; depends on the volume of pressure you are pumping.

MR. SLAGHT: Something about city water in the middle not coming in regularly? A. Yes, particularly from expansion. These three inch and a quarter lines are coming from power-banked transformers; that is this one, this one and this one.

Q. You are indicating the three pipes at the other end of the tank behind which the entry pipe is? A. That is right.

Q. And do they run into the tank all the time or not? A. They are running continuously.

Q. So how many pipes have you?

HIS LORDSHIP: Excuse me. Where do they get their water from? A. They are coming off the city line and they pass through a combination cooling,—oil-cooled and water-cooled transformers.

MR. KEOGH: Q. So how many pipes on that model, Exhibit 193, have you that are running all the time? A. Well, I would say the one from the annealing ovens is running continuous, and the waste water from the electrometal transformer, I would say that would only be running when the plant is operating. They would shut that down when they shut the electrometal furnace down, but these three run from our power-banked transformers and are running continuously.

Q. And you have the names tagged on each one of those pipes? A. Yes.

Q. Now then, the screen which is in this model a short distance in front of the pipes which lead down to the pumps, you have said that that was not to scale? A. No. That is, the mesh of that screen is not to scale.

Q. But is the position of it otherwise to scale? A. Yes.

Q. And what is the mesh of the screen in the tank? A. Seven sixty-fourths of an inch.

M. KEOGH: Then the large pipe at or close to one end of the tank about which you have already referred, is—what do you call that? A. I would call it the discharge pipe from the scrubbers, which is 10-inch. We call it 10-inch, the return line from the fly-ash collector.

Q. A 10-inch return line from the scrubbers? A. Yes.

Q. And the diameter of that is 10-inch? A. Yes. That is placed practically the centre of the first compartment.

Q. It is located, as you indicated, about the centre of the first compartment of the tank? A. Yes.

Q. Before the first baffle. Then, you have three outlets marked on one side of the tank. What are they? A. Those are the connections to the sludge pump.

Q. And are they all the same size? A. Yes.

Q. And what is the diameter of them? A. Those are four-inch.

Q. Then, on the opposite side from the sludge outlets, near the top of the tank, is another outlet. What is that? A. Those are overflows from the two of those.

Q. Oh, there are two of them in each end? A. Yes. One is spaced on the original metal bracket, an inch lower.

Q. And what is the diameter of those overflow pipes, which are two in number, and located on the opposite sides of the tank? A. Those two are four-inch.

Q. Now, in the bottom of the first, second, third and fourth compartments of the tank, being the compartments made by the baffles, there are pipes located on the bottom of the tank with a series of holes in them? A. That is correct.

Q. What are they and what is their purpose? A. Those are agitator pipe lines, two-inch standard pipe, and they are small nozzles there because there is no nipples showing on those, but we do have nipples coming off at a 45 angle all the way across the agitator pipes.

Q. And those agitator pipes with those holes or nipples in them, are used for what purpose? A. Well, they are for sludging out the tank; is to stir up all the sludge in the bottom of the tanks, to keep all solids so they can pump it out of the sludge tank.

Q. And when those agitators are required, are those connected with any particular pumps? A. Yes, they are connected with the No. 2 pump. By operating different varieties of combination of opening and closing, they can tie this line in with the No. 2 regular pump.

Q. They can be switched over when required to the No. 2 pump which is the No. 2 of the pumps that pump up to the top of the cupolas? A. That is right.

Q. Now, have we described all of the main features of this model, or is there any other thing or any other dimensions to give us, or any other part of it that we have not described? A. No, I don't think so. I think we have covered it fairly well.

—EXHIBIT No. 193: Model of sludge tank at defendant's property.

In the Supreme Court of Ontario No. 53 Defendant's Evidence Gordon MacAulay Examination-in-Chief 9th May, 1949 Continued

Q. Now, taking the cupolas in order, that is 1, 2, 3 and 4, counting from the west, what are the capacities of the air blower fans for each of those cupolas? A. 4,400 cubic feet per minute on No. 1.

Q. 4,400 cubic feet of air per minute is the fan attached to No. 1? A. It is directly connected.

Q. Well, we will come to that in a minute. What is the capacity of cubic feet per minute for the fan directly connected to No. 2 cupola? A. 8,700.

Q. And then what is the cubic feet of air per minute capacity of the fan directly connected to No. 3 cupola? A. 8,700.

Q. And for No. 4? A. The same, 8,700.

Q. Now then, since you built No. 4 cupola on March 31st, 1947, as you have told us, have those fans been made interchangeable? A. Yes. The piping has become interchangeable, that you could operate any one of the cupolas.

Q. And since that date have you used the 4,400 fan at all? A. No, I don't believe so.

Q. So that since that date you have used the fans that you have described for whatever three cupolas were operating, week by week? A. That is correct.

Q. Is it or is it not correct that you usually run a cupola a whole week and then change over on the week-end? A. I am not familiar with all their foundry practices out there, but I believe they do work out something like that.

HIS LORDSHIP: Well, these three exhaust pipes that you spoke of that take water from the sediment tank that would go into the well of each cupola, do they go directly to the cupola? A. You are speaking of the pans, your lordship?

Q. The three on the tanks, the end, here? A. They go through the pump and then directly into the cupolas.

Q. And what size did you say they were? A. Four-inch.

Q. They come from the pump? A. And then directly up the scrubbers and discharge right over the top.

Q. Yes. I quite understand that. That main pipe must branch off it some place? A. Oh, it does.

Q. There are two branches, one comes in on one side and the other in the other side of the cupola? A. No. This goes back through the pump and takes in the jacket across from the buildings and discharges directly on to the discharge nozzle.

Q. Yes, but the discharge nozzle is fed from the two sides? A. No, it is directly down the centre.

Q. I don't think you understand me. The sample shows the pipes leading in from each side? A. Yes. Well, here is the big nozzle that was said in relation to the four-inch pipe coming across.

Q. Well, isn't there water comes in from each side? A. Well, on the main pipes coming across as this is shown there.

Q. I see. It is fed from the same pipe? A. Yes.

Q. Is this a blind end shown here? A. Yes, one is a blind end.

Q. Well, the pressure would be different on the different sides, would it not? A. Yes, somewhat.

Q. What size pipe is that? A. That is a four-inch pipe.

Q. You carry the same size all the way through? A. Yes.

Q. And then you drop to three-quarters on each side? A. Yes.

Q. I see.

MR. KEOGH: Q. Then, there was some—I believe Mr. Thom, the last witness, just wasn't sure of the date of the foundry. I think you said it was built from 1936 and 1937. Can you tell us when the new enlarged foundry went into operation? A. 1937.

Q. Would it be the early part or the latter part? A. It was the early part; all through 1937, and I think the project was finished in 1938, finally.

HIS LORDSHIP: Q. How many cupolas would you have then? A. We only had two at the time.

Q. Two in operation at the start? A. Yes.

Q. That is in 1937? A. Yes.

MR. KEOGH: Q. Then, in 1938, did you have three cupolas running? A. Yes, approximately—around three.

Q. Are you able to say whether it was the early part or the latter part of 1938 that you had three cupolas running? A. The latter part.

Q. Now then, when was your present forge shop built? A. The present forge shop was built in 1936.

Q. Before I leave the foundry, I should have asked the witness where was the present foundry built with reference to the location of the previous foundry? How did the two locations compare? I don't want them exactly. A. Fairly well on the same site.

Q. In other words, the new and enlarged foundry which was completed in 1937 and 1938 was built over and around the site of the previous foundry? A. That is right.

Q. Then, you have told me that the forge shop was built in 1936, the present forge shop? A. That is correct.

Q. How did its site compare with the site of the previous forge shop? A. The old forge shop was approximately about 400 feet south of the present forge shop, I believe; somewhere—approximately.

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Q. On the same site on Ontario Street, that is the west side? A. Yes, the same side.

Q. Now, at the present time, how many hammers are in the forge shop? A. I believe six.

Q. My instructions are there are eleven? A. Yes, that is approximately right.

Q. And I am told you have a 5,000-pound hammer there now? A. That is correct.

Q. That is your largest now? A. That is correct.

Q. You did earlier have a larger one, 6,000 pounds? A. 6,000 pounds, that was scrapped.

Q. When was the 6,000-pound replaced by the 5,000-pound hammer? A. That was April, 1947, when we started the project, and I believe we put the hammer in operation in September, 1947.

Q. And is that 5,000-pound hammer that you have there now a steam-operating hammer? A. It is air-operating.

Q. And the 6,000-pound which it replaced, how long had the 6,000-pound hammer been there? A. Well, I believe it was moved from the old forge shop in 1936, so it would be moved into the present position in 1936.

Q. And you say it was there some time before 1936 in the old forge shop? A. That is correct.

Q. Then, you have a 4,000-pound steam hammer, I am instructed? A. That is correct.

Q. When was that installed? A. I would not want to just state that at all.

Q. Was it about 1943? A. Approximately around in there.

Q. And then the 2,500-pound steam hammer, was it installed in 1941? A. Correct.

Q. And then the 2,000-pound air hammer in 1937. Is that right? A. Yes.

Q. And then when we come to some board hammers, would you just describe briefly to his lordship the difference between a board hammer and a steam or air hammer,—just the principle particularly? A. Well, your lordship, when we have an anvil and two sets of weights with an arm on it, and the boards are clamped in here and we have a roller head on top of the hammer and those rollers are engaged and pulls the hammer head up and drops it.

Q. The board hammer drops by its own weight? A. Yes, that is right.

Q. It is lifted by its own weight and allowed to drop? A. Yes, it has an arm.

Q. Whereas the steam and air hammers are put down by pressure? A. Yes.

Q. Then, you have a 2,500-pound board hammer which was installed in 1926, is that right? A. That would be in the old forge shop. It would be moved over to the present position in 1936.

Q. And then a 2,000-pound hammer which has been in operation since 1928? A. That would be, yes.

Q. And an 18-pound board hammer in operation since 1926? A. Did you say 18-pound?

Q. 1,800-pound board hammer in operation since 1926? A. That would be correct, yes.

Q. And the two 1,500-pound board hammers, one since 1926 and the other since 1934. Is that right? A. That is correct, yes.

Q. And the last, I believe, is a 1,000-pound board hammer installed in 1926, and brought over to the new foundry in 1936? A. That is correct.

Q. Then, also in the forge shop, you have heating furnaces, have you? A. Yes.

Q. And how many of those have you? A. I think there is 16 of them.

Q. And what fuel is used in those heating furnaces, in the forge shop? A. Bunker C.

Q. Bunker C fuel oil, is it? A. Yes.

Q. And you were asked by me to produce a table of the average consumption of fuel oil in the foundry in all departments of the foundry, of all types of oil, for the past few years. Have you made that up? A. Yes, I have it here.

Q. And will you produce that, please? A. (Produced.)

—EXHIBIT No. 194: Table of fuel oil used in forge shop, 1945 to March 31, 1949.

Q. And you start off in 1945 on this table with 2,341 gallons bunker C, 658 gallons of medium fuel oil, and in 1948 you have 2,558 and 1,057, respectively, of the same type? A. That is correct.

HIS LORDSHIP: When did you start to use Bunker C oil? A. That was before I came on this particular job, but I believe it was—we have been using it around the forge.

MR. KEOGH: I beg pardon. My friend corrects me. I have been using the word "foundry" about this oil. This should be forge shop oil. A. Yes.

Q. And this table, Exhibit 194, takes in all the oil in all the departments in all the forge shop? A. That is correct.

HIS LORDSHIP: Well, the witness started to speak to me. You started to use Bunker C oil in 1940? A. I believe so.

Q. What fuel did they use in the forge shop before that? A. I believe a medium oil.

Q. Well, do you know anything about the consumption of oil in the forge shop prior to 1936, when the present forge shop was built? A. No, I have not any figures on that.

MR. KEOGH: Q. Are you in the forge shop quite frequently in the course of your duties as plant engineer? A. Yes, I would say so.

Q. And dealing with these heating furnaces in the forge shop that use this Bunker C fuel oil, what do you say about the smoke situation there? A. Well, naturally, there is a certain amount of smoke when they light up in the morning, until their fires get going, and from there on, why, it is heat more than it is smoke—my idea of it.

Q. In the forge shop it is heat rather than smoke? A. That is right.

Q. And you say for a few minutes in the morning when you light up—how many minutes would that be roughly, or approximately? A. Well, it takes approximately three or four minutes to get heat into the burner and get better combustion. Naturally, fires going against cool brick, is not good combustion.

Q. Then, do they light up again after the noon-hour lunch period? A. No, they are running continuous. I believe they run right straight through from 7.00 to 4.30 and 4.30 to 2.00 in the morning.

Q. And then, as you have said, there are these two shifts, and did we get the times exactly, of them? A. 7.00 in the morning to 4.30 is the day shift, and the night shift is from 4.30 to 2.00 a.m. in the morning.

Q. That is for the forge shop? A. Yes.

Q. Now, the period in question, that is from and including the year 1945 on, was the forge shop ever run more than those two shifts, say from the year 1945 on? A. No, not to my knowledge, no.

Q. Then, are there any portable ovens in the forge shop? A. Yes, we have the pedestal type oven in the forge shop.

Q. How many of those? A. There is quite a number of them; maybe seven or eight of them.

Q. And they stand on a pedestal on the floor? A. Yes.

Q. And are directed towards the operators on the huge hammers, are they? A. That is correct.

Q. Are there any smoke stacks—is it all right for me to go on?

HIS LORDSHIP: Yes.

MR. KEOGH: Q. Are there any smoke stacks leading from any of the heating furnaces in the forge shop? A. No.

Q. Why is that? A. Well, the construction of the building, it is a two-monitor type building, 110 feet wide, and the monitor is about 52 feet to the ground, right up to the peak of the monitor.

Q. In other words, the peak of the monitor, that is some structure in the roof of the forge shop? A. Yes.

Q. You said about 110 feet wide, the building. Can you tell us how long the forge shop building is? A. The forge shop is approximately 222 feet long.

Q. And there are two monitors, are there? A. Yes.

Q. Located in each peak of the roof? A. Yes, that is right.

Q. The roof of the forge shop has two peaks in it? A. That is right, and the monitor sits on each peak.

Q. And how high are the peaks of the monitors above the floor of the forge shop? A. About 52 feet.

Q. And is the floor of the forge shop concrete, or is it earth? A. Concrete.

Q. And how long are the monitors? A. Well, they would be 222 feet; the full length of the building.

Q. They run the whole length of the building on the peaks of the roof? A. That is correct.

Q. And what opening or openings are there in each of these monitors? A. Well, there is a double window operated by a chain mechanism and the openings are practically continuous the full length of them. That is, one folds over the other pretty well, wide open; the whole monitors open them up.

Q. And you say these openings are practically continuous over the whole length of each monitor? A. Yes.

Q. And are they on one side or each side of the monitor? A. On both sides of the monitor.

Q. And when the openings are open, what is the height of the openings, that is, starting from the roof up; the vertical height of the roof? A. I would have to approximate that. I would say about seven or eight feet high.

Q. Vertically? A. Yes.

Q. And you have already told me that they run the whole length? A. Well, just a margin for the mechanism to operate in.

Q. With that exception, they run the whole length of the building? A. That is true.

Q. Then, how are the north and south sides of the walls of the forge shop building equipped, as far as doors are concerned? A. Well, they have a continuous sliding door there. That is, they can telescope them and open it up wide.

Q. A series of telescopic doors along each of those sides? A. That is right.

Q. And, except in cold weather, what is the practice in connection with those doors? A. Those doors are always kept open during the summer months; until it gets real cold, they keep them wide open.

Q. Then, I would like you to describe to me generally the foundation on which each of these hammers sits in the forge shop. I appreciate the dimensions and the difference, but the general construction of the foundation is basically the same with variations and dimensions, isn't it? A. Well, they are usually exactly down to whatever the hammer-makers specify,—are a solid block of concrete with a certain amount of reinforcement potentiometer, and then that ——

Q. And that, you tell me, may go down, depending on the —— A. —— weight of the hammer.

Q. The weight of the hammer, from what distance to what distance? A. Well, some of the big hammers are 18 feet, and then we get up to the smaller ones, are only 8 feet.

Q. And then is there a recess in the top of that concrete block? A. Yes.

Q. And what is put into that recess? A. Usually oak timbers.

Q. And do the size of the timbers vary with the size of the hammer? A. Yes.

Q. What is the size for the smaller hammers and what is the size of the timbers? A. Oh, they run from 6, 8, 10 and 12 square.

Q. And does the number and the layers of the timbers on top of the concrete vary with the size of the hammer? A. That is correct, one or two layers is the usual.

MR. SLAGHT: Q. What dimension of the timbers? A. 12 by 12, 10 by 10, 8 by 8.

Q. Twelve inches square? A. Yes.

Q. Thanks.

MR. KEOGH: And as you have indicated, there are one or two layers, depending on the size of the hammers? A. Yes.

Q. I take it from that, that the large hammers have two layers of oak timbers, and the small have one layer on top of the cement? A. Yes.

Q. And the timbers are tied in with tie bolts across each end of the sections, to keep each layer in one piece? A. That is right.

Q. Then the hammer rests on the top of this layer of oak timbers which, in turn, rests on this recess in the concrete blocks, sunk in the ground? A. That is right.

Q. And is there any solid connection at any point between the concrete block on which the hammer sits, and the concrete floor surrounding it, in the forge shop? A. No.

Q. Well, what is in the space between the two? A. When we set the anvil on, we put in loose fill from there and we do not have any solid connection between the solid base of the hammer up to the concrete floor.

Q. Loose fill of what? A. Well, cinders, or anything.

Q. Then, I think you told us you were, at the beginning, the electrical superintendent for some 27 years before you got your present position? A. That is correct.

Q. As electrical superintendent, did you have to do with the electrical recording machines around the plant? A. Well, that comes under my supervision at the present time, but that is under my department.

Q. Have you any electrical recording potentiometers in the core ovens, in the foundry? A. Yes.

Q. And are they delicate mechanisms, or are they not? A. Yes, they are very sensitive. They have a galvonometer suspension wire in there, which is very sensitive.

Q. And in the period from 1945 to date, have you had any trouble with any of those instruments from the vibrations of hammers, or vibrations when the hammers in the forge shop are operating? A. No.

Q. Then, in the course of your duties, are you frequently in the core room when they are loading cores into the core-baking ovens? A. Yes, I am through the core room regularly.

Q. And have you seen any of those cores broken when the big hammers in the forge shop were operating or going? A. No.

Q. Did you obtain electric trucks to move the cores from the core maker to the core ovens? A. Yes. That is one of the problems we had when we started to handle cores with trucks, that we could not use a gas truck. We had to use an electric truck so we would have a smooth start. It had a tendency to break the green cores.

Q. Then, I show you photograph Exhibit 71. Of what is that a photograph? A. That is standing looking west on the foundry roof, or north, rather, of the two, No. 1 and No. 2 cupola scrubbers.

Q. The witness Edwards identified the one on the right as being one of the chain curtains, but he could not say anything about the other two. What do you say about the other two? A. Well, these are the water wash scrubbers.

Q. Then, I show you a photograph, which has no date on it, but shows all three cupolas looking the same. Is that a photograph of the first three cupolas after they were completed? A. Yes, that is a photograph of No. 1, No. 2 and No. 3 cupola, and the scrubber; the washing scrubbers.

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—EXHIBIT No. 195: Photo showing No. 1, 2 and 3 cupolas and the washing scrubbers.

Q. That will be some time after the end of April, 1945, when the third one was completed? A. Yes, that is right.

Q. Then, I show you a photograph which has a stamp on it, "January 8, 1945". Of what is that a photograph? A. That is a photograph of Mr. Walker and Sons florist greenhouses; it looks south. It was taken at Carlton Street.

Q. And what is the stack shown—a smoke stack? A. Smoke coming out of his stack.

—EXHIBIT No. 196: Photo, January 8, 1945, plaintiff's greenhouses, showing smoke-stack.

Q. Then, there was a photograph, Exhibit No. 37, which, I do not think, has anything very definitely to do with this case. I show you a photograph which was put in, a panoramic view—well, I will come to that.

HIS LORDSHIP: Well, you can come back to that to-morrow morning.

MR. SLAGHT: My lord, my friend indicated to my partner this morning, as I understand it, that he hopes to finish his evidence to-morrow.

MR. KEOGH: Yes, I do.

MR. SLAGHT: As I see it now, my reply will be very brief, and I am just concerned with this. I rather gathered that it might suit all plans to argue the case in Toronto, rather than here, if I could have an intimation from your lordship and my friend asks for that. I have some plans to make that are dependant upon my being in Toronto in the evening, not for pleasure, but for work again in another matter. Could I get some indication, if we should finish to-morrow evening, or at noon on Wednesday, if it has been thought of, so that I could get some idea?

HIS LORDSHIP: Well, would it be all right if I decide that to-morrow?

MR. SLAGHT: Oh, certainly, my lord. You are not able to decide now when we shall finish, but if I could get a little advance information as to when I could reach Toronto, I would like to have it.

HIS LORDSHIP: Well, I will think it over. I will consider that very seriously. There are some reasons why I would very much sooner have it argued in Toronto.

MR. SLAGHT: I understood my friend was kind enough to assent to that.

MR. KEOGH: I am willing to do whatever your lordship wishes.

In the Supreme Court of Ontario Discussion by Counsel 9th May, 1949

HIS LORDSHIP: There are other reasons that I can give my exclusive attention here, but when I get to Toronto, people have a habit of wanting to interrupt my consideration of this and other things. I will think it over. I would rather anticipate and I suggest that I could put a closure on the argument, but I do not intend to. It is an important case and I do not intend to do that. I am sure counsel will not take any advantage that is not necessary and I am leaving that entirely to counsel.

MR. SLAGHT: I have been working on my own over both week-ends, with a view to condensing it, and I think I am getting it in a pretty condensed form.

HIS LORDSHIP: Well, I will decide that when we get a little further on. To-morrow morning.

—Whereupon Court adjourned until 10.00 a.m., May 10, 1949.

Tuesday, May 10, 1949, 10.00 a.m.

In the Supreme Court of Ontario No. 9 Plaintiff's Evidence Douglas Ure Examination-in-Chief Recalled 10th May, 1949

DOUGLAS URE, recalled

EXAMINED BY MR. SLAGHT:

MR. SLAGHT: My lord, I have Mr. Ure, the surveyor, here, and he has made some lines which I think are what your lordship and my friend and I had in mind. He is rather a busy man.

HIS LORDSHIP: Well, can we have a look at them?

MR. KEOGH: I have every confidence in Mr. Ure.

HIS LORDSHIP: Well, let us see what he has done.

MR. SLAGHT: I think it would be well to call him to explain, one arc being 360 degrees.

HIS LORDSHIP: Very well.

MR. SLAGHT: He has put them on duplicate No. 1 and No. 11. (To witness): Now, this is not your original. Would you show that to his lordship and let me ask you—I think I can ask you just what you did in the first place. You carried the directions of the compass which appear in dark ink on your plan over to a line through the middle of the cupolas? A. Yes.

Q. And this line shows the proper north and south, according to that, and this line shows east and west, running through a point in the middle of the cupolas? A. Yes.

Q. And you put in an arc, I see, being one-quarter of 360 points of the compass, from south to west, in a circular way. What do you say that arc constitutes? Is that southwest? A. Yes.

Q. Winds occurring across that arc would be coming from the southwest? A. Yes.

Q. If they got right over here, due south, and over here, due west, but anywhere between would be southwest to you? A. Yes.

Q. But take the first line you put through the centre of the Walker property and in a northeasterly direction, then, where does that line initiate in the arc, which is, or which means the southwest wind? A. That would be 30 degrees west of south.

Q. Then, that line runs right straight through the centre of the Walker property? A. Yes.

Q. Then, you have another line which, taking a point at the northerly corner of the Walker property and just the corner of greenhouse No. 7, and you produce that line through the cupolas? A. Yes.

Q. And does that also come out so that a southwest wind would blow along that line? A. Yes.

Q. And how many degrees is that? A. That is 21½ degrees west of south.

HIS LORDSHIP: They are all on here.

MR. SLAGHT: Then, a third line may be taken from a point which is at the southerly boundary of the Walker property and to be projected on through the southerly boundary in a northeasterly direction and then back through the cupola arc, and where does that come out in the quarter arc? A. 50 degrees west of south.

Q. So I take it that a southwest wind blowing from any of those degrees of the southwest that you have mentioned, would come through and across the Walker property in the respective positions you have indicated by the red lines? A. Yes.

Q. Well, then, anything from the southwest and from that arc, a wind in between the northerly and southerly red line, would be, and which would cross the Walker property where would you say, in between these two red lines? Would that be also a southwest wind? A. Yes.

Q. And a slightly different degree of southwest? A. Yes.

Q. Now, that is the interpretation of it.

HIS LORDSHIP: That is plain enough.

MR. SLAGHT: Q. Now, Mr. Ure, those can go out with the Court exhibits, or those can, if my friend agrees, be substituted and marked just the same.

THE WITNESS: Well, there have been some markings put on there during the trial.

MR. SLAGHT: That is my copy of it, my lord, of Exhibit 11.

HIS LORDSHIP: I think it would be better to substitute this one, then you would get away from the marks I put on. I put some marks on No. 11, thinking it was my own copy, and Mr. Slaght's copy does not seem to have any marks on it, so if we just substituted it for No. 11 it would make it much less confusing. If you will take this one, then, Mr. Registrar.

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MR. SLAGHT: Then, by consent, that is taken to and becomes officially No. 11, and No. 11 formerly the exhibit perhaps can come back to me, because I want one.

HIS LORDSHIP: Yes.

MR. SLAGHT: Thank you, my lord.

MR. KEOGH: He doesn't have to do it right away; any time to-day or to-morrow.

MR. SLAGHT: Yes. Now, Mr. Ure, will you be kind enough, out of Court any time to-day or to-morrow, to take my copy and put on Mr. Keogh's copy and also on mine for me, a similar charting and marking that you brought here?

MR. KEOGH: I will put a "K" on here, and then I will know.

MR. SLAGHT: And you can put "Slaght" on this one and if you will fix those up in the same way, will you please?

THE WITNESS: I will.

MR. SLAGHT: I do not think it is necessary to fix No. 1.

HIS LORDSHIP: No, just No. 11. Mr. Ure, I wonder if you would just do the same thing on my copy. A. I will do that, your lordship, in one of the offices downstairs.

In the Supreme Court of Ontario
No. 53
Defendant's Evidence
Gordon MacAulay
Examination-in-Chief
Recalled
10th May, 1949

GORDON MacAULAY, recalled

EXAMINATION CONTINUED BY MR. KEOGH:

THE REGISTRAR: You have already been sworn, Mr. MacAulay? A. Yes.

HIS LORDSHIP: Just before you proceed, Mr. Keogh, I have given some consideration to the matter of an arrangement to have the argument in Toronto. I have discussed it with the Registrar, and he tells me that he can make arrangements to come to Toronto to have custody of the exhibits. It would serve, I am sure, great convenience for all concerned to have Mr. Marquis there, as he is familiar with them and can readily get the exhibits, during the argument, whereas a stranger would probably have some difficulty handling them and, if it is not trespassing too much on Mr. Keogh's good nature, which seems to be unlimited, I think that we might arrange to have the argument in Toronto. We will have access to the Court Library, which would be quite an advantage, and it would probably be more convenient to counsel to commence argument on Monday than this week. It would give a few days. Possibly, if we finished the evidence to-morrow, it would give you two or three days to orientate yourselves. Would that be satisfactory?

MR. KEOGH: That would be quite satisfactory to me, my lord. Your lordship will undertake to obtain either a Court-room or a room of some kind. I understand they are in short supply.

In the Supreme Court of Ontario No. 53 Defendant's Evidence Gordon MacAulay Examination-in-Chief 10th May, 1949 Continued

HIS LORDSHIP: Well, probably we had better have Mr. Marquis phone Mr. Smythe to-day and just make sure that we can have a Courtroom. I think likely there will be one at Osgoode Hall; rather, judging from the Court of Appeal list, I think probably the Court of Appeal will not have more than one Court sitting next week, but you might phone Mr. Smythe and find out if he can guarantee us a Courtroom next week. Would Monday be quite satisfactory to you, Mr. Slaght?

MR. SLAGHT: Quite, my lord, and it is a God-send that your lordship has arranged to have the Registrar to look after these exhibits, because the Registrar has been very alert in attending to them. May I ask what time your lordship would start?

HIS LORDSHIP: I think half past ten.

MR. SLAGHT: And my friend can communicate with me. He can quite readily find his way to the Courtroom at 10.30. I need not tell my friends, my lord, I have this memorandum that he asked Mr. Walker to have prepared, and turn in for record in the Court some days ago. This occurred when our case was going in in chief, and I can have Mr. Walker put them in. I want to put them in before my friend closes his case.

HIS LORDSHIP: Well, I do not think you had better interrupt Mr. MacAulay. Discuss that after Mr. MacAulay is finished.

MR. KEOGH: I am nearly through.

Q. I show you, Mr. MacAulay, Exhibit 120. Do you recognize that picture? A. Yes, it appears to be an early view of the McKinnon area.

Q. And I think, for the convenience of his lordship, that if you would just take your pen and mark several letters on it. I would have you mark on the location of the forge and the foundry and Mr. Walker's premises and one or two others.

MR. SLAGHT: When was this taken?

MR. KEOGH: It was taken in May of 1947.

MR. SLAGHT: Did he take it?

MR. KEOGH: No. It was identified by a previous witness, and he says he recognizes it as a photograph. Would you be kind enough to point out to his lordship, first of all, the cupola stacks on the photograph, and put the letter A alongside of them? A. Your lordship, those are the four cupola stacks operating, right there.

MR. KEOGH: And would you put the letter A just to the left of them?

HIS LORDSHIP: Up above them. You could not just draw a line up to the top—oh, I think if the witness just points them out and describes them, that will be sufficient.

In the Supreme Court of Ontario No. 53 Defendant's Evidence Gordon MacAulay Examination-in-Chief 10th May, 1949 Continued

MR. KEOGH: Q. Would you point out to his lordship—you have already pointed out the cupola stacks. Would you point out on Exhibit 120 the forge shop building? A. That is the forge shop.

HIS LORDSHIP: Right behind the stacks? A. Yes, and then our foundry continues right straight up to about half way across those monitors, right there.

Q. Then, would you point out to his lordship your building on the east side of Ontario Street and say what you call it? A. This is known as the Delco Building, right in that area. This is the power station and the coal silos.

HIS LORDSHIP: Q. And that is near the stack? A. Yes, right adjacent near that stack.

MR. KEOGH: Q. And then where is Mr. Walker's greenhouse property? A. It is right in there.

Q. Then, just below your property. Would you indicate that to his lordship? A. There is the McKinnon Chain Company, sits in there.

Q. And then the building to the left of that? A. That is the Tyler property.

Q. I think those are the main features. Your witness.

CROSS-EXAMINED BY MR. SLAGHT:

In the Supreme Court of Ontario No. 53 Defendant's Evidence Gordon MacAulay Cross-Examination 10th May, 1949

Q. Mr. MacAulay, you spoke of the two three-quarter inch pipes, do you remember, in Exhibit 192, being the actual pipes and the block with the exit taken off one of the cupolas, was it? A. Yes, sir.

Q. And those three-quarter inch pipes, as appears here, are set in opposite one another? A. Off centres.

Q. Off centres? A. Yes.

Q. What happens to the water inside the block, according to your theory? A. It forms a circular movement.

Q. And it goes around inside there? A. Yes.

Q. So that the pressure is around in a circular way, rather than a downward pressure? A. Well, when it hits the dome of the bell, it is forced down.

Q. Well, it would have to get out that way, yes, but I was wondering if the circular movement to some extent counteracts the downward pressure? A. No, I don't believe so. It creates pressure in there and is forced out at the mouth of the bell.

Q. Then, how do you get the idea that there is 200 gallons a minute going through this one and one-eighth inch opening on to the apex of the cupola? A. I don't think at any time we ever said there was that amount of water. We said that was the capacity of the pumps.

Q. Oh, I see, because I went into it with my expert and he would not think there would be 200 gallons a minute go through. You don't think so either? A. Well, I have never made a positive check of it, and I wouldn't want to say there is.

Q. Well, that clears that up. You don't know how much water goes through. You cannot help me on that? A. No, I wouldn't give you an exact amount.

Q. You were with the party, or were you, on March 14th, when the visit on the Court Order was made? A. Yes, sir.

Q. Am I right in understanding that on that occasion there was only one pump operating—one of the three pumps? A. On the cupolas?

Q. Yes? A. Now, I wouldn't want to say that. I wasn't up above to see.

Q. No, but the pumps are down below? A. Yes, but I wouldn't want to say how many pumps were operating at the time. I believe it was just in between shifts, when they were shutting down. There might have been two or three, or one running.

Q. There really are four pumps there? A. Yes.

Q. And there might have been one, or two, or three? A. Yes.

Q. Then, the three cupolas were all working that day? A. I don't know. When we get down to the settling basin, all cupolas were operating. They possibly had been shut down at that time.

Q. Well, they saw the three, and you would not deny the three were in operation? A. No, sir.

Q. We have been told that in the tank—the 5,000 gallon tank, is it? A. That is correct.

Q. That the water for washing purposes in that tank, which is pumped up from the cupolas, is used over and over again? A. That is correct.

Q. And we were told by Mr. Williams and Mr. Campbell that there is sediment in that water? A. That is correct.

Q. You would expect sediment there? A. We cannot get it all out. We have baffles in there.

Q. The screen was to get some of it out? A. And the baffles.

Q. There would be sediment in the water that would be used over and over again? A. That is correct.

Q. Can you give me any estimate—it would only be an estimate—as to how many times in an hour that dirty water would go up and over the cupolas? A. No, I wouldn't want to estimate that.

Q. It struck me that in a minute, probably, it would make that circuit twice in a minute, which would be about 120 times to the hour, at least? A. Well, approximately somewhere in there.

Q. You think that is a fair estimate? A. Yes.

Q. And then after the five hours, it would be five times 120, that would be 600 times it had gone through and collected dirty water, and we have heard about the outlet, where it goes out, and we have heard about the inlet? A. Yes.

Q. But there was always dirty water in the tank? A. Yes; we do not put fresh water in continuously.

Q. We heard at Ford Rouge they put fresh water in there and do not re-use the water over and over again. You could have done that? A. Well, I am not so sure of it.

Q. Why not? Isn't there a supply of water around your plant? A. Yes, but if you will understand what it means to get any permission to pump water out of Government rivers and streams—

Q. Well, you didn't try? A. Yes.

Q. Were you refused? A. Yes, but at the present time there is some negotiations between the hydro and the Dominion Government. We couldn't possibly get anything definite from them.

Q. Then, you heard, or perhaps did you hear Mr. Reginald Williams tell us of the single test for three or four days he made in 1945 of before and after the wash at the cupolas? A. Yes.

Q. And that no other tests which have been available to us were made until April, 1949, this year? A. That is right.

HIS LORDSHIP: No, there was a test marked in March, 1949, the results of which were destroyed.

MR. SLAGHT: Yes. That was the first one, in March, 1949. Thank you, your lordship. A. Yes. I was not concerned in those tests, myself.

Q. You did not order their destruction? A. No, I did not.

Q. You don't know who did, I suppose? A. No. I wouldn't say who did that.

Q. Then, we got just the two. We got in 1945, the Williams one, and as far as this Court is concerned the only other one available is the test made on the 18th or 19th of April, by Mr. Gaukroger? A. That is correct.

Q. And the equipment was there in the meantime for tests to have been made? A. Yes, but we assumed, from our observations and Dr. Katz's tests, that it was not necessary to make it.

In the Supreme Court of Ontario No. 53 Defendant's Evidence Gordon MacAulay Cross-Examination 10th May, 1949 Continued

Q. You assumed that it was not necessary? A. Yes.

Q. What are your academic qualifications, Mr. MacAulay? A. I have second year high in Chatham Collegiate, and I have had practical experience.

Q. As a practical man, I gather that—you have not had a University course? A. No, sir, I am not a graduate.

Q. Nor degrees in metallurgy, chemistry or horticulture? A. No.

Q. I am not saying you might not be just as good a man, Mr. MacAulay, but that is correct? A. Yes.

Q. Now, a word about the forge shop. There are 16 furnaces there burning bunker fuel oil? A. Yes.

Q. And we had the quantity and gallons yesterday from your man, Thom, that goes through there in a year. You consume over a million gallons a year, according to your figures? A. Yes, and we gave you the daily average.

Q. Yes, and I did a little arithmetic, which gives me a mean, taking only 300 days in a year—

HIS LORDSHIP: This is only in the forge shop? A. No, medium oil is used in the foundry in the forge shop.

MR. SLAGHT: And bunker C, they tell me, is a smoky fuel? A. Well, it is not refined.

Q. And it is the cheapest of the fuel oils you can burn? A. Yes, it is highest in b.t.u. contents.

Q. And therefore economical? A. Yes.

Q. But it is about half the price of the medium or refined? A. I wouldn't say half, but it is much lower.

Q. It is much cheaper? A. Yes.

Q. And I think you were good enough to tell us that both in the cupolas and in the forge shop in the respective period when the fires are first kindled, burning for half an hour or so, you get more fumes out of the stack and out of the vents in the forge shop? A. I wouldn't say half an hour to an oil fire. You would possibly get improved combustion within five to ten minutes.

Q. And how about coke, over on the cupolas? A. Well, I couldn't express my opinion on that, because I am not a cupola man.

Q. Well, when I suggested half an hour of rather dense smoke in starting, that doesn't shock your idea? A. Well, he would start with wood first, so naturally you expect certain smoke.

Q. Yes. I think that covers that. Now, in the core shop, or the part of the foundry which has been called the core shop, where the cores are made, is there between that and the forge shop where the hammers operate, is there a wall or two walls? A. Two walls.

Q. How thick are they? A. I believe they are 16 inch.

Q. 16 inches each? A. Well, the forge shop is not 16. I think that is only about a 12 inch wall.

Q. So that, being two solid walls there, I take it there could be no concussion of air pass through from those walls from the forge shop to the cores? A. No, and you have a trainway in between those two walls.

Q. So I understand. So that the forge shop is protected against air, if the hammers push out air; there is no air can get in the forge shop? A. No, sir.

Q. And you perhaps don't know the conformation underneath your plant there, the regular conformation? A. Well, we have been down 18 feet for our hammer bases and, well, got ordinary clay.

Q. Below that you have not explored? A. No, sir.

Q. So you cannot help me as to the character below 18 feet? A. No, sir, I cannot.

Q. You heard the evidence of Larry Edwards? A. Yes, sir.

Q. And you may remember perhaps that, back in 1942, he was investigating at the instance of the company the conditions at Walker's greenhouses, of which Mr. Walker had complained? A. I only heard rumours of that. I was not talking to Mr. Edwards on that.

Q. You did not talk to Edwards about his investigations? A. No.

Q. Well, then, I cannot ask you about that. And in your capacity there, did you come across a report your company procured on the samples from Walker's, that Edwards sent away? A. No, I didn't do anything about that.

Q. Can you furnish those to this Court—the analyses or the report? A. No.

Q. They seem to be a mystery, like the one that was torn up. And about the cupolas. I want to ask you this. You heard Edwards say that he recommended to the company that they reinstall the Whiting type of cupola? A. Yes, I heard that.

Q. And I have here a circular of the Whiting people which purports to set out the benefits of a Whiting type, in the lessening of the dust and fumes that get out the chimney. A. Oh, there is a lot of difference of opinion on these water scrubbers.

Q. Well, are you— A. I believe the Whiting has not been adopted in practically—in practically any of the General Motor plants.

Q. Well, are you prepared to condemn the Whiting in any way? A. No, I am not; but we, after making very extensive inquiry throughout the corporation, we found that it had a tendency to retard the operation of the cupolas in the air and cupola operators were always opposed to it in that respect.

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Q. I think you gave us yesterday the terrific rate the air passed—that the ovens create in that upward blast? A. Yes.

Q. It runs in the amount of about 8,700 square feet to the minute? A. That is the speed of the fan and the cubic feet per minute.

Q. Yes, the cubic feet per minute I should have said, to get out of that mouth? A. Well, that is just the full capacity of the fan going into the wind box. It is variable in there. We don't know what they are putting in there half the time and according to the charge put in there, why, the blast is—

Q. I quite understand, but it is some major operation, 8,700 cubic feet to the minute? A. Yes.

Q. That is a terrific up-blast? A. Yes.

Q. And if there is not perfect combustion in there—and I don't think there is such a thing as perfect combustion—you agree with that—that there is no such thing? A. I would agree with that.

Q. By that I mean 100%, and if the combustion is such for the first half hour out of every period it is right to say it takes the cupolas to get under way, with that terrific up-draught, you would expect a lot of the contents of the exhaust, both fumes and solid particles, to be a pretty severe exit? A. That is right.

Q. Because you have not got perfect combustion; you have got good combustion, yet you have got a terrific up-draught. You have solids being carried out of the stack and gases coming out of the stack? A. But you cannot retard them in your stack; if you retard them in your stack, you won't get combustion at all.

Q. I am not suggesting anything so stupid as that, that you have to retard them. You deliberately create them? A. Yes.

Q. Both to try and heat your products quickly and also to get the stuff out of the chimney and make room for more heat? A. That is right.

Q. It is a question of heat there? A. Oh, yes, very high temperatures.

Q. You are after great heat in those cupolas, and you produce grey iron from the cupolas, which was not capable of producing in the old plant, with the other company, the McKinnon Dash? A. Yes.

Q. They could not produce grey iron? A. Not with their type of furnace.

Q. So in 1937 or '38, you completed the cupolas and you set up a type of apparatus to produce a new type of produce? A. Yes.

Q. In the grey iron, and you continued on to do malleable work? A. Yes, we do duplexing with the malleable.

Q. I want to read you this from a certain circular. "In a hot blast cupola," you have heard what a hot blast cupola is? A. Yes.

Q. The Whiting people put this out, "Two types of hot blast equipment are in successful operation today, one being the Griffin design, for which the Whiting Corporation has exclusive sale rights in the United States, and the other being Whiting's own design." Yours is not a Griffin? A. No, ours is a Buick. The design was designed in the Buick plant.

Q. But it is not the type manufactured by cupola manufacturers? A. No.

Q. It is a home-made type in the Buick plant which you have put in there? A. Yes, and it has been adopted in a lot of plants in the United States.

Q. Have you seen those plants you are speaking of? A. I have seen the Buick plant.

Q. But these lots of plants in the United States, I suggest to you that is purely a hearsay statement. You have not been to them, have you? A. No, but our own officials have been to them.

Q. Well, that is all right, but they are not here to be cross-examined. Then, "In the Griffin process, the blast air is pre-heated by burning the waste cupola gases in a furnace outside the cupola." You know that? A. Yes. Well, in the Whiting system the blast air is pre-heated in an externally fired furnace.

HIS LORDSHIP: What does that mean—the blast air is pre-heated before the blast goes into the cupola? A. Yes.

Q. What is the object of pre-heating? A. I couldn't tell you, your lordship. I am not an iron melting man. You get into a lot of details in iron melting.

MR. SLAGHT: Q. Well, then, I will read you this and see if you can find fault with it. "Solves smoke nuisance with the Griffin hot blast process, most of the solids in the gases are deposited in the hot blast stove or in the ducts, thus eliminating the necessity of cleaning the roof and resulting in fewer complaints from surrounding dwellings." Are you able to deny that that result is attained with the hot blast system? A. No, and we get the same result with ours.

Q. And then, in the externally fired hot blast, "In the Whiting externally fired hot blast system, the blast is pre-heated by passing the air through an external heater, which may be fired in any way desired, by hand, by stoker or with pulverized coal, oil, or gas. Hence, the blast can be supplied hot as soon as the cupola is started, without having to wait for hot gases to develop from the cupola." Are you able to deny that statement? A. Well, no. I don't know whether it would be applicable to our particular set-up or not. Those things have to be studied from that angle.

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Continued

Q. So you don't know whether or not those benefits would accrue in your system? A. No, I don't know.

Q. Now, just one more from these people, and this is on page 16. I have been reading from page 14 and 15. "Griffin hot blast process. The Griffin system is based on the principle that a good portion of the heat ordinarly lost in the stack gases can be recovered and utilized for heating the blast, thereby increasing the overall thermal efficiency of the cupola. The Griffin process accomplishes this by drawing out the waste gases through ports below the charging door, completing the combustion of the carbon monoxide contained therein, and using the resultant heat to preheat the blast air." Now, we heard of your own test that Williams made, in 1945, and there was 3% carbon monoxide coming out of the stack, and that means 30,000 parts to the million. They say they can eliminate that with this system. Are you able to deny that? A. No, I wouldn't deny that.

Q. Well, it is quite clear you are not eliminating the carbon monoxide? A. But we are doing a very good job down there, better than anybody in Ontario at the present time.

Q. Well, again, now, I challenge that statement as an improper one for you to make. Have you visited everybody else's plant in Ontario? A. Well, when we first adopted this system here, the upper management asked me to explore the possibilities of some kind of water scrubber, and I inquired throughout Ontario and I was not able to find anybody here doing any scrubbing on top of the cupola.

Q. You see, I didn't ask you what you inquired about and let somebody else tell you; did you see, and inquire and investigate any other system, than yours? A. No.

Q. Then, when you made that statement that you were superior to any plant in Ontario, you made it on your own hearsay statements and on hearsay statements alone, and not from what you saw, and you listened to what people told you about the relative value of your system.

HIS LORDSHIP: Well, we are really not concerned with what other plants are doing in Ontario. We are concerned with this plant.

MR. SLAGHT: All right, my lord, but I did not want that statement to go unchallenged.

HIS LORDSHIP: I know, but it is of no relevance in this case at all.

MR. SLAGHT: Excuse me a moment, my lord. Before 1937 when your foundry was rebuilt and the cupolas first installed, Carlton Street was open west of Ontario Street? A. Yes.

Q. And you people connected the two, closed them by municipal proceedings? A. Yes.

Q. And there was a coal pile to the south of Carlton Street and to the north of the old foundry? A. Yes. That is where they got their supply from, for their annealing plant.

Q. Then, you built your plant further up, using part of the Carlton Street and using the plot which had been formerly the coal heap? A. I believe that is right, from memory.

Q. Oh, perhaps it is unnecessary, most everybody has told us, but you have been in Court a great deal and have heard others tell us that fumes from your cupolas and forge shop and core shop at times go over Walker's greenhouses? A. Well, we have a certain amount of smoke going out. I would estimate, with a southwest wind, it would travel over all the properties around there.

Q. Thank you. I think we have had that, but you confirm for me that there is no treatment of the gases inside the core shop? A. No.

Q. And in the evenings a good deal of smoke comes out of there? A. Well, I wouldn't want to say during the evenings.

Q. During the 24 hours? A. Yes.

Q. And there is no process of smoke treatment in the forge shop? A. No.

Q. We have heard yesterday about the ventilators that are on the four sides? A. Yes.

Q. No process there. The smoke comes out in its virginal impurity? A. Well, the smoke is high over the top of the building.

Q. That is all.

RE-EXAMINED BY MR. KEOGH:

Q. You told my friend the water in the sediment tank in the scrubbing system was used over and over again, and then you told us yesterday, in describing the model, I think, there were five pipes into which water from the cooling coils of the transformer and the heating vents ran into the sediment tank? A. Yes, there is a certain amount of water going in.

Q. What is the explanation between those two statements? A. Well, I assumed you figured the make-up water was going in there continuously and at the same time it was not cleaned out 100% of the tank.

Q. And that is the explanation for those two statements? A. Yes.

HIS LORDSHIP: Q. Do you know anything about the quantity of what you call the "make-up water" goes in?

In the Supreme Court of Ontario No. 53 Defendant's Evidence Gordon MacAulay Re-Examination 10th May, 1949 Continued

MR. KEOGH: The witness, Jones, gave evidence—

HIS LORDSHIP: I know he did, but do you know anything about it, yourself? A. Your lordship, there could be a lot of variables there. It is coming from city water under pressure and the city water has a differential of possibly 10 to 15 pounds, to be exact. I had never made any measurement, myself.

Q. There were some very wide differences between what had been said earlier in the trial and Jones' evidence, and I do not know whether we had from Mr. Jones' evidence of all pipes running, or part of them. Apparently the pipes from the city water just run sometimes? A. That is right. There is valves on all these pipes and for me to say they are all running full at a certain pressure at all times—

Q. You could not say that? A. No, I could not say that.

Q. It was said it was about 300 gallons an hour? A. Well, that is out of line altogether, because one inch and a quarter pipe will practically deliver nearly 3,000 gallons per hour.

Q. But they are not constant, in any case? A. No, I would not say they are constant.

Q. So you are not in a position to say how much there would be, and they would vary from time to time? A. That is correct.

Q. Yes. That is all.

MR. SLAGHT: My lord, may I have permission to ask about a matter I entirely overlooked?

HIS LORDSHIP: Subject to re-examination.

MR. SLAGHT: Yes. It is about the model of the cupola which you put in yesterday, and which is Exhibit 191. I am just interested in these two water pipes that run from different sides and feed the little block part.

HIS LORDSHIP: Mr. Slaght, they do not run from different sides. You will notice one end is sealed.

MR. SLAGHT: Oh, yes, I did not notice that.

Q. Well, then, you have two little pipes that take up a larger pipe that feed into the little block house that is supposed to be for the apex of the cupolas? A. Yes.

Q. Now, how are these ends of that larger water pipe adjusted and fastened at either side, both, on each side of the cupola? A. They have a U-bolt going down there. It covers around the four inch pipe and there is a U-bolt down on an angle iron welded on to the shoulder of the arm.

Q. And were you there when those were originally installed and the U-bolt tightened to a certain tightness? A. No.

Q. You did not have to do with that operation of installing that? A. No.

Q. Because it would be important that outlet of that, for the apex of the cupola? A. Yes. I did not inspect it after it was done.

Q. And therefore if it was not precisely over, if it were off centre, this outlet, it would just naturally follow that it drops more water on one side of the cupola than on the other? A. Well, it has to have quite a bit of diversion before it becomes noticeable at all.

Q. How much diversion have you noticed on it? A. Very little; around half an inch or five-eighths; something like that.

Q. That is what Campbell told us, the off centre—the diversion from true centre of five-eighths of an inch. A. Yes.

Q. Looking at this model you have in here, it is off centre now? A. Well, it has been handled and so on and it is out of adjustment there.

Q. Well, I don't think much turns on that, but we have Campbell who told us, you see, that that article got off centre since Chrismas by about five-eighths of an inch, and you agree with him. That is all, thanks.

HIS LORDSHIP: Q. Mr. MacAulay, would the cleaning of the windows of the plant come under your direction? A. Yes, my lord.

Q. Mr. Jackson told us yesterday that on the occasion of, and he is the gardener, and he was just speaking the language of a layman, he said that iron got on the windows on the occasion of the windows being cleaned and they had to use acid to clean it. Is that correct? A. That is correct. On that particular day, I know the incident that he was talking about.

Q. Well, I am concerned about the windows. Is that general, that you clean your windows with acid? A. Yes, a certain percentage in a pail of water.

Q. That is because of the iron adhering on the glass? A. I wouldn't say iron; it is an accumulation of—

Q. Well, whatever it is, it is fumes of some kind? A. Yes, and it may be possible we had used it for iron rust, like, in the foundry, on the inside of the windows especially.

Q. I am talking about the outside. A. Well, where he was speaking of, there was rust on both of them, in some of the iron departments when there is a certain amount of dust.

Q. I am talking about the outside of the windows. Apparently it was used on the outside in that case? A. Yes. We used it on the outside if they are very dirty.

Q. All right.

—Witness excused.

MR. SLAGHT: Now, my lord, before my friend closes his case, I want to have those matters he asked Mr. Walker to get. May I call Mr. Walker now to put them in?

HIS LORDSHIP: If that is satisfactory.

In the Supreme Court of Ontario No. 53 Defendant's Evidence Gordon MacAulay Re-Examination 10th May, 1949 Continued

MR. SLAGHT: And my friend will understand I am not calling Mr. Walker in any sense in reply, at the moment.

HIS LORDSHIP: No, it is a continuation of his evidence in chief, and Mr. Keogh will have an opportunity to answer any evidence that has been given by Mr. Walker.

MR. SLAGHT: Exactly, my lord, that is quite correctly the position.

In the Supreme Court of Ontario No. 10 Plaintiff's Evidence William Wallace Walker Examination-in-Chief 10th May, 1949

WILLIAM WALLACE WALKER, recalled,

EXAMINED BY MR. SLAGHT:

Q. Mr. Walker, you were asked to have prepared first a comparison of sales from production before the McKinnon strike. A. Yes, sir.

Q. In July and August of 1947 and the same months of 1948. You have had that prepared? A. Yes, sir.

Q. And these are the figures. They will be, for the convenience of my friend who asked that they should be put in when he was cross-examining? A. Yes, sir.

—EXHIBIT No. 197: Comparative statement of plaintiff's greenhouse sales before and after strike period at defendant's plant.

HIS LORDSHIP: What do you mean by sales and production? A. Sales and production, that is the entire amount of our sales from both production and sales in the store. They can go through only the one channel. We only have one outlet.

Q. All of sales from production, oh, yes. I was misreading it.

MR. SLAGHT: Yes. And your lordship will appreciate these are only greenhouse sales. These are not store sales.

HIS LORDSHIP: This is charged out from the greenhouses to any customers?

MR. SLAGHT: Including their own stores.

THE WITNESS: Yes, sir. That is sales tax and everything.

MR. SLAGHT: Q. Then, next you were asked and you produce a memorandum showing the gross sales from geenhouses and store for the three years, 1943, 1944 and 1948, and I show you this memo. Do you say that covers that point? A. That is correct, sir.

—EXHIBIT No. 198: Memo of gross sales greenhouse and store, 1943, 1944 and 1948.

HIS LORDSHIP: I have forgotten why this was asked for in this form.

MR. KEOGH: Well, the period in between I read out to him from his examination for discovery. It is in the record.

HIS LORDSHIP: Oh, I see, yes.

MR. KEOGH: I think both of these were asked for before we knew definitely there was going to be a reference, as to damages.

MR. SLAGHT: I think I have made it clear the way we are putting them in. They are not my putting in; they are my friend's request and while I have handed them in physically and had them marked, it was at his request they were put in.

HIS LORDSHIP: Well, Mr. Keogh is explaining the matter.

MR. SLAGHT: Then, I think you were asked to have a financial statement of the greenhouses only for the year 1947, the operation of the greenhouse. 1948 you did put in. Is this a statement for 1947? A. Yes, sir.

—EXHIBIT No. 199: Financial statement re plaintiff's greenhouse for 1947.

Q. All right, Mr. Keogh.

MR. KEOGH: I have no questions.

HIS LORDSHIP: Let me have Exhibit 197 please. Just a question I want to ask. Was there any material difference between the character of the production of the greenhouse in August, 1947, and July and August, 1948? A. On one bed alone, when the strike was on and the McKinnon's was not operating, we cut $501 worth more.

Q. Now, listen, just try to direct your mind to the question I am asking you. A. All right, your lordship.

Q. I asked you if there was any difference in the character of the production, that is any difference in the type of flowers that you grew between the two years? For instance, if you changed over to—I know more about farming than I do about greenhouses, but if you grew barley and buckwheat one summer and you had a big crop of fall wheat another summer, you could not compare those two summers very well, could you? A. No.

Q. Well, what I want to know is, was there any difference in the character and type of production? A. Your lordship, I would like to answer it in this way, that there was very, very little from one year to another, but there was a large difference in both quality and quantity.

Q. Yes. You dealt with quality and quantity in your evidence in chief, but it was quality and quantity of the same type of plants? A. Exactly. May I answer one other question?

Q. Yes. A. There was a complete difference in the other plants, which showed for the six months.

Q. Now, don't get off on to something I am not asking you about. A. All right.

Q. Then, was there any material difference in the price level between 1947 and 1948? A. I would say very little, your lordship.

Q. That is all.

MR. SLAGHT: Now then, my friend may proceed with his defence.

In the Supreme Court of Ontario No. 54 Defendant's Evidence Donald Sinclair Examination-in-Chief 10th May, 1949

DONALD SINCLAIR, sworn,

EXAMINED BY MR. KEOGH:

Q. Mr. Sinclair, you are a photographer on the staff of the newspaper, the St. Catharines Standard? A. Yes, sir.

Q. And I show you a photograph which bears your name and date stamp of April 27th, 1949, Exhibit 106. Did you take that photograph? A. Yes, sir.

Q. And what time in the morning did you take that on that day? A. I would say about five or ten minutes after nine in the morning.

Q. And was it taken in the ordinary way according to ordinary photographic procedure? A. Yes, sir.

Q. And this is a true and correct photograph of what was taken at that time? A. I think that it is an accurate photograph as could be taken under the circumstances.

Q. Then, I show you another photograph which has not been filed yet, and I show you another photograph, or rather, they both deal with the same thing, the two photographs which bear your name and stamp on May 9th, 1949. Did you take those photographs? A. Yes, sir.

Q. And that was yesterday? A. Yes, sir.

Q. In the morning or the afternoon? A. About 3.00 o'clock in the afternoon.

Q. And they are photographs of what? They both deal with the same thing. A. I am not a technical man, but I understand that they are the sprinkler system on top of the cupola.

Q. Well, you climbed up some ladders and up a cat-walk up to the top of these cupola stacks at McKinnon's foundry, did you not, to take them? A. Yes, sir.

Q. And you took it looking down into one of these cupolas? A. That is right.

Q. And were you there long enough to observe them remove this from the same cupola, or was that done after you left? A. Well, it was not done while I was there.

Q. And do you remember which cupola you took the pictures of? Was it the third from the west, or what was it? A. It was the second from the west.

Q. And that is your memory of it, is it? A. Yes.

Q. And the water was running as shown in these photo graphs? A. Yes.

—EXHIBIT No. 200 A and B: Two photos taken May 9, 1949, and showing water wash system in operation in cupola at defendant's plant.

Q. Your witness.

In the Supreme Court of Ontario No. 54 Defendant's Evidence Donald Sinclair Cross-Examination 10th May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. The photo, Mr. Sinclair, on April 27th, in the morning, that is Exhibit 106, appears to show the sun was shining brightly that morning? A. Yes, sir.

Q. And it had rained during the night, I am told? A. That is right.

Q. Then, that having—

HIS LORDSHIP: Q. You are facing the sun in the case of this photograph, Exhibit 106, are you not? A. Almost directly, sir.

MR. SLAGHT: Q. Well, this one in as 200 A and B, while I am interested in 200A, as you say, you are not a metallurgist or a mechanic. You don't know much about the purpose of it. You just went and photographed it at the request of the defendants? A. That is correct.

Q. 200A looks to me as though the water was pretty lean coming down this side, and pretty fat going down the other. What do you say? A. It would appear that way from the photograph. Of course, it was spotty all around.

HIS LORDSHIP: Q. What was spotty all around? A. I mean, the flow of water as seen from a photograph is heavy in some parts and lighter in others.

MR. SLAGHT: Q. And that is the way you saw it when you were photographing that, because you told us the picture is a true picture of what you saw with the naked eye? A. That is right.

Q. Thank you. That is all.

—Witness excused.

In the Supreme Court of Ontario No. 54 Defendant's Evidence Wilbur F. Brown Examination-in-Chief 10th May, 1949

WILBUR F. BROWN, sworn,

EXAMINED BY MR. KEOGH:

Q. Mr. Brown, are you a chemist with the Libby Owens Ford Glass Company of Toledo, Ohio? A. I am.

Q. And were you formerly chief chemist with that company? A. With the old Libby Owens, which was the predecessor of the Libby Owens Ford.

Q. And for how many years were you chief chemist with your predecessor company, that is, the Libby Owens, before it became Libby Owens Ford, approximately? A. 10 or 11 years.

Q. And you are now in charge of the technical commercial work for the Libby Owens Ford Glass Company, that is the amalgamated company? A. The Rosevear plant, where we make a large perecentage of plate glass, but I also work on spot assignments; any special job they choose to give me. I have been with them—I am on my 31st year.

Q. Are you a graduate of Cornell University? A. Yes, sir.

In the Supreme Court of Ontario No. 55 Defendant's Evidence Wilbur F. Brown Examination-in-Chief 10th May, 1949 Continued

Q. What degree did you get? A. I took U.D. in chemistry.

Q. Then, I wish to show you Exhibit 100, which was filed by the plaintiff, and which according to the note on it was taken from the south end roof of No. 7 greenhouse, and Exhibit 101 which, according to the note on it, was taken from the same place, the south end roof, No. 7 greenhouse. You looked at those prior to the opening of Court this morning, did you, and I ask you to look at them again. Have you looked at both of them again? A. Yes, sir. I looked at them this morning and you told me I could not do anything with it. I wanted to.

Q. Never mind what I told you. I want to ask you some questions about them. Have you looked at both of them? You will see in the lower lefthand corner of the exhibit which you have in your hand, and which is Exhibit 100, and in the lower lefthand corner of Exhibit 101, a comparatively clean spot, or a clean spot which Mr. Ferguson said he had cleaned off for comparative tests. Is there any evidence of any stain of any kind on that clean spot? A. There is no evidence of stain.

Q. Is there any evidence that you can see of any stain or permanent discolouration on any of the rest of the glass? A. There is not.

Q. Can that dirt, which is on the rest of the glass—would there be any difficulty about washing that off? A. I think not, but I would like to try it.

Q. You would like to try it? Would it be all right for the witness to take his pocket handkerchief, perhaps, and try a little corner of it, my lord?

HIS LORDSHIP: Well—

THE WITNESS: You see, that has been cleaned there and I have been asked if I can clean it, and I see no reason why I couldn't, but I cannot say I can until I have done it.

HIS LORDSHIP: Well, I think probably the witness might take another corner somewhere, the opposite corner diagonally —no, the part already cleaned and tested by the witness we had here. Now, witness, if you would just not be so busy working on that glass, that is an exhibit in Court, and it is not for you to be working on it, except under direction. The part that was cleaned by the witness in Court is below the tag that has been put on it—directly opposite No. 100 to the left. I makes a difference which way you look at it. Turned to the right, the corner diagonally opposite—yes.

MR. SLAGHT: Hot saliva being applied.

HIS LORDSHIP: Now, what is it?

THE WITNESS: I would say it cleans very easily.

Q. Hold it up. You say that is clean now, do you? A. I can tell from my experience that I can clean it.

HIS LORDSHIP: I see.

MR. KEOGH: Q. And we have had some evidence given by the plaintiff that he had to use muriatic acid to clean the glass in this large greenhouse, No. 7, and that those samples, Exhibits 100 and 101, were a fair representation sample of all the glass in that greenhouse. Having regard to that evidence, what do you say as to whether or not muriatic acid would be necessary to clean the glass in Exhibits 100 and 101?

HIS LORDSHIP: No, Mr. Keogh, that is not accurate. What the witness said was to take off the whitewash he had to apply muriatic acid after these cupolas were put up, whereas before that they would take off the whitewash with a brush.

MR. KEOGH: Well, I am sorry, I must have misunderstood him.

HIS LORDSHIP: Well, that is what the evidence was.

MR. KEOGH: Well, disregard what I have told you about the evidence, but would muriatic acid be required to clean either of those samples, Exhibits 100 or 101? A. It would not be.

Q. Then, I show you Exhibit 99, which according to the notation on it was taken from the east side of the cloth house, near the south end. You have looked at that before Court opened. Don't handle it any more than you can help, but will you look at it again and I want to ask you a question or two about that. Yes, the east side of the cloth house near the south end. Is there any stain on that glass? A. Most of the cleaned area is clean on the east. One place which I cannot tell without trying whether it is a permanent stain on the glass or not; it has not been cleaned at this particular point through there.

Q. You are indicating a sort of a streak across the cleaned area where the sticker for the exhibit number is on? A. Yes.

Q. Does your lordship—

HIS LORDSHIP: I do not think there has ever been any allegation the glass is permanently stained. It comes off if you scrape hard enough. The complaint was the great difficulty that they had to wash them frequently.

MR. KEOGH: Q. Have you had any experience with the removal of lime from greenhouse glass? A. No, sir, not lime. I have worked on that.

Q. If there was any stain on this glass, in looking at Exhibit No. 99, any permanent stain, how could that be cleaned? A. I think with ordinary chemical cleaners.

Q. Well, name one of them, or two of them—washing soda? A. Ordinary washing soda would be the cheapest.

Q. Is "Okite"— A. Yes, "Okite", as I remember, is dry sodium phosphate. It is an excellent cleaner.

In the Supreme Court of Ontario No. 55 Defendant's Evidence Wilbur F. Brown Examination-in-Chief 10th May, 1949 Continued

Q. And what do you use with that? A. You have to rub it on. It is an abrasion, when the glass is dirty, to clean it.

Q. And you have to have a brush, and what else? A. And water.

Q. Is that a complicated and difficult problem? A. No. Am I permitted to say one thing? It is the same as washing an automobile. If you take the hose and squirt it on, you do not get your car clean. You have to take your brush.

HIS LORDSHIP: It depends on the character of the dirt that is on it, doesn't it? A. Yes, but you just cannot clean a car by squirting water on it.

MR. KEOGH: Q. I am going to ask you if the dirt on Exhibit 99, which appears to me to be dust, on those three panes, could be removed by washing with ordinary water and washing soda and a brush, in the manner you have described. A. Yes, sir.

Q. That it all; your witness.

In the Supreme Court of Ontario No. 55 Defendant's Evidence Wilbur F. Brown Cross-Examination 10th May, 1949

CROSS-EXAMINED BY MR. SLAGHT:

Q. You have come all the way over here from where, Mr. Brown? A. Toledo.

Q. And what are the Libby Owen Ford people? Are they florists, or greenhouse operators? A. No, sir. They are the largest producers of plate glass in the world.

Q. Oh, they are plate glass producers? A. And very, very large producers of window glass. I don't know what the proportion of window glass is. I cannot tell you.

Q. Very interesting, and a good ad. for your company. Tell me this. Have you been down to the plant here, yesterday or today? A. The McKinnon plant?

Q. Yes? A. No, sir. I have been by there. I did not see the plant.

Q. You did not see that iron and rust on their windows, which they had to wash off with acids? A. I did not even look at the glass in it.

Q. They didn't even ask you to look at it, or take you there. You heard the evidence given this morning by the plant engineer, that the stuff from their chimneys is so serious on the glass of their windows, that they cannot get it off with water, or perhaps he didn't say that, but they have to use acid for removing it and asked whether there was iron or rust in it, he said he didn't know, but they did create rust in their gas? A. I have not seen the glass. If you will give me a piece of the glass, I will look at it and tell you.

Q. We have not, either. I just asked you if they let you go down and see what was coming out of their stacks and on to their windows, and see how they get it off. A. That has not been put up to me at all.

Q. Well, I suspected it would not be. Then, let me ask you this. Assume an oily, dirty substance from oil-burning furnaces or oil-burning apparatus, where the combustion was not perfect, flowed on to the glass of Walker's and then on top of it come small particles of iron rust and soot and lodge there, what do you think about how you would get that off? A. If you will give me a piece of the glass I will tell you whether I can take it off or not, very easily.

Q. I am not offering you a piece of glass. I am asking your opinion as to how you would get it off. A. I would wash it the same as this glass was washed, that I looked at.

Q. And I suppose washing glass roofs of acres of greenhouses or large areas costs money, doesn't it? A. You have to pay to have it washed.

Q. That is all. A. I would like to answer that question further. I happen to have a neighbour and a friend who has greenhouses, four and a half acres, and he washes his glasses, or his men wash the glass once in a while.

Q. Has he got a melting plant 600 feet away? A. He asked me once just as a friend and neighbour about washing it, and the reason he washes it, is because there are three railroads—

Q. Will you answer my question? Is there a melting plant 600 feet from him? A. I don't know what you mean by a melting plant.

Q. Well, this McKinnon's outfit are running a melting plant and they melt down rusty scrap iron, pig iron in their hot cupolas. That is the process until they get it red hot and malleable, and they shoot out at a high rate of speed fumes and solid particles through their chimneys, including rust and iron, and that lodges on us. Now, that is what I mean by melting. Has your neighbour got a melting plant or a foundry within 600 feet of him? A. There is no foundry, but there are railroads there and he says the reason he has to wash his glass so much is that the railroad puts so much dust on it.

Q. All right. There are there railroads. It is the kind of smoke that comes out of the chimney out of a locomotive. Are they electric locomotives, or steam? A. When he first asked me this, several years ago, they were ordinary steam locomotives; fired locomotives.

Q. What are they now? A. I do not know.

Q. They might be electric now. Well, that is all. A. One that wanders by sees his plant is still there.

HIS LORDSHIP: Well, I do not think we will get too far into that plant. The question I want to ask you is, does tar come off easily by the application of water? A. I would say no.

Q. All right. That is all.

MR. SLAGHT: That is all, thanks.

—Witness excused.

In the Supreme Court of Ontario
No. 56
Defendant's Evidence
Elizabeth Webb
Examination-in-Chief
10th May, 1949

ELIZABETH WEBB, sworn,

EXAMINED BY MR. POND:

Q. Mrs. Webb, where do you live? A. I live in the second house on this side of Walker's greenhouse.

Q. On what street? A. Manchester.

Q. What number? A. 4.

HIS LORDSHIP: That is the second house going toward Ontario Street? A. Yes.

Q. That would be the second house west? A. Going towards Ontario Street.

MR. POND: Q. And has your house attached to it a back yard running parallel to Mr. Walker's property? A. It runs right direct back towards Carlton Street.

Q. And how long have you lived there? A. 18 years.

Q. What took place, if anything, about your experience there with Mr. Walker's smoke stack, the stack from his heating plant? A. Well, around about, between 8.00 and 9.00 in the morning, if the smoke is blowing our way—

MR. SLAGHT: Just a moment, witness. My lord, there is no allegation in the defence that there was any complaint concerning Walker's stack to which this evidence would be applicable. It may be, of course, I suppose unnecessary to our attack, without alleging it. They may be able to put in evidence of this kind.

HIS LORDSHIP: I think the evidence is admissable.

THE WITNESS: Well, around 8.00 or 9.00 o'clock in the morning, if the smoke is blowing our way, which doesn't blow so very often, when he starts up his fire—I don't know if it is his first fire or second, I know it is the time I am washing—hanging my washing out, I have had to bring it in and do it over again from that smoke coming over, especially on my starched clothes.

MR. POND: Q. What effect does the smoke have on your clothes? A. It leaves all dark soft coal spots on.

Q. And how do you know if that comes from Mr. Walker's stack? A. Because it doesn't bother me when the wind is blowing the other direction. It is when the wind is blowing our way.

Q. Can you see the smoke coming out of the stack? A. You certainly can.

Q. Now, did you have any flowers growing about your place? A. Well, at the front we had—we have Scarlet Runners and Morning Glories and pansies. We don't go in for many flowers.

Q. And can you tell us whether or not you ever had any trouble growing these simple flowers in front of your house? A. No, we have not had any before.

In the Supreme Court of Ontario No. 56 Defendant's Evidence Elizabeth Webb Examination-in-Chief 10th May, 1949 Continued

Q. Now, what can you tell us about smoke or anything of that kind from the McKinnon's? What has been your experience, say, from 1945 up till the present time? A. Well, before they put on that screen, whatever they did to the cupolas there that time, from then up to now—before that we did have quite a bit of smoke and trouble, you know, it was about similar until they put that on, but the smoke don't bother now.

Q. You say it doesn't bother you now? A. No, it don't bother me in hanging washing out, or anything now. When it is a miserable day or anything, it doesn't bother me, but, before, it did.

Q. That is all.

CROSS-EXAMINED BY MR. SLAGHT:

In the Supreme Court of Ontario No. 56 Defendant's Evidence Elizabeth Webb Cross-Examination 10th May, 1949

Q. What is your name, madam? A. Elizabeth.

Q. And how long have you been married to Webb? A. Neighbourhood of 28-30 years.

Q. You say that the reason you know that smoke from Walker's chimney troubles you is because when the wind is in the opposite direction you don't have trouble? A. No. If it blows that direction, but when the wind blows this way, it comes right over my clothes lines in my yard.

Q. We have had eight or ten people tell us here that the smoke and fumes from McKinnon's cupolas and forge shop blow over Walker's place and, during the period from 1945 on to now. Do you say it doesn't? A. No. Their smoke stack don't affect our way; it affects more down Carlton Street.

Q. First, let us take Walker's place. Do you say, and you are pretty close to Walker there, aren't you? A. A lot between the two lots.

Q. I show you on the map, looking at Exhibit No. 11, Mrs. Webb, look at this with me. You have not seen it before, so just put your glasses on. A. Yes, I am getting old.

Q. Oh, no, you are not. Now, here is Manchester. Here is "A. Webb". That is your lot? A. Yes.

Q. South of Manchester? A. Yes.

Q. There is just one lot between you and Walker? A. Yes, Dedenian.

Q. How wide is Dedenian's frontage there? A. About the same.

In the Supreme Court of Ontario No. 56 Defendant's Evidence Elizabeth Webb Cross-Examination 10th May, 1949 Continued

Q. About 40 or 50 feet frontage? A. Yes.

Q. So you are just 40 or 50 feet away from Walker's greenhouses? A. Yes, around there; 50 or 60 feet.

Q. Now, are you telling us from 1945 right down to the present time that fumes and smoke do not come from McKinnon's over you? A. Well, they don't bother us now.

Q. Well, in the first place, do they come over you? They may be of a harmless variety, but do smoke and fumes from the McKinnon's come over you? A. Oh, I suppose they come over a certain amount, but not over our house part, for we are too near the plant. It is more Carlton place, I think, it hurts, more than it would us.

Q. Well, Carlon Street is right down below. But leave out other places now, because you surprise me and I want to see if you want to correct it or not. I want you to tell me if it is your story that smoke and fumes from the McKinnon's do not pass over your lot and your house? A. No, not to hurt anything.

Q. Well, let us leave that out for a minute. A. Well, what do you mean? Listen, what I am finding fault about was the smoke coming from Mr. Walker's on to my washing, but now I can hang my washing out if the smoke is coming from McKinnon's over, it doesn't affect me.

Q. Well, that is very interesting, but would you mind answering my question, because you have said the very opposite. I direct your mind to this. Leave the washing out and leave Walker out. Are you telling us that the smoke and fumes from McKinnon's doesn't pass over your yard and house, or does it? A. Oh, I don't think the smoke goes over our house. At least, I have never been affected with it. I leave my windows down.

Q. Madam, will you just answer the question? A. No.

Q. Oh, you won't? A. No. I mean that they don't affect me.

Q. Well, you see, you are jumping right into that and all I want you to tell me is this. Are you saying, as against a good many people who have said the contrary, are you saying that the smoke and fumes from the McKinnon place have not been coming over your place since 1945, and come over now, I mean in the last ten days? Does it come over you or doesn't it come, from McKinnon's over you? Never mind affecting you. A. Well, yes, smoke certainly will come over, but it was finding fault with it affecting me was what I was saying.

Q. And the smoke comes over you from McKinnon's the same time any smoke from Walker's chimney comes over to you,

too? A. Well, it is a different smoke, but it isn't here.

Q. I know, did it come over sometimes when the wind is in certain directions? Did it come over from Walker's chimney and McKinnon's chimney? A. Walker's comes right direct into the house, the back door, but the McKinnon's, their smoke stack is so high that it takes it on over.

Q. I know. You had better take Mr. Keogh's gown, now. You are getting good. But, madam, I want a simple answer from you. At times when the wind blows that way— A. Yes, it certainly blows that way.

Q. Wait, don't tell me until you hear the question. Oh, you are talking about the big stack, are you? A. Yes, that is what I am talking about.

Q. Well, I am talking about a very different thing. I am talking about the cupolas. Do you know where the cupolas are? A. Oh, I have an idea. I have never been in the foundry here, around the place.

Q. Well, you have been sitting in Court over here for days, haven't you? A. No.

Q. Well, we are told there are four cupola stacks on the foundry of McKinnon's. A. Smoke stack on the foundry of McKinnon's?

Q. Yes? A. Oh, that doesn't affect me. I am talking about the high smoke stack that goes over us but I know what you mean now. I comes so low when it gets to us it don't seem to make bother.

Q. Then, it comes, but it comes low. It is a low-coming smoke? A. I thought you meant the high smoke stack.

Q. Well, I am sorry you misunderstood me, but I mean from those low stacks the relatively low stacks, four of them, and then that comes over you, but it creeps over low close to the ground. Is that it? A. I don't even know it reaches us when it gets over. I said it comes over. If it came, it is not noticeable to us.

Q. It comes so low it is not noticeable to you? Well, I should have thought the lower it came the more noticeable it would be, but you don't think so? A. No.

Q. Well, thank you, madam. Thank you very much.

—Witness excused.

—Intermission.

MR. POND: That is the end of the defence, my lord.

MR. KEOGH: I apologize, my lord, I was a few minutes late downstairs. That is the case for the defence.

DEFENCE CLOSED

In the Supreme Court of Ontario
No. 57
Plaintiff's Evidence
In Reply
Tennyson Jarvis
Examination-in-Chief
10th May, 1949

MR. SLAGHT: Then, my lord, I will call Mr. Jarvis in reply.

TENNYSON D. JARVIS, recalled,

EXAMINED BY MR. SLAGHT:

THE REGISTRAR: You have already been sworn, Mr. Jarvis, and you understand this is a continuation under oath of your evidence? A. Yes.

MR. SLAGHT: Q. Mr. Jarvis, you have been in Court, I believe, during the evidence of the witness, Katz, and of the witness, Ledingham? A. Yes.

Q. You have heard the entire evidence of both those gentlemen? A. Yes, Mr. Slaght.

Q. And I would like you to deal with their suggestion, or rather this suggestion of Katz, first, that a home-made recorder showed at a point known as the outhouse, numerous low concentrations—I am condensing in a sentence that aspect of Katz's testimony. You heard him in effect say that? A. Yes, I did.

Q. Does that mean to you that there was not sufficiently high concentration of SO_2 at the Walker greenhouses to describe the injuries that you described to the Court in your evidence in chief? A. No.

Q. You say "no"?

HIS LORDSHIP: I would like the witness to explain that a little further.

MR. SLAGHT: Yes, my lord, I will have him. Will you explain that a little further, but tell us about using the recorder which he anchored at one spot, and then Katz went so far as to say that on some of these exhibits and so on, that there was no evidence of SO_2. Will you elaborate that, having regard to his tests and methods? A. Well, I think if he had had a portable recorder registering all the concentrations, night and day, some one working in the smoke stratum—

Q. A portable recorder working the smoke stratum? A. Yes, why, it might have been helpful, but in a small area like that, I cannot understand why a recorder was necessary at all. It would only take about half an hour to get over the ground to find out whether there were markings there or not.

Q. Yes. Well, then, you got among the flowers and the vegetation, I believe on many, many visits in your investigation over the period of the years 1946, 1947 and 1948. And did you, on those investigations, examine the beds themselves as a whole, and the markings on the flowers, in the beds, as to which you testified in chief? A. Yes.

Q. What do you say as to whether or not — well, first, I will ask you something further about Katz's recorder. Now, you have said if he had a portable one and followed the stratum of the smoke that would be by day? A. Keep it in the smoke stratum which we have heard of.

Q. Yes, which we heard from all these people in different directions? A. Yes.

Q. That, you would think, would have rendered him better evidence of his investigations? A. Better. But let me also add this. If you can find characteristic markings of sulphur smoke on the susceptible plants, why, I do not think it matters whether you have a recorder or not at work. I mean, I cannot understand — at least, that is the way it appeals to me, anyway.

Q. Now, another point about Katz's investigation I want you to tell me about. He has said, in effect, that although there was an apparatus available from 1945, when Williams took the test, right down to the present time, that he did not — well, he did not say he did not permit, but that he did not make use of it, neither did they as a company take any tests of before and after the wash in the cupolas. What do you say as to that attitude of an investigator? Have you any comment rather to make on the failure by Katz to permit tests to be made for him, or to have made for him those tests? A.

HIS LORDSHIP: I wonder if it is the function of Mr. Jarvis to comment on Mr. Katz's failure to make the tests?

MR. SLAGHT: Well, I can put it in a better way, I think; perhaps it was not well put.

Q. What do you say as to whether or not in the making of an investigation of that type, tests from the method of the chimney, made inside the cupola of before the wash and after the wash, would or would not have been valuable to you as an investigator? A. I think it would have been valuable to us all in determining, but, even in the last analysis, it is the markings on the plants that count.

Q. Well, I understand that is your viewpoint. And what do you say as to whether or not if you had been investigating and had two recorders, would it or would it not have been valuable instead of putting one on at once one mile away, put one in the cupolas and take another one at another cupola and take two tests? A. Well, I think it would have been better.

Q. I will ask you this question. Bearing in mind you gave evidence in great detail, put in a great many exhibits, I put this general question. After hearing Katz's and Ledingham's evidence you have heard, do you wish to alter or withdraw your evidence given earlier as to the actual results you found from any visits and many investigations of the beds, the markings on vegetation and plants, both in the Walker greenhouses and the beds adjacent thereto? A. Not one iota.

Q. Your witness.

In the Supreme Court of Ontario No. 57 Plaintiff's Evidence In Reply Tennyson Jarvis Cross-Examination 10th May, 1949

CROSS-EXAMINED BY MR.KEOGH:

Q. I show you Exhibit 168, which was filed by Dr. Katz as specimens of sulphur dioxide injury to gladioli leaves collected by him in the Sudbury area, on September 5th, 1945. You have seen them before, several times? A. Yes, Mr. Keogh.

Q. And do you deny that those are not typical specimens of sulphur dioxide injury? A. No. They are specimens of dioxide injury. I do not think there is any doubt about it. I have seem them like that too, in various places.

Q. And you can see islands of bleach and islands of green tissue on those specimens, can't you? A. Yes.

Q. That is one of the characteristics of sulphur dioxide bleach, is it not? A. Yes, but there is a tremendous variation in them.

Q. Then, do you see any similar islands on the specimen Exhibit 774, which you filed? A. This is a very much lighter bleach, and you can see the bleached areas here, just at the tip, and here is an island here. But it is just a lighter bleach, and you get that variation in any different environmental coincidences. You also get great variations.

Q. And I show you Exhibit 79. Do you see any similar islands on that? A. Yes. That is just as typical as that, if not more so.

HIS LORDSHIP: You say 79 is just as typical as 168? A. Yes. Here are the areas here.

Q. Now, you are pointing to something and say "here". Will you just indicate on 79 what it is, Mr. Jarvis, you wish to comment on? A. I wish to comment on these bleached areas between the veins there, the light areas.

Q. You are showing a light area about three-quarters of the way up on the lefthand leaf, that is mounted? A. Yes, and here, at the tip, there is some more there. Then you get it starting at the tip and work down — at least, it doesn't work down, but it goes down that far. That is a very typical SO_2 bleach, but these are a lighter bleach than the other and in different environmental coincidences, where you get decided variations in the markings, and find it.

MR. KEOGH: Q. Then, I show you Exhibit 82. What part do you say of Exhibit 82 is similar to the specimen in 168? A. In this case it is an extremely light bleach.

HIS LORDSHIP: I think 82 is the one that ——

MR. KEOGH: 82 is a year later.

HIS LORDSHIP: One of the witnesses said yesterday he would not like to say.

MR. KEOGH: I believe that was 77.

HIS LORDSHIP: It was a single leaf.

MR. KEOGH: I thought it was a sweetpea.

HIS LORDSHIP: No, it was a gladioli leaf. It had some of the characteristics. It was Dr. Duff yesterday. Exhibit 77, he said the same thing, but it was a gladioli leaf; that was a single. Now, you are referring to intravenous bleaching?

THE WITNESS: Not on that one, I don't think there is any. Oh, yes, just a little.

Q. Yes, there is some at the top. A. Yes, just a light bleach on the tip of the leaf.

MR. KEOGH: Q. Then, Exhibit 91. What parts of Exhibit 91 do you say are similar to Exhibit 168 in the markings? A. All the bleached area there. This is the second bleach. Had quite a heavy bleach there.

Q. And would you say that the bleach in Exhibit 91 was more or less severe than the bleach shown by the specimen in Exhibit 168? A. No, I would not. Yes, it is probably a little more, if anything, but you get just such a difference as that in many plants.

Q. And then, with the exception of the exhibit mentioned by his lordship, I believe Exhibit 82, the others, 74, 79 and 91, according to your recollection were all stated by Drs. Ledingham, Crocker and Duff to have no evidence of sulphur dioxide injury on them. In view of that, will you still hold your opinion? A. Absolutely.

Q. And you got your information as to the sudden appearance of these bleaches from Mr. Walker over the telephone. Is that right? A. Yes, and in every single case Mr. Walker notified me, he was right. He never notified me once that he did not have a bleach.

Q. What I mean is that if it turned out they did not appear suddenly, but that it appeared progressively over a week or ten days, would that have any effect on your opinion? A. If it had appeared progressively and had signs of disease or diseased markings ——

Q. I did not say anything about disease. I just said progressively. A. If it appeared progressively and made progress as it went along, no, I would say that I would look for something else as the cause.

Q. Had you ever, until you heard it in this Courtroom, had you ever heard of the xanthomonas comintans? A. No, I didn't know.

HIS LORDSHIP: Did anyone say these were suffering from that?

MR. KEOGH: The doctor from Ottawa said the specimens in 1937, not from Walker's, but from McKinnon's were.

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Q. Are you a plant pathologist? A. Yes, I did plant pathology for 14 years, and then I was a plant pathologist for the International Nickel Company.

Q. But you never heard of that bacterial blight? A. No, I don't know them all, but I know where to find them, if I don't know them.

Q. Were you not in Court when he gave his evidence? A. I didn't quite catch the word when he mentioned it, but I heard him give his evidence.

Q. And you heard him describe it as a bacterial blight? A. Yes. Pardon me, may I ask, who was the witness reporting that?

Q. Dr. Saville of the experimental farm, at Ottawa. A. I did not hear him say there was anything like that on the leaves. He reported a bacterial blight, and I did not see traces of bacterial blight on any glad in the district.

HIS LORDSHIP: Q. You did not? A. No trace, although it is a bacterial disease and works rapidly and passes from leaf to leaf by ravenous spreads and usually takes a whole plant till mostly all the leaves are affected, and there was no sign. I mean, it has first of all a darker greenish watery-soaked areas, and these turn reddish brown later on and then very often die. But there was no sign of any bacterial blight. If it were a blight, why, they would not bloom at all. You would not get any flowers. If you did get one, it would be of very inferior quality.

MR. KEOGH: Q. And what is the name of the bacterial blight which you have just finished describing? A. Bacterial blight.

Q. And what type, or name of bacterial blight is it? A. What do you mean by that?

Q. What is the name of the bacteria? A. That is the only name, a bacterial blight of the glad. There were two diseases mentioned, the fusarium yellows of 1948, and the bacterial blight, in 1947.

Q. You have been describing to us the last few minutes the effect of what you call a bacterial blight. I am asking you what kind of bacteria are involved in that bacterial blight, the effects of which you have been describing to us. What is the name of that? A. I know it by that name, bacterial blight.

Q. You don't know the name of the bacteria that you have been describing? A. The bacterial blight of gladiolus, known as bacterial blight of the gladiolus. They differ in different plants. You have a different organism. It usually sometimes gets more related plants. You get the same blight from a single cell organ. They multiply very rapidly and progress very rapidly in the plant.

Q. Are there not hundreds of different bacteria that affect gladioli? A. A hundred different kinds?

Q. Yes, of bacteria? A. No, I don't know of any other bacterial disease of gladioli.

Q. You heard Dr. Saville say that they had records of this disease at various other cities in Ontario involving gladioli? You heard him say that, didn't you? A. I don't know whether those are his words or not. I have just forgotten, Mr. Keogh. But there may be. This blight is common in some years, especially in wet seasons. It is spread by rain from leaf to leaf, and they start working in the plant and work very rapidly until they very often destroy the whole plant.

Q. Then, referring to the gladioli in the McKinnon test plot, you heard Dr. Duff describe the reddish brown markings on the leaves, in two years in succession? A. I thought the second year it was fusarium yellow.

Q. No, Dr. Duff didn't say a word about fusarium yellows. A. Well, as I understand it, he mentioned only these reddish brown spots, and that was characteristic of the blight.

Q. And were you in Court when he said that in one visit in July he outlined them in India ink, and when he came back in August they had progressed a great deal more. Did you hear him say that? A. I did.

Q. And he described them as reddish brown markings, didn't he? A. Yes.

Q. Now, from that description, did his description of those markings correspond to the description which you have just given us on the bacterial blight you have been speaking of? A. No. To begin with, those markings are in squares, rectangles, any they are a dark green and water soaked. Later on, when the leaf is about ready to die, they turn a reddish brown, but you say he marked one of these various minute lines which almost run together,—I don't see how he could have done it.

Q. That was my question. A. I am sorry.

Q. From the evidence you heard Dr. Duff give of these reddish brown markings over the periods of 1946 and 1947, in each of which he made two or three inspections of the gladioli in the McKinnon test plot, from his evidence of the description of the markings that he described, do you or do you not say that the markings described by him correspond to the description you have just given us of the markings of what you term bacterial blight? A. Absolutely. If he saw those, I would expect it to be bacterial blight.

HIS LORDSHIP: Any re-examination?

MR. SLAGHT: Just a word or two. Shall I conduct it first?

HIS LORDSHIP: Yes.

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RE-EXAMINED BY MR. SLAGHT:

Q. Mr. Jarvis, about Dr. Duff's India inked leaf. You also heard him admit that he destroyed the leaf, did you, instead of preserving it and producing it in Court; that he did not keep it to produce it in Court? A. I think he said that, but I am not absolutely sure about that.

Q. A word about that.

MR. KEOGH: I don't think that is right.

THE WITNESS: Pardon me, I think, Mr. Slaght, he was watching it, waiting for another visit.

MR. SLAGHT: Well, I see. Anyway, he did not produce his leaf in Court. Just one other matter. My friend asked a good deal about Dr. Saville and your hearing his evidence and in order to refute the imputation, if that is all it was, that there might be disease in Walker's place. After hearing Saville, did you go and take any gladioli bulbs from the Walker greenhouse property? A. Yes, after I heard the evidence.

MR. KEOGH: Excuse me. Is this evidence in chief, after hearing Saville? This is something was done in the last few days.

HIS LORDSHIP: I will give you the right to cross-examine on it.

MR. KEOGH: I don't think my friend should introduce new evidence at this stage.

HIS LORDSHIP: If Saville's evidence in advance had been that on some samples that were sent to him he found evidence of fusarium crelos ——

MR. KEOGH: That was in 1948.

HIS LORDSHIP: Yes. In reply, Mr. Slaght would be able to, if he had brought it up a little earlier, to have offered evidence to refute that, or to explain it, or anything of that sort, and all I am doing is giving him the opportunity to re-open it, subject to your right to cross-examine.

MR. KEOGH: Yes, but this is something that was done in 1949, I take it.

HIS LORDSHIP: Well, if he refutes it, I won't allow any new evidence, that is, in the sense of attempting to prove something against your client if it is not in answer to something that has been given; then, I will not allow it.

MR. SLAGHT: Well, I am going to withdraw the question, because it might be too dangerous.

HIS LORDSHIP: Well, do not let us get into danger at this stage. We have kept out of danger so far.

MR. SLAGHT: No, I do not want to imperil my case by anything that is not properly evidence.

HIS LORDSHIP: Mr. Jarvis, there are some things I want to discuss with you. A. Yes, my lord.

Q. It may be that I have, in a certain measure forgotten some of the details of your evidence. In the first place, what do you say about this subject of chronic injury. You mentioned three classes of injury, the acute, chronic and the invisible. Let us leave invisible injury out of consideration at the moment. What is the effect of chronic injury? A. If sulphur dioxide is breathed into the stomata and does not cause a bleach, it retains in the inter-cellular spaces, and then we may get more of it from time to time in the next few days or even longer, and that is a very—what shall I say—a poison to the plant, and it does affect—it might affect any of the metabolic processes, and especially the reproductive processes. Now, I am only going by my studies and especially the German man, who worked in the field with a great many field crops, and they do as I always have, and I think most people have, till now it is really a classic in that line. They have done a most valuable work on chronic injury. Cohen and Rustin have done the same, too, but they believe that sulphur dioxide breathed in affects these metabolic processes, especially the reproductive organs. I found two very marked cases in the Walker greenhouses. I thought the one affecting the chrysanthemums was especially by SO_2 bleaching.

Q. That is chonic? A. Yes, chronic.

Q. We are not talking of acute? A. No. The chrysanthemums especially, the leaf is most resistant, whether from an acute standpoint or ——

Q. The chrysanthemum is most resistant? A. Yes, so that you would be less likely to get an acute injury from a chrysanthemum than most of the other flower plants.

Q. You say you would be less likely to get an acute injury from chrysanthemum than from most of the other flowering plants? A. I find it so and Dr. Coutts has put it at the end of the list on page 102, the bottom of the page. He gives a long list of susceptible plants and then of resistable plants and then at the end he says the chrysanthemum is most resistant, to use his exact words.

Q. Now, you were going to say something about chronic injury in chrysanthemums. You are using that as an illustration. A. We had the case of these blooms, these bronze mums, "The Detroit News", to give you the exact name. They were affected that way and the blooms, instead of being, when they came out, instead of being bronze, were an insipid yellow.

Q. Yes, I think you told us that in chief. A. Yes, my lord.

Q. Well, I asked Dr. Duff yesterday, if plants were subjected to low concentration fumigations so as to produce chronic injury, would they more readily show acute injury, that is show acute injury at a lower concentration and lower duration than they would if they had not been previously subjected to low concentrations, and he said they would. Have you any observations to make about that? A. No. As I understand it, the chronic is the result of either one fumigation or several, and one or several may have a very poisonous effect on the metabolism and catholism and the tearing down process of the plant.

Q. What I was seeking to get from Dr. Duff was, if you had a plant that had been subjected for some time to those concentrations that would produce chronic injury and then was subjected to a higher concentration but one that would probably not produce acute injury on a perfectly healthy plant but that had been fumigated, and he seemed to say that that would be the effect, that the plant whose constitution, so to speak, had been undermined before would be more susceptible? A. My lord, I think that might be true, too, but I do think in most cases it would not be after—you mean if there is some of the sulphur dioxide already here or even if it has been affected it might be more easily affected the next time?

Q. Yes? A. Well, I would not like to say.

Q. Well, now, can you say how long it would take for the evidence of acute injury to develop? A. Acute, yes. I would say we would get—at Copper Cliff we would get our records to show conditions were right for bleach during that day or the previous day, and next morning we would go out and find the bleach.

Q. Well, on the other hand, if you find a bleach, how long may you have to go back? What is the greatest length of time? A. The greatest length of time? Well, it does vary to some extent, but I would say two or three days at the most but, after the two or three days, then we have conditions ripe at the latest.

Q. Now, you came in to study this situation first in 1946? A. August 22nd, 1946.

Q. And how closely were you keeping the plant life in the district under observation, following that? A. I went back on the 10th of September that year. That is the only other visit I made.

Q. You just made two visits? A. Two visits in 1946.

Q. Then, we get to 1947. Will you just recall for me how closely you were keeping it under observation in 1947? A. In 1947 I asked Mr. Walker to watch for this sudden appearance of the markings on his plants—to watch very, very closely for them and, when he called me in the first place, I think it was June 17th.

Q. Yes, but you were there before then? A. Yes, I was there before then. I had made several examinations before that.

Q. What I want to get at is, independently of the calls from Mr. Walker. A. I think about every week or nine or ten days would be the most.

Q. You were going every week or ten days? A. Yes.

Q. Irrespective of any calls Mr. Walker might make? A. Yes.

Q. Did you visit and inspect the plant life in the area? A. Always.

Q. Well, then, on June 17th, 1947, that is the date on which you say you found the bleach? A. I was called on the 17th and visited the plant on the 18th.

Q. Oh, you visited the plant on the 18th? A. I may have made a mistake, but that is the date. I was called on the 17th and I made a visit on the 18th.

Q. Yes. Your specimens are the 18th. That is right. Now, I want to discuss those specimens with you. You have filed Exhibit No. 74, which is a specimen taken on June 18th of the gladioli leaves? A. Yes.

Q. And Exhibit No. 75, a specimen of the grape leaves? A. Yes.

Q. Exhibit 76, a specimen of a Lombardy poplar. Now, to what extent did you find the gladioli bleached—as you have indicated in, as you say, as indicated in Exhibit 74? A. This is the average. I always take the average bleach.

Q. Oh, you mean that it was not an isolated story? A. No, absolutely not. If it is a tree, I try to get the branch or leaves that are most—that look to be bleached the average to me.

Q. Now, on Exhibit 75, that is a grape leaf? A. Yes.

Q. I think you told me where you took that from. Yes, from one of Mr. Walker's neighbours? A. Yes.

Q. Can you say how nearby? A. It would not be more than one-eighth of a mile away. I would say about one-eighth of a mile.

Q. I see. And I do not think your identification of this as an SO_2 bleach has been changed by anyone, nor the poplar leaves. Do you remember where the poplar leaves were taken? A. Yes, on that street, not the car-line—may I have the map? I have just forgotten the name.

Q. Yes. A. Manchester Avenue. Those are all trees along here.

Q. On the north side of Manchester Avenue, just across the road from Mr. Walker's greenhouse? A. Yes.

Q. Well —— A. Just there there was a very faint marking on the border, which was very typical of SO_2. You can see it, maybe, there, on the edge.

Q. Yes, I think I can see it. A. Just the merest trace. It was a very light bleach on the border.

Q. Well, with respect to the grape leaves again, were those isolated examples? A. No. There was that little vineyard there; that was quite characteristic of the whole vineyard.

Q. And the grape vines growing in that small, what you call little vineyard? A. Yes. The grapevine as it was, being in a very susceptible stage at that time.

Q. Then, those are the ones on —— A. June 18th.

Q. On June 26th—no, that is Exhibit 48. I beg pardon. Yes, July 9th, 1947, you took a sample of sweet peas. Now, where did you get that sample? A. From the cloth house.

Q. That is from the cloth house in Mr. Walker's? A. Yes.

Q. Now, again, you have five examples there. Were those isolated examples on the sweet peas? A. No, my lord. That was characteristic. They were spread over the whole bench.

Q. Then, these Exhibits 78A and 78B, taken on July 16th, 1947, of the sword fern. I think you said you had examined the ferns on July 9th? A. Yes.

Q. And you did not find them affected? A. I did not find any markings on them at that time.

Q. You made some remark about is it pennies? A. Yes, little leaflets, or pennies.

Q. Being fallen. What did that indicate? A. Well, we find very often where the sulphur dioxide affects the area, a specialized area, between the petiole and the leaf in its attachment to the stem,—it is the area that the leaves drop from in the fall, and this area, that is ripened at that time; it seems to cause a ripening effect on that specialized area. For instance, in the patches we found the ground covered with leaves and without any acute markings on any of them at all.

Q. Of course, you have given your opinion as to those being sulphur dioxide markings or burns. Were these again isolated specimens among the ferns, or were the ferns generally affected in this manner? A. The whole bunch was affected, some a little worse than others, but there was not a single pot on this bench, which must have contained, I would say, around 200.

Q. Well, where was that bench? A. I have just forgotten the name of that greenhouse, but it was the greenhouse that he usually keeps his ferns in.

Q. Could you locate it on the map. A. I am not absolutely sure, but I think it was not in the cloth house. It was in one of the regular houses.

Q. It was inside the greenhouse, was it? A. Oh, yes, yes.

Q. It was not outside? A. Oh, no, my lord. This one and the sweet pea are the only two cases of acute injury I found inside the greenhouse that I was definitely sure of. I think I explained to the Court that to identify markings inside a greenhouse was much more difficult than identifying them outside. You can always map out your area very definitely, but not inside, and I had never had any experience, except the experience of many years in Copper Cliff, on greenhouse plants but, even there, I found it very difficult to assess damage, but it was a little worse near the ventilators than it was at points on the bench a little farther away; but it was just a small bleach, but it did affect the saleability of the plant very much, I would say.

Q. You feel quite clear in your own mind? A. I do not think I have a questionable marking in my ——

Q. I am just dealing with these ferns and sweet peas. You feel absolutely clear? A. Yes, my lord. But, as I told you, if there is any place you can go wrong, it will be inside. It is much more difficult to identify than outside. There were lots of markings inside that looked like sulphur smoke markings, but I didn't take them, because I was not sure.

Q. Then, you took some samples on July 31st, 1947? A. Yes, my lord.

Q. And you have samples of gladioli? A. That is the apricot, isn't it?

Q. Exhibit 79 and 80? A. Apricot. They are susceptible and they are in every vineyard in this district.

Q. Exhibit 81? A. The peach, and that is all that date.

Q. Have you got the date that the plant was closed down for inventory? That was what year?

MR. KEOGH: I think it was ——

HIS LORDSHIP: That was July 24th, 1947, wasn't it?

MR. KEOGH: Something like that, my lord, to August 11th of the same year. I believe they closed down the same time each year.

MR. FERGUSON: It was in the end of the first week of July to the end of the third week.

MR. KEOGH: No—it is shown on one of the tables.

HIS LORDSHIP: Well, that is not evidence. That is one of the things we had to strike out.

MR. KEOGH: Mr. MacAulay tells me there is a variation of a day or two in each year, but his memory is in 1947 it was about the 23rd of July for about two weeks.

HIS LORDSHIP: Well then, we have not got it definitely.

MR. KEOGH: I think Dr. Katz said something about that.

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HIS LORDSHIP: I think he was not definite about it. There was nothing definite. However, you took these samples on the 31st of July, at any rate? A. Yes, my lord. The bleachings may have been a week before, but I do not think any more than that at the outside; more likely three or four days.

Q. Well, it might have occurred up to a week before? A. Yes.

Q. Now, I put it to you again, you had taken samples from the gladioli bed, the last one June 18th, I think, prior to that? A. Yes, my lord.

Q. And this one on July 31st, was that again an isolated case? A. That was an average specimen.

Q. Well, if there was a general bleaching in the bed, of that character, that would be about the end of the gladioli bed, wouldn't it—if it went that far, all the gladioli in the bed bleached to that extent? Do you mean that? A. Well, there was quite a lot of the green of the leafy material there still.

Q. Was it all bleached as badly as that, or were some plants bleached worse than others? A. I think it would be the average. That is what I aimed at getting in each case.

Q. An average representation? A. An average representation.

Q. Then, take page 7, which you say was taken from one of Mr. Walker's neighbour's properties. Is that a fair representation of the condition of the leaves on the tree? A. Yes, my lord.

Q. And the apricot tree taken at the same time, from one of Mr. Walker's neighbours. What do you say as to that? A. That is very typical of the bleach; quite characteristic of the apricots in the vineyards.

Q. Well, then, apparently June 26th was the first date, in 1948, when you found what you say is evidence of bleaching? A. Yes, sir.

Q. Had you visited the property from time to time? A. Yes. In 1948 I aimed at visiting it every week right through.

Q. Every week in 1948? A. Yes, commencing about June, when the bleaches started, or the latter part of May.

Q. And you have one sample on June 26th, a sample of a gladioli, Exhibit 82, samples in Exhibit No. 83, apricot Exhibit 84, plum Exhibit 85? A. That is July 7th, my lord.

Q. No, they are all on June 26th. A. Oh, yes, and some oats and barley from the test plot of Mr. McKinnon's—no, that is oats from the test plot.

MR. KEOGH: He was not sure it was from McKinnon's test plot.

HIS LORDSHIP: No, not McKinnon's test plot. That was from Mr. Walker's test plot, and Exhibit 86, the barley, from Walker's test plot. Now, what do you say as to whether the apricot leaves were an isolated case, or represented the characteristics of the tree from which they were taken? A. That was quite characteristic.

Q. And what about the plums? A. The plums also characteristic.

Q. And what about the oats? A. That is just characteristic of the oats.

Q. In the plot? A. In the plot.

Q. And the barley? A. That is the same.

Q. Now, what about the barley? There is some suggestion that there was not much to be seen on the barley? A. There (indicating).

Q. You are pointing to the tip of the leaf? A. If it is fresh you could see it much more plainly then, and these are broken off here. You see, it is very delicate.

Q. What do you say as to whether it is as easy to identify the markings on fresh vegetation, or rather on specimens that have been mounted for some time, than on fresh vegetation? A. Well, I think it is a little easier to use the fresh vegetation. This gives you an example here. That showed up quite clearly on the barley, there, when I took it, and it is broken off now.

Q. Then, we come to July 9th, 1948; Exhibit 91 is the gladioli; Exhibit 87 is the plum; Exhibit 88, peach; Exhibit 89A, fern; 89B, fern; 90A, grapes; 90B, grapes; 92 is peony; 93, barley; 94, Day lily; and 95, apricots. Now, taking those eleven specimens, I want to ask you again if they were special specimens, or are they representative of the condition of the leaves on the respective plants in the area from which they were taken? A. Yes, they are quite characteristic of all the plants. This one here, the plum, was exceptionally susceptible, it must have been. Well over 100 prune and plums, young and old, which were affected.

Q. You mean 100 trees? A. Young and old, that were killed.

Q. That was how far from Mr. Walker's? A. Oh, that would be not quite half a mile.

Q. In what direction? A. More north than east to northeast.

Q. And what do you say about that as being— A. That is very typical,—a plum bleach and a sulphur bleach. There is no disease you can mistake that for, nor the peaches; it is typical of it. That fern is very susceptible, in front of the house there.

Q. You are referring to Exhibits 89A and B. Where is that fern? A. Right in front of the house, that little house on Mr. Walker's property; right beside the test plots there. I used that as one of the test plants.

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Q. What do you mean by using it as a test plant? A. Well, it was right beside the other test plants, the barley, the glads and others, and knowing it to be a susceptible plant, I used it as well.

Q. Now, you were attending there from week to week? A. Yes.

Q. And would you inspect these plants that you were observing—would you have inspected this fern the week before July 7th? A. Yes, my lord, and I watched the susceptible plants most closely.

Q. Where were these Day lilies? A. They were in a lady's garden on Ontario Street, on the east side of Ontario Street, pretty close to the plant; behind a little cottage there.

Q. Now, did you make any observations about the characteristics of the blight that you observed with respect to the concentration in any particular area? A. Blights?

Q. Well, these observations that you made, was there any pattern evident? A. Yes, my lord. I nearly always—not always, but practically always—went to the end and sides of this fan-shaped or cone-shaped area. It varies, cone-shaped or fan-shaped, depending much on the wind.

Q. And we had one of the witnesses, I think it was Dr. Best, who sort of drew a plan of the area that he studied.

MR. SLAGHT: Dr. Duff.

HIS LORDSHIP: Yes, I beg pardon, Dr. Duff—I wondered. We will adjourn now for lunch and after lunch there are some more questions I want to ask you, and if you could just have some way that you could indicate the pattern that you said, the pattern made on the landscape, whether it was in a circle, all around, or whether there was a particular pattern laid out, or whether it was something else. I think you understand? A. Yes, I do, my lord.

—Whereupon Court adjourned until 2.15 p.m.

Tuesday, May 10th, 1949, 2.15 p.m.

HIS LORDSHIP: Now, Mr. Jarvis, you were going to tell us what pattern, if any, the burnings made, having regard to the locality. A. First of all, my lord, I owe you an apology. I thought I could find a map to show this fan-shaped area on and I started to draw it, and I found it too big a job to get it done satisfactorily, so I wonder if I could show it to you on one of the larger maps.

HIS LORDSHIP: Well, if we get Exhibit No. 1? A. I would like to show it on the map that has the fruit trees on it.

HIS LORDSHIP: Let me have Exhibit No. 11. Now, can you indicate on that map? A. The cupolas are here, and this is Johnston Street over here. That is about five-eighths of a

mile away from this big red schoolhouse.

Q. That is on the east side of Johnston Street? A. Yes, and I got my bearings there. That is in a northeasterly direction. Sometimes the bleaches were a little bit westward, sometimes was southerly and sometimes northerly. They vary. These two lines here, that is the V-shape, these red lines ——

Q. You are indicating the lines on this map that swing 21 degrees 31 minutes west and south 50 degrees west? A. I did not go far enough this way.

Q. You want to go farther to the northwest? A. Yes.

Q. Well, would the line on this—take this, south 50 degrees west. Is that the southerly boundary and the north and south line, can we take the north and south line as the north boundary? A. That is getting pretty close.

Q. So it would be roughly between the easterly limit of Ontario Street and the northerly limit of Carlton Street, east to Johnston Avenue? A. Yes, my lord.

Q. Running in a cone shape. Is that correct? A. That is correct.

Q. Now, just keeping in mind that sometimes the bleach would not cover this whole area, sometimes it would be a little more northerly and sometimes a little more southerly, would it run in streaks according to the particular day? A. Yes, you might say streaks so the southerly and northerly boundaries would vary.

A. That is for one day when you found bleaches, they might have been further north than they would be on another day? A. Yes, sir.

Q. But did it go from sort of a base? A. Yes. North, when I say "north", always in a cone shape or a fan-shaped area. Sometimes, if the wind was light, why it is probably spread out a little more; be a little more fan-shaped.

Q. Where was the apex of the cone? A. The apex, here (indicating).

Q. Did the apex of the cone point towards the cupolas? A. The apex pointed toward the cupolas.

Q. Now, on those investigations, Mr. Jarvis, did you find any bleaching in any area that was contiguous to the cupolas in area further away than Johnston Street? A. No, I did not find any area further away and as we approached Johnston Street, the bleach always got lighter.

Q. Do you know anything about the disease, fusarium yellows? A. Yes, my lord. It is a systemic disease. That is, it works in the vascular system and it works—that is, it does not decrease. It is practically a town disease and finally rots. It is a systemic disease. That is, it is differentiated from a disease that works on an organ, or a leaf, or a stem of a plant, but this

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works on the whole system of the plant, manifesting usually on one of the upper leaves and then that leaf dies and becomes yellow at first and then brownish and then it passes on and you get manifestations in other leaves of the plant and a dwarfing is the chief characteristic of the plant and you get an uneven development. For instance, we nearly always find normal plants mixed with little dwarf plants in yellows.

Q. Is there any difficulty in distinguishing fusarium yellows? A. Absolutely, no. Any pathologist could not possibly be mistaken except—now, when I say that, if a man was sent, or a pathologist was sent a few leaves,—one of the characteristics of this is the first leaves to fall down, droop and fall to the ground, if two or three of those leaves were picked when they were in the yellowish stage, or a half dozen, and sent away to a pathologist, he might mistake them, especially if he didn't know a sulphur dioxide bleach—he might.

Q. But is there any difficulty in one who is inspecting a bed distinguishing this? A. No. I mean, Dr. Ledingham, being a pathologist and a SO_2 specialist, might have, if he had studied the disease, he might have been, but not a pathologist alone. I do not see how he could differentiate.

Q. I am talking about studying a bed. Would you have any difficulty in looking at the bed and distinguishing between fusarium yellows and SO_2? A. Absolutely no, especially when following the progression of the disease.

Q. Now, there has been some evidence given by Dr. Duff yesterday, I think it was in 1945—counsel will correct me if I am wrong—that he saw thrips? A. Yes, my lord.

Q. On Mr. Walker's gladioli, if that is 1945, and they were in an unhealthy condition. You did not see them in 1945? A. No. But I can tell you the characteristic of the thrips. It is an insect grown into the hemiptera and the homoptera and through their sucking methods the insects suck the juices from the plant and it discolours it sometimes, and there are only three or four types of insects that make such markings similar to SO_2, and this is one of the insects that does make such a marking. An entymologist would not mistake it but one who had not the learning might mistake the marking.

Q. But did you find any evidence of thrips on the plants in 1946 or 1947 and 1948? A. I didn't find thrips on the gladioli any year that I examined them.

Q. Well, that is all I want to ask you. Thank you.
—Witness excused.

WILLIAM W. WALKER, recalled

EXAMINED BY MR. SLAGHT:

THE REGISTRAR: Mr. Walker, you have already been sworn, of course? A. Yes, sir.

MR. SLAGHT: Q. You told us in your evidence in chief in this case about a visit to the cupolas in March the 14th, this year, under the Court Order? A. Yes, sir.

Q. When you saw the condition of the water running over the cupola? A. Yes, sir.

Q. There has been some evidence of some men who said they inspected it that day and the evidence of Campbell who said that it had been off centre at periods. What do you say, having heard their evidence of the inspecion, as to whether or not your recollection of conditions as you gave them is or is not correct? A. It is correct in every way.

Q. Then, Mr. Jarvis told us before and to some extent again to-day, of having made repeated visits to your place? A. He did, sir.

Q. Over the years; I need not go into that. A. Yes, sir.

Q. Were you there on most occasions, yourself, when Jarvis visited you? A. Most all—I believe all.

Q. Well, most all, and did you or not go with him when he took samples of the various beds and plots, and so on, in his investigation? A. I accompanied him on every trip.

Q. Now, from the vast number of exhibits put in, I am not going to show them to you in detail, but I would ask you this general question and just give heed. When he took those samples, so far as your observation as an experienced florist is concerned and so far as your observation personally was concerned, what do you say as to whether or not being with him, the samples he took from the greater quantity of plants in beds were picked samples looking towards being worse, or whether or not they were fairly representative samples as a whole? A. I would say they were fairly representative samples as a whole. He was very careful and he would sooner find the place to go over first and look around that section before he took his samples.

Q. Then, we heard some evidence from some gentleman about the conditions back in 1908 in the McKinnon Dash days. I don't know whether anybody went behind that or not, but you told us in chief that you bought in 1903, you built some buildings in 1904, and that you started business in 1904? A. That is right, sir.

Q. Your wife helped you look after it and you were working in the winter time in the Dash plant. Now, from 1904 when you started business, did you, in your business, have any trouble in that business until the year 1937? A. None whatever.

Q. And, by "trouble", I mean any interference of fumes, dust, deposits on your flowers, or your roofs, so as to find that the McKinnon Dash people were interfering with you or injuring your property, or your poducts? A. None whatever till the cupolas were set up in 1937 or 1938.

Q. And that is the answer, I expect, because there is a little doubt about whether they got going in 1937 or 1938. Then, in 1947, will you direct yourself to the month of July, and will you take your diary, and look at it, and let me know what conditions were on the 24th and 25th of July. Refresh your memory from your diary. Read out what you find, or give us the effect of what you find? A. July 21st, gas and oil directly over greenhouses. July 24th, gas and oil, smoke very bad all day, directly all greenhouses. Took photos of stuff found in gladioli plantings and also lily-of-the-valley plantings to-day.

Q. Now, on the 24th? A. That is on the 25th, too, sir.

Q. Wait a minute. Does your recollection agree with your records there? A. Recollection agrees, yes, it does.

Q. Well, you found they were very bad, you say, and you began to take photographs? A. I did, yes.

Q. And what can you tell me as to whether or not you telephoned to Mr. Jarvis to come on or about that time, and what day? A. I believe it was that day that I called Mr. Jarvis. He did not come for two or three days. He was very busy in his garden. He might have been there three days later.

Q. What day did you find things very bad and take photographs? A. That is the day.

HIS LORDSHIP: And what date is that? A. That date, my lord, is the 24th of July.

MR. SLAGHT: That was the 24th. Now, look further in your diary, because Jarvis told us himself, and you told us, I think, before, because my friend cross-examined Mr. Jarvis about it, as to whether Mr. Jarvis came at once and as to whether there was a slight delay. A. As I told you, Mr. Jarvis was quite busy in his fruit, and I believe it was either three or four days.

Q. Well, look through your diary and give us the record of his visit and speak assisted by your record. A. On the 31st of July, Mr. Jarvis here.

Q. And what do you say as to whether or not you showed him the injuries that you had observed on the 24th? A. I did, sir.

Q. Were you with him when he visited the bed where that injury was? A. I was.

Q. Then, in your evidence in chief, you testified in some detail as to injuries which you had sustained in your business from and beginning with the early part of 1945 down to the

present time. Do you recall going over that in detail? A. Yes, sir.

Q. I believe you were in Court and heard Katz and Ledingham; Ledingham was only there twice, but you heard Katz and Ledingham's evidence in its entirety, did you? A. I did.

Q. And having given the Court the observation you made of injuries you complained of over that period, and having heard those gentlemen express their opinions, what do you say as to whether or not you desire to withdraw or correct or alter the evidence you gave to the Court as to the actual conditions as you saw them over the period? A. I will not withdraw or correct one word.

HIS LORDSHIP: You were not asked whether you would or not. You were asked whether you wanted to.

MR. SLAGHT: Yes, I mean I don't want to be stubborn about it.

HIS LORDSHIP: If you have any misgivings about the evidence you have given, we want to know about it at this time. It is not just a question of whether you are going to stand by it or not. A. I have none whatever, your lordship.

MR. SLAGHT: Q. Now, bearing that in mind, get your mind into this frame of mind. If, as a result of the evidence you have heard and bearing in mind your observations as you recall them and testified to in chief in this Court, do you feel that it would be proper for me to stand corrected in some respect and make any explanations which would deviate from your earlier testimony? A. I know no point whatever, or can recommend any evidence that should be changed, other than I gave.

Q. You saw the McKinnon test plot in 1947, I believe? A. I did, sir.

Q. And were there plants—that is the one next the outhouse? A. That is right.

Q. And were there plants in that plot discoloured in 1947? A. Their plants was as fine No. 1 selection, we will say—there was not a single mark on them whatever the day I saw them, until after the day they were hit.

Q. And how would that correspond with the day that you say they were hit? A. We got some gas the same night, or the next morning, whatever it was, and a light, mild wind across and jumped over from us, our wind being a little more southwest, they didn't get it quite so heavy. However, it did a good bleaching.

Q. But not quite so heavy as yours? A. Not quite so heavy.

Q. Now then, in 1948, we heard that theirs were discoloured. We had Mr. Dunn come along and say there was

disease, but never mind that. Did you have occasion to look at their test plot, the one next the outhouse, again in 1948? A. I might say a correction there. That half was planted with what they call cloth house mums. That is, there is a shade put over them. The shade is lowered at 5.00 o'clock and remains there till half past seven next morning.

Q. You are now speaking of? A. 1948 planting.

Q. In the mums displayed next his outhouse? A. Yes, which leaves the exposure on only about 15 hours.

HIS LORDSHIP: Well, at any rate, there was no gladioli in that plot at all? A. None whatever.

MR. SLAGHT: Q. But there were mums there? A. Yes.

Q. Did you have occasion to examine those? A. I did. Those mums were planted, fairly well grown before they were put in, and they had attention of three men eight hours a day to look after and see that everything could be given to them to do good. That is a well-known fact.

Q. Well, I don't want an observation. Just keep to my question. You told me you did have occasion to observe them and their condition? A. I did, sir.

Q. And tell us about their condition, just briefly? A. 1948, when the growing season was on, the McKinnon's was shut down. We grew good mums and they grew good mums. No reason why either one of us shouldn't.

Q. Did you see their good mums growing when McKinnon's were shut down? A. I did.

Q. In this test plot? A. Yes.

Q. And where did you purchase the bulbs that you planted, the gladioli bulbs that you planted—from what source? A. 1946-7-8, from James Platt, of Vineland.

Q. We heard Dunn tell us that he purchased from some one. You didn't buy any or plant any from Palmer? A. No, I didn't.

Q. You heard Dunn tell us that he planted some diseased ones that he purchased from Palmer. Well, I need not tell you that. Did you see the gladioli that were planted by the McKinnon people, Dunn, apparently, in 1948 at their plot called the forge plot? A. I took a picture on Sunday, showing a few old glads in there.

Q. You mean on a Sunday that year? A. This is Sunday, I believe, July 3rd.

Q. Back in 1948? A. Back in 1948. It showed a few old glads which had been left in there, which Mr. Jackson, the gardener, I believe, confirmed on Tuesday. I came back ——

Q. Wait a minute. You heard Jackson's testimony in Court? A. Yes.

Q. And you think, in his testimony, he confirmed the condition you are now telling us about? A. Yes.

Q. Whether or not he did, tell us what you saw? A. That was on Sunday. On Tuesday I came along and that bed was planted with the fanciest lot of gladioli I have ever seen in my life. Each one must have started in a pot, separate. That was on a Tuesday. Thursday I came back from Port Dalhousie and I thought I would stop and have a look at them and they had had a very, very bad burn. I immediately secured my commercial photographer and went down in the morning to take a photo, but they had been removed, but we did find Mr. Jackson removing also a batch of glads from the south wall of the Delco plant and they were all badly marked, too.

Q. Ledingham and Katz visited your greenhouse, according to their story, in 1945.

HIS LORDSHIP: You mentioned July 3rd. You had seen old glads that had come up from the previous year? A. Yes, my lord.

Q. That is July 3rd of the year —— A. 1948, last year.

Q. Yes.

MR. SLAGHT: Katz and Ledingham said they paid a rather brief visit to your place in 1945, and Katz thought and then Ledingham said first that you were there to show them around. Were you there on the occasion of their visit at all, or any part of the time? A. I was not there when they came and they had left when I went down between 5.00 and 6.00 o'clock. I heard from my son ——

Q. Well, don't tell us about your son, but on any occasion in 1945 were you there when those two men visited your place? A. No, sir.

Q. And you never showed them around? A. No, sir.

Q. What about dahlias? Were there any dahlias growing on your property in or out of the greenhouse, in the year 1945? A. I have no recollections—a good many years before that, too.

HIS LORDSHIP: You started to say you have no recollections. We are dealing with the year 1945. Were you growing any dahlias that year? A. No, sir.

MR. SLAGHT: Your witness.

HIS LORDSHIP: What did you mean by saying, "I have no recollections"?

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A. Your lordship, I had a former employer who had a few and he left me 16 years ago to go to Sudbury and he had the last dahlias I grew on the place, just five or six plants.

Q. Well, when you started off to say you had no recollection, you could not recollect? A. Well, I was leading more up to that. It was 16 years ago, Brown left us.

Q. Well, you had not had any for the last 16 years? A. That is right, your lordship.

MR. SLAGHT: Your witness, Mr. Keogh.

CROSS-EXAMINED BY MR. KEOGH:

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Q. Have you your 1947 diary there, Exhibit 68? A. Yes, sir.

Q. Would you mind turning up to your entry of July 26th, which says, "McKinnon Industries closed to-day till after Civic Holiday"? A. That is right, sir.

Q. And it is the fact, is it not, that they were closed there and including July 26th, until after Civic Holiday, which was the first Monday in August? A. That I couldn't answer, but I would say that that would be likely.

Q. Well, you don't suggest that Civic Holiday is not always the first Monday in August, do you? A. No. That is usually followed unless there is something else. I never knew any other day but that.

Q. You never knew any other day here excepting the first Monday in August? A. That is right, sir.

Q. Well, you have heard evidence given by the various plant witnesses for the defendant of the changes which were made in the cupolas, first as to the spray nozzle scrubbers in April, 1945, and secondly as to the flow cone scrubbers, commencing with March, 1947, and running on to December, 1947, and in the case of another cupola in February, 1948, the last one? A. Yes, sir.

Q. You have heard all that evidence? A. Yes, sir.

Q. And prior to that date, that is from 1942 to April, 1945, there were just the chain curtains on the third? A. If there was, I couldn't tell you the exact date. I would agree with Edwards and the other man.

Q. Well, I don't recall the date exactly, but my memory is he said some time in the early part of 1942 they put the chain curtains on. Would that about agree with your recollections? A. I think that would be about correct.

Q. And it is my memory that in giving your evidence in chief, you said that conditions as to fly ash and soot were much worse from April, 1945, on. Did you make some such statement as that? A. No, sir.

HIS LORDSHIP: No, my recollection is he said they were not as bad from 1945 on.

MR. KEOGH: Q. Did you say they were not as bad from 1945 on? A. If I had not said, I say it now.

HIS LORDSHIP: I thought he had said something like that. It was bad, but it was not as bad as it had been before.

MR. KEOGH: I have not that. I thought you said in chief they got worse from 1945 on.

MR. SLAGHT: Well, he is telling you now.

MR. KEOGH: Q. Well, at any rate, what you say now is that they got better after April, 1945. Is that what you say now? A. After they changed the chain curtain over to the other.

Q. Well, you have heard that by witnesses, that water scrubbers were first installed on the three cupolas then in existence, in the month of April, 1945, and there is not any doubt that as far as smoke and fly-ash is concerned and the soot conditions improving from that time on, as far as you are concerned? A. Except for the big chimney.

Q. Leave the big chimney out of it for a minute. I am just talking about the cupolas. A. Right, sir.

Q. There was an improvement as far as the cupolas are concerned from 1945 on, is that right? A. After they were changed from the curtain to the water wash.

Q. And I suggest to you, a substantial improvement as far as the deposit of soot and fly-ash is concerned? A. I am not saying soot, I am saying fly-ash.

Q. Well, how do you distinguish between the two of them? Don't they all come out of combustion? A. They do, but they seem to break up. The soot seems to be a soft particle and the other seems to be a hard particle. You can blow it off, but the soot sticks.

Q. Let us take one thing at a time. You say now there was an improvement as to fly-ash from the time the water scrubbers were first installed in the cupola. You have no doubt about that? A. No, sir, that is right.

Q. And what do you say about whether or not the soot conditions improved from that time on? A. I would say the soot conditions have not, in view of that part of it, because from the forge shop it has been much worse.

Q. Has been much worse since the scrubbers were first installed? A. Yes.

Q. And it is the fly-ash, according to your witnesses, contains the iron oxide, is it? A. That is a chemical question I am not able to say.

Q. You are not able to say which does that? A. No, sir.

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Continued

Q. Then I suggest to you that your own stack is a source of considerable trouble; that soot gets on your greenhouses and on your plants? A. I wouldn't agree with that. Our stack has been placed after giving it big consideration where most of the winds would come from. It has been placed to one side so that a southwest wind would only have 12 or 14 feet to blow it over. Further, if you want to go to where the same kind of stacks are quite a bit higher in greenhouses ——

Q. You say that your stack is placed off to one side of your greenhouse? A. It is placed off to the east.

Q. I show you Exhibit 196. Is that a photograph of your stack and some of your greenhouses? A. Yes, but that is looking from the front, which does not give a fair picture of the greenhouse behind.

Q. That is looking north from Carlton Street, isn't it? A. True enough, but here is the line of greenhouses, going down here, and No. 3 behind that, one alongside each other; placed almost to one side.

Q. Doesn't this photograph show —— A. That greenhouse, yes, but it is only about 11 to 13 feet from the edge.

Q. Just a minute. Doesn't the photograph, Exhibit 196, show one greenhouse south of this stack, squarely south of it, approximately? A. About two-thirds.

Q. And doesn't it show another greenhouse approximately squarely north of the stack? A. Yes, part.

Q. And with the stack in the middle, between the two? A. That's right. It is over to one side of the general line of greenhouses.

Q. And then it shows another greenhouse to the right, or the most southerly greenhouse? A. That's right.

Q. And, when you have a southwest wind, that is a wind blowing from the southwest, I suggest to you that soot from your own stack would be blown on your greenhouse and in your greenhouses when the ventilators were open? A. No, I disagree with you there. It is a sufficiently high, tall, to carry over the soot. That is why it was put there.

Q. Well, it is only about 10 feet above the top? A. It is 29 feet high.

Q. But the top of your largest greenhouse is 19 feet high? A. That's true enough; nevertheless it is on one side and wouldn't go over that greenhouse.

Q. So that the top of your smoke stack is only 9 feet above the top of your greenhouse? A. 9 or 10 feet. That is all that is necessary.

Q. And you burn soft coal? A. With a stoker.

Q. And we have had evidence in this case that one of the sources of iron oxide and soot is the combustion of soft coal. You don't agree with that, do you? A. That is a chemical question.

Q. And you complain mostly about soot and tarry substances in the winter time, don't you? A. I wouldn't say that I complain most in the winter time. I complain all the time.

Q. At any rate, it is in the winter time that you have your three boilers going practically all the time? A. That is right, sir.

Q. Then, I want to show you Exhibit 99, which has a sticker on it, "east side of cloth house, near south end". A. That's right, sir.

Q. This looks like a pane out of an ordinary window? A. No, it is not, sir. That house is made up of what we call sash. Sash is the smaller one, so we built that house out of the sash.

Q. That is what we call a sash house. In other words, the side of this cloth house was sash window, sash similar to the sash that you usually use for cold frames? A. That's right, sir.

Q. And that glass was located how close to the ground? A. I believe there is 15 feet from the big greenhouse over, then we have about seven feet, and the sash comes down this way on top of the roof, forming the last six feet of covering.

Q. So you have part of the cloth house roof made of cloth, part of it made of window sash? A. That is right. We use this for hardening up the stuff.

Q. And this was out of the last part of the roof of the cloth house? A. That is right, sir.

Q. And about how close to the ground? A. Oh, I can pretty well stand in there. I would say six feet, or six feet and a half.

Q. Well, it is my understanding that this pane of glass was removed by you on April 22nd, 1947. Is that right? A. That is right, sir.

Q. That is a little over two years ago. Where did you keep this pane Exhibit 99, since? A. No. this is 1948, not 1947.

Q. Oh, I beg pardon, 1948. A. Yes.

MR. SLAGHT: Is it marked on it?

MR. KEOGH: No, it is not marked on it, but Mr. Pond has a note.

Q. At any rate, you say you removed it on April 21st, 1948, do you? A. That would be right.

Q. And that this is the exhibit in front of you, Exhibit 99? A. That is right, sir.

Q. And that is a little over a year ago. Where did you keep that pane from the time you removed it up till the time of the commencement of this trial? A. Mr. Keogh, if I may make one correction there. This is not 1947 or 1948, it is 1949, this year. Taken out all the same time as the other three panes, and on the same day.

HIS LORDSHIP: You are probably thinking of the other one, Mr. Keogh. This is the one that was submitted to the young physicist for his tests. Now, I do not think they were taken out at the same time. Is that correct, Mr. Walker? A. Your lordship, I believe they were. I believe they took overything out the same, with the exception of the night before, we took one pane.

MR. SLAGHT: The official record shows the glass from the north house, 22nd April, 1949. 19A, analysis of the glass. The Registrar has here marked, my lord, is the official text.

MR. KEOGH: Well, if it is, that is the end of it. I won't press it.

MR. SLAGHT: Well, I may be all in error, but it seems to me his record is correct.

THE REGISTRAR: I see I have no date on it, but I have a description of 98.

MR. KEOGH: But you have not got the date for 99. Well, you say now it was removed in April, 1949? A. That is right, sir.

HIS LORDSHIP: Those were both removed at the same time, were they? A. The two big ones, and this here one and I think you have another small one like that. Not quite a full one.

Q. I show you Exhibit 58. Can you suggest to his lordship when that was removed? There is a note on it, but I suppose it came from the same place? A. Just lay it along and see if it is the same.

MR. SLAGHT: The record is April 3rd.

HIS LORDSHIP: April 3rd from the cloth house. That was put in during the evidence of ——

MR. KEOGH: I think Mr. Walker was called back to the stand to identify that just before the evidence of Burgener.

HIS LORDSHIP: McAlpine gave evidence. He made tests in the fall of 1947. Those were magnetic tests.

MR. SLAGHT: Sunday, April 3rd, I think.

HIS LORDSHIP: Took sample of glass on Sunday, April 3rd. Now, I have not marked down the year.

THE REGISTRAR: I have it as 1949, my lord.

MR. KEOGH: Q. Well, you say now they were both taken the same year? A. Both taken the same, including the other two as you have there.

Q. They were all taken in April, 1949? A. Yes.

Q. That is, Exhibits 58, 98, 99 and 101? A. Four panes of glass.

HIS LORDSHIP: Oh, yes. Mr. McAlpine said he made tests by scrubbing off part of the deposit and found it to be magnetic, in 1947, and made tests since.

MR. FERGUSON: Those tests have no reference to Exhibit 58, though, my lord.

HIS LORDSHIP: Probably not.

MR. KEOGH: Then, I just deal with the year 1947, but I suppose there is no doubt there was a similar close-down at McKinnon's for the inventory, around Civic Holiday, in each of the years 1945 and 1948? A. 1948, sir, the strike was on.

Q. I beg pardon. I should have said 1945 and 1946. A. I believe that would be correct. It might vary a day or two.

Q. It might be a day or two out in either year, but approximately around the same time? A. That would be correct.

Q. And then, is Dr. Berkeley, the Director of the Dominion Experimental Farm here? A. He is, sir.

Q. Did he make some tests for you and take some samples for you during the three or four years prior to the commencement of this trial? A. 1940, I believe.

Q. And he took specimens and made tests of soil, did he? A. No. I called him and if I recollect he came down and the first thing he asked me had we been using any manure. I said no we had not, because we had to have our ground tested by the O.A.C.

Q. Well, I don't want hearsay. I just wanted to know if he did that, or did not.

HIS LORDSHIP: Is this in 1940 you are talking about? A. Yes, sir.

MR. KEOGH: No, but I am talking about 1945, 1946 and 1947. A. You mean Dr. Berkeley in those years?

Q. Yes, taking samples and making tests for you in those years? A. He did in 1940, but I have no recollections in those years 1945, '46, '47 and '48.

Q. Were you asked these questions and did you make these answers on your examination for discovery. Question 530 to Question 532.

MR. SLAGHT: My lord, just before my friend proceeds. This witness was in the box in chief and cross-examined by my friend at great length and it seems to me that would have been the proper time to have gone into this.

HIS LORDSHIP: No. Mr. Keogh may cross-examine the witness when he has him in the box about anything he likes.

MR. SLAGHT: Well, I point out I did not say anything about this sort of thing.

HIS LORDSHIP: That does not make any difference.

MR. SLAGHT: Because, doing it this way, except when it is in chief, I do not know what it is leading to; but may I point out I am now prevented from having Dr. Berkeley here if there was enough in it to make it worth while.

HIS LORDSHIP: If there is something brought out in reply, you can still call him, if you want to.

MR. KEOGH: Q. I ask you if you were asked these questions and made these answers on your examination for discovery. Question 530:

"Q. 530. Did Dr. Berkeley take samples and make tests "during the three years? A. Dr. Berkeley was one of the "first ones to make a test; he made the first test and said "it was apparently caused by gas scale.

"Q. 531. Did he take samples from you for that test, or "were they delivered to him? A. He came over and saw "the gladioli there and I believe he and Richardson took "them with them. In conversation with him he said appar-"ently it was gas scale or bleach.

"Q. 532. Did he make a test of your soil as well? A. I "don't know whether he did or not."

Were you asked those questions and did you make those answers on your examination for discovery on the 15th of March, 1948? A. If I answered the question in regard to Dr. Berkeley, it had reference to his 1940 examination, the only time Berkeley was over there.

HIS LORDSHIP: Well, it does not mention the year there.

MR. KEOGH: It says during the last three years. Question 530, "Did Dr. Berkeley ——"

HIS LORDSHIP: Yes, but the witness says Dr. Berkeley was one of the first that we had. He does not agree that it was during the last three years.

MR. KEOGH: He does not expressly say it was within the last three years.

MR. SLAGHT: Well, read the answer.

MR. KEOGH: "Dr. Berkeley was one of the first ones to make a test; he made the first test and said it was apparently caused by gas scale."

HIS LORDSHIP: And you say now that was in 1940?

THE WITNESS: That was, my lord.

MR. KEOGH: That was not in the period then for which you are claiming any loss? A. No, sir.

Q. That is all.

RE-EXAMINED BY MR. SLAGHT:

Q. Just one little matter. If you will hand his lordship Exhibit No. 11. I want to show you Exhibit 11 just on the point of, you said you put up your stack with some care after considering where it should be put.

MR. KEOGH: Well—oh, yes, I see. That's all right.

MR. SLAGHT: Q. And it shows in the white space between No. 7 and the lower greenhouse? A. That is right, sir.

Q. Right alongside of item 6 there? A. Yes, sir.

Q. Now, my friend asked you whether when the wind was from the southwest, whether the smoke from that stack would not go over your greenhouses, and you told him no? A. That is right, sir.

Q. And according to the surveyor, Ure, he has put a red line on there showing where the smoke goes when it crosses that central point. What do you say now as to whether—oh, well, I don't need to ask you.

HIS LORDSHIP: No, I don't think you need to. It is certainly elementary. No, I do not need evidence of that.

MR. SLAGHT: It is quite clear from the plan it would not go over the greenhouses with a southwest wind. Of course, other winds might. That is all, Mr. Walker.

HIS LORDSHIP: Mr. Walker, there is a question I want to ask you. Dr. Katz, and I think Dr. Ledingham, gave evidence about seeing a bed of lily-of-the-valley on the occasion when they visited your greenhouse and that the tips of the leaves were discoloured. I think it was on the 7th of June, if my recollection is correct. They attributed it, that discolouration, to keeping the glass lid down too long, and they had come in physical contact with the glass after the bed had grown. Have you any recollection of that bed under the circumstances? A. I think, my lord, the back of that bed is placed 25 inches above and the other side 14 inches below to drop the rain off and we never have a valley that comes to reach that glass—to the top of that glass. It is growing there now, just a little bit.

MR. SLAGHT: The witness admitted he had never seen it on, my lord. It was just a theory.

HIS LORDSHIP: Well, that is comment. How high do you say the back of the bed is? A. The back of the bed is 25 inches and the front 14, or vice versa.

Q. And you say that the lily-of-the-valley —— A. The lily-of-the-valley ——

Q. Wait till I get through. You say the lily-of-the-valley, to come in contact with the glass, would have to be 14 inches high? A. I would say that is correct.

Q. And you say it never grows high enough to come in contact with the glass? A. I have never seen it, sir.

Q. All right. Next witness. A. May I answer one other question about the burn?

HIS LORDSHIP: No.

....—Witness excused.

In the Supreme Court of Ontario No. 59 Plaintiff's Evidence In Reply John S. Beaumont Examination-in-Chief 10th May, 1949

DR. JOHN S. BEAUMONT, recalled

EXAMINED BY MR. SLAGHT:

THE REGISTRAR: You have already been sworn, Mr. Beaumont? A. Yes.

MR. SLAGHT: Q. Mr. Beaumont, you gave evidence in chief and since then these Exhibits 191 and 192 have been put in by Mr. MacAulay showing a roof model of the cupola and a real intake pipe, which is off one of them, with a square drop.

HIS LORDSHIP: Not an intake pipe, Mr. Slaght. It is the flow nozzle, which is the opposite from an intake pipe.

MR. SLAGHT: Oh, yes, thank you, my lord. A real flow nozzle off one of them with a square drop and outlet which is supposed to be over the apex of the cupola. Have you examined those two exhibits with me? A. Yes, I have.

Q. To-day? A. To-day.

Q. At intermission. And what do you say as to an outlet one and one-eighth diameter only, of water, to drop on this cupola, having regard to its size, the circumference at the foot, or rather the diameter at the foot being given as eight feet. What do you say, assuming that it is not off centre but working all right. What do you say regarding it? A. The water supply would be totally inefficient.

Q. That is your opinion? A. Yes, sir.

Q. And perhaps based in part on your inspection of the River Rouge plant of the Ford, I believe? A. Yes, and of inspection of the two inner pipes into the nozzle, which I am given to understand is a three and a quarter inch pipe. The total area of those two three-quarter inch pipes would total around 88 square inches. That would take—I take the diameter of the cone as a 70-inch cone, because no one would give me the information as to what the diameter when I was at McKinnon's, so I based it on a 70-inch cone.

Q. Which is somewhat under six feet? A. Yes, something much more conservative.

Q. He is going to give you a calculation, my lord, which he did on a six foot, five foot ten basis of 70 inches, because he did not have the diameter of the cone. Now we have got the diameter of the cone considerably more than that, it is eight feet in diameter, but I didn't ask you to do it over again. If it were

five foot ten, what would you have to say scientifically about it? A. The bottom of the cone, 70 inches, has a circumference of approximately 225 inches.

Q. Wait a minute. The bottom of the cone, which you took as a basis for calculation, has a circumference of what? A. Approximately 225 inches.

Q. Go ahead. A. I was told at McKinnon's, by the engineer, that they required a curtain of water for washing 1/32 of an inch thick.

MR. KEOGH: No. I object to what he was told by somebody.

HIS LORDSHIP: No, that is not evidence. You can tell us from your experience what is the necessary curtain of water and you can tell us how far this measures up to it. A. The minimum amount of water in the curtain for efficient spraying should be 1/32 of an inch thick. That gives you a total area of water required to form the curtain around the bottom of the cone of 7.1 square inches.

Q. The total area of square inches of water—you are still working on the smaller circumference cone? A. That is correct.

MR. SLAGHT: All right. Go on. A. Therefore the water supply with an outlet something under one square inch would not be sufficient under its pressure, to supplying an area of 7.1 square inches, so that the curtain could not be complete.

Q. Now, is it or not in your view if you are going to use a device of this gauge type at all to create an entire curtain, so that it is all the way around instead of leaving blank spaces for gas and solids to come out? A. Very necessary, otherwise the curtain would not be effective.

HIS LORDSHIP: Now, you may ask the witness what would be the effect of extending the cone to be eight feet in diameter at the base instead of seven inches.

MR. SLAGHT: I should have asked that. What would be the effect of your statement as to its efficiency or otherwise, if the cone actually were eight feet in diameter, which we have now learned this cone is? A. That would make it much more effective than a 70 inch cone.

Q. Yes, because you use the five foot ten in diameter. Then, let me ask you this. I think we will finish with the cone and the model. Now, those two models are 191 and 192. Did you have a look at the model to see whether on the model—and I do not attach too much importance to this—on the model which is said to be reasonably accurate, is the opening from the little block, is that on centre or off centre as regards the apex of the cone? A. On the model?

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Q. Yes? A. It is off centre on the model.

Q. Now, we heard Campbell say that on the device itself, from Christmas last down till the present time, he frequently found this nozzle off centre as regards the apex of the cone from one-quarter to five-eighths of an inch, and then MacAulay this morning was good enough to say that he found at times that it was off centre by, as he put it, about five-eighths of an inch. Now, bearing that in mind and having a look at this photograph which is 200A, which they have put in—I don't know whether you did look at this before or not? A. Yes, I saw this.

Q. Photograph No. 200A, which purports to be taken yesterday of the portion of the cone and bearing in mind what you told us in chief when you were here before regarding your observation on March 14th, what comment do you make as to all these conditions of off centre five-eighths of an inch, bearing in mind the outlet is only one and one-eighth in its entirety; the photograph here and the statement you made that you found it inefficient on the west one to the extent of 70 against 30 and, let us say efficient, what comment do you make on your previous evidence and this photograph and the admissions that it is off centre in varying amounts, and that Campbell never corrects it. He runs it right through the shift off centre or on centre. Will you just give us your view of that situation as to whether or not, that is aside from its efficiency, whether it is efficiently operated or not, or could have been? A. Could not have been efficiently operated, because the apex of the cone would then be 1/16 outside of the area of the outlet pipe.

Q. What do you mean by that? The area of the outlet of the pipe is one and one-eighth inches? A. Yes.

Q. That is nine-eighths inches, is it not, as a fraction? A. Correct.

Q. And if the outlet device is off centre as regards the apex to the amount of five-eighths of an inch, it is off centre a little more than one-half of the diameter of the outlet, is it not? A. One-sixteenth more.

Q. Thank you. Now, if it were on centre and the outlet was flowing down over the apex of the cone on dead centre, the apex would be at a point from both edges of the cone a distance of four and one-half eights? A. Nine-sixteenths.

Q. Is that right? A. Correct.

Q. Now, I will just take one of these exhibits, 98, having no regard for the glass, but if that is the apex of the cone and the outlet is off centre to the extent of five-eighhs of an inch, will you just hold that Exhibit 192 up about six inches over the apex of this imaginary cone that I am holding, and don't drop it on this glass, please. A. I can do it better with half a dollar.

Q. I just want an actual demonstration of what you are telling me about the inefficiency of this working.

HIS LORDSHIP: You have to have something that is reasonably to scale, having regard to—you need something that has a diameter of eight feet with the height that the cone has, and the sample the witness has is a sample that is not to scale to such an accurate height, therefore it has to operate on something that is the size of the actual cone.

MR. SLAGHT: Yes.

MR. KEOGH: And the drop of half a dollar, I suggest, my lord, is no use.

MR. SLAGHT: Well, I am not going to use the half dollar. Just go with me first. If it is not of value, tell me so. My idea is this: take the exhibit, and the apex which is at the bottom of it, the one and one-eighth inch outlet, and hold it temporarily above the bar, about six inches above the apex of the cone. Now then, if it gets off centre, say that it is to one side five-eighths of an inch, what do you say as to whether the water that comes from it will or will no distribute itself equally over the cone? A. About 25% on one side and 75% on the other.

Q. And I think you found on the west cone, on the 14th of March, that, as an estimate actually it was running something like 70 on one side and 30 on the other? A. About that.

Q. Now, take a look at that picture again. What is your comment as to disclosure in that picture? A. Something has been changed on there. There is a greater flow of water in that picture than there was the day we made our inspection.

Q. That is your first comment? A. Yes.

Q. This was done yesterday. I forgot to ask, but never mind that comment, because I should have asked about that. But taking this picture by itself, what it discloses to us with the cone and the outlet in operation, what do you say from the bald facts on the face of that picture as to whether the water yesterday was being distributed evenly or unevenly over the cone? A. It is hard to say whether this cone is centred, because you would have to have two views: but it does show definitely there is sufficient of water insomuch as the water is starting to break up and run down in rivulets instead of one sheet. The reason of this is that, at the time the nozzle system was introduced into the plant, it is evident they put the settling down as a piece of equipment.

MR. KEOGH: Now, just a moment. I am objecting to anything in the way of argument, or something that is not evidence. The witness is speaking from hearsay, or from his own personal knowledge? A. I am speaking of my own personal knowledge of having spent a day, March 14th, when the plant was in operation.

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MR. KEOGH: Yes, but you started to say at the time they put the spray plant in, it is evident. A. At the time they put the spray tank and the nozzle system in.

HIS LORDSHIP: Just a moment. Do not let us get into any confusion about this.

MR. SLAGHT: Just a moment. I think Mr. Keogh properly suggests that you must not speculate on what they did at the outset, when you were not present, and we have had no evidence from anybody who installed this system.

HIS LORDSHIP: I want the witness' views on the quantity of water. You said the photograph demonstrated that there was an insufficient quantity of water and, you said, because it was coming down in rivulets, rather than a sheet? A. Yes.

Q. Should it form a complete sheet all around? A. A complete sheet all around, yes, sir. That water, at this point near the apex of the cone, would be a quarter of an inch or more in thickness, tapering down until it got to the bottom of the cone, to give a curtain 1/32 of an inch, and you see here where there is no water, and it is breaking.

Q. Well, you cannot see any water? A. No curtain of water.

Q. May it not be from the angle at which this photograph is descending? A. You get both angles. You get the right angle there and the other angle here. This black space is black iron.

Q. Photographs are sometimes evasive. I would not place too much confidence on a photograph one way or other, on a matter of that kind.

MR. SLAGHT: It strikes me that way, too. But leave out the photograph for a moment. Have you an expression of opinion as to what it disclosed? Leave out the photograph altogether. I understood you to say, before I showed it to you at all, that there is an insufficiency of water there to do the job it ought to do and, secondly, that the off centre of five-eighths of an inch, having regard to the small outlet pipes, there is the water flowing unequally down the cone to the extent you measured, of 75 and 25, and your own observation in March, what do you say as to whether that is an efficient operation of that apparatus to do the job that it ought to do to protect the neighbours? A. Most inefficient.

Q. Now then, just another point or two and we will leave that cone business. The matter of light, a word or two in reply to that, Mr. Beaumont. You heard Mr. Dunn, did you, tell us that he got deposits on his roof, that he didn't know whether there was any iron in them and he didn't know whether any sulphur dioxide injured his plants but, while he called them a nuisance, he thought they were very minor. Did you hear Dunn's testimony to that effect? A. I was not here when Mr. Dunn gave evidence.

Q. Well, did you hear Mr. Katz tell us—you heard Katz? A. Yes.

Q. That he found over the roof of Walker's seven greenhouses he found it covered with a deposit, that he saw that first in 1945 and he said, "I didn't regard them as of any concern." That was his passing off of that condition. Now, having regard to the conditions, and the story put forward by Katz, what do you say as to whether or not interference with light to any appreciable extent would or would not have a detrimental effect on the flowers being grown in the winter time? A. Definitely.

Q. Now, a word about coke. You suggested in your evidence, you may remember, that the quality of coke used by these people has deteriorated—the specifications? A. Yes, sir.

Q. And also they could not from these cupolas, under the process with which you are familiar—sulphur dioxide was produced by the following products of combustion, (a) volatile matter, (b) ash, (c) coke, and (d) rust. Having heard Katz's story, what do you say as to whether you were correct in that earlier statement you made? A. I was perfectly correct.

Q. Then, Mr. Thom having informed us that 56,000 tons of pig iron, steel and scrap were treated in one cupola in 1940, and in the year 1948 he didn't have the tonnage of coke, but there was 6,820 tons of coke used, and bearing in mind the evidence of Watson, from the weather bureau, that half the time the winds were from a direction which took this escaping product over Walker, have you any comment to make on the statement of Dr. Katz that there was no sulphur dioxide injury of any known quantity, in his opinion, bearing in mind Katz was there once in 1945, and as to whether or not he is correct in that, we have your earlier evidence about that? A. Dr. Katz was incorrect in the fuel used in the cupola of which 40 tons is used per cupola. 40 tons of coke is used.

Q. A day? A. 40 tons on 200 tons of metal. That is the daily output. You burn 40 tons of coke average. The analysis of that coke is given by McKinnon's as .65 of sulphur.

MR. KEOGH: I don't recall any such analysis being given, not in this witness box.

MR. SLAGHT: No, I believe you must eliminate that. A. I asked for the analysis and probably that was the one given to me. The average sulphur in the coke of today is approximately .65. That means there are 13 pounds of sulphur in various forms in each ton of coke. In other words, there is 500 in 20 pounds of—

MR. KEOGH: I object to this general evidence about the average type of coke today, or evidence of that sort.

MR. SLAGHT: Well, this is in reply to Dr. Katz.

THE WITNESS: The pounds of sulphur in various forms burned in the cupolas daily.

MR. SLAGHT: Now, there were three cupolas running concurrently? A. Yes.

Q. Well, just take one cupola. A. I am taking the total tonnage of 200 tons a day of metal, which is about the production at McKinnon's.

Q. And what do you deduce from those facts? A. Of the 550 pounds of sulphur pounds in making a charge, we always allow an .03% increase in the sulphur content of the product being made, that is, malleable iron or cast iron will absorb that amount of sulphur and that allowance has to be for the time the charge is calculated, which proves definitely the presence of sulphur. Of the other 400 pounds, a portion of that is absorbed by the slag. That portion goes off as sulphur dioxide; in allowing that, 80% would be absorbed by the slag, which is the amount—

HIS LORDSHIP: Mr. Slaght, it seems to me now that you are getting into a lot of technical calculations that were essentially evidence in chief. I do not think it is quite fair to the defence.

MR. SLAGHT: I bow to your lordship, and I suggest I withdraw the question and ask the Reporter to be good enough to strike it out.

HIS LORDSHIP: Well, I did not know where it was leading to, but I rule it all out. You had your opportunity of putting in any calculations you wished to show, what emissions there would be in the air, and that was part of your case. Now, the defence has put in their defence and I do not think that we can now go back and say, "Oh, well, that defence has not made out a case. We are going to show now what the emissions were."

MR. SLAGHT: In view of your lordship's suggestion, I will ask the Reporter if he will be kind enough to strike out that question.

HIS LORDSHIP: I do not think it can be stricken out now. It is in, but I am ruling it out of consideration in this case.

MR. SLAGHT: Well, I am acquiescing in your lordship doing this. I will go on to something else. The nozzle system.

Q. You heard the nozzle system described about the nozzles being four inches apart, and so on. and in March, 1947, No. 2 cupola, with a diameter across its base of eight feet, was put in. Will you comment on the nozzle system which Mr. Williams told us was often clogged with sediment from repeatedly using the water in the tank, or have you any comment on that? A. That is typical of a nozzle system. One of the reasons for the nozzle system is that it will use much less water than the flow

system. In fact, I think it is about one-third the amount of water is required for a good nozzle system, one that will whirl, as against the other flow system. That is the reason that the water curtain on the cone is not completed.

Q. Now, we were told that the three of the cupolas were equipped in April, 1945—

HIS LORDSHIP: I do not see how that answers the questions you are putting to the witness. The question you asked him was something about the nozzles being clogged, and he said the nozzle system requires less water than a cone system. I do not see how the answer is related to the question.

MR. SLAGHT: Well, the nozzle system was operated during part of the time we are claiming damages. But let me put this to you. What do you say as to the nozzle system operated with a re-used water that contains sediment and thereby clogs the holes to some extent, making necessary any maintenance each night, for a man to take wire and clean them up for next day. What do you say as to whether or not that is an efficient system to take objectionable solid matter or gases from the air, with the higher efficiency? A. It is impractical to have water pass through a nozzle system that contains the slightest form of grit.

Q. You told us at the Rouge plant of the Ford people they put fresh water through? A. Yes, sir.

Q. The settling tank shows, if the screen is to size, that is, to scale, it shows that—

MR. KEOGH: It has been said it is not to scale.

THE WITNESS: Not only slime, but particles will pass through it. It is not even filtered.

Q. You need not call it slime, my friend objects to that, but solids? A. Solids and solid particles.

Q. What do you say as to Katz's story about his investigation excluded because he thought it was of no value—samples taken from the cupolas themselves before and after the wash? Can you comment on that, as to whether or not that was an efficient investigation system, to exclude that?

HIS LORDSHIP: I don't think that is a proper question for this witness to comment on, the efficiency of their investigation. He may give evidence as to what value the samples taken would have in determining the efficiency of the operation of the water curtain.

MR. SLAGHT: Yes. Would or would not any value attach to samples taken before or after the wash, in determining the quantity of injurious gas or solids that were being emitted from the mouth of the chimney? A. Are you speaking in connection with the water curtain system?

Q. Yes? A. That would not be indicative of—

Q. Pardon? A. They would not be valuable at all.

Q. Well, then, in attempting to investigate the injury of smoke that had come from the chimney on the surrounding country, would tests of that kind be of any value? A. Not unless taken at the same time, making sure that the water curtain was complete and the gas passing from the cupola was thoroughly washed.

HIS LORDSHIP: Well, witness, I was going to ask you some questions about this. On Exhibit 121, it shows that the analysis for SO_2 at the charging floor at 11.00 to 11.21 was 24 parts per million at the outlet, that is at the water wash, that is nine parts per million. That is the most extreme example. Here is another one probably in the same proportion—a little more extreme. Would that indicate the efficiency of the operation of the water curtain during that time, when 9.246 of the gas is escaping? A. That would give an indication that some of the SO_2 was being dissolved.

Q. Well, it would give an indication some was being dissolved and some was escaping? A. Yes, sir.

Q. We have great variations on another occasion, that is in parts per million, showing a test at the charging floor and at the outlet of five parts per million, which was apparently five-sixths on that occasion was escaping. Is that a fair assumption on those tests? A. That a portion was being cleaned from that gas?

Q. Well, one-sixth of it was being cleaned under those circumstances, was it not? A. Yes.

Q. Well, then, in another one, there are 14 parts per million at the charging floor and there appears 3,000,000 at the outlet. Would that indicate eleven-fourteenths had been caught? A. Was being caught, sir.

Q. Well, then, why would an examination of that sort not be a fair, or a means of ascertaining how far the water curtain was operating efficiently, if those tests were being taken from time to time? A. Because those samples can be taken from behind the existing curtain, like, where the water was coming 65% on the half cone, where the sample is being taken on the other side, the emission was greater.

Q. Oh, I see. It would depend on where the sample was taken? A. Absolutely, sir. In order to sample SO_2 in the cupola, it would have to be done by the Bedeau system, in order to ascertain the swirls caused by the pressure of air coming up thruogh the bed, which must be uneven, as you see chunks of steel and therefore there are little whirlwinds occurring, coming up the chimney, so you have to take the circle of your stack and you start inside and take samples at various distances in order to try

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and get the average from the samples that will come out of the cupola. Then, it will show one part per million, if you happen to get into one of these severe burnings.

Q. But, basically, and properly, if the sample is properly taken, it will in some measure, at any rate, reflect the efficiency of the water curtain? A. Oh, yes, sir.

MR. SLAGHT: Then, I have just a question about the gentleman who testified this morning, Mr. Wilbur Brown, and being shown by my friend some of the exhibits of glass from the greenhouses filed here, having permission to see what he could do in taking off the stains, we saw him use saliva from his mouth and his handkerchief to rub. What do you say as to effect of saliva as a solvent, say, as against just ordinary water? A. Saliva in many cases is a stain remover.

Q. Have you had experience of that? A. Yes, sir, on polished surfaces of steel, very often you get a little stain which you cannot rub off, cannot wash off with any of the ingredients you might have to hand, so if you just use a little saliva—

Q. Human saliva? A. Human saliva, and rub it well, it will disappear.

Q. I see. A. It is the old method of buffing. Before buffing became prevelant in the cutlery industry 16 years ago, the girls used to rub it with their thumb and take away the stains and polish it. That was the practice.

In the Supreme Court of Ontario No. 59 Plaintiff's Evidence John S. Beaumont Cross-Examination 10th May, 1949

CROSS-EXAMINED BY MR. KEOGH:

Q. I understood you told my friend that as a result of certain calculations of area, the areas of the pipes going into this flow nozzle Exhibit 192, and the areas on the nozzle and the area of the cone, that the water curtain would not be complete on the cone as a result of those calculations? A. Correct.

Q. And, in expressing that opinion did you know anything at all about the rate of the water flowing on to the cone through these pipes per minute? A. Well, that is information—only information I can recite, that is the definite information given by the McKinnon's engineer.

Q. Well, I am not asking you for information. I am asking you when you made those calculations and gave that opinion, did you have any personal knowledge of the rate of the water flowing on to the cone in gallons per minute? A. From my judgment, I would say—

Q. I didn't ask you that, now. A. Pardon?

Q. I didn't ask you what was your judgment on the point. I said when you made those calculations and gave that opinion, did you have any personal knowledge of the rate of water flowing on to the cone? A. I had personal knowledge imparted by my

eyesight, that I could see, and that I could judge the amount of water that is flowing fairly accurately. That is the only judgment I could give on that, if that is satisfactory.

Q. And did you rely on your personal judgment from your eyesight, on the rate of water on the cone, in expressing that opinion? A. No. I coupled it with the information given to me by McKinnon's engineer.

Q. What I am trying to get at and I don't want to keep coming back to information given you by McKinnon's when I am not asking you any such questions—

MR. SLAGHT: Now, my lord, my friend is not fair in that statement. He opened the door there and asked him what he relied on.

HIS LORDSHIP: I think the witness can say he based his calculations on a certain flow per minute, whatever that was, but it is no evidence that that was the flow per minute, but on what rate per minute did you base your calculations? A. 200 gallons per minute, sir.

Q. Well, have we anything that tells us what the flow is?

MR. SLAGHT: We have this, that MacAulay told us today that it was not as great as 200 gallons per minute. I suggested to him some one in this case had said 200 gallons per minute, and he said it would not be that great.

HIS LORDSHIP: Well, the witness has said he based his calculation on 200 gallons per minute.

MR. SLAGHT: Well, I am just answering your lordship, that the witness said that is not accurate.

MR. KEOGH: I quite agree that MacAulay said that the capacity of the pumps was 200 gallons per minute, and it would not always be up to capacity, but I just don't understand how your calculation of the flow entered into these comparisons of the areas that you mentioned to my friend, the areas of the two entering pipes being .88 square inches. A. .88.

Q. And the area of the cone being 7.1 square inches, if I took you down correctly? A. You did not take it down correctly.

Q. What was it? A. The area of the water leaving the cone. The water leaves the cone and should leave the cone in a thirty-second of an inch thickness of what is the circumference of the cone area and that 1/32 of 70 inches is 7.1 per square inches.

Q. And that is the area of the solid curtain of water extending all over the cone, is it? A. Yes, correct.

Q. 1/32 of an inch thick? A. No. That drops from the circumference of the cone, not all over the cone; the thickness of the wall.

HIS LORDSHIP: As I understand, the circumference of the cone, in order to maintain a curtain 1/32 of an inch thick, there would have to be an emission of water 7.8 square inches? A. It works out about 6 square inches, because there is a little pressure behind it.

MR. KEOGH: And that area of six square inches is the area of what part of the cone? A. It has nothing to do with the area of the cone. It is the area of the water. It is the area of a wall of water 225 inches long and 1/32 of an inch thick, 32 divides into 225 ——

Q. And how wide? A. An area doesn't have three dimensions; it only has two.

Q. Yes. You are talking about a wall of water 1/32 of an inch thick. A. Talking about an area as a flat surface.

HIS LORDSHIP: Do you just look down at it from above as it leaves the edge of the cone? A. Yes.

Q. Oh, I see. So if you had the cone upside down, you look at this level of water, if the water would flow uphill, which it won't, and it is the area of this rim of water as it leaves the rim of the cone? A. Correct, yes.

Q. And that gives you 7.1 square inches? A. Yes.

MR. KEOGH: Q. And from that conclusion and with that flow, you say that it is insufficient? A. Insufficient, totally.

Q. Now, did you know anything about the pressure of this water, or the head of water as it comes into the flow nozzle, Exhibit 192, when you made these calculations? A. The pressure of the water at the time I viewed the cupola was practically nil.

Q. And you are giving this opinion on there being practically nil pressure of water, are you?

HIS LORDSHIP: No. I understood it was 200 gallons per minute.

MR. KEOGH: No, that is the rate of their flow.

HIS LORDSHIP: Well, does it make any difference? A. Well, there would be a little correction on pressure a minus quantity; then there would be a plus quantity due to gravity on the cone.

Q. Yes, but if 200 gallons comes out per minute, that is the quantity of water? A. It doesn't make any difference what the quantity is that comes out.

Q. Oh, it is the quantity that comes out per minute? A. Correct, sir.

In the Supreme Court of Ontario No. 59 Plaintiff's Evidence John S. Beaumont Cross-Examination 10th May, 1949 Continued

MR. KEOGH: Just a minute now, witness. Doesn't the pressure have some effect on the distance that the spray is whirled out? A. The spray was not swirling out on March 14th.

Q. Do you say there was no whirling motion on —— A. I saw there was no whirling motion on March 14th, which I invited you to come and see, but no one would come with me.

Q. Never mind the invitation. But, anyway, you saw no whirling motion at all on the one you saw on March 14th, 1949. Is that correct? A. There was no whirling motion.

Q. And if there was none, you saw none. Is that what you say? A. Obvious.

Q. And the two pipes in Exhibit 192, there is no doubt about it, they enter, do they, the centre from opposite sides? Is that right? A. Yes, sir. They will not give a whirling motion. It is mechanically impossible, just the two streams meeting.

Q. Now then, when you were making this computation of five-eighths of an inch deviation being serious deviation, and you told my friend that that would leave the apex 1/16 of an inch outside of the diameter of the outlet and so by inference inferring that it would be outside of the arch of the spray, from what part of the apex of the cone did you measure that deviation, or did you calculate that result? A. The cupolas were in operation when I viewed this and saw the deviation and it was impossible to climb on top of the cupola and measure such.

Q. So that your conclusion of a deviation of five-eighths rendered it inefficient because it would put the apex of the cone 1/16 of an inch outside of the orb of the nozzle, so to speak, is based on what you saw that day and not on any calculation? A. It certainly is on the calculation of observation.

HIS LORDSHIP: Well, calculation is purely a mathematical one, is it not? If you have a pipe that is three-quarters of an inch in diameter and the apex of the cone is under the centre of the pipe, then you might have a pipe to one side of five-eighths, then the apex of the cone becomes one-sixteenth of an inch outside the rim of the pipe.

MR. KEOGH: Oh, yes. But that is all you are saying then, on that morning, saying the apex of the cone will be one-sixteenth of an inch outside of the rim of the water flowing in through the pipe, are you? A. Would you mind repeating that?

Q. You are not saying the apex of the cone would be one-sixteenth of an inch outside of the rim of the water? A. No, out of perpendicular of the wall and the orifice in which the water meets.

Q. In the eight-foot cone, do you think the 1/16 of an inch is at all serious, especially in around an apex like this? A. 1/16 of an inch would be approximately 5% incorrect.

Q. Isn't that apex of the cone, in Exhibit 200A, somewhat rounded at the top? A. Yes. The distribution of the water is at a place before the apex of the cone is met, so it doesn't matter.

Q. The water doesn't hit on the apex of that cone at all, on this photograph? A. Very well.

Q. Nearly all the water has gone down from the apex hasn't it? A. It does on that picture, but it didn't the day I observed it. The pressure has been increased on that.

Q. That is what you say? A. I am positive.

Q. Just how far do you go now? On what do you make that statement, that the pressure had been increased when this photograph, Exhibit 200A, was taken? A. I will show you, if you like to hand the photograph here. This "A" you see here, the spray of water flowing to a distance which I would presume about 14 inches down from the cone. On the day of my visit this water was not dropping above four to five inches from the top of that cone, that was the body of water was hitting the cone there. Now, it is hitting it about 14 inches and that tells me definitely that the pressure of the water supplied on the taking of this picture is greater than it was the day we viewed it and it looks like a greater volume of water.

Q. Then, pressure has something to do with it as well as the flow and other matters? A. Not in that sense. When I say pressure, probably I would explain it better by saying the delivery of water is greater.

Q. What you really mean is that there is a greater flow shown in Exhibit 200B than when you saw it on March 14th? Is that what you are suggesting? A. What I mean is there is a greater flow than when I saw it on March 14th.

Q. And then I believe you told my friend that it would be impractical to have with a grit in it in any nozzle system? Is that the statement you made to my friend? A. I did.

MR. SLAGHT: I did not hear—I heard the witness speak about scale. I did not hear any mention of grit. Are you using the words interchangeable?

MR. KEOGH: I am talking of the word grit as indicative of coke dust, anything gritty, in particle form.

HIS LORDSHIP: I take it you mean in a practical way, sediment from the tank? A. Sediment from the tank.

In the Supreme Court of Ontario No. 59 Plaintiff's Evidence John S. Beaumont Cross-Examination 10th May, 1949 Continued

MR. KEOGH: Q. And you are not forgetting that the problem about sediment only arose when the first type of nozzle cone—when there was a water jacket between the two cones? You are not forgetting that? A. I am not forgetting that at all.

Q. And you are not forgetting that the evidence of Jones and of Williams and I believe also of Campbell was that this scale or sediment gradually accumulated around the bottom of the water jacket, making it necessary to flush it out occasionally? A. Sediment will accumulate there, yes.

Q. Scale, I believe, is the word they used? A. I disagree.

Q. Well, isn't scale one of the problems you have in any hot water boiler? A. Scale, yes.

Q. Wherever you have metal with heat on one side and water on the other? A. What kind of scale are you speaking about, Mr. Keogh?

Q. Any kind of scale. A. No, it isn't metallic scale at all. It is calcium scale. Inside a boiler it is mineral scale. It is not metallic scale. Metallic scale only comes in an oxidized atmosphere, or in an atmosphere where oxidization can take place. Scale inside a boiler, taps or hot boilers, is all calcium or mineral scale, like you get in a kettle.

Q. And you would expect whatever you call the kind of scale, that is calcium or mineral or a combination of both, you would expect a certain amount of scale from a water jacket situated between two cones, the bottom of which was a cone right in direct contact with heat and flame coming up the cupola and the top of that cone being covered with water and a water jacket; you would expect scale to form in that situation? A. I would expect no scale to form under such a situation because, in order to deposit scale of a mineral type, you must have evaporation. All these matters are solids that are dissolved in the water until such time as the water is evaporated, then, scales do no deposit.

Q. Well, when you are speaking about grit, or whatever you called it, sediment, or whatever it is in the water system, and that you say made the nozzle system impracticable, where do you suggest that this grit or sediment came from? A. It came from the particles emitted from the cupola, that the water was able to knock down; a portion of the grit and dirt is knocked down by that water.

Q. And that was sediment that the water spray knocked out of the smoke and the fumes of the cupola and then was washed down into the water system into the sediment tank? A. Right.

Q. I believe you made the statement to my friend that if the flow nozzle was 5/8 of an inch off centre, that it would deliver 25% of the water to one side of the cone and 75% to the other. Have you made any calculation to support that, or is that your opinion? A. That is my opinion from observation of the actual piece of apparatus in operation.

Q. I see. Thank you.

HIS LORDSHIP: Mr. Beaumont, what do you say as to whether the fumes that would be given off, if there was no control system on these cupolas, could be controlled so as not to be offensive, so that they would not be offensive to anyone living in the surrounding territory? That is, is it possible to put a control on that would be effective? A. I think it is possible to put a control on that would be 85 to 90% effective. We know that data already.

Q. You mean that anything that was emitted would be of a very minor character? A. Would be of a very minor character and not likely ——

Q. To do damage? A. To do damage. The concentrations would be so small, that it would be negligible.

Q. I am not suggesting the present system is not effective to accomplish that, but you say if it is not, that could be done? A. Yes, sir.

Q. There is a complaint about oil fumes coming from the forge shops. You saw the forge shops? A. Yes, sir.

Q. And that they emit or deposit in the area an iron oxide that is given off, forming a substance that is injurious. Whether that be true or not, what do you say as to whether there can be any control system put on the forge houses that would reduce that, too, so that there will be no danger or injury from it? A. They could be greatly reduced. I don't know of any system that completely reduces it at the present time, but it could be greatly reduced by the pre-heating of the oil before combustion, making it more easy to burn.

Q. Is that being done? A. It is being forced to be done at the present time, for one reason ——

Q. Well, I am not asking that, I am asking if it is being done. A. It has not been done with that object in view, but it is being done from another objective.

Q. Well, all I am asking is, is it being done in the Ford plants, to your knowledge, or have you any knowledge of it? A. I have knowledge that this is being done.

In the Supreme Court of Ontario No. 59 Plaintiff's Evidence John S. Beaumont Cross-Examination 10th May, 1949 Continued

Q. Personal knowledge? A. Yes, sir. I have installed some of them; it is being done and it does reduce the gases and the soot from those oil furnaces. Now, in doing that, we had not that intention in mind. We were working on a different experiment. This oil had not been atomized and it was there in little blobs of oil on the steel and, when the steel got in the machine shop, it broke the points of the tools, because those little globlets of oil carbonized the steel and hardened it in those spots, and so, to do away with that, we had to devise in the Dominion Forge and Stamp Company, methods for heating in order to make it more easily volatilized, so that those globules would not go on that steel. Now, that system has accomplished the purpose you asked about.

Q. And you say that would reduce the amount of gaseous fumes or oily gas that is given off from those furnaces? A. considerably, sir.

Q. There is no system of control like there is in a cupola, for instance, in installing it to protect against that sort of thing? A. There are systems installed by Lees and Netherope that control the amount of fuel and steam that is supplied to the burner so that no workman can go and turn the burner and over-supply the oil and create a dust forming on the stack at that time and the mixture is definitely stopped and controlled by another instrument.

Q. But there is no system of controlling it after it goes out? A. Not after the combustion is made.

Q. All right, thanks. Any other witness?

MR. SLAGHT: That is the reply, my lord. I guess that is the end of the evidence.

HIS LORDSHIP: Well, it is late in the afternoon. What do you say, Mr. Keogh, about a view now? Of course, we have got to remember the purposes of a view. The purposes of a view are not for the Judge to gather evidence that has not been given in the witness box; it is so that he may understand that evidence better.

MR. KEOGH: I am afraid the cupolas either have been shut down or will be shut down within the next few minutes and you would not be able to see them in operation.

HIS LORDSHIP: What would I gain by seeing those cupolas in operation? I must depend on the description that has been given to me of what they are like and what they do. I cannot go and see for myself, because another Court would not have what I saw and I must depend on the record.

MR. KEOGH: Well, it is entirely up to your lordship. I thought it might help you to understand the evidence. I checked with Mr. MacAulay a day or two ago and he told me, I thought, that they started shutting them down between 3.30 and 4.30.

HIS LORDSHIP: I think if I see the physical plant— I think it is better, as a matter of fact, that I should not see that which has been described by witnesses as to the operation of the plant. I think if I saw the physical plant and the lay-out and know what they have been describing, that would be helpful, and I think we can go now and we can probably see the plant and have a look at Walker's plant, as to his typical lay-out. There again, it is not proper that I should consider anything as evidence except the benefit that I get from seeing what they have been describing so that I may better understand the evidence.

MR. SLAGHT: I think that could all be done in that limited inspection.

MR. SLAGHT: That could all be done, I think, in an hour and a half, my lord.

HIS LORDSHIP: Well, we will go now. Then Court will adjourn until Monday morning at 10.30 at Osgoode Hall, Toronto.

—Whereupon the proceedings were adjourned till 10.00 a.m., Monday, May 16th, 1949, at Osgoode Hall, Toronto.

Monday, May 16th, 1949, Osgoode Hall, Toronto.

—Argument proceeded with and continued Monday, Tuesday and Wednesday, at the conclusion of which:

HIS LORDSHIP: Well, I want to thank counsel for the very thorough preparation and presentation of this case. It has been done with great ability on both sides, and I am indebted to counsel for it. I shall have to take some time to deliver my judgment.

—Whereupon Court adjourned.

Certified,

F. CLITHEROE,
Official Reporter, S.C.O.

JUDGMENTS AND REASONS

In the Supreme Court of Ontario

In the Supreme Court of Ontario No. 60 Formal Judgment at [redacted] trial 15th June, 1949

THE HONOURABLE MR. JUSTICE MCRUER | Wednesday, the Fifteenth day of June, A.D. 1949.

BETWEEN:

WILLIAM WALLACE WALKER

Plaintiff;

—AND—

THE McKINNON INDUSTRIES LIMITED,

Defendant.

This action coming on for trial on the 11th, 12th, 13th, 14th, 25th, 26th, 27th, 28th days of April, and the 2nd, 3rd, 4th, 5th, 6th, 9th and 10th, 16th and 17th days of May, 1949, before this Court at the Sittings holden at St. Catharines, Ontario, for the trial of actions without a jury in the presence of Counsel for all parties, upon hearing read the pleadings and the evidence adduced and what was alleged by Counsel aforesaid, this Court was pleased to direct this action to stand over for judgment and the same coming on this day for judgment;

1. THIS COURT DOTH ORDER AND ADJUDGE that the Defendant, its servants and agents, be perpetually restrained from discharging or allowing to be discharged from its works in the pleadings mentioned into the air any substance, gas or matter, so as to occasion damage to the Plaintiff as the owner or occupier of the property described as follows:-

Part of Lot 21, in the 4th Concession of the Township of Grantham, in the County of Lincoln and known as part of Lot 7, the whole of Lot 8 and Part of Lot 9, shown on a map or plan of that portion of the said Lot filed by Edwin C. Graves in the Registry Office for the County of Lincoln on the 4th day of August, 1902 as number 78, and which may be more particularly described as follows:

Firstly — Being a part of Lot 7 on said Plan, commencing at a point on Carlton Street distant 12 feet from where the easterly boundary of Lot 6 meets Carlton Street; Thence northerly parellel with the easterly boundary of said Lot 6 to the rear of Lot 7 to the westerly boundary of Lot 8; Thence along the westerly boundary of Lot 8 to Carlton Street; Thence westerly along the northerly boundary of Carlton Street, 70 feet more or less to the place of beginning.

Lot 8 and part of Lot 9 — Commencing at a point on the northerly side of Carlton Street where the boundary line between Lots 8 and 9 meets Carlton Street; Thence easterly along Carlton Street 2 feet; Thence northerly parellel with

In the Supreme Court of Ontario No. 60 Formal Judgment at trial 15th June, 1949 Continued

the easterly boundary of Lot 8 to the rear of Lot 9; Thence westerly along the rear of said Lot 9 to the easterly boundary of Lot 8; Thence along the easterly boundary of Lot 8 to Carlton Street to the place of beginning.

Secondly — Being part of Lot 21 in Concession 4: Commencing at a point in the rear of Lot 7, distant 12 feet from the easterly boundary of Lot 6; Thence northerly 115 feet to a point; Thence in an easterly direction 108 feet to a point; Thence southerly 115 feet to a point; Thence westerly 108 feet to the place of beginning.

Thirdly — Being composed of Lots Numbers 20, 21 and 22 as shown on registered Plan Number 95 of Ontario Gardens, being a subdivision of part of Lot 21 in the 4th Concession of the Township of Grantham, and of a re-subdivision of Lots Numbers 15 and 16 of the Graves Plot, said Lots fronting on the easterly side of Manchester Avenue.

or so as to occasion damage to the said property including the plants, shrubs and flowers in, on or upon the said lands belonging to the plaintiff until further order of the Court, PROVIDED, however, that the operation of the said injunction be suspended until the 1st day of November, 1949.

2. AND THIS COURT DOTH FURTHER ORDER AND ADJUDGE that it be referred to His Honour the County Judge of the County Court of the County of Lincoln to inquire and assess the amount of damages the Plaintiff has sustained during the years 1945, 1946, 1947, 1948 and 1949 and down to the date the said injunction comes into operation, PROVIDED that in assessing the said damage the said County Court Judge will not take into consideration any claim for damage sustained by reason of vibration nor for invisible injury to plants as distinguished from acute or chronic injury.

3. AND THIS COURT DOTH FURTHER ORDER AND ADJUDGE that the Defendant The McKinnon Industries Limited do pay to the Plaintiff the amount of the Plaintiff's damage found as aforesaid by the said County Court Judge forthwith after confirmation of the County Court Judge's report.

4. AND THIS COURT DOTH FURTHER ORDER AND ADJUDGE that the Defendant The McKinnon Industries Limited do pay to the Plaintiff the costs of this action including the costs of said reference forthwith after taxation thereof.

JUDGMENT settled this 24th day of June, 1949.

"Chas. W. Smyth"
Registrar, S.C.O.

"R.M.S."

JUDGMENT signed this 15th day of July, 1949.

"Rose Marie Shrive"
Deputy Local Registrar, S.C.O.

In the Supreme Court of Ontario

ST. CATHARINES NON-JURY

In the Supreme Court of Ontario No. 61 Reasons for Judgment of the Honourable Mr. Justice McRuer 15th June, 1949

H.C.J.

WILLIAM WALLACE WALKER

v.

THE MCKINNON INDUSTRIES LIMITED

Copy of Reasons for Judgment of McRuer, C.J.H.C., delivered 15th June, 1949.

A. G. SLAGHT, K.C., R. I. FERGUSON, K.C., and R. K. ROSS, K.C., for the plaintiff.

J. L. G. KEOGH, K.C., and J. L. POND, for the defendant.

MCRUER, C.J.H.C.:- This action is brought by the plaintiff, who carries on the business of growing flowers for sale, against the defendant, a company engaged in the manufacture of steel and iron products. Damages are claimed for injuries alleged to be suffered by the plaintiff by reason of the emission of smoke, noxious fumes, vapours and gases from the defendant's works, and an injunction is asked.

The plaintiff's property is between Carlton Street and Manchester Avenue in the City of St. Catharines. The noxious fumes complained of are said to be emitted from four cupolas situated about 600 feet in a southwesterly direction from the plaintiff's property, and a forge shop and foundry situated about 400 feet in a more westerly direction.

The plaintiff purchased and took possession of his property in 1904 and built his first greenhouse in 1905 and since that time has carried on his business, enlarging his greenhouse space from time to time.

The property now owned and occupied by the defendant was previously owned and occupied by predecessor corporations, the history of which for the purpose of this action it is unnecessary to detail. It is sufficient to say that from 1925 until the present time it has carried on its works at the present location. Up until the year 1938 the plaintiff had no cause to complain about the manner in which the defendant or its predecessors in title had carried on their business. In 1936 the defendant built the present forge shop and in 1937 enlarged its foundry, when the process of smelting iron was changed from two air-flow furnaces to three cupolas between 50 and 60 feet in height; two were built in 1937, the third in 1938, and in 1947 a fourth was added so that there might be an alternate to enable the defendant to operate three at a time when one was requiring repairs. The evidence is that only three operate at one time. The cupolas are fired by coke with combustion accelerated by a forced up-draft of 8700 cubic feet per minute. The amount of coke consumed during the years under review ranged from approximately 6800 to 9100 tons annually. The amount of metal including pig iron and scrap iron charged

into the cupolas ranged from 36,000 tons to approximately 50,000 tons. An average of about 3700 gallons a day of bunker C oil is consumed in the forge shop and large quantities of fuel oil are likewise consumed in the foundry.

The plaintiff's claim may be considered in four aspects — (1) gaseous fumes accompanied by soot, fly ash and iron oxide are driven off in the operation of the cupolas which, in combination with oil fumes from the foundry and forge shop, drift across the plaintiff's property when the wind is in a southwesterly direction and settle on the glass of his greenhouses, forming a tenacious coating interfering with the passage of light rays through the glass with a detrimental effect on the growth and development of the plants. (2) the combination of fumes and organic substances causes a similar coating to form on the foliage of the plants, affecting their growth and salability; (3) the fumes contain sulphur dioxide (which I shall hereafter refer to as SO2) in such quantities that the growth of the plants is affected and on several occasions the vegetation on the plaintiff's property has been subjected to what is known as SO2 blight; (4) the operation of the hammers, and particularly the five-thousand-pound hammer in the forge shop, causes such vibration as to detrimentally affect the growth of orchids in which the plaintiff has specialized for many years and has to some extent caused cracking of glass, and injury to the plaster in a house situated on the plaintiff's property.

Any one of these complaints, if established in evidence, would be sufficient to grand relief providing material injury to the plaintiff's property has been shown. They are in a sense co-related but they are in no sense interdependent.

Up until the new cupolas were installed the plaintiff says his flowers were healthy and that while there was some small annoyance from smoke there was nothing that would not brush off without difficulty. His evidence is, and I accept it, that after the cupolas went into full production and the defendant started to use the fuel oil and bunker oil in the foundry, the forge shop and foundry fumes, together with organic substances from the cupolas, came over his property and he noticed his plants were not showing the same growth. In 1940 the trouble appeared to abate somewhat but in 1941 it got worse.

The evidence shows that the predominant wind in this area is from the southwest. The following is the record given by a representative of the meteorological department of the Dominion government resident in the area:

The wind blew from the southwest,

in 1946 — 174 days
in 1947 — 182 days
in 1948 — 192 days.

On November 24th, 1941, the plaintiff wrote a letter to the defendant (Exhibit No. 5) which he commenced with the words "With regards to smoke-oil smudge and refuse from your plant causing damage to our production at the greenhouses," and referring to a conversation of ten days before, he stated: "We thank you for the prompt attention in sending your Engineer Mr. Edwards over, but to date we have not heard either from him or yourself. He will recall the condition of some of the stock in our greenhouses. On inspection this week we find that we are again filled up with coke-breeze, and other dirt, and must ask that immediate attention be given to remedy this." He stated that through this nuisance he had lost over sixty per cent. production in the upper house which should be added to the loss outside and diminished production throughout the greenhouses. He concluded:— "But we will take this loss up direct with you after the remedy has been found. In the meantime this loss keeps piling up. Your urgent attention is requested." To this letter the defendant replied on November 26th (Exhibit No. 6), stating as follows:—

"Since you spoke to the writer concerning it, the matter has been having our best attention. You will appreciate that it is essential that we first determine whether or not the damage of which you complain is actually the result of our operations.

"We will require probably an additional week or ten days within which to complete our preliminary investigation and you may be assured that, as soon as this has been done, we will be in communication with you."

On January 6th, 1942, the plaintiff wrote again to defendant (Exhibit No. 7) giving an itemized statement of losses said to have been sustained "Through smoke oil smudge and coke nuisance" coming from the defendant's plant. This was said to amount to $1,228.50 for the past year. The letter concludes:—

"Undoubtedly this does not cover all, and we are not sure to what extent this has been remedied by yourselves as shortly we will have to open vents to air flowers. It is when this is done that a great deal of the damage occurs with the coke breeze etc. coming right down on the flowers."

Following this, two written agreements were entered into, both dated the 2nd January, 1942, (Exhibits Nos. 8 and 9). Both of these documents provide that in executing them the defendant is not to be taken as admitting any liability and they are no evidence of an admission of liability. They were admitted in evidence in view of the fact that the defendant had pleaded prescriptive right and acquiescence and they are evidence to show that the plaintiff had not acquiesced in the emission of fumes of this character over his property as pleaded in the statement of defence. On the other hand, they are also evidence that the plaintiff was vigorously pressing his claim for redress. The agreements con-

sisted of a release by the plaintiff, in consideration of the sum of Twelve Hundred and Twenty-five Dollars, of all claims against the defendant for injuries sustained by reason of any cause or matter or thing whatsoever existing up to the date of the agreement "and without limiting the generality of the foregoing, particularly by reason of the emission from and discharge over, along and upon any of the premises and/or property of the said William Wallace Walker of any smoke, oil smudge, ash, gasses and other substances whatsoever and/or by reason of any nuisance or alleged nuisance to the said William Wallace Walker his lands, premises, chattels and effects occasioned or claimed to have been occasioned by the operations of the said The McKinnon Industries Limited"; and an agreement to pay the sum of Six Hundred Dollars for an easement for the years 1942, 1943 and 1944, "to emit and discharge over, along and upon the lands hereinafter described, smoke of whatsoever nature and kind and the constituent parts and ingredients thereof, oil smudge, gasses, ash, vapors, and noxious fumes, without any let or hindrance whatsoever and to do and create over, along and upon the said lands and premises for the purposes of the manufacturing operations of the said McKinnon, such other acts which but for the existence of this agreement might be deemed to constitute a nuisance thereon in respect of the occupation and use thereof."

The term of the license granted under the latter agreement having expired on December 31st, 1944, Mr. Schiller, the plaintiff's solicitor, after a meeting with Mr. Cook, the general manager of the defendant, wrote to the defendant on September 7th, 1945, advising that the plaintiff intended to issue a writ for damages and an injunction. The letter goes on:—

". . . We could not effectively claim an injunction during the war period, but now that the war is over there is no reason why we could not get an injunction.

"We regret the fact very much, and this letter is written for that purpose, that although we have co-operated to every extent with you, you did not co-operate in the last week when it was arranged that your Mr. Cook and your counsel would meet either at our office or at your office to inspect some photographs we have showing the damage done, in fact we had no word from your office whatever."

No action having been taken by the defendant following this letter, this action was commenced on March 19th, 1946.

It is convenient to deal with the evidence with as much regard for chronology as is possible in the circumstances. Lawrence Edwards, a mechanical engineer in the employ of the defendant from February, 1941, to May, 1944, stated that he visited the

plaintiff's greenhouses at the request of the defendant in October, 1941. He found the plaintiff's plants covered with an accumulation of dust and dirt. A number of the orchid leaves were brown and the white chrysanthemums had a greyish tinge. He cut a bloom and shook it on a sheet of white paper and it gave off an accumulation of dust. He reported his findings to the defendant and was told to investigate the possibilities of eliminating or reducing the difficulties. At this time there was no form of smoke or fume control on the cupolas. Mr. Edwards recommended a type of arrester manufactured by the Whiting Corporation but this was considered too expensive. He made further inquiries and recommended the installation of a chain curtain control which had the effect of causing a portion of the solids given off from the cupolas to be deposited near the opening but had no effect on the gaseous fumes emitted. These chain curtains were installed early in the year 1942. Following their installation there was more accumulation on the roof of the foundry and Mr. Edwards went to the plaintiff's greenhouse and found that he was getting less dust and dirt. In 1942 he collected samples of the leaves of plants in the greenhouse. These he says were sent away for analysis but we have no information as to the result of the analysis. The witness said he visited the plaintiff's greenhouses from time to time thereafter and he estimated that the chain curtains reduced the trouble by about twenty per cent. He says he found the glass of the greenhouses covered with a substance having a coppery tinge. In April, 1945, the chain curtain control was replaced by a water curtain control consisting of a double metal cone built into the mouth of the cupola around which a water curtain was created by water emitted under pressure from a series of flow nozzles placed around the circumference of the base of the cone. The purpose of a water curtain is to arrest the solids and much of the gases given off by the combustion in the cupola and return them to a settling tank where they are disposed of. In this case the water from the settling tank was re-used in the system together with fresh water introduced into the circuit. It was found that the small holes in the flow nozzles became stopped by sediment with the result that maintenance was difficult and if they were not kept open the efficiency of the water curtain was greatly impaired.

On the new cupola completed in March, 1947, the type of control now in operation was installed. At the same time No. 1 cupola was converted to this type of control and No. 2 was likewise converted in December, 1947, and No. 3 in February, 1948. The control consists of a single steel cone installed in the top of the cupola with the apex upwards, over which is discharged from a flow nozzle, one and one-eighth of an inch in diameter situated six inches above the apex, a flow of water. This flow nozzle is fed by

pipes three-quarters of an inch in diameter entering in from opposite sides but not directly opposite, so as to give the water in the flow nozzle a swirling motion. The theory is that the water should flow evenly over the cone and form a curtain at the base one-thirty-second of an inch thick through which all discharge from the cupolas must pass. The evidence showed that the flow nozzle was off centre five-eighths of an inch; that is, that the centre of the flow nozzle was not directly over the centre of the apex of the cone. Mr. Beaumont, an experienced engineer called for the plaintiff, with whose evidence I will deal later, stated that the effect of this would be to give an uneven distribution of water over the cone with the result that the continuity of the water curtain would be destroyed. The evidence of witnesses called for the defence does not agree with this and I do not think it is any part of my task to deal with it at any length. This action is not founded on negligence, but is based on nuisance. The evidence, nevertheless, has some bearing on the final disposition of the case. I prefer to accept Mr. Beaumont's evidence as to what he saw when he inspected the cone and his opinion as to the scientific result. There is no doubt in my mind that the water curtain does not operate so as to give the uniform protection that is intended. This view is fully confirmed by a study of exhibits 121, 122, 123 and 124, which I shall later discuss, together with exhibits 118 and 119.

I now deal with the evidence adduced to show that the plaintiff has suffered damage by reason of noxious fumes and organic matter emitted from the defendant's works and carried over his property by southwesterly winds. I prefer to deal first with the allegation that the plaintiff's property is materially injured by the deposit of foreign substances on the glass of the greenhouses impairing their efficiency for the purpose for which they were installed, with the result that the plaintiff's business is detrimentally affected.

The evidence clearly shows that for eight months of the year the efficient operation of a greenhouse requires all the sunlight that is available in this climate. During the four months commencing about the middle of May and ending the middle of September it is necessary to cut down the strength of the sun's rays by putting a coating of lime on the glass.

The plaintiff has adduced convincing evidence, that during the period under review when the wind is in the southwesterly direction, and particularly when the humidity is high and the wind light, dense smoke and fumes from the cupolas, the foundry and the forge shop drift over his property with the result that an oily film forms on the glass which catches the organic substances which congeal and form a slightly amber coating. Four sections of glass were filed as exhibits, Nos. 100 and 101 taken from No. 7

greenhouse, and Nos. 58 and 99 taken from what is known as the cloth house which is adjacent to No. 7 greenhouse. A mere examination of these exhibits, which are stated to be typical, shows the general character of the film to which I have referred. The witness McAlpine, in whose evidence I have confidence, made different analyses of the deposit on the glass of the greenhouses. The results of one made on November 18th, 1947, are shown in Exhibit No. 43 and of one made on March 31st, 1949, in Exhibit No. 45. While they vary slightly the variation is not material. The following is the result of the analysis made on March 31st, 1949:—

"(Ether soluble)	0.5%
Magnesium as carbonate	1.9%
Calcium as carbonate	6.7%
Iron as iron oxide	45.4%
Ash insoluble in acid	16.9%
Loss on ignition	27.8%
Manganese	0.2%
Sulphur as sulphuric acid	2.3%

Each analysis showed approximately forty-five per cent. iron oxide present. The evidence is that iron oxide that has formed on the scrap iron which is charged into the cupolas is all driven off by the force of the draft and that which is not caught in the water curtain passes into the atmosphere. Mr. McAlpine produced several vials containing samples of the deposit on the glass when removed with distilled water and absorbent cotton. He says the deposit adhered tenaciously to the glass and was only removed with difficulty. These appear to have some of the characteristics of tar. Exhibit No. 44 taken on October 30, 1947, is an example and is said to have a strong smell of crude oil. The witness made magnetic tests from the scrapings from the glass and always found the presence of iron. His evidence is that a deposit of this character would not come from a soft coal furnace. The whole of the evidence satisfied me that that view is correct. Exhibits Nos. 59 and 99 taken from the cloth house must not be confused with the glass of No. 7 greenhouse or the other greenhouses. The cloth house is to the east of No. 7 greenhouse and the roof is about 7 feet high whereas the greenhouse is 19 feet at the peak and the pitch is much steeper. Part of the roof of the cloth house is open during the growing season when it is used. Over this area cloth is suspended during a certain part of the year. The reason that the deposit is much thicker on the glass of the cloth house is, I believe, due to two causes: the roof is flatter and is in the lee of the higher greenhouse. This building forms only a small portion of the plaintiff's plant. Mr. McAlpine, by means of a light-meter, frequently measured the obstructions to the sun's rays caused by the deposit on the glass of the greenhouses and found by com-

parison with readings made in the open that the rays were cut down sixty-five to eighty-five per cent.; the rays passing through clean glass would be cut down from twenty to twenty-five per cent.

John Burgener, a physicist and now practising as a spectroscopist, examined the samples of glass filed, with a view to ascertaining to what extent the various rays of the sun failed to pass through the glass and were absorbed by the deposit. His examination consisted of a scientific measurement of the light rays passing through a clean area of the respective exhibits as compared with an area of the exhibit before it was cleaned. The following shows the extent to which the respective rays were absorbed:—

Exhibit No. 100 taken from No. 7 greenhouse (east side):

red	30%	green	52%
orange	30%	blue	52%
yellow	45%	violet	63%

Exhibit No. 101 taken from No. 7 greenhouse (west side):

red	25%	green	33%
orange	35%	blue	50%
yellow	35%	violet	57%

Exhibit No. 99 taken from the cloth house:

red	84%	green	80%
orange	76%	blue	83%
yellow	78%	violet	92%

The evidence is that all the sun's rays are important to plant life and particularly the violet rays.

In addition to the examination of the glass, on March 19, 1949, Mr. McAlpine collected a great many samples of fresh snow with deposits thereon, which he melted and passed through filter paper for the purpose of ascertaining the character of the deposit on the snow. Exhibit No. 59 was taken from the plaintiff's property just to the west of No. 2 greenhouse. The contents of the filter paper were largely iron. The records show that the wind on March 18th and 19th was from the north and the west. Exhibit No. 61 is a chart showing the locations from which the various samples were taken. All the samples taken to windward of the cupolas were non-magnetic while those in the immediate lee were magnetic. As the locations recede from the cupolas the samples were found to be non-magnetic. Mr. McAlpine's evidence is that these deposits would not be given off by an ordinary soft coal furnace.

Another test was made and the results produced in evidence on behalf of the plaintiff. By means of an attachment to a vacuum cleaner placed on the roof of the plaintiff's plant air was drawn through a white porous material. Exhibit No. 62 is a file containing samples of the material following tests made on Novem-

ber 26th and December 13th, 1948, together with two tests on October 1st, 1948, taken when the defendant's plant was shut down. These show a very heavy black deposit when the defendant's plant was in operation and a very light one when it was not. Exhibits Nos. 64, 65 and 66 are the results of tests made on other dates in 1948 when the defendant's plant was in operation. All show very heavy deposits of some black substance. Exhibit No. 63 is a sample similarly taken by Mr. McAlpine at the clover leaf at Port Credit, which shows very little deposit of any kind. The importance of these exhibits is that they indicate that during the period when the defendant's plant was closed the foreign organic material in the air appeared to be inconsequential.

In addition to this scientific evidence there is abundance of reliable evidence given by witnesses without scientific training as to the heavy fumes and smoke issuing from the defendant's cupolas, foundry and forge shop, which when the wind is in the southwest pass over the plaintiff's property. Leslie Dwyer, an independent witness, said that on some days "it was a smoke screen; it comes down as a haze; you can taste the smoke sometimes."

An attempt was made to meet this evidence by showing the results of a dust-meter set up on the south side of Carlton Street and operated under the directions of the witness Dr. Katz in conjunction with a wind recorder installed under his direction, together with a dust-meter set up near Dunn's greenhouse, about one and three-quarters miles away. For reasons that will become apparent when I come to deal with Dr. Katz's evidence on another branch of the case, I do not accept his evidence as in any sense meeting the case made out by the plaintiff that the organic matter, which gives rise to the plaintiff's complaint on this branch of the case, emanated from the defendant's works. There was also some evidence that some smoke from a soft coal furnace came from the plaintiff's own plant. It is to be observed that the plaintiff's boiler and stack are situated on his property in such a location that the predominant winds from the southwest would carry the smoke away from his greenhouses and it is only when the wind might be coming directly from the south that the deposit would come over No. 7 greenhouse. It may well be, and likely is, that there is some degree of smoke and soot passing over the plaintiff's property from other sources but I find as a fact that the real difficulty arises from the fumes and smoke emanating from the defendant's works and is contributed to in an inconsequential manner by others. The trouble was not present before the cupolas and the new foundry and forge shop were put into operation and it was not present while the defendant's works were closed due to a strike which lasted from July 15th to November 2nd, 1948.

Many witnesses agreed that soot is not pure carbon; that it contains varying amounts of tar and that this tar adheres so tenaciously to everything that it is not even removed by rain and is, in short, a kind of varnish. This condition is particularly aggravated by the character of the deposit in this case which contains a very high percentage of iron oxide (much higher than in soot from ordinary soft coal) and is combined with oil fumes from the forge shop. The evidence is that the plaintiff has had great difficulty in washing the roof of the greenhouse and that he must use muriatic acid to remove the lime that is put on for the summer months, whereas he could formerly do so with a brush. I find as a fact that the deposit on the glass of the plaintiff's greenhouses is a material injury to his property, impairing their usefulness for the purpose for which they were constructed.

The effect of a deposit of the character which I have just discussed on plants as distinguished from the effect of the emission of SO2 gas from the cupolas with which I will deal later, can be disposed of with little elaboration on what I have already said. The same oily substance that adheres to the glass entered the greenhouses through the ventilators and settled on the leaves and flowers of the plants. For the purpose of demonstration two orchid leaves were filed as an exhibit. The upper part of these leaves which had not been wiped clean, for the purpose of showing the contrast, was covered with a tenacious dark film. The evidence is that the film will not wash off with water sprayed over the plants and that it injures the blooms. The plaintiff stated that all the plants in season had to be washed, some two or three times, before sale. Mr. McAlpine said that he examined the plants in the greenhouses and found them coated with an oily substance. Mr. Tienken, a chemist and an experienced grower of orchids, made an analysis of the deposit on the leaves of the plants as well as the deposit on the roofs of the greenhouses. The result is shown in Exhibit No. 73. It compares closely with the analysis made by Mr. McAlpine to which I have referred. The sample taken from the plants showed 43.97 per cent iron oxide and that from the greenhouse 44.52 per cent. Both samples showed the presence of sulphuric acid, the sample from the plants 1.63 per cent. and that from the greenhouse 1.37 per cent. The evidence shows that a deposit of this character prevents the rays of sunlight getting to the stomata, interfering with photosynthesis. Photosynthesis may be described in laymen's language as the digestive process of the plant. It is the process by which the water from the roots and the carbon dioxide from the air, coming in contact with the sun's rays, are converted into starches and sugars which are vital to plant life. The evidence satisfies me and I find as a fact that the foreign matter described by the various witnesses, which is deposited on the plants, is a material detriment to growth and particularly to those plants that are grown in the greenhouses. The extent of this

detriment is hard to measure disassociated from the evidence that the deposit of the film of oil and organic matter was accompanied by fumigations of SO2 in varying concentrations.

The case was most strongly contested on the ground that there were no concentrations of SO2 for a duration sufficient to do injury to plant life on the plaintiff's property. Many witnesses were called on both sides whose evidence deals with this phase of the case, and I feel sure that every possible effort has been put forth by the defendant to meet the evidence adduced by the plaintiff to show that vegetation in the area and on the plaintiff's propery was injuriously affected by SO2 gas emanating from the defendant's works.

As the evidence is very conflicting, I will deal with it in detail and for the benefit of any other Court indicate as clearly as I can the evidence that I consider reliable and that which I do not.

That SO2 gas is given off by the cupolas cannot be questioned. On July 5th, 1945, R. H. Williams, assistant chief metallurgist of the defendant, made an analysis of the cupolas gases before and after the wash. In view of an analysis that was made later, I doubt the accuracy of this analysis, particularly with reference to the concentrations before the wash. The samples were not taken contemporaneously, and the analysis has little value. Another analysis was made on samples taken on the 3rd, 4th, and 8th of August. Here again, the samples were not taken contemporaneously and the results are likewise of little value. No further tests of the cupola fumes were made until March, 1949, when Mr. Gaukroger, the chief metallurgist of the defendant, took samples and made an analysis, the record of which was destroyed. Mr. Gaukroger's explanation is that the samples were not taken contemporaneously and he thought for his purposes they were of no value. On the 18th and 19th of April during the progress of the trial, samples were taken again at each of the cupolas, the results of which are shown in Exhibits Nos. 121, 122 and 123. There is no satisfactory explanation why the results should vary so widely; for example, Exhibit No. 122 shows six samples taken at different times between 11.10 a.m. and 2.35 p.m. The first sample showed thirteen parts per million at the charging floor and two ppm. emitted into the atmosphere above the water curtain, while the third sample showed six ppm. at the charging floor while five ppm. were emitted into the air above water curtain; the last sample showed eight ppm. at the charging floor and nothing emitted into the air above the water curtain. It would appear that in one case five-sixths of the gas was passing through the water curtain, while in another case no part of the gas passed through the water curtain. One of the samples taken at the cylinder iron cupola, which is referred to in Exhibit No. 121, shows twenty-four ppm. at the charging floor and nine ppm. emitted above the water curtain. These exhibits show that considerable quantities of SO2

gas are given off in the cupolas and pass through the water curtain, depending on its efficiency.

All witnesses agree that there are at least two types of injury to plant life that has been subject to fumigation by SO2 gas; acute injury and chronic injury. Some authorities consider that there is a third, known as invisible injury. This is disputed and for the purposes of this case it may be left out of consideration. Even if such injury did exist I would have grave doubts if it alone would on the authority of the judgment of Sir George Jessel in *Salvin* v. *North Brancepeth Coal Company*, 9 Ch. App. 705, give rise to a cause of action. I think on the evidence the progress of invisible injury would be so slow as to make proof of damage extremely difficult.

Acute injury is that caused by a fumigation of the gas in such concentration and duration as would cause markings on the foliage which are visible to the eye. Chronic injury is that caused by plants being repeatedly subjected to low concentrations of the gas with the result that growth and development are retarded and in cases their flowering interfered with. That chronic injury can be serious is not forcibly contested and little or no evidence was adduced by the defence which dealt with this aspect of the case. The evidence offered by the defence was directed almost exclusively to showing that vegetation in the area suffered no acute SO2 injury.

I think this branch of the case can best be approached by considering first the evidence given by witnesses as to their personal observations and to deal with the evidence of mechanical tests which cannot be disassociated from those under whose direction they were conducted.

The plaintiff said that he used a plot in front of his greenhouse for growing bulbs. These started to deteriorate after the cupolas were built and in 1945 daffodils and tulips had imperfect blooms. He says that for twenty years he had success with pansies in the area east of No. 4 greenhouse but after the cupolas were installed these had to be discontinued. He also was obliged to discontinue Jerusalem cherries, carnations and delphiniums. He rented a plot of farm land one mile north in which the same stock as that which failed in his greenhouse grew well. His evidence is that he had the soil at the greenhouse regularly tested and no conclusion can be drawn that the plants there did not have an equal chance with those grown at the farm.

As I have stated, the defendant's plant was closed in 1948 from July 15th to November 2nd on account of a strike. During this period the flowers in and around the plaintiff's greenhouses thrived as they had not done for some years previous. Carnations which had failed to develop satisfactorily in previous years developed earlier and better than those at the farm. He says that from sweet peas and chrysanthemums he realized, at approxi-

mately the same prices, Five Hundred Dollars more than he had realized in the previous year. Evidence was given that in November, 1947, a chrysanthemum known as "Detroit News" which is naturally bronze, came out an insipid yellow. This is said to be due to chronic SO2 injury. The evidence of the plaintiff as to the deterioration of his flowers and plants is corroborated by several witnesses, particularly John Walker, a son of the plaintiff, and Messrs. Tienken, Armour and Gautby. Mr. Armour and Mr. Gautby are florists with many years experience. Both gave detailed evidence of the injury to the plants they observed. Mr. Gautby visited the plaintiff's greenhouses from time to time in 1946, 1947 and 1948. He saw the plants in an unhealthy condition, suffering from what he described as some outside influence. He saw no evidence of disease. He gave evidence as to the improvement of the plants during the time the defendant's plant was closed due to the strike.

The chief witness called by the plaintiff on the subject of SO2 injury was Tennyson Jarvis, a plant pathologist of very long and wide practical experience in the field of SO2 injury to plant life, including fourteen years with the International Nickel Company in charge of the investigation of fume damage and the settlement of claims. He is a witness in whose evidence I have great confidence, both as to statement of fact, and his scientific opinion. His demeanour in the witness box and manner of giving evidence convinced me that he was a man of integrity and one who gave scientific opinions only after most careful consideration.

Mr. Jarvis was consulted first on August 22, 1946, when the plaintiff complained of a sudden burning "of vegetation" on his property. The witness said he examined the plaintiff's greenhouses and observed what he called a "dismal appearance" due to the deposit on the glass. He says that during 1947 and 1948 it could be washed off but would soon come back. He also observed the dust on the leaves to which I have already referred. He says it was sticky and could not be washed off with a spray. At this time he examined plants in the area outside the greenhouses within a quarter of a mile to the northeast and found typical SO2 marking on plants he knew to be particularly susceptible to the gas. He advised the plaintiff to plant beds of plants which he knew to be of the susceptible character. It is unnecessary to detail the many visits made by the witness to the area during the following years. They were frequent and in the spring of 1948 up until the defendant's plant closed, weekly. He was keeping the vegetation on and around the plaintiff's property under close observation and for any sudden appearances of blight that would indicate acute SO2 burning. Arrangements were also made with the plaintiff to notify him if he saw any sudden change. On the witness's visit during the spring of 1947 he found no SO2 marking on any vegetation until June 18th when he found what he

identified as SO2 bleach on certain susceptible plants. The conditions under which plants are most susceptible to SO2 blight are bright sunlight, high humidity, growing temperatures, and little or no wind. These the witness says were present around and before June 18th. On this occasion he took three specimens which were preserved and filed as Exhibits 74, 75 and 76 at the trial. Exhibit No. 74 is a specimen of gladioli leaves from a test plot in front of the plaintiff's No. 1 greenhouse; Exhibit No. 75 consists of two specimens of grape leaves taken from a grapevine growing on the plaintiff's property; Exhibit No. 76 is a specimen of leaves of a Lombardy poplar tree growing on the north side of Manchester Ave. to the north of the plaintiff's property. I shall later discuss all the specimens collected. On July 9th, 1947, the witness returned and found what he identified as fresh SO2 markings on vegetation. On this occasion he took several cuttings of sweet pea foliage from sweet peas grown in the cloth house on the plaintiff's property. These are filed as Exhibit No. 77. On July 16th, 1947, he returned and found new markings and took six specimens of sword fern from one of the plaintiff's greenhouses. These are filed as Exhibits Nos. 78A and 78B. The witness said he had inspected the sword ferns on July 9th as they are very susceptible to SO2 fumigation and they showed no sign of injury on that date. On July 31st he returned again and found what he called a very severe burning in the area. On this occasion he took three specimens which were filed as Exhibits Nos. 79, 80 and 81. Exhibit No. 79 consists of gladioli leaves taken from the plaintiff's property; Exhibit No. 80 consists of three sprays of apricot leaves taken from a tree in a neighbour's yard to the east of the plaintiff's property; and Exhibit No. 81 consists of three sprays of peach leaves taken from a peach tree in a neighbour's yard nearby. No further acute injury was observed in the year 1947; but in November the witness saw a bronze chrysanthemum that had turned an insipid yellow. He says this is characteristic of SO2 chronic injury. Up until June 11th, 1948, on none of his visits to the plaintiff's property did Mr. Jarvis find any evidence of SO2 bleaching. On a visit on this date he found evidence of bleaching but took no specimens. On June 26th he found extensive evidence of SO2 bleaching. Five specimens were taken which were filed as Exhibits Nos. 82, 83, 84, 85 and 86. Exhibit No. 82 is a gladiolus leaf taken from the plaintiff's property; Exhibit No. 83, three sprays of apricot leaves taken from a tree in the yard of a neighbour nearby; Exhibit No. 84, several plum leaves taken from a plum tree in a neighbour's yard; Exhibit No. 85, three blades of oats taken from a test plot planted on the plaintiff's property; Exhibit No. 86, three sprays of barley taken from a test plot on the plaintiff's property. On July 7th, the witness says he found what appeared to him to be the most severe bleach of all. Eleven specimens were filed that were col-

lected at this time; Exhibit No. 87, a spray of plum leaves taken from a neighbour's tree; Exhibit No. 88, two sprays of peach leaves taken from a neighbour's tree; Exhibit No. 89A, a fern leaf picked from the plaintiff's property; Exhibit No. 89B a fern leaf picked from the plaintiff's property; Exhibit Nos. 90A and 90B, a spray and several grape leaves picked from a grapevine on a neighbour's property close to the plaintiff's greenhouses; Exhibit No. 91, gladioli leaves taken from the plaintiff's test plot; Exhibit No. 92, two peony leaves taken from a neighbour's property; Exhibit No. 93, three garlic leaves taken from a neighbour's garden; Exhibit No. 94, three day lily leaves taken from a neighbour's property; and Exhibit No. 95, three sprays of apricot leaves taken from a garden about five-eighths of a mile to the northeast.

In December, 1948, the witness visited the plaintiff's greenhouses and found azaleas suffering from what he identified as typical SO2 injury. I have set out these specimens filed in some detail as they have a very important bearing on the evidence adduced by the defendant.

I will now discuss some of the expert evidence called by the defendant. Dr. Morris Katz, who was at that time employed by the National Research Council, was retained by the defendant in 1944 as an expert adviser with a view to the preparation of evidence to meet any claim that the plaintiff might put forward against the defendant based on nuisance. He is a man of very wide experience but whose dependability as a witness I shall deal with in greater detail when I come to discuss another aspect of the case. Dr. George H. Duff, a professor of plant physiology at the University of Toronto, was retained by the defendant on July 3rd, 1945. At that time he visited the plaintiff's greenhouses and during the years 1946 and 1947 made periodic visits to a test plot set up by the defendant on the south side of Carlton Street, to the south of the plaintiff's property, and on such visits inspected the vegetation in the area. Dr. Ledingham of the National Research Council, Ottawa, visited the plaintiff's greenhouses on June 7th, 1945, at the request of Dr. Katz. He visited the defendant's test plot and observed gladioli leaves with deep and marginal discolourations. He took about six leaves to Dr. Crocker of the Boyce Thompson Institute at Yonkers, New York, and Dr. Crocker examined the specimens given to him and gave evidence. Dr. Savile, a plant pathologist at the Experimental Farm at Ottawa, examined certain gladioli leaves handed to him by Dr. Ledingham on September 10th, 1947, and three or four gladioli leaves and plants handed to him by Dr. Katz on June 8th, 1948.

The witnesses Dr. Katz and Dr. Duff gave evidence that they made frequent visits to the area and inspected it and at no time found evidence of any SO2 injury. The specimens of gladioli leaves, Exhibits Nos. 74, 79 and 82 were shown to the witness

Katz and he said there were no signs of SO2 markings on them. Dr. Duff said Exhibits Nos. 74, 79 and 91 did not bear SO2 markings in his opinion but Exhibit No. 82 came the closest to them of any specimen shown to him and he said he would not like to say whether they were SO2 markings or not. Dr. Ledingham said that he saw no evidence of SO2 markings on Exhibit No. 74; he did not think Exhibit No. 79 showed SO2 injury; on Exhibit No. 82 he said he saw no evidence of SO2 injury and the injury to Exhibit No. 91 was certainly not SO2 injury. He said Exhibit No. 74 was not normal but he could not say what caused the markings. Dr. Crocker said that in his judgment Exhibits Nos. 74, 79, 82 and 91 were not injured by SO2 because the bleaching was too brown. He said some of the bleaching on Exhibit No. 91 looked more typical but he did not believe it was SO2. Of Exhibit No. 77, the specimen of sweet peas, none of the defence witnesses to whom it was shown offered the opinion that the markings were not due to SO2. Dr. Katz said they were fairly close to the markings SO2 would show; the character of the markings approached SO2; Dr. Crocker said he would not give an opinion on this specimen; Dr. Duff said the bleach was much more like SO2 injury, there were symptoms there but he wouldn't say definitely. The only other specimen concerning which the witnesses for the defence offered any information was Exhibit No. 86, a specimen of barley. This was shown to Dr. Duff and he said the specimen was too small and he would not make a statement about it. All the other specimens collected from the plaintiff's property and the immediate area and filed by Mr. Jarvis were not dealt with by any defence witness. Many of these have very extensive and pronounced markings. An examination of them shows the extent of these markings. Mr. Jarvis' evidence is that the specimens he took were not isolated samples but fair examples of the general condition in the beds or on the trees from which they were taken. He says the small vineyard from which the grape leaves, Exhibits Nos. 90A and B were taken was all affected in the same way. I accept Mr. Jarvis' evidence as to these facts. My conclusion is that the witnesses who say they looked for evidence of SO2 injury in the area either did not look at the right time or in the right place, or were careless in their investigation. It is worthy of note that an extensive blight was found on gladioli plants in the area but notwithstanding that no effort was spared to produce expert evidence in this case no witness was called by the defence who examined the growing plants, who offered any opinion as to the cause of the blight.

Two pieces of evidence were adduced for the purpose of suggesting a cause of the blight. In 1948 Dr. Katz removed a few gladioli plants from a bed near the butane tank in front of the defendant's forge shop, and took them to Ottawa and gave them to Dr. Savile for examination. Dr. Katz said he thought they were

suffering from fusarium yellows. Dr. Savile identified the disease from which they were suffering as, in his opinion, fusarium yellows. No attempt was made to show that these specimens were fair samples of all the plants suffering from the blight. On the other hand, near the close of the case it developed that they came from a bed where the gladioli bulbs had been left in the ground for two or three years. Mr. Jackson, a gardener employed by the defendant, gave evidence that the bulbs had been left out all winter for two or three successive years and that on June 18th he dug them up as they were unsatisfactory. I doubt very much if this information was ever conveyed to Dr. Savile. Dr. Savile was given another sample of a few leaves in 1947 for examination. These had been selected by one Dunn, a florist carrying on business in St. Catharines, whom the defendant had retained to assist it in the development of a test plot for the purpose of producing evidence in this case. Dr. Savile said that in his opinion the plants were suffering from bacterial blight due to a bacteria known as xanthomonas gummisudans. Again there is no evidence that these were fair average samples of the gladioli grown in the district that was suffering from blight. One would have expected that the defendant would have had a plant pathologist examine the growing plants to ascertain the nature of the blight from which they were suffering. On the other hand, Mr. Jarvis is a plant pathologist who saw the growing plants, and he says that the plaintiff's gladioli were not suffering from bacterial blight or fusarium yellows. He says these diseases are easy to identify on growing plants. He gave some of their characteristics. He described the nature of the burns he observed and gave evidence as to the area covered. He said it was triangular in form with the apex to the defendant's works and the severity diminished toward the base five-eighths of a mile to the northeast. He gave a most positive opinion that the plants in that area that he observed were suffering from acute SO2 injury.

Both Dr. Katz and Dr. Ledingham testified that on their visit to the plaintiff's greenhouses on June 7th, 1945, they saw a bed of lily of the valley suffering from some sort of blight. The only suggestion they could make as to the cause was that the glass frame had been kept on too long and the plants had come in physical contact with the glass. The evidence is that at no time did the glass on this bed come in physical contact with the plants.

There remains to be considered the evidence of Dr. Katz with respect to the mechanical tests of the air for SO2 content made by him during the years 1944 to 1949 at a test station set up on the south side of Carlton Street about 200 feet south of the plaintiff's property, together with tests of the air made at Dunn's greenhouses about one and three-quarters miles away. In the first place,

these tests of the air made at the Carlton Street test house were made on a machine that was built by the defendant under the direction of Dr. Katz and was not tested in any scientific laboratory. The galvanometer was purchased from a reliable manufacturer of instruments of that sort but other than that we have no guide as to its accuracy. There is no evidence that it was tested with any instruments for accuracy at any time nor inspected by any engineer trained in the special work of building these instruments. The risk of relying too definitely on a mechanical device was made evident during the trial from records submitted of the result of tests made on an instrument devised for the purpose of testing vibrations; in this case some loose connection made the results entirely unreliable. I think in the administration of justice one must accept mechanical tests with great care where the tests conflict with what appears to be reliable viva voce evidence. This is especially true where the test is not made under the joint supervision of mechanical or engineering experts appointed by both sides. A machine cannot be cross-examined.

The elaborate reports of the operation of this machine would show that while there were substantial quantities of SO2 in the air during the period in question they were never in sufficient concentrations or duration to produce acute SO2 injury. It is not suggested that they would not produce chronic SO2 injury and from Dr. Duff's evidence it is not clear they might not have been sufficient to produce acute injury.

There is a difference between witnesses as to what is the minimum concentration that would produce acute injury. Mr. Jarvis says .15 parts per million or possibly .12 ppm. under the most favourable atmospheric conditions. that is, bright sunlight, high humidity, low wind and growing temperatures. Dr. Katz puts the minimum at .20 but at that concentration he says the duration would have to be twenty to twenty-four hours of continuous fumigation. While the readings from the recorder show concentrations that would be high enough to produce acute injury, the duration, according to Dr. Katz, was not sufficient. Dr. Duff gave evidence that plants subjected to a series of fumigations at low concentrations would be more likely to suffer acute injury at a lower concentration and shorter duration than plants that have not been subject to any fumigation from SO2 gas. In addition to the difficulties that arise from accepting these mechanical tests in preference to the evidence of Mr. Jarvis and other witnesses called for the plaintiff, there is the fact that this instrument was under the exclusive direction of Dr. Katz and the results of these tests must be affected by Dr. Katz' reliability as a witness. After the most careful consideration of the demeanour of this witness in the witness box and the whole character of his evidence, I have come to the conclusion that it would be an unsafe basis for a judg-

ment. The witness appeared to me to be more anxious to advance the case of the defendant than to produce to the Court an impartial result of scientific experiment. There was a certain lack of frankness, probably more evident in his demeanour than will be in the written record, that characterized his evidence throughout. When this witness was retained by the defendant, it was quite evident that a lawsuit was likely to develop. The whole course that was followed, in my view, was planned with great care but not the care that one would have expected if it were designed to show all the facts. If it had been the desire to ascertain what contribution, if any, the defendant was making to the injury complained of by the plaintiff, it would have been quite simple to set up a test house to the northeast of the source of the alleged pollution and one to the southwest. If the instruments were accurate, a comparison of the records would have given a fair indication of the extent to which the defendants polluted the air; but the instrument for the tests was set up further to the south than the course of the prevailing winds from the cupolas, and almost directly east of the forge shop. This in itself would not impress me so much but what did impress me was that a second test house with a recorder was set up at Dunn's greenhouse a mile and three-quarters to the southeast. The records taken from there can have little value compared with those that might have been taken had the plan I suggest been adopted. Dr. Katz did not satisfactorily explain why this plan was not followed. Another important element in the case was the content of the dust and organic matter alleged to have been causing injury to the plaintiff. How far the defendants contributed to this could have been determined with great accuracy by setting up a dust recorder as I have suggested, at two points equi-distant from the defendant's works but on opposite sides. and could have been determined with considerably more accuracy by a correct analysis of the dust that was caught in the dust recorder. If this analysis showed a high content of iron oxide and those other ingredients shown in Mr. Tienken's analysis when the wind was blowing from the works and no such content when the wind was blowing the fumes away from the recorder, a clear inference could be drawn that the defendant was responsible for those ingredients which were said to be particularly injurious. Notwithstanding all the elaborate preparation that was made over a period of years, for the trial of this case, at no time was a real analysis of the dust caught in the dust recorder made by Dr. Katz or under his direction. I was not impressed with Dr. Katz' explanation as to why the dust recorder was not operated while the defendant's plant was closed during the strike. He offered as a reason that they could not have access to the defendant's laboratory for making the tests of the dust that were made (none of these tests could be called an analysis). I cannot

help but think if the witness had seriously desired that the Court should have the information that could have been obtained by operating the test recorder during this period it could have been made available.

As to Dr. Katz' visual examination of the foliage in the area, if he did not see those injuries to plants that Mr. Jarvis saw, specimens of which have been produced, I do not think he made a sufficiently close examination. The fact that he left the Court with the impression that the gladioli roots and plants taken in June 1948 from the bed in front of the forge shop and given to Dr. Savile for examination, were representative of gladioli in the district, and from which it might be inferred that the blight that was shown on the plants was due to fusarium yellows, is disturbing. If Dr. Katz did not know that the bed which was dug up a day or two after he removed these specimens was a bed of gladioli that had been in the ground over the winter for two or three years and was a poor enough specimen that the gardener saw fit to dig it up, it would indicate that any examination of the foliage he was making was a very superficial one. If, on the other hand, he did know that was the character of the bed from which he took the samples, his failure to tell the Court is unpardonable.

Considering the whole evidence, and I must not be taken to have referred to all the evidence that has affected my mind, I am thoroughly convinced that certain plants on the plaintiff's property and in the area were, during the years 1946, 1947 and 1948, subjected to acute injury by SO2 gas emanating from the defendant's works and I so find as a fact.

The evidence also convinces me that the plaintiff's plants were subjected to chronic SO2 injury by gas emanating from the same source. Dr. Duff described how conifers suffer chronic injury from SO2 gas in the ordinary atmosphere of a city. There is no doubt that the defendant was adding substantial concentrations of SO2 to the normal atmosphere in that area. As I have already indicated, it is difficult to disassociate the result of the SO2 injury from injury resulting from the deposit of iron oxide and other organic matter, and from the smoke and fumees issuing from the defendant's works. For the purpose of this case, in view of the findings that I have made, I do not feel that it is necessary to do so. They together account for the deterioration in the plaintiff's plants and do him material injury.

There remains to be considered the claim that the operation of the forge shop caused vibrations which affected the growth of the plaintiff's orchids, in some cases broke the glass in the greenhouse, and caused plaster to fall in a house erected on the plain-

tiff's property. There is some evidence that a five-thousand-pound hammer caused some vibration on the plaintiff's property but that it caused the glass to break or the plaster to fall was not established to my satisfaction nor was it established that the plants suffered any material injury. I feel that the inferences I would be called upon to draw to give effect to this contention are much too speculative to form the basis of a judgment. On the argument counsel for the plaintiff frankly agreed with this view and stated to the Court that he was not pressing any case based on a nuisance due to vibration.

The law to be applied to these findings of fact has been discussed at great length in numerous cases and by many textbook writers and I do not feel that I can add anything to jurisprudence by a discussion of it, more than to make some reference to the legal considerations that have guided me in coming to a decision.

An actionable nuisance cannot be defined with exactitude. In Blackstone's Commentaries, III, Ch. 13, p. 216, an attempt is made to define a private nuisance as "anything done to the hurt or annoyance of the lands, tenements or hereditaments of another." This definition is of value only to form a starting point for the consideration of the law. It is too broad to be otherwise useful and would include many things that are not actionable. Each case must necessarily depend upon the facts of the case but in coming to a conclusion whether the facts of a particular case establish an actionable nuisance there are some very well defined principles to guide the judicial mind. The first is that in the approach to the facts there is a difference between an action brought for nuisance upon the ground that the alleged nuisance produces material injury to property and an action brought for a nuisance on the ground that it is alleged to produce a sensible personal discomfort. In *St. Helen's Smelting Company* v. *Tipping*, 11 H. L. Cas. 641, Lord Westbury, L.C., at p. 650, states:

"With regard to the latter, namely, the personal inconvenience and interference with one's enjoyment, one's quiet, one's personal freedom, anything that discomposes or injuriously affects the senses or the nerves, whether that may or may not be denominated a nuisance, must undoubtedly depend greatly on the circumstances of the place where the thing complained of actually occurs." After pointing out that if a man lives in a town, it is necessary that he should subject himself to the consequences of those operations of trade which are necessary for trade and commerce and for the enjoyment of property by the inhabitants, he goes on to state:—

". . . when an occupation is carried on by one person in the neighbourhood of another, and the result of that trade, or occupation, or business, is a material injury to property, then there unquestionably arises a very different consideration. I think, my

Lords, that in a case of that description, the submission which is required from persons living in society to that amount of discomfort which may be necessary for the legitimate and free exercise of the trade of their neighbours, would not apply to circumstances the immediate result of which is sensible injury to the value of the property."

The problem for the Court is to determine the limits of the rights of the respective parties in each case. Lord Wensleydale at p. 652 delineated the task of the Court in simple language of great clarity:—

"Everything must be looked at from a reasonable point of view; therefore the law does not regard trifling and small inconveniences, but only regards sensible inconveniences, injuries which sensibly diminish the comfort, enjoyment or value of the property which is affected."

In *Fleming* v. *Hislop*, 11 A.C. 686 at p. 695, Lord Fitzgerald, in dealing with a case based on a nuisance which interfered with the comfort and enjoyment of property, states that there is this restraint imposed on the right of a proprietor to the free and absolute use of his property for the protection of his neighbour; "he is not so to use his property as to create that discomfort or annoyance to his neighbour which interferes with his legitimate enjoyment." Lord Bramwell at p.694 said:

"The word "material" is one used continually in endeavouring to explain to a jury what it is which would constitute a nuisance as distinguished from something which might, indeed, be perceptible, but not of such a substantial character as to justify the interference of the Court or allow the maintenance of an action; in conformity with the legal maxim, 'Lex non favet delicatorum votis.' It appears to me to be a right finding."

Lord Halsbury at p. 697 makes this general statement:—

"My Lords, it seems to me to be established clearly and beyond all doubt by a current of authorities, and to have been expressed with a degree of precision and logic in the judgment in *Bamford* v. *Turnley*, 3 B. & S. at p. 82, by my noble and learned friend on my right (Lord Bramwell), that what makes life less comfortable and causes sensible discomfort and annoyance is a proper subject of injunction."

Bamford v. *Turnley*, 3 B. & S. 62, not only deals with what may constitute a nuisance but the contention that if what is done may interfere with the plaintiff's enjoyment of his property so as to constitute a nuisance, the trial Judge may not take into consideration the question as to whether the defendant was making a reasonable use of his land. At p. 76 Williams J. stated:—

"If it be good law, that the fitness of the locality prevents the carrying on of an offensive trade from being an actionable nuisance, it appears necessarily to follow that this must be a

reasonable use of the land. But if it is not good law, and if the true doctrine is, that whenever, taking all the circumstances into consideration, including the nature and extent of the plaintiff's enjoyment before the acts complained of, the annoyance is sufficiently great to amount to a nuisance according to the ordinary rule of law, an action will lie, whatever the locality may be, then surely the jury cannot properly be asked whether the causing of the nuisance was a reasonable use of the land."

At p. 85, Baron Bramwell in cogent language disposes of any argument that "the public benefit" of the works complained of may be taken into consideration.

In *Rushmer* v. *Polsue and Alfieri Limited*, (1906) 1 Ch. 234, Vaughan Williams L.J. at p. 245, referring to *St. Helen's Smelting Company* v. *Tipping*, distinguishes the case under consideration from one where the nuisance produces material injury to property.

Where the action is founded on injury to property, some guide in determining what character of injury is actionable is found by an examination of the judgment of Sir George Jessel, M.R. in *Salvin* v. *North Brancepeth Coal Company*, 9 Ch. App. 705, reported in the foot-note on page 706, and his reference to the charge to the jury of Mr. Justice Mellor in *St. Helen's Smelting Company* v. *Tipping*. The learned Master of the Rolls quotes Mr. Justice Mellor as instructing the jury that in an action for nuisance to property arising from noxious vapours, the injury, to be actionable, must be such as visibly to diminish the value of the property and the comfort and enjoyment of it, and ". . . all the circumstances, including those of time and locality, ought to be taken into consideration; and that with respect to the latter, it was clear that in counties where great works had been erected and carried on, persons must not stand on their extreme rights and bring actions in respect of every matter of annoyance, for if so, the business of the whole country would be seriously interfered with." In considering this last statement of the law one must not lose sight of the observations made on appeal in the House of Lords to which I have already referred. The learned Master of the Rolls went on to say:—

"That ruling was upheld by the House of Lords, and I take it as having established, in the first place, that the injury must be visible, by which I understand visible to ordinary persons conversant with the subject matter. I do not think that this condition is satisfied by getting a scientific man to say that, by the use of scientific appliances, microscopic or otherwise, he can state that there will be in future time an injury. I do not think that that would be sufficient."

At p. 709 of the report, James L. J. in discussing this language of the master of the Rolls said:—

"When the Master of the Rolls said that the damage must

be visible, it appears to me that he was quite right; and, as I understand the proposition, it amounts to this, that, although when you once establish the fact of actual substantial damage it is quite right and legitimate to have recourse to scientific evidence as to the causes of that damage, still if you are obliged to start with scientific evidence, such as the microscope of the naturalist, or the test of the chemist, for the purpose of establishing the damage itself, that evidence will not suffice.

"The damage must be such as can be shewn by a plain witness to a plain common juryman.

"The damage must also be substantial, and it must be, in my view, actual; that is to say, the Court has, in dealing with questions of this kind, no right to take into account contingent, prospective, or remote damage."

The learned Lord Justice then went on to illustrate what he meant, by referring to the imperceptible accretions to a river bank or to the seashore which, after a lapse of years, might become measurable and ascertainable.

Any detailed consideration of some of the language of this judgment in the light of the developments of modern science is not necessary in view of the facts as I have found them, except as it may have application to the suggestion of invisible SO2 injury to which I have already referred.

In *Walter* v. *Selfe, 4 DeG. and Sm 315,* Lord Justice Knight Bruce, in dealing with an action based on a claim for damage or annoyance to the plaintiffs from burning or causing to be burned bricks on the defendant's property, occasioning damage or annoyance or injury to the plaintiffs' property and growing plants, at p. 322 said:—

"And both on principle and authority the important point next for decision may properly, I conceive, be thus put: ought this inconvenience to be considered in fact as more than fanciful, more than one of mere delicacy or fastidiousness, as an inconvenience materially interfering with the ordinary comfort physically of human existence, not merely according to elegant or dainty modes and habits of living, but according to plain and sober and simple notions among the English people?"

In *Crump* v. *Lambert,* L.R. 3 Eq. 409, Lord Romilly, M.R. at p. 413 in very comprehensive language sums up the law applicable as follows:—

"The owner of one tenement cannot cause or permit to pass over, or flow into, his neighbour's tenement any one or more of these things in such a way as materially to interfere with the ordinary comfort of the occupier of the neighbouring tenement, or so as to injure his property. It is true that, by lapse of time, if the owner of the adjoining tenement, which, in case of light or water, is usually called the servient tenement, has not resisted for a period of twenty years, then the owner of the dominant tene-

ment has acquired the right of discharging the gases or fluid, or sending smoke or noise from his tenement over the tenement of his neighbour; but until that time has elapsed, the owner of the adjoining or neighbouring tenement, whether he has or has not previously occupied it, — in other words, whether he comes to the nuisance or the nuisance comes to him, retains his right to have the air that passes over his land pure and unpolluted, and the soil and produce of it uninjured by the passage of gases, by the deposit of deleterious substances, or by the flow of water. And the doctrine suggested in *Hole* v. *Barlow*, that the spot from whence the nuisance proceeded was a fit, proper, and convenient spot for carrying on the business which produced the nuisance, is no excuse for the act, and cannot be made available as a defence either at law or in equity."

Some evidence was adduced to show that others are polluting the air over the plaintiff's property. While there is no evidence on which I could find the plaintiff suffered material injury from pollution by others than the defendant, even if others are in some degree polluting the air, that is no defence if the defendant contributes to the pollution so that the plaintiff is materially injured. It is no defence even if the act of the defendant would not amount to a nuisance were it not for others acting independently of it doing the same thing at the same time. *Salmond on Torts*, 10th Ed. p. 229, following *Lambton* v. *Mellish*, (1894) 3 Ch. 163, *Sadler* v. *G.W. Ry.* (1896) A.C. 450: see also *Thorpe* v. *Brumfitt*, L.R. 8 Ch. A. 650, Sir W. M. James L.J. at p. 656. Any further discussion on this aspect of the case is unnecessary in view of the fact that the defendant created a new condition in the area after 1937 by the erection of the cupolas and the reconstruction of the foundry and forge shop with the result that the fumes from these respectively had a combined effect not formerly present.

The defendant pleaded that the plaintiff's claim, if any, was barred by the Statute of Limitations, and prescriptive right and acquiescence. The evidence in this case falls far short of justifying any finding of fact sufficient to establish any of these defences. On the argument counsel wisely abandoned these defences.

On the law and on the facts I find the plaintiff is entitled to relief.

There remains to be discussed what form the relief should take. I had occasion to review the principles on which the Court acts in granting an injunction in cases of this sort in *McKie* v. *The K.V.P. Company Limited* (1948) O.R. page 398 at p. 416. This judgment was affirmed in the Court of Appeal in (1948) O.W.N. 812 with a slight variation in the terms of the injunction. In that case I followed the judgment of Lord Lindley in

In the Supreme Court of Ontario No. 61 Reasons for Judgment of the Honourable Mr. Justice McRuer 15th June, 1949 Continued

Shelfer v. *City of London Electric Lighting Company; Meux's Brewery Company* v. *City of London Electric Lighting Company,* (1895) 1 Ch. 287 at p. 314 where he quoted from the judgment of Lord Kingsdown in *Imperial Gas Light and Coke Company* v. *Broadbent,* 7 H.L.C. 600, as follows:—

"The rule I take to be clearly this: if a plaintiff applies for an injunction to restrain a violation of a common law right, if either the existence of the right or the fact of its violation be disputed, he must establish that right at law; but when he has established his right at law, I apprehend that unless there be something special in the case, he is entitled as of course to an injunction to prevent the recurrence of that violation."

And at p. 322 Lord Justice Smith said:

"Many Judges have stated, and I emphatically agree with them, that a person by committing a wrongful act (whether it be a public company for public purposes or a private individual) is not thereby entitled to ask the Court to sanction his doing so by purchasing his neighbour's right, by assessing damages in that behalf, leaving his neighbour with the nuisance . . .

"In such cases the well-known rule is not to accede to the application, but to grant the injunction sought, for the plaintiff's legal right has been invaded, and he is *prima facie* entitled to an injunction."

The only matter that has given me concern with this aspect of the case is the fact that in January, 1942, the plaintiff entered into an agreement with the defendant whereby he accepted Twelve Hundred and Twenty-five Dollars in full satisfaction of all claims and demands against the defendant up until that time for injuries sustained by reason of the alleged nuisance, and in consideration of the sum of six hundred dollars granted an easement to do the things here complained of until December 31st, 1944. It is argued with force that by entering into these agreements the plaintiff acknowledged that his injuries could be properly compensated for by a money payment and therefore an injunction ought not to be granted. In reply to this counsel for the plaintiff stresses the evidence given to the effect that at this time the plaintiff was advised by his solicior, Mr. Schiller, that in his opinion a Court would not grant an injunction against the defendant by reason of the fact that it was engaged in the manufacture of munitions of war on a very large scale which were urgently needed, and that the Court would not exercise his discretionary jurisdiction to do anything that would interfere with full production of this character. My first view was that there was much weight in the argument pre-

sented on behalf of the defendant, but on further consideration I have concluded that when the plaintiff was advised by a competent solicitor acting in good faith, that a Court would not under these circumstances grant an injunction, he could not have been expected to have insisted on that remedy at that time and ought not to be prejudiced in claiming his full rights now that his action is before the Court for determination. I therefore consider the case irrespective of these agreements.

On behalf of the plaintiff, evidence was given by Mr. Beaumont that if the proper controls were established, the fumes from the cupolas would not be injurious; on the other hand, no evidence was given by the defendant that if fumes were being emitted from their works they were beyond their control. The cases well establish that economic considerations do not enter into the matter, and I am not called upon to weigh the economic disadvantages to the defendant. In my view this is a case where damages are inappropriate. It is impossible to find, with any degree of precision, what damage to his business the plaintiff suffers by reason of the injury to the plants. Some plants are more susceptible than others. He is restricted in the use of his property in the way that he wishes to use it by reason of the fact that he is unable to grow certain plants with success. There is, in fact, no standard against which monetary loss can be measured.

An order will issue for an injunction restraining the defendant from discharging, or permitting to be discharged, from its works into the air, any substance, gas or matter so as to occasion damage to the plaintiff as the owner or occupier of the property mentioned in the pleadings, or injury or damage to the said property, until further order of the Court. If the parties cannot work out the terms of the injunction I may be spoken to. I have substantially followed the wording in *Walter* v. *Selfe*. The operation of the injunction will be suspended until November 1st, 1949, in order to give the defendant an opportunity to make such alteration in its plant as may be necessary to conform to this order.

An order will go referring the matter to the County Judge of the County of Lincoln to ascertain and assess the damages sustained by the plaintiff during the years 1945, 1946, 1947, 1948 and 1949 down to the date on which the injunction becomes effective. In the assessment of damages the County Judge will not take into consideration any claim for damage sustained by vibration nor by so-called invisible injury to the plants as distinct from acute injury or chronic injury as heretofore discussed.

The plaintiff will have judgment for the amount of the damages so found and the costs of the action, including the costs of the reference.

In the Supreme Court of Ontario No. 62 Reasons for Judgment of Court of Appeal 30th March, 1950

In the Supreme Court of Ontario

C.A.

WALKER

v.

McKINNON INDUSTRIES LIMITED

Copy of Reasons for Judgment of Court of Appeal (Henderson, Roach and Bowlby JJ.A.), delivered 30th March, 1950.

J. J. ROBINETTE, K.C., and J. L. G. KEOGH, K.C., for the defendant, appellant.

A. G. SLAGHT, K.C., and MARTIN MORRISSEY, for plaintiff, respondent.

HENDERSON, J.A.
ROACH, J.A.
BOWLBY, J.A.

This is an appeal from the judgment of the Chief Justice of the High Court, dated the 15th day of June, 1949, whereby an injunction was granted restraining the defendant from discharging or allowing to be discharged from its works in the City of St. Catharines onto the plaintiff's property described in the pleadings any substance, gas or matter so as to occasion damage to the plaintiff's land and the plants, shrubs and flowers in or upon the same, and a reference was directed to the County Judge of the County of Lincoln to assess the plaintiff's damages. We are all of the opinion that this Court should not disturb the findings of fact as made by the learned trial Judge. Those findings are amply supported by the evidence.

It was argued by counsel for the appellant that even on those findings of fact this is not a proper case for the granting of an injunction and that damages would constitute the proper remedy. The evidence supports a finding that it is feasible for the defendant to prevent the discharge onto the plaintiff's land of the deleterious matter complained of, and in that circumstance this is eminently a proper case for the granting of an injunction.

Some reasonable time should be granted to the defendant to instal the necessary devices to accomplish that purpose, and in our opinion a period of six months would be adequate.

Paragraph 1 of the formal judgment as issued should be varied and as varied should read as follows:

THIS COURT DOTH ORDER AND ADJUDGE that the defendant, its servants and agents be and they are hereby restrained from discharging or allowing to be discharged from its works in the pleadings mentioned any substance, gas or matter in such a manner or to such an extent as to occasion damage to

the plaintiff's property (as described in the pleadings) or the buildings thereon and/or the plants, shrubs and flowers thereupon or therein, provided however that the operation of this injunction be suspended until the 1st day of October, 1950.

Paragraph 2 of the formal judgment should be amended to read:

AND THIS COURT DOTH FURTHER ORDER AND ADJUDGE that it be referred to His Honour the County Judge of the County of Lincoln to inquire and assess the amount of damages the plaintiff has sustained during the years 1945, 1946, 1947, 1948 and 1949 and down to the date the said injunction goes into operation, provided that in assessing the said damages the said County Judge will not take into consideration any claim for damage sustained by reason of vibration nor for invisible injury to plants as distinguished from acute or chronic injury.

Subject to the foregoing, this appeal should be dismissed with costs.

In the Supreme Court of Ontario No. 63 Formal Judgment in Court of Appeal 30th March, 1950

In the Supreme Court of Ontario

"Law Stamps $2.40 Cancelled"

THE HONOURABLE MR. JUSTICE HENDERSON
THE HONOURABLE MR. JUSTICE ROACH
THE HONOURABLE MR. JUSTICE BOWLBY
} Thursday, the 30th day of March, A.D. 1950.

BETWEEN:

WILLIAM WALLACE WALKER

Plaintiff

— and —

THE McKINNON INDUSTRIES LIMITED

Defendant

UPON NOTICE made on the 27th, 28th and 29th days of March, 1950, by counsel on behalf of the Defendant by way of appeal from the judgment pronounced by the Honourable The Chief Justice of the High Court on the 15th day of June, 1949, herein, in the presence of counsel for all parties, upon hearing read the pleadings, the evidence adduced at the trial and the judgment aforesaid, and upon hearing what was alleged by counsel aforesaid, this Court was pleased to direct the said motion to stand over for judgment and the same coming on this day for judgment.

1. THIS COURT DOTH ORDER that the said judgment be and the same is hereby varied as follows:

(1) Paragraph 1 of the formal judgment as issued should be varied and as varied should read as follows:—

"THIS COURT DOTH ORDER AND ADJUDGE that the defendant, its servants and agents be and they are hereby restrained from discharging or allowing to be discharged from its works in the pleadings mentioned any substance, gas or matter in such manner or to such an extent as to occasion damage to the plaintiff's property (as described in the pleadings) or the buildings thereon and/or the plants, shrubs and flowers thereupon or therein, provided, however, that the operation of this injunction be suspended until the 1st day of October, 1950."

(2) Paragraph 2 of the formal judgment should be amended to read:

"AND THIS COURT DOTH FURTHER ORDER AND ADJUDGE that it be referred to His Honour the County Judge of the County of Lincoln to inquire and assess the amount of damages the plaintiff has sustained during the years 1945, 1946, 1947, 1948 and 1949, and down to the date the said injunction goes into operation, provided that in assessing the said damages the said County Judge will not take into consideration any claim for damage sustained

In the Supreme Court of Ontario
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Continued

by reason of vibration nor for invisible injury to plants as distinguished from acute or chronic injury."

2. THIS COURT DOTH FURTHER ORDER that in all other respects this appeal be and the same is hereby dismissed.

3. AND THIS COURT DOTH FURTHER ORDER that the Defendant do pay to the Plaintiff his costs of this appeal forthwith after taxation thereof.

Entered OB. 209, Page 222,
September 15th, 1950.
"H.R."

"CHAS. N. SMYTH"
Registrar, S.C.O.

In the Supreme Court of Ontario No. 64 Order of the Honourable Mr. Justice Aylesworth admitting appeal and allowing security 21st June, 1950

In the Supreme Court of Ontario

"Law Stamps $1.90"

THE HONOURABLE MR. JUSTICE AYLESWORTH } Wednesday, the 21st day of June, A.D. 1950.

IN CHAMBERS

BETWEEN:

WILLIAM WALLACE WALKER

Plaintiff

— and —

THE McKINNON INDUSTRIES LIMITED

Defendant

(seal)

ORDER

UPON the application of counsel for the Defendant in the presence of counsel for all parties, upon hearing read the pleadings and proceedings and the affidavits of Thomas J. Cook and William Walker (2) filed and the cross-examination of said Thomas J. Cook on his affidavit and the Exhibits therein referred to, and upon hearing what was alleged by counsel aforesaid, and it appearing that this case is one in which the Appellant, The McKinnon Industries Limited, has under the provisions of The Privy Council Appeals Act, Revised Statutes of Ontario 1937, Chapter 98, a right to appeal to His Majesty in His Privy Council.

1. IT IS ORDERED that the Two Thousand Dollars ($2,000.00) heretofore paid into Court to the credit of this action by the Defendant as security pursuant to Section 2 of The Privy Council Appeals Act, that the Defendant will effectually prosecute its said appeal to His Majesty in His Privy Council and pay such damages and costs as may be awarded in case the judgment appealed from is affirmed in whole or in part, be and the same is hereby approved and allowed as good and sufficient security pursuant to the said Act.

2. AND IT IS FURTHER ORDERED that the appeal of the said Defendant from the judgment pronounced by the Court of Appeal for Ontario in this action on the 30th day of March, 1950, to His Majesty in His Privy Council be and the same is hereby admitted under the said The Privy Council Appeals Act.

In the Supreme Court of Ontario No. 64 Order of the Honourable Mr. Justice Aylesworth admitting appeal and allowing security 21st June, 1950 Continued

3. AND IT IS FURTHER ORDERED that the Defendant (Appellant) do as soon as possible file in this Court in this action a Bond executed by it and by a Surety Company approved by the Lieutenant-Governor-in-Council of the Province of Ontario under The Guarantee Company Securities Act, Revised Statutes of Ontario 1937, Chapter 263 as amended, in the penal sum of Fifty Thousand Dollars ($50,000.00) in which Bond such Surety Company and the Defendant shall be named as obligors and the Plaintiff shall be named therein as obligee, as security that the Defendant will pay such damages and costs as shall be awarded to the Plaintiff on the reference to the County Judge of the County of Lincoln in this action, which reference was directed by the judgment pronounced at the trial of this action on the 15th day of June, 1949, by the Honourable the Chief Justice of the High Court and which reference was further affirmed and directed by the said judgment of the Court of Appeal for Ontario, in case the judgment appealed from shall be affirmed or in part affirmed on the Defendant's appeal therefrom to His Majesty in His Privy Council, and will pay the amounts by the said judgments directed to be paid either as a debt or for damages or the part of it as to which the said judgments may be affirmed, if they are affirmed only as to part, and all damages awarded against the Defendant on such appeal; and that such Bond when filed as aforesaid be and the same is hereby approved and allowed as good and sufficient security as aforesaid under the said Act.

4. AND IT IS FURTHER ORDERED that the Defendant do as soon as possible file in this Court in this action a Bond executed by it and by a Surety Company approved by the Lieutenant-Governor-in-Council of the Province of Ontario under The Guarantee Company Securities Act, Revised Statutes of Ontario 1937, Chapter 263 as amended, in the penal sum of Eleven Thousand Dollars ($11,000.00) in which Bond such Surety Company and the Defendant shall be named as obligors and the Plaintiff shall be named therein as obligee, as security that the Defendant will pay such costs as have been awarded to the Plaintiff by the said judgments of the Court of Appeal for Ontario and of the Honourable the Chief Justice of the High Court in this action in case the judgment appealed from and the said trial judgment shall be affirmed or in part affirmed on the Defendant's appeal from the said judgment of the Court of Appeal for Ontario to His Majesty in His Privy Council and will pay the amounts by the said judgments directed to be paid for costs or the part of the said amounts for costs as to which the said judgments may be affirmed if they are affirmed only as to part; and that such Bond when filed as aforesaid be and the same is

In the Supreme Court of Ontario No. 64 Order of the Honourable Mr. Justice Aylesworth admitting appeal and allowing security 21st June, 1950 Continued

hereby approved and allowed as good and sufficient security as aforesaid under the said Act.

5. AND IT IS FURTHER ORDERED that upon the filing as aforesaid of the aforesaid Bonds, execution on the said judgments be and the same is hereby stayed until the disposition of the said appeal by the Defendant to His Majesty in His Privy Council.

6. AND IT IS FURTHER ORDERED that upon the filing of the aforesaid Bonds as aforesaid, the said reference be and the same is hereby stayed and postponed until the disposition of the said appeal by the Defendant to His Majesty in His Privy Council.

7. AND IT IS FURTHER ORDERED that the costs of this application be costs in the said appeal to be taxed by the Taxing Officer at Toronto.

"C.H." "C.A.S."

Entered O.B. 210, Pages 37-38,
June 27th, 1950.

CHAS. A. SMYTH
Registrar, S.C.O.

In the Supreme Court of Ontario No. 65 Statement of Law and Fact of Defendant on appeal to Court of Appeal

In the Supreme Court of Ontario

BETWEEN:

WILLIAM WALLACE WALKER

Plaintiff

— and —

THE McKINNON INDUSTRIES LIMITED

Defendant

APPELLANT'S STATEMENT OF POINTS OF FACT AND LAW

1. The learned trial Judge ought not to have awarded any injunction, since the plaintiff showed that his damages could be properly compensated in money by entering into an agreement and release with the defendant (Exhibits 8 and 9) accepting $3,025.00 for his damages to the end of the year 1944.

Reasons for Judgment—
Appeal Book 1, p.70-71, 38-40.

Exhibits 8 and 9—Release and Agreement—
Appeal Book 1, p.82-90.

Reply (second) of Plaintiff—
Appeal Book 1, p.30.

Statement of Claim (original) of Plaintiff—
Appeal Book 1, p.7 (paragraph 7).

Statement of Claim (amended) of Plaintiff—
Appeal Book 1, p.13-14 (paragraphs 7-9).

Evidence of *Plaintiff*—Evidence *Vol. 1:*
p.82 l. 29-30;
p.84 l. 6-21;
p.87 l. 1-27.

Wood v. Sutcliffe 2 Simons (N.S.) 163 at 168-169; 61 E.R. 303 at 305.

Lockwood v. L. & N.W. Rly., 19 L.T. 68.

Sec. 17, The Judicature Act, R.S.O. 1937, Chapter 100.

Cotton v. Ontario Motor Co. (1916), 11 O.W.N., 100 at 101.

2. *Alternatively, the injunction is too wide and oppressive.*

Reasons for Judgment—
Appeal Book 1, p.71.

In the Supreme Court of Ontario No. 65 Statement of Law and Fact of Defendant on appeal to Court of Appeal Continued

Formal Judgment at Trial—
Appeal Book 1, p.31-32.

Only damage to the plaintiff's flowers and light was proved at the trial, as being caused by soot, gaseous fumes, fly ash, iron oxide, dust and sulphur dioxide gas from the defendant's foundry cupolas and oil fumes from the defendant's foundry and forge shop. No damage to the plaintiff's land and buildings was proved to have been caused by these substances.

Reasons for Judgment—Appeal Book 1, p. 36.
McKie v. KVP Co., 1948 O.W.N. 812 at 813-814.

It is impossible to operate the foundry without discharging some gases and soot into the air, and so it is impossible for the defendant to operate its foundry in compliance with this injunction. The rest of defendant's plant depends for its operation upon the operation of the foundry.

Canada Paper Co. v. Brown, 63 S.C.R., 243 at 252-253 (per Duff, J.)

Evans v. Manchester, etc., Rly., 36 Ch. D., 626 at 639-640 (per Kekewich, J.).

3. The trial Judge gave no weight to the almost continuous and automatic records taken on Sulphur Dioxide Automatic Recorder Machine and Dust Measuring Machine operated by the defendant during most of the periods in question.
Reasons for Judgment—Appeal Book 1, p.57-59 and p.50.

Evidence of *Dr. Katz—Vol. 3*—
p.1149 l. 27 to p.1152 l. 18;
p.1152 l. 26 to p.1155 l. 16;
p.1158 l. 8-30; p.1160 l. 24-28;
p.1163 l. 23 to p.1164 l. 18;
p.1165 l. 8-27; p.1169 l. 29 to p. 1170 l. 11;
p.1228 l. 14-21; p. 1233 l. 25 to p.1234 l. 5;
p.1236 l. 6-18;
p.1239 l. 3 to p.1240 l. 10;

Vol. 4—
p.1395 l. 26-30; p.1396 l. 6-9;
p.1397 l. 3-5;

Evidence of *Longhurst—Vol. 3*—
p.916 l. 23 to p.917 l. 14;
p.918 l. 15 to p.919 l. 2;
p.922 l. 7-28;
p.937 l. 29 to p.938 l. 20;
p.952 l. 9-21.

Vibration Recorder Report—Exhibit 173—
Appeal Book 4, p.603.

Evidence of *Cavanagh—Vol. 4*—
p.1689 l. 23 to p.1690 l. 15.

Photograph of Sulphur Dioxide Recorder—
Exhibits 110, 111—Appeal Book 5, p.36, 37.

Photograph of Dust Measurement Machine—
Exhibit 112—Appeal Book 5, p. 38.

Chart Roll from Sulphur Dioxide Recorder—
Exhibit 113 (not copied).

Notation Sheets by Longhurst of Recordings—
Exhibits 114 and 114A (not copied).

McNiven v. Crawford, 1940 O.W.N., 323 at 324 (per Robertson, C. J. O.).

4. *The location of the Defendant's Recorder Station or Test House was as good as could be obtained* (since the Plaintiff had refused to allow it on his property) and was explained.

Reasons for Judgment—Appeal Book 1, p.59-60.

Plan—Exhibit 11 —Appeal Book 1, p.94.

Evidence of *Plaintiff* —Evidence *Vol. 1*, p.262 l. 6-23.

Statement of Claim —Paragraphs 4 and 5—Appeal Book 1, p.13.

Evidence of *Dr. Katz—Vol. 4*—
p.1386 l. 11 to p.1387 l. 16;
p.1393 l. 110 to p.1394 l. 27;
p.1510 l. 15-29.

Evidence of *Williams—Vol. 3*—
p.989 l. 9 to p. 990 l. 28.

5. The trial Judge ought not to have found that other sources of pollution were inconsequential after indicating that he considered evidence of other foundries and paper mills irrelevant, and having no evidence before him on the point. There was no sufficient evidence to justify a finding that the defendant was adding "substantial concentrations" of sulphur dioxide gas to the normal atmosphere.

Reasons for Judgment—Appeal Book 1, p.46, 58, 61 and 68.

Evidence of *Cahill—Vol. 4*—p.1596 l. 3-14.
The records of the Sulphur Dioxide Recorder during the period when Defendant's plant was closed because of a strike from July 16 to November 1, 1948.

In the Supreme Court of Ontario No. 65 Statement of Law and Fact of Defendant on appeal to Court of Appeal Continued

Exhibit 153—Appeal Book 3, p.412-436.
Exhibit 154—Appeal Book 3, p.459-462.

Evidence of *Plaintiff*—Evidence *Vol. 1*—p. 109 l. 13-28.

Discussion by Trial Judge re other foundries—*Vol. 4*—
p.1520 l. 1-18;
p.1596 l. 15 to p.1597 l. 28;
p.1599 l. 26 to p.1602 l. 26.

Evidence of *Dr. Katz*—*Vol. 3*—
p.1205 l. 15-17;
p.1243 l. 16 to p.1244 l. 9;
p.1245 l. 3 to p.1247 l. 16;
p.1287 l. 12-24; p.1289 l. 2-10;
p.1294 l. 13-16; p. 1295 l. 3-29;
p.1326 l. 7-11; p.1331 l. 3-7;
p.1331 l. 29 to p.1333 l. 17;
p.1345 l. 12-19;
Vol. 4—
p.1448 l. 3-18;
p.1450 l. 18 to p.1451 l. 30;
p.1455 l. 25 to p.1457 l. 1;
p.1461 l. 7-11; p.1490 l. 14-25;
p.1518 l. 3-14; p.1519 l. 10-20.

Gaukroger's Analyses—Exhibits 120-124A—
Appeal Book 1, p.171-180.

Records of Sulphur Dioxide Recording Machine near Defendant's plant:
Exhibit 134—Appeal Book 2, p.192-194;
" 136 " " 2, p.234-248;
" 140 " " 2, p.261-263;
" 144 " " 2, p.295-300;
" 148 " " 3, p.364-370;
" 154 " " 3, p.457-464;
" 161 " " 4, p.538;
" 166 " " 4, p.543-569.

Evidence of *Jarvis*—*Vol. 2*—
p.728 l. 26 to p.729 l. 16;
p.739 l. 10-21.

Evidence of *Beaumont*—*Vol. 2*—
p.616 l. 11-14.

Evidence of *McAlpine*—*Vol. 1*—
p.395 l. 22 to p.396 l. 2;
p.400 l. 14-20;
p.401 l. 25 to p.402 l. 1.

6. The trial Judge erred in finding that the water curtain smoke and soot control systems in the cupolas of the defendant's foundry were defective and inefficient.

Reasons for Judgment—Appeal Book 1, p. 41-42, 49.

Photographs—Exhibits 200A and B—Appeal Book 5, p. 62-63.
Exhibit 195—Appeal Book 5, p. 60.

Exhibits 191, 192 and 193—Models of Cupola and Sludge Tank, and Flow Nozzle (not copied).

Evidence of *Horne—Vol. 4*—
p.1616 l. 12 to p.1621 l. 9;
p.1622 l. 20-29;
p.1623 l. 8-15.

Evidence of *Wilcox—Vol. 4*—
p.1647 l. 2-15;
p.1643 l. 21 to p.1645 l. 13;
p.1646 l. 1 to p.1647 l. 1;
p.1640 l. 8 to p.1643 l. 20.

Evidence of *Campbell—Vol. 4*—
p.1656 l. 6-20;
p.1660 l. 16 to p.1661 l. 17;
p.1663 l. 1 to p.1666 l. 8;
p.1670 l. 1-14.

Evidence of *Gaukroger—Vol. 3*—
p.1053 l. 30 to p.1054 l. 12;
p.1059 l. 2 to p.1060 l. 5;
p.1100 l. 21 to p.1101 l. 4;
p.1102 l. 4-16.

Exhibit 121—Gaukroger's Analysis—Appeal Book 1, p.171.
Exhibit 122—Gaukroger's Analysis—Appeal Book 1, p.173.
Exhibit 123—Gaukroger's Analysis—Appeal Book 1, p.175.
Exhibit 124A—Gaukroger's Analysis—Appeal Book 1, p.180.
Exhibit 124—Gaukroger's Analysis—Appeal Book 1, p. 177-178.

Evidence of *Beaumont*—Evidence *Vol. 2*—
p.576 l. 10-27;
p.579 l. 25 to p.580 l. 3;
p.585 l. 10-20;
p.595 l. 11 to p.597 l. 11;
p.598 l. 6-27;
p.603 l. 11-14;
p.548 l. 1 to p.549 l. 16;
p.552 l. 11 to p.555 l. 30;
p.606 l. 12-30.

Evidence of *Plaintiff*—Evidence *Vol. 4*—
p.1976 l. 1 to p.1977 l. 30.

Evidence of *Edwards*—Evidence *Vol. 2*—
p.640 l. 5 to p.641 l. 18.

In the Supreme Court of Ontario No. 65 Statement of Law and Fact of Defendant on appeal to Court of Appeal Continued

7. The Plaintiff's own smoke stack was the source of some of the smoke and soot of which he complained.

Reasons for Judgment—Appeal Book 1, p.46.

Photograph, Exhibit 196—Appeal Book 5, p.61.

Plan, Exhibit 11—Appeal Book 1, p.94.

Evidence of *Mrs. Webb—Vol. 4*—p. 1926 l. 1-18.

Evidence of *Plaintiff*—Evidence *Vol. 1*—
p.276 l. 2-18;
p.277 l. 6-9 and 28-30;
p.278 l. 1-21;
p.284 l. 10-13.

Evidence of *Dr. Ellis*—Evidence *Vol. 4*—
p.1730 l. 6-9;
p.1730 l. 27 to p.1731 l. 1;
p.1731 l. 8-9.

8. The oily soot on the Plaintiff's greenhouses and flowers was not a substantial or serious nuisance. It was remediable by more frequent washings of the glass and of the flowers, at a small extra cost.

Reasons for Judgment—Appeal Book 1, p.47-48.

Statement of Claim—paragraphs 6, 7 and 8—
Appeal Book 1, p.13-14.

Photographs—Exhibit 19—Appeal Book 5, p. 4.
Exhibit 20—Appeal Book 5, p. 5.
Exhibit 22—Appeal Book 5, p. 7.
Exhibit 28—Appeal Book 5, p.13.
Exhibit 31—Appeal Book 5, p.16.
Exhibit 34—Appeal Book 5, p.19.
Exhibit 106—Appeal Book 5, p.32.
Exhibit 188—Appeal Book 5, p.58.
Exhibit 189—Appeal Book 5, p.59.

Evidence of *Dr. Katz—Vol. 3*—
p.1314 l. 13-23; p.1326 l. 12-15;
p.1331 l. 8-11.

Evidence of *Campbell—Vol. 4*—p.1656 l. 6 to p.1657 l. 3.

Evidence of *Brown—Vol. 4*—
p.1918 l. 22-29;
p.1919 l. 22-25;
p.1921 l. 15-20.

Evidence of *Dunn—Vol. 4*—
p.1809 l. 3-11; p.1816 l. 15-22;
p.1826 l. 1-29; p.1827 l. 7-25;
p.1828 l. 1-9; p.1828 l. 26 to p.1829 l. 11.

Evidence of *Plaintiff—Evidence Vol. 1*—
p.300 l. 25-30; p.301 l. 1-9;
p.194 l. 6-13; p.184 l. 3-25;

Vol. 2—
p.838 l. 10-30; p. 845 l. 2-7 and 19-30;
p.846 l. 1-8.

9. The learned trial Judge cross-examined Dr. Katz and other defence experts at great length. He asked leading questions of the chief expert for the Plaintiff (Jarvis) after the Defendant's cross-examination of him was completed, when he was recalled in reply at the end of the trial. At other times, and to other experts for the Plaintiff, leading questions were put by the learned trial Judge.

Evidence of *Dr. Katz—Vol. 3*—
p.1172 l. 15 to p.1173 l. 30;
p.1177 l. 30 to p.1180 l. 17;
p.1208 l. 10 to p.1214 l. 20;
p.1217 l. 26 to p.1218 l. 22;
p.1236 l. 19 to p.1239 l. 10;
p.1240 l. 20 to p.1242 l. 30;
p.1270 l. 29 to p.1272 l. 9;
p.1276 l. 14 to p.1285 l. 7;
p.1296 l. 8 to p.1298 l. 17;
p.1299 l. 13 to p.1304 l. 26;
p.1306 l. 10 to p.1311 l. 30;
p.1338 l. 23 to p.1341 l. 15.

Evidence of *Dr. Katz—Vol. 4*—
p.1378 l. 28 to p.1381 l. 30;
p.1399 l. 11 to p.1401 l. 7;
p.1412 l. 16 to p.1414 l. 8;
p.1434 l. 20 to p.1436 l. 4;
p.1438 l. 6 to p.1441 l. 17;
p.1494 l. 15 to p.1496 l. 30;
p.1518 l. 15-16 and 29-30.

Evidence of *Dr. Ledingham—Vol. 4*—
p.1528 l. 22 to p.1529 l. 9;
p.1535 l. 4 to p.1536 l. 8;
p.1543 l. 12 to p.1545 l. 4;
p.1551 l. 14 to p.1554 l. 14.

Evidence of *Dr. Crocker—Vol. 4*—
p.1565 l. 16 to p.1566 l. 30;
p.1569 l. 29 to p.1571 l. 20;
p.1574 l. 8 to p.1575 l. 24;
p.1583 l. 14 to p.1584 l. 17;
p.1587 l. 25 to p.1588 l. 30.

Evidence of *Dr. Duff—Vol. 4—*
p.1795 l. 3-27;
p.1802 l. 29 to p.1804 l. 1;
p.1808 l. 8-23.
Evidence of *Dr. Saville—Vol. 3—*
p.1047 l. 3 to p.1051 l. 18.
Evidence of *Jarvis*—in reply—*Vol. 4—*
p.1945 l. 11 to p.1964 l. 26.
Evidence of *Jarvis*—in chief—*Vol 2—*
p.727 l. 4 to p.728 l. 8;
p.733 l. 24 to p.734 l. 24;
p.737 l. 2-17;
p.748 l. 9-26.
Evidence of *Beaumont*—in reply—*Vol. 4—*
p.2018 l. 20 to p.2021 l. 8;
p.2005 l. 11 to p.2007 l. 8.
Evidence of *Beaumont*—in chief—*Vol. 2—*
p.594 l. 2-30;
p.554 l. 21 to p.555 l. 30;
p.564 l. 16 to p.566 l. 10;
p.612 l. 17 to p.614 l. 3.
Evidence of *McAlpine—Vol. 1—*
p.409 l. 22 to p.411 l. 6.
Yuill v. Yuill (1945), 1 A.E.R., 183 at 185 and 189; (1945), p.15 at 20 (Lord Greene, M. R.).
Hvalfangerselskapet Polaris v. Unilever Ltd. (1933), 46 Lloyd's List Reports 29 (House of Lords).

10. Jarvis himself cited Dr. Katz as an authority and agreed with Katz' specimens from Sudbury—Exhibit 168. Jarvis knew Dr. Crocker. Important parts of Jarvis' evidence and certain of his specimens of alleged SO_2 bleach were contradicted by Dr. Katz, Dr. Saville, Dr. Crocker, Dr. Ledingham and Dr. Duff as well as by the Sulphur Dioxide Recorder records above referred to.

Evidence of *Jarvis—Vol. 2*—p.740 l. 9-26;
Vol. 4—p.1935 l. 29 to p.1936 l. 15;
Vol. 2—
p.724 l. 26 to p.725 l. 7;
p.688 l. 12 to p.689 l. 9;
p.720 l. 15 to p.721 l. 19;
p.722 l. 8-17.
Evidence of *Dr. Katz—Vol. 3—*
p.1239 l. 20 to p.1240 l. 10;
p.1353 l. 21 to p.1356 l. 2;
p.1362 l. 28 to p.1364 l. 5;
p.1365 l. 22-25;
Vol. 4—p.1433 l. 1-8.

Evidence of *Dr. Saville—Vol. 3*—
p.1036 l. 15-21;
p.1037 l. 5-9.
Evidence of *Dr. Crocker—Vol. 4*—
p.1565 l. 9-15;
p.1568 l. 24-30;
p.1569 l. 24-28;
p.1571 l. 21 to p.1572 l. 24.
Evidence of *Dr. Ledingham—Vol. 4*—p.1545 l. 5-24.
Evidence of *Dr. Duff—Vol. 4*—p.1787 l. 15 to p.1788 l. 22.

11. The trial Judge gave weight to the defendant's scientific testimony, where it supported the plaintiff's claim, but gave no weight to it otherwise; while at the same time he criticized the defendant and its scientific witnesses for not submitting additional scientific evidence.

Reasons for Judgment—Appeal Book 1,
p.55-56, 57, 58, 59, 60, 61.
Reasons for Judgment—Appeal Book 1, p.42 and 48-49.
Evidence of *Dr. Katz—Vol. 3*—
p.1258 l. 19-25;
p.1259 l. 6-10;
p.1239 l. 20-29;
p.1346 l. 11-20.
Vol. 4—p.1411 l. 25 to p.1412 l. 6.
Evidence of *Jackson—Vol. 4*—
p.1832 l. 16-22;
p.1833 l. 3-5 and 14-18;
p.1833 l. 28 to p.1834 l. 8;
p.1837 l. 2-11.
Evidence of *Gaukroger—Vol. 3*—p.1070 l. 26 to p.1071 l. 10.
Evidence of *Dr. Ledingham—Vol. 4*—
p.1523 l. 17-22;
p.1525 l. 9-30;
p.1533 l. 4-14;
p.1545 l. 5-24.
Evidence of *Dr. Crocker—Vol. 4*—
p.1562 l. 20 to p.1563 l. 15;
p.1564 l. 1 to p.1565 l. 3;
p.1565 l. 9-15;
p.1567 l. 15 to p.1568 l. 12;
p.1568 l. 24 to p.1569 l. 1;
p.1569 l. 24-28;
p.1571 l. 21 to p.1572 l. 24;
p.1573 l. 5-18.

In the Supreme Court of Ontario No. 65 Statement of Law and Fact of Defendant on appeal to Court of Appeal Continued

Evidence of *Dr. Duff—Vol. 4*—
p.1768 l. 26 to p.1769 l. 22;
p.1770 l. 14-26;
p.1771 l. 16 to p.1772 l. 30;
p.1777 l. 18 to p.1778 l. 1;
p.1778 l. 23-30;
p.1779 l. 29 to p.1780 l. 5;
p.1781 l. 7-8;
p.1781 l. 29 to p.1782 l. 9;
p.1784 l. 16-25;
p.1785 l. 11-25;
p.1787 l. 15 to p.1788 l. 22.

Evidence of *Dr. Saville—Vol. 3*—
p.1036 l. 15-21;
p.1037 l. 5-9.

Yuill v. Yuill (1945), 1 A.E.R., 183 at 188-189; (1945) p.15 at 20 (Lord Greene, M.R.).

Approved in *Watt v. Thomas* (1947) A.C., 484 at 489; (1947) 1 A.E.R., 582 at 587.

Hvalfangersolskapet Polaris v. Unilever Ltd. (1933), 46 Lloyd's List Reports 29.

McCann v. Behnke (1940), 4 D.L.R., 272 at 273 (S.C.C.), affirming 1939, O.W.N. 333.

In the Supreme Court of Ontario

In the Supreme Court of Ontario No. 66 Statement of Law and Fact of Plaintiff on appeal to Court of Appeal

BETWEEN:

WILLIAM WALLACE WALKER

Plaintiff (Respondent)

— and —

THE McKINNON INDUSTRIES LIMITED

Defendant (Appellant)

STATEMENT OF LAW AND FACT

on behalf of Plaintiff-Respondent, William Wallace Walker

SLAGHT & SLAGHT
320 Bay Street
TORONTO 1 - ONT.

I N D E X

TO APPELLANT'S STATEMENT OF LAW AND FACT

In the Supreme Court of Ontario No. 66 Statement of Law and Fact of Plaintiff on appeal to Court of Appeal Continued

In the Supreme Court of Ontario No. 66 Statement of Law and Fact of Plaintiff on appeal to Court of Appeal

In the Supreme Court of Ontario

BETWEEN:

WILLIAM WALLACE WALKER

Plaintiff (Respondent)

— and —

THE McKINNON INDUSTRIES LIMITED

Defendant (Appellant)

STATEMENT OF LAW AND FACT

on behalf of Plaintiff-Respondent William Wallace Walker

STATEMENT OF CASE

1. This is a damage action brought by the plaintiff, William Wallace Walker, who has carried on business as a florist and grower in Grantham Township immediately adjoining the City of St. Catharines, at his present greenhouse premises for the past 45 years, specializing particularly in orchids, and maintaining several large greenhouses; and in addition the plaintiff maintains a dwelling house on said premises. The plaintiff also claimed an injunction.

2. The defendant company, having its head office and plant at St. Catharines, is a subsidiary of General Motors Corporation Inc. of Detroit.

3. The above facts are not in dispute, having been put forward by the plaintiff in paragraphs 1, 2 and 3 of his amended Statement of Claim and admitted by the defendant in paragraph 1 of its Statement of Defence.

4. The plaintiff, who is sole owner of his business, carries it on under the firm name of W. W. Walker & Sons and in addition to the greenhouse premises, operates a retail florist shop in the City of St. Catharines.

5. After a lengthy trial at St. Catharines when judgment was reserved, Chief Justice McRuer rendered judgment in favour of the plaintiff for damages for the years 1945 and following years down to the date of assessment of damages, and directed a reference to the Master of Lincoln County to fix the amount thereof and gave the plaintiff judgment therefor and for an injunction, with costs of the action and reference. (See Judgment, A.B.1, p. 31-34).

6. At the opening of the trial applications were made and granted allowing both plaintiff and defendant to call more than three expert witnesses. The plaintiff called an engineer and surveyor, Douglas G. Ure, in opening his case, who verified a plan (A.B.1, p. 75, Ex. 1) and testified to the following distances and facts:

(a) from the centre of the McKinnon cupolas to the centre of Walker buildings—about 600 feet;

(b) from McKinnon's forge shop to Walker buildings—about 430 feet;

(c) estimated height of cupola stacks—60 feet;

(d) total area of Walker property—approximately 45,160 square feet;

(e) buildings numbered 1 to 7 with the area of each, and approximate total—13,334 square feet;

(f) area east of No. 7 greenhouse—approximately 6,500 square feet;

(g) area east of No. 4 greenhouse—approximately 6,000 square feet;

(h) area south of No. 1 greenhouse—approximately 2,400 square feet;

7. The plaintiff alleges and has established that the defendant, who came into existence as a corporation by Letters Patent dated November 30, 1925 (A.B.1, p. 97, Ex. 14), carries on the business of a foundry, forge and machine shop manufacturing automobile parts and engines and other heavy equipment in a large plant located westerly, south-westerly and southerly of the plaintiff's greenhouse property, and as part of the said foundry has since 1938 operated four large cupolas situate about 600 feet south-westerly of the plaintiff's greenhouse and a large forge shop situate about 450 feet south-westerly from the plaintiff's greenhouse.

8. The chief complaint is against the operation of the cupolas and core shop in the foundry and forge shop, and in paragraphs 5 to 11 of the plaintiff's Statement of Claim are set forth these specific complaints which the plaintiff says constitute a nuisance against him and cause him serious damage.

9. The plaintiff sought relief of a two-fold character set out in his prayer as amended by Order of 11th April, made without objection from the defendant (A.B.1, p. 15), reading as follows:

> "(a) Damages for loss incurred by reason of the matters set out in paragraphs numbered 5 to 11 inclusive in such Amended Statement of Claim for the years 1945, 1946 and 1947 and from and after such years down to the date of the assessment of damages in this action."

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and (b) also sought a permanent injunction restraining the defendant from continuing such injuries.

10. On the same date the defendant was allowed (A.B.1, p. 24) to amend its defence and the Record was duly amended.

11. The plaintiff, who had a lifetime of experience as a florist and orchid grower (Ev. Vol. 1, p. 55 l. 13-29; p. 57 l. 5-30; p. 58 and p. 59) gave evidence in great detail covering the operation of his business over the relevant period in this action and has established beyond any reasonable doubt that the operations by the defendant over that period (other than the strike period in 1948) have caused him serious loss and damage. He gave details of each aspect of the causes, such as gas, smoke, fumes and dirt — the deposit of particles of substances such as iron rust, ash and dirt both on the roofs of his greenhouses, obstructing the sunshine, and on his plants, flowers and bulbs both inside and situate in his garden plots outside—and that such injuries were the direct result of the operation by the defendant of its adjacent plant. The trial Judge specifically finds that he accepts the plaintiff's evidence. (Ev. Vol. 1, p. 37).

12. The plaintiff was amply corroborated as to different aspects of the causes of the nuisance and different aspects of the injury done, by the following witnesses who were employed by him over the relevant period, and others who visited his property from time to time for the purpose of investigating and observing the nature of the injuries and the causes thereof:—

John Henry Walker (a son), many years Manager of the greenhouse properties.

George Thomas, many years an employee at the greenhouse properties.

Charles Campbell, many years an employee at the greenhouse properties.

Joseph Scott, occupant of the house on the greenhouse properties since 1947.

Kaleb Steeves, many years an employee at the greenhouse properties.

These men all testified to smoke fumes, dirt and deposits coming directly from the defendant's plant, carried by the wind when in the right direction over the Walker greenhouses and property. They gave various descriptions of the appearance of the smoke and the smells therefrom. All but Scott testified as to the deposit of substances on the plants, bulbs and flowers inside and outside the greenhouses. Cross-examination failed to throw any real doubt on the truth and dependability of their evidence.

13. The plaintiff also called a number of witnesses who were experts in their field, but also each and every one of whom had personally visited the greenhouse property on more than one occasion and had first-hand practical knowledge of the actual conditions observed by him at such property.

14. The plaintiff suggests that the value of evidence by such witnesses who saw the actual conditions and occurrences is greater than the evidence of experts, no matter how well intentioned the expert who had *not* personally observed conditions, might be, and in this regard directs attention to the observations of Chief Justice Robertson on this subject found in *McNiven v. Crawford*, 1940 O.W.N. (on appeal) at p. 324.

EXTRACTS FROM EVIDENCE OF PLAINTIFF
W. W. WALKER
Vol. 1 Ev.

Cupolas hit very hard the first year of operation:
p.95 ll. 1-25

Another neighbour hard hit—similar soil to ours—:
p.96 ll. 19-30
p.97 ll. 1-6

Another neighbour 85% loss due to gas:
p.98 ll. 10-30
p.99 ll. 1-14

Daffodils and tulips—imperfect blooms due to iron and other deposits from McKinnon's. Next year—a few leaves and no flowers—the year after they were gone:
p.102 ll. 20-30
p.103 all page

Shrubs very bad from fumes:
p.104 ll. 23-30
p.105 ll. 1-17

Pansies were good for 20 years—then iron and gas and we lost them:
p.106 ll. 11-30
p.107 ll. 1-19

Jerusalem cherries very susceptible—had to discontinue:
p.107 ll. 22-27

Since gas lost our carnations:
p.108 ll. 1-12

Rented a farm 1 mile north—carnations did well on it:
p.108 ll. 14-30
p.109 ll. 1-13

While strike closed the plant last year, July 16-November 2, over 100 days—a godsend to us—onions and sweet potatoes all improved—delphiniums and mums much improved during shutdown.
p.109 ll. 14-30
p.110 all page

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p.111 all page
p.112 ll. 1-24

Peonies and sweetpeas—we had seven years' success till cupolas came:
p.115 ll. 15-21

Total cost re greenhouses, $62,360.00:
p.118 l. 23

Value now is 75% more:
p.119 ll. 20-26

Stock of plants, bulbs and orchids and so forth, $70,000.00:
p.123 ll. 11-32

June to December dates showing general conditions and results bad:
p.127 to p.129

Many dates and details:
p.130 ll. 16-30
p.131 all page
p.132 all page

Called Jarvis over in July 1947:
p.133 ll. 15-27

Took moving pictures of actual conditions (these were later proffered and objected to and not admitted by the Court):
p.135 ll. 27-30
p.136 ll. 1-5

Took samples off roof of greenhouse as instructed for McAlpine and Tinkien: (p.146 l. 29-30; p.147 l. 1-19).

Delivered direct to McAlpine: (p.148 l. 9-10).

Jarvis took his own: (p.148 l. 11-12).

March 17, 1949, visited defendant's plant under Court Order to inspect it: (p.148); with two experts of ours, McAlpine and Beaumont: (p.148 l. 15-30).

Also present, Mr. Keogh, solicitor, and Cook, superintendent: (p.148 l. 15-30).

Went with Beaumont to top of one cupola in operation—very powerful hot air: (p.149).

Not one cupola where spray was placed correctly in centre: (p.150 l. 25-30).

Result water not effective—parts of cone had a trickle only—distribution not uniform: (p.151).

Wind was so we could lean over cupola—smelled sulphur dioxide —same smell as at our greenhouse: (p.152 l. 6-26).

In forge shop many ovens: (p.153 l. 23-30).

Oil is the fuel—steel ingots are passed along: (p.154 l. 1-22).

Very heavy fumes—no chimney from which to escape: (p.157).

Forge shop fumes—seen from outside—came through roof—no

device to clarify deposits of oil coming out: (p.158 l. 11-30).
Exhibit 17, photo of cupolas—fumes seen similar since 1945: (p.159 l. 1-30).
Forge also—oil and smoke coming out: (p.160 l. 4-14).
Exhibit 18, photo—smoke comes over (p.161 l. 12-30) our greenhouse (p.162 l. 10-19)—both oil and iron together (p.163 l. 21-28) —requires acid to remove (p.164 l. 1-12).
Exhibit 19, photo of No. 7 greenhouse shows washed and dirty: (p.165 l. 1-28)—20% loss: (p.165 l. 26).
Exhibit 20—taken 1946—cannot get proper growth—light is essential: (p.167 l. 1-22).
Not over 50% protection: (p.168 l. 12-17).
Exhibit 21, photo—smoke from cupolas: (p.169 l. 1-7).
Exhibit 24—test plot of McKinnon's—white spot on gladiolas not healthy or normal: (p.171 l. 4-21).
Exhibit 26 shows burning on our place: (p.173).
Exhibit 33 shows gas and so forth—plants suffering: (p. 180 l. 1-12).
Washing glass good for ten days only—costs $350.00: (p.184 l. 3-14).

Counsel consents to witness referring to his diary (p.214 l. 14).

Plaintiff recalled (Ev. Vol. 4, p.1910); files Exhibit 197, a comparative statement of Plaintiff's greenhouse sales before and after strike period at Defendant's plant.
Exhibit 198 (p.1911 l. 6) memo of gross sales greenhouse and store, 1943, 1944, 1948 (put in at express request of Mr. Keogh, l. 14-20).
Exhibit 199, financial statement re plaintiff's greenhouse for 1947 (l. 29); (p.1912 l. 3-4 and 24-27).

PLAINTIFF'S EVIDENCE AS TO DETERIORATION OF HIS FLOWERS AND PLANTS WAS CORROBORATED BY SEVERAL WITNESSES — PARTICULARLY JOHN WALKER, A SON (Trial Judge found such corroboration) AB1, p.51:

JOHN HENRY WALKER—reference to evidence, Vol. 1, p.473 to 498—
Twenty years superintendent of the greenhouses: (p.474 l. 1-2).
No trouble prior to 1938 when cupolas erected (p.475 l. 11-30) and forge shop first set up—continued and got worse: (p.476 l. 18-23).
Substances came from McKinnon's: (p.477 l. 14-16).
Prevailing wind is south-east: (p.477).
Describes fumes in detail: (p.478).
Grey ash—powder form—little white flecks: (p.478 l. 5-13).
Worse on muggy days: (p.478 l. 14-22).

I made diary entries in 1946—gas and oil and smoke—all the bloom had to be washed—same came from McKinnon's: (p.486 l. 7-30).
Lot of smoke from cupolas on April 6th, 1946: (p.486 l. 28-30).
April 9th—same thing: (p.487 l. 14-15).
April 16th—the same (p.487 l. 19-24).
April 18th and 20th—had to wash plants again (p.488 l. 25-30); (p.489 l. 1-2).
Pages 490 to 492 inclusive contain many specific dates and detail.
Exhibit 67, being 1946 diary, put in by consent of defendant: (p.494 l. 20-25).
Exhibit 68, 1947 diary, put in on same basis: (p.496).
Exhibit 69 is 1948 diary (p. 497 l. 7).
We brought Jarvis on—I was there when he looked them over in July, 1948: (p.497 l. 1-19).
Smelled gas from McKinnon's: (p.507 l. 1-4).
Exhibit 70, 1949 diary, put in by consent (p.509 l. 8-16).
Vast improvement during the close-down September 1948 over 1947: (p.510 l. 17-30; p.511).

LESLIE DWYER—
Fruit farmer a mile northerly from Walker (p.422 l. 1-8).
Travelled down past there many times a week: (p.422 l. 28-30; p.423 l. 1-2).
Saw smoke and haze from McKinnon's over Walker's many times in a year and a half: (p. 424 l. 4-30).
You could taste it—chemical taste—you want to spit it out: (p.425 l. 3-12).

GEORGE THOMAS—
Worked twenty years at plant, except out five years overseas—took samples for McAlpine with a little vacuum cleaner: (p.430 l. 7-30).
Shipped same by express (p.431 l. 1-9).
Could see McKinnon cupolas and forge shop—fumes and smoke—you would kind of duck like—smell also: (p. 432 l. 9-30).
Verifies Exhibit 62 as samples of black cotton he took: (p.433 l. 1-9).
I put down dates of time and taking: (p. 434 l. 16-18).
Verifies Exhibits 64 and 65 same way and says information on slips is correct: (p. 435 l. 5-22).
Verifies Exhibit 66 also: (p.436 l. 1-4).
Verifies Exhibit 26—he is in the picture—the leaves all yellow—right down the leaves is a yellowish brown: (p.432 l. 6-30).
Verifies picture taken same day on McKinnon's trial plot—gladiolas shown are injured: (p.433 l. 1-29).
Exhibit 28—witness in picture, September 5, 1947—gladioli completely damaged: (p.445 l. 1-26).

Verifies Exhibit 29 on McKinnon test plot: (p. 445 l. 27-30).
Unhealthy plants: (p.446 l. 1-27).
Washed No. 7 greenhouse with muriatic acid—water wouldn't do it: (p.449 l. 10-30; p.450 l. 1-26).

JOSEPH SCOTT—
Lives in the house on the greenhouse property—since September, 1947: (p.466).
Frequent fumes from McKinnon's—unpleasant odour like burnt paint—gets down my throat and in my stomach: (p.467 l. 10-30).
Smelled so bad had to close our windows in summer time: (p.468 l. 8-13).
Front hall very black from smoke: (p.469 l. 13-17).

CALEB STEEVES—
Night watchman at Walker's since 1942: (p.512).
Since 1945 has been bothered on muggy nights—cloud of gas—smells like rotten eggs: (p.513 l. 19-30; p.514 l. 29-30).
Affects my stomach—made me dizzy—one time hung up my hoe and quit: (p.515 l. 1-14).
A sort of gummy substance covers the greenhouse glass and darkens it: (p.518 l. 16-19).

JOHN CAMPBELL—
Worked for Walker since before 1945, to date, except November 1942 to November 1945, when away at war: (p.755 l. 17-26).
Smoke and fumes from McKinnon plant troubled Walker plant—from cupolas and forge shop—disagreeable, irritating odour—blue haze: (p.757 l. 7-30).
From November 1945 to present time, leaves a coating on roof—very hard to get off—like a film—identifies Exhibit 58 as a fair sample: (p.750 l. 7-30).
Affects plants and leaves inside and outside the greenhouses—they don't grow too well: (p.759 l. 1-21).

HARRY HESTER, called by plaintiff—
Worked from 1938 to July 1948 as foreman for McKinnon's—parted friendly with them—was on both night and day shifts: (p.525 l. 10-30).
Normal use of cupola was a coke fire in the bottom and blowers to induce updraft: (p.528 l. 14-30).
When fire going well, scrap and pig iron put on top of it through a side opening—molten metal then taken off from floor below: (p.528).
Fumes from cupola chimneys give dark grey smoke—vary in intensity—also shade—sometimes very dark—also dark grey—sometimes almost white—other times a little yellow tinge: (p.530 l. 17-30).

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Sixty-five to seventy tons molten metal per nine-hour shift per cupola — went through — sometimes three cupolas running: (p.531 l. 5-25).

EXPERT WITNESSES CALLED BY THE PLAINTIFF ARE:

KENNETH LANGRILL McALPINE—(Vol. 1, p.325)—

Qualifications as a chemist and grower of orchids (Vol. 1, p.325-328).

1919-20 employed under Professor Joslyn Rogers at Toronto University—one year while at chemistry course.

1923—graduate of Queen's—degree of B.A. in chemistry.

1925—M.A. from Toronto University in biochemistry.

1923-26—on the staff of Connaught Laboratory in research work on insulin under Doctors Banting and Best.

1926-31—Manager of Insulin Department of H. K. Mulford Co. of Philadelphia, who were licensees for Toronto University for manufacture of insulin in the United States. This Philadelphia work was directly connected with chemistry research.

1933-39—became Chief Chemist of E. B. Shuttleworth Company in Toronto, manufacturers of chemicals and pharmaceuticals.

1939 to date—Chief Chemist for Synthetic Drug Company.

Fellow of Canadian Institute of Chemistry.

Experience in two distinct fields of chemistry—biological and synthetic.

Several years' personal experience in growing orchids with a private collection augmented by purchase of a portion of the Flanagan orchid collection—including several years' experience as consultant to Colonel J. W. Flanagan regarding care and growth of his collection at Divadale.

British Orchid Review published in 1947—paper and article by McAlpine on growing orchids.

First consulted by Walker in July 1947.

Made many visits to Walker plant and surrounding premises during his investigation (Vol. 1, p.329 l. 25).

p.330 l. 5-15—Through all the greenhouses ferns discoloured.
l. 24-30—Lily of valley—discoloured.
p.331 l. 1- 3—Decidely unhealthy.
l. 4-10—Grapevines unnatural brown.
l. 20-29—Fruit trees unhealthy.
p.332 l. 29-30
p.333 all —Sample from roof—analyzed Exhibit 43.
p.334 l. 15-26—43% iron oxide.
p.336 l. 1- 7—Came from cupolas.

p.337 l. 13-21—1.7% sulphur from fumes of SO_2 passing over.
p.339 l. 6-16—Bottle, Exhibit 44, viscose sticky—strong smell crude oil—sample from roof.
p.346 l. 15-25—Exhibit 46—off roof 45% iron—several pages, bottles of ferric hydroxide off roof of his greenhouses.
p.350 l. 8-30
p.351 all —Samples Exhibit 54—Miller, Toronto.
Samples Exhibit 55—Naughton, Toronto.
Samples Exhibit 56—Doughty, Oakville.
Samples Exhibit 57—Lorimer, Port Credit.
p.351 l. 25-30—Difference most conspicuous.
p.352 all —Sulphur dioxide—highly deleterious to plant life (l. 16-17).
p.354 l. 17-30—Exhibit 58—prevents orchids getting light they
p.355 l. 1-21 need—would get only a minute fraction through this.
p.361 l. 7-30—Visited plant again July 2, 1948—dismal effect both from deposit on roof and on the *leaves*.
p.362 l. 16-30
p.363 l. 1- 3—Serious effect on the orchids.
p.366 l. 12-18—To Court: Cut off of light as per meter measurements 65% to 85% instead of a 20% normal.
p.368 l. 20-30—In forge house—opaque.
p.369 l. 1- 7—Black smoke—no device,—
l. 17-20—to ameliorate its density before it escaped.
p.370 l. 4- 5—Black smoke from forge house.
l. 6-10—From cupola—white—grey and rusty.
p.371 —Test, March 19, 1949,
l. 8-30—on snow on ground.
p.372 all —Took samples in jars on property—then on filter papers.
p.373 —Exhibit 59 (l. 10-30)—from 1 quart melted snow and iron.
p.374 —Exhibit 60 (l. 13-22)—from front forge shop.
p.377 —Exhibit 61 (l. 1-9) map, blue pins show places where iron was deposited.
p.390 l. 15-24—My snow tests showed effects of sulphur dioxide.

The plaintiff submits that the result of McAlpine's testimony with detailed analyses (properly made) and exhibits filed, shows clearly that the defendant damaged the plaintiff in the following respects:

(a) by obstructing the light and the beneficial violet rays to the extent of at least 50% of what should have gone through the roof;

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(b) by deposits of iron and ash soot and dirt on the plants, bulbs, leaves and flowers;

(c) by diffusing harmful gases over the plants, bulbs and flowers, both inside and outside the greenhouses, including SO_2 as was demonstrated by the snow samples and other samples.

The trial Judge refers to this evidence as follows: "The witness McAlpine, in whose evidence I have confidence." (A.B. 1, p.43 l. 7.)

JOHN S. BEAUMONT—(Ev. p.540)—

Qualifications—p.540 to 542 l. 12.

Engineer—graduate from Sheffield University in 1906.

Worked for several steel companies in England.

Practised as consulting engineer in Birmingham.

Came to Canada in 1912.

With Ford Company at Windsor, 1912 to 1941, barring time out in the army, first war 1914-20. During first war was placed by General Curry and on his staff acting as officer in charge for Canadian Army for all defensive measures against gas attack, respiration, etc., for two years. During last war did consultant work under Mr. Howe for Munitions Branch in 1941, and made special trip to England for Howe on munitions and metallurgical work in 1941.

Now living about six miles from St. Catharines, but doing consultant engineering work for the Dominion Government and other clients in metallurgical field.

Visited McKinnon's on two occasions during the last war for Mr. Howe of Dominion Government, to maintain production and deal with some troublesome problems in defective castings.

Came into Walker matter September, 1948, to advise on conditions (Ev. Vol. 2, p.543 l. 1-7).

Made many visits to his greenhouses.

Visited McKinnon plant in March, 1949, pursuant to Court Order—quality of coke now used has deteriorated—also impurities in coke and scrap iron which were not there in earlier years (p.544 l. 8-30).

p.545 l. 1- 4—This would increase sulphur from chimney.
l. 5-28—Describes the cupola process.
p.546 l. 12-30—On March visit went to top of cupola chimney—Mr. Walker also came up—no one for the other side.
p.547 l. 20-30—Examined all three cupolas.
p.548 l. 17 —That made a very inefficient wash.
l. 22-30—Water not delivered in sufficient quantity.
p.549 l. 4- 7—A space that got no water at all.
l. 17-30—There are two other well-known systems.
p.550 l. 1- 5—McKinnon system ineffective because water was slimy—and had been used before.

l. 15-17—*A chain system* would be *more efficient* in stopping rust and fumes.

l. 18-30—When they used nozzle system with slimy water, nozzles clogged and efficiency nil.

p.551 l. 1- 5—McKinnon went backwards as to system instead of forward.

p.552 l. 11-30—Ford Motor use clean water and three times as much—and get much better results.

p.553 all

p.554 l. 29-30

p.555 l. 1 —Gases escape anyway with the curtain wash system.

p.556 l. 17-23—There are two other devices—also the Schneible Wheling.

p.557 l. 3-12—Saw scrap piles—fairly rusty—because in the open and rain makes them rusty.

l. 13-30—Shown Exhibit 18—has seen smoke in greater volume from forge shop and cupolas—same would be definitely consistent with the damage to Walker, including orchids.

p.558 l. 1-26—Soot issues—carbon nut bronze—will show itself in gases—soot and smoke filter out the solar rays, i.e., violet rays, and these are so essential to plant life. I have specialized on violet rays in lab work.

p.559 l. 1-26—Scraped some glass which I had taken from roof—dissolved it—found 50% of it iron in the form of rust.

p.560 l. 1-11—This rust would definitely filter out the solar rays.

l. 12-16—Very deleterious to plant life.

p.561 —Shown Exhibit 25, taken March 14, 1949—and time I saw it that day—it was in a heavier cloud than shown in Exhibit 21.

p.562 l. 23-25—Identifies bottle, Exhibit 46, as iron hydioxide.

p.566 l. 11-30—Shown Exhibits 59 and 60, analyzed by McAlpine.

p.567 l. 14-15—These are typical of deposits from a foundry.

p.569 l. 8-16—This gas, as plant breathes it, kills the chlorophil—this is definitely happening at Walker's.

p.572 l. 4- 6—You have very little effect from an air furnace—but a very definite effect from the cupolas.

NOTE: The trial Judge says about this witness: "I prefer to accept Mr. Beaumont's evidence as to what he saw, etc." (A.B.1, p.42 l. 7).

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JOHN BURGENER—(p. 765)—

Physicist and spectromagraphist of Toronto University.

p.766 l. 1- 8—Aluminum Co. of Canada for years; now a consultant with own office.

l. 20-30—Made spectrographic analyses of glass samples furnished me by Walker.

(Walker re-called to identify Exhibits 98, 99 and 100, taken from his greenhouses and given to Burgener, April 22, 1949. In same condition now except no clean spot on each when delivered. (Ev. p.763 l. 1-30; p.769 l. 1-22.)

(McAlpine re-called to identify Exhibit 102, given by him to Burgener, taken from Miller's greenhouse in Toronto. Ev. p.770 l. 18-30.)

Burgener resumes:

p.772 l. 12-28—Cleaned one corner—then used Tungsten lamp—and photos of clean and dirty part—99 and each

l. 29 sample—files his report as Exhibit 103.

p.773 l. 27-30

p.774 l. 4- 6—Report shows only 16% of light gets through

l. 17-30 the dirty glass.

p.776 l. 1-12—Sample 2, Ex. 100—absorbed by dirt 63% (l. 6).

p.777 l. 2- 3—Sample 3, Ex. 101—57% absorbed.

l. 4-12—Sample 4, Ex. 98—10% and 50% only absorbed by dirt (Taylor's greenhouse).

p.778 l. 20-30—Miller's (Toronto) sample, only from 5% to 20% light absorbed by the dirt.

p.779 l. 1- 2—Glass is standard in each case.

p.780 l. 4-30—Black part on Exhibits 99A, 100A, 98A, 102A shows light absorbed by dirt on each.

JOHN C. ARMOUR—

Florist and grower, Montreal (p.782 l. 20-30).

Member of firm of Wiltshire Bros.

p.783 —Visited Walker plant August or September, 1945.

l. 3-24 Dust fumes and smoke coming from McKinnon cupolas and forge shop that day.

p.784 l. 4-30—Plants not healthy—film of dust or soot on practically everything — damage to orchids and Boston ferns—seemed to permeate the whole building.

Had bought for Walker for twenty years until 1944—bought nothing since.

p.785 l. 16-30—At plant today before trial—took samples.

p.787 l. 6-29—For 1944 and 1945 was appointed Field Man for our association, Allied Florists and Growers of Canada—travelled across Canada—Halifax

to Windsor—interviewed florists, growers and retailers to put them right on troubles in production and marketing of flowers—help, grading, etc.

l. 23-24—Visits were educational.

p.788 l. 1- 7—Visited 400 or 500 greenhouses.

p.792 —Samples show chemical reaction.

l. 7-20—Files Exhibits 104, A, B, C, D and E.

l. 28-30—The deterioration is not disease—but outside influence.

p.794 l. 24-30—Not healthy—burnt and colour changed.

CECIL B. GAUTBY—(p. 806)—

p.806 l. 10-30—Florist for 35 years—general course, Guelph Agricultural College—15 years with Dale people, Brampton—3 years with Calverts at Brampton.

p.808 l. 1- 9—Visited Walker's for 19 years up till 1940 and

l. 10-15—bought stock from him for Dale prior to 1940—his stock very good—suitable for Dale's trade.

l. 16-30—Gap till 1946 visit.

p.809 l. 1-18—Carnations very sickly—ready to throw out—too dirty for retail trade—on account of dirt and quality.

l. 19-22—Both carnations and general run of stock.

l. 26-30—There again in 1947—March and also in fall—burned leaves were injured—sickness from an outside influence.

p.810 l. 12-24—Visit in December, 1948—changed from previous December (strike had shut plant).

p.811 l. 21-30—Yesterday and this morning (during trial) plants and leaves very dirty and dusty and grimy looking. This morning dense smoke from cupolas.

p.812 l. 17-24—Driving smoke right through Walker's gardens.

p.813 l. 1- 5—White blooms absolutely destroyed—no use for sale.

l. 20-24—No evidence insect pests or disease on any visit.

JACK COOPER, photographer—(Vol. 2, p.847)—

Deals with defence photo, Exhibit 106, and shows sun on glass—magnifies the apparent clarity of the glass (p.848 l. 9-30)—and if showing down and reflecting back into the camera, it will look like clear glass (p.848 l. 22)—it would wash out detail (p.848 l. 26-28).

Counsel begins to show witness photographs filed as exhibits (p.849).

Counsel for defendant makes statement to shorten evidence: "I am not questioning any photographs that have been

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put in that have been identified by witness from time to time, such as Mr. Walker saying this is a photograph of my greenhouse, and so on" (p.849 l. 23-29).

LARRY EDWARDS—(p.629)—

Qualifications—p.629 l. 1-21.

Plant engineer with McKinnons (p.629 l. 29-30) from 1941, with war until 1944 (p.630 l. 1-5). They were working three cupolas and electric fans—fairly heavy production (p. 630 l. 6-11).

Learned Walker having trouble, as plant engineer went over—met Walker there (p.630 l. 12-30)—went through all his greenhouses to investigate.

Directed by the company to investigate Walker's claims for injury.

Examined his greenhouses—found his plants covered with a heavy dust or material.

Saw the entire plant—saw orchid leaves discoloured—big white chrysanthemums had a greyish tinge. I took the bloom and shook it over a piece of paper and got a deposit of dust and dirt particles (p.631 l. 4-30).

Went back and reported and was then assigned the task of trying to prevent this (p.632 l. 1-13).

Had "Whiting" device literature and recommended their installation—the company rejected same as too expensive—was asked to find a cheaper method (p.632 l. 14-27).

Finally found a device of light drop chains and recommended those, a cheaper method, which were installed (p.632 l. 28-30; p.633 l. 1-14).

Kept close watch and kept in touch with Walker, and chains were helping but were not eliminating the trouble (p.638 l. 10-14). We couldn't catch all the particles. Moreover, this device caught no gas, but just solids.

During 1942 got samples off deposits on the leaves of plants and flowers into an envelope from various parts of Walker's greenhouses—mailed these under instructions (p.636 l. 12-24).

Roofs of greenhouses had a copper coloured oily scum on them (p.637 l. 3-12).

NOTE: The trial Judge relies on his evidence in some detail. (A.B.1, p. 40 l. 9 to p.41 l. 2.)

HARRY G. TIENKEN, of Syracuse, N.Y.—(Vol. 2, p.645)—

Chemist by profession—graduate Master of Science from Massachusetts Institute of Technology, Cambridge, Mass. Practised since 1922.

Was with Industries of America—Walter P. Lasher Holding Company of New York, for eight years, covering work in American Chain Company, Bridgeport, Connecticut—Bridgeport Glass Manufacturing Company, Onadaga Steel Asphalt Products Company—Parrott Paint & Varnish Company.

Assistant Chief Chemist to Holding Company.

Has had experience in analyzing for poisons in plants since 1930 (p.646 l. 10-21).

Orchid grower also for past seven years—have my own greenhouse (p.646 l. 22-28).

Visited Walker plant in fall of 1947 (friendly call).

Also visited Dales in Brampton (p.647 l. 16-24).

My first visit was extremely disappointing in general condition of his plants—lack of feeding roots and long, lean, starved appearance—leaves much elongated (p.648 l. 11-23).

Mr. Keogh consented to letters being filed (p.653 l. 22).

Walker sent me samples which I analyzed. See analyses Exhibits 72, Aug. 16, 1948 (A.B. 1, p.149) and 73 (A.B. 1, p.150) —heavy iron contents, and in quantity found would cause damage to any growing plant (p.654-55).

Visited greenhouse again on October 25, 1948—further samples—plant not running—amazingly improved conditions (p.651 l. 10-30; p. 652 l. 1-15).

These conditions unhealthy for the growth of orchids and other plants (p. 657 l. 7-21).

TENNYSON D. JARVIS—(Vol. 2, p.676 to p.679 l. 5)—

Graduate Ontario Agricultural College, 1900—specializing in biology.

Post-graduate course at Cornell University in 1904-6 in plant pathology, plant histology, plant physiology—post-graduate work, Oxford University, in 1912-13, in biological and biochemical subjects.

Experience:

Appointed to staff of biological department, Ontario Agricultural College, in 1900. Except for time off for post-graduate studies, continued with department until 1914, acting successively as demonstrator, lecturer and associate professor in plant pathology, entomology and zoology.

1915-35—plant pathologist and investigator of SO_2 plant damage claims for International Nickel Company.

During period also acted as SO_2 consultant for Mond Nickel and British American Nickel.

Tour of United States and Canadian smelters, 1920, to study SO_2 problems in Western Canada and United States.

1925-30—fruit growing at Grimsby.

1930-44—in charge of agricultural research at Ontario Research Foundation. While there acted for several years at request of the Ontario Government as inspector of SO_2 damage claims for Niagara Peninsula fruit growers.

Have lived on and operated fruit farm in Grimsby district from 1925-1948.

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Consulted by Mr. Walker in August, 1946—made first examination of his greenhouses and surrounding area then. Found markings on many plants, inside and outside, and on cultivated and natural flora north and east of McKinnon plant, showing typical SO_2 markings (p.679 l. 6 to p.681 l. 30).

Found a few dead and sickly trees with symptoms of SO_2 injury. Convinced that the damage was of SO_2 origin.

Suggested Walker plant a check plot, which he did (p.679 to p.685).

Mr. Jarvis then gave a detailed history of his many, many visits to the plant down to the present time. These visits were made the next day or a few days after he would receive word of new bleaches, which he immediately examined.

The following exhibits show part only of the result of his intensive supervision over this business:

Exhibit 74—gladiolus leaf, June 17, 1947.
Exhibit 75—grape leaf, June 17, 1947.
Exhibit 76—Lombardy poplar leaf, June 17, 1947.
Exhibit 77—sweet peas, July 9, 1947.
Exhibit 78—(a) sword fern specimen, July 16, 1947.
(b) sword fern specimen, July 16, 1947.
Exhibit 79—gladiola leaf, July 31, 1947 (tips injured).
Exhibit 80—apricot leaf, July 31, 1947 (brown markings of SO_2).
Exhibit 81—peach leaf, July 31, 1947, from neighbour's place.
(p.685 l. 17 to p.696 l. 12.)

In fall of 1947 saw chrysanthemums injured—the brown had faded to an insipid yellow.

Shown Exhibit 32, a photograph of mums in 1946, witness says this was chronic injury from SO_2 (p.697 l. 8-22).

1948, visited plant several times.

June 11, 1948, saw first bleaching.

Exhibit 82—gladiola leaf, June 26, 1948.
Exhibit 83—apricot leaf, June 26, 1948.
Exhibit 84—prune plum leaf, June 26, 1948.
Exhibit 85—oats from Walker's test plot, June 26, 1948.
Exhibit 86—barley from Walker's test plot, June 26, 1948.
(p.698 l. 10-30 to p.701 l. 30.)

Series of Specimens taken July 7, 1948:

Exhibit 87—plum leaf.
Exhibit 88—peach leaf.
Exhibit 89—(a) and (b) fern.
Exhibit 90—(a) and (b) grape leaf.
Exhibit 91—gladiola from Walker test plot.
Exhibit 92—peony leaf from neighbour's garden.
Exhibit 93—garlic from neighbour's garden.
Exhibit 94—garlic from neighbour's garden.
Exhibit 95—apricot leaf, ⅝ mile from McKinnon plant.
(p.702 l. 5 to p.706 l. 23.)

All the injuries on above Exhibits 74-95 are due to SO_2 (p.704 l. 25).

From the McKinnon plant (p.706 l. 2-3).

Light

Mr. Jarvis had fourteen years' work on it in Research Institute (p.708 l. 7-17).

Found the light in Walker's greenhouses dismal, although washed occasionally. Shown Exhibit 19, photograph of greenhouse roof, indicates very unfavourable condition in which to grow flowers.

All flowers require light, especially in winter—it controls blooming and fruiting (p.708 l. 18-30 to p.710 l. 16).

Shown Exhibit 26, photograph, August 7, 1947 (upper lot of plaintiff), shows SO_2 marking—this from test plot of Walker.

Exhibit 27, photograph, August 7, 1947 (test plot of McKinnon), shows SO_2 markings (p.710 l. 17 to p.711 l. 18).

Shown Exhibit 96 (a) and (b)—orchid leaves from Walker's greenhouse taken April 26, 1949—half rubbed off. Says this dirt is residue of smoke—has iron in it.

Effect reduces intensity of light and starches and sugar, and retards growth and blooming.

Spray would not get the dust all off.

Soot always clogs up stalk (p.713 l. 29 to p.720 l. 1).

On cross-examination to Mr. Keogh, Mr. Jarvis states:

The 15 parts per million of SO_2 would cause injury.

Eight or ten hours with a low concentration of high humidity are favourable conditions for SO2 injury (p.720 ll. 5-27).

Respondent submits there is no greater authority in America today than Mr. Jarvis with regard to the problems here involved. His character and integrity are unimpeachable and Respondent submits that the Court can with safety adopt this evidence where it may conflict with other supposed experts.

Respondent notes that the Appellant's witness, G. B. O. Saville, from Experimenal Farm, Ottawa, admitted that if the injuries found by Mr. Jarvis occurred overnight as Jarvis stated, he was not then able to say that they were caused by disease, and that disease injuries cannot occur overnight. He further admitted that single plants taken away from their surroundings (such as the two meagre samples brought to him) did not always give a fair picture, and that if he were called to a grower's plot he would have no difficulty in correctly diagnosing cause.

JOSEPH WATSON—(p.749)—

p.749 l. 14-19—In charge Dominion Meteorological Service.

l. 21-30—Southwest winds taken east part of St. Catharines:

1946—173 days
1947—196 days
1948—182 days

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p.750 l. 21-26—1945—ran about the same.
p.751 l. 11-13—Personal observation and recorded same.

THE CONTRAST IN EXPERT WITNESSES CALLED BY PLAINTIFF AND DEFENDANT

The witnesses called by the plaintiff as experts are unimpeachable in character and experience:

1. MCALPINE—vast experience, including work with Dr. Banting.
2. BEAUMONT—vast experience, having been expert adviser to Ford Motor Company for years, and entrusted by General Curry with the gas defence problem for the whole Canadian Army in the first war.
3. JARVIS—vast experience and ten years with International Nickel and Mond Nickel as adviser, and investigator in adjustment of claims at Sudbury.
4. TIENKEN—an experienced orchid grower.
5. ARMOUR—President of the Canadian Florist Association.
6. GAUTBY—Fifteen years with Dale Estate and now with Calverts in Brampton.

Against these six, defendant relied chiefly on Morris Katz and Lance Dunn.

The Court had opportunity to observe the demeanour of these rival experts and to appraise their respective dependability, and did so adversely to the defendant.

Such appraisal resulted in the acceptance of the evidence of the witnesses for the plaintiff.

DEFENCE EVIDENCE ANALYZED

McKinnon's opened their defence with a witness, young Ericson, from Bondbrook, New Jersey, 30 miles from New York, employed by "Thomas Young" Orchids Incorporated—growers.

Ericson admitted he was neither a metallurgist nor a graduate chemist, and that his academic experience consisted of one year of two terms at Rutgers College, where he took a course in nursery practice, but not in chemistry (Vol. 3, p.884 l. 2-13).

It is respectively submitted his evidence is practically worthless, and no answer whatever to the volume of evidence given by the plaintiff showing actual conditions at the Walker greenhouses and the McKinnon plant, and the actual results to the Walker products.

His plant burned no bunker oil or crude oil (Ev. p.887 l. 20-22).

Ericson admitted that the Bondbrook climatic and humidity conditions were not the same as St. Catharines (p.899 l. 22-30), and that he knew nothing of them at St. Catharines (p.900 l. 1-13). He had never been inside the Walker greenhouses (p.903 l. 4).

He was unaware that over the period of years McKinnon's had subjected Walker to deposits on his glass roof and plants, which contained 45% iron, .2 manganese, oily substance and tar (p.891 l. 5-16). He said loss from soot "*as a nuisance*", involved selling injured plants at 25c a flower less.

Shown Exhibit 104A and B (samples taken by Mr. Armour showing burns), he admitted that as a grower he could not say whether the injury was caused from burn or other possible reasons. He admitted "they may be the result of SO_2" (p. 897 l. 18-29).

HARRY LONGHURST, called by defence—(Vol. 3, p.916)—

This witness was an electrician who verified photographs of certain machines which were installed under direction of Dr. Katz. He admitted he knew nothing of the actual operation of the machines nor of the reason for the liquid mixtures that were used in them, nor of the processes which it may be suggested they were able to perform, so that his evidence amounts to nothing more than a history of the alleged testing apparatus being set up and certain recordings that he put down, and sent on to his superior without a knowledge of their applicability to this case. (Ev. p.958, Vol. 3, l. 20-30; p.959 l. 1-5.)

Admits wind carried McKinnon smoke over the Walker greenhouses—and had smelled the oily smoke (p.967 l. 24-29).

REGINALD WILLIAMS—(Vol. 3, p.973)—

Foreman—second chief chemist and for part-time assistant chief metallurgist employed by McKinnon's from February, 1941, to October, 1945, and now employed with Canadian Westinghouse at Hamilton.

This witness took certain analyses (Exhibits 117 and 118), which he admitted were not complete analyses but only partial, with respect to only two of the gases in question.

His exhibits (A.B.1, p.167-68) show that the sampling did not purport to be concurrent at the foot of the cupola and the exit from the chimney, the first of which were taken on August 3rd and the other samples taken August 4th to 8th, making it impossible to get relative conditions at the two points (Vol. 3, p.1000 l. 17-27).

Exhibit 119 shows escaping SO2 gas from the chimney as high as 3.5 parts to a million (Vol. 3, p.989). Witness was unable to say that .12 parts of a million would not injure plants.

He admitted that owing to the re-use of the water in the tank below over and over again, the holes in this system would become clogged, and the maintenance of same would affect the economy of it (Vol. 3, p.998 l. 23-29; p. 1000 l. 1-6).

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He utterly failed to show any proper inspection, either by himself or anybody else, of this system, which was supposed to extract both solids and gases before the same left the cupola chimneys to spread over the neighbours' property.

Same smelly and fumey residue from oil from forge shop going over Walker's. Devices might have lessened the nuisance (p.1026 l. 24-30).

DR. DOUGLAS SEVILLE—

This witness from the Experimental Farm at Ottawa had two small samples delivered to him at his lab in Ottawa (of which he did not know the source). Never had been at Walker's (Ev. p.1046 l. 16-17).

G. K. GAUKROGER, Chief Metallurgist at McKinnon's—

Supervised sampling of ore and made limited analysis (never making a complete analysis).

Exhibit 121—report dated April 18th of gas analyses at cylinder iron cupola—four samples record SO_2 on the charging floor and at the roof outlet.

First sample shows 24 and 9 parts per million. This means, of 24, they caught 15 in their wash and 9 went out the chimney.

Exhibit 122—April 19th—covers six samples (Ev. p. 1082 l. 29-30; p. 1083 l. 1). The third shows 6 and 5, which means they caught only 16 2/3% of the gas in the cupola and 83 1/3% went out the chimney.

Gaukroger admitted that this extreme loss might have occurred many times through the years.

Exhibit 123—April 19th—the fourth item shows 6 and 2, which means 4 caught; that is, they caught 66 2/3% and lost 33 1/3% out the chimney (Ev. p.1082 l. 22-28; p.1083 l. 1-10).

Gaukroger admitted that from January, 1945, to date he had only personally glanced at the wash cone once (Ev. p.1086 l. 22-30; p.1087 l. 1-4).

He made the further startling admissions that from August and July, 1945, when Williams did similar tests (see Williams' results, Exhibits 118 and 119)—

(a) the defendant knew before Williams made his tests that Walker was complaining and threatening suit;

(b) that they never made a similar test from August, 1945, until the tests in April, 1949, with one exception;

(c) the exception was a test made one month ago by the witness, the record of which he destroyed and gives no reasonable explanation for destroying it.

(Ev. p.1127 l. 5-11; p.1130 l. 2-6; p.1090 l. 24-30; p.1091 all.)

The result on the company's own story is that with a device when properly serviced and maintained, only the minor smoke escaped according to Williams' tests in 1945—yet for economy in maintenance the company changed their system to the present one in 1947 (p.1121 l. 11-16).

To the Court, admits the sheets he has been calling an analysis—

1. Do not show the constituents of the dust;
2. He did nothing more than get the total quantity of dust caught;
3. And of gas caught—merely the bulk in each case.

Did nothing to break down the contents of either the dust or the gas.

ALBERT DAVEY, lab technician at McKinnon's—(Vol. 3, p.1135)—

Filed some specimen records (Exhibits 128 and 129).

Admits he knows nothing about the machine or why it is supposed to be correct (p.1138 l. 17-24).

Admits no calculations were made during the strike (p.1143 l. 15-16; l. 27-30).

ALBERT DUROCHER, another lab technician at McKinnon's—

Files Exhibit 130, which shows that, taking 65 as a standard, this dust ran 35.

Was at plant during the strike, but made no computations then (Ev. p.1146 l. 19-24).

DR. MORRIS KATZ—(Vol. 3, p.1149)—

This witness gave evidence at very great length. The trial Judge deals with his evidence and with him in several places in his judgment found in A.B.1, as follows:

p.46—REFUSED TO ACCEPT KATZ' EVIDENCE AS MEETING PLAINTIFF'S CASE.

p.57—KATZ AND LEDINGHAM'S SUGGESTION REGARDING GLASS FRAME REFUTED.

p.58—NO EVIDENCE KATZ' MACHINE WAS TESTED FOR ACCURACY.

p.59—KATZ' EVIDENCE WOULD BE AN UNSAFE BASIS FOR JUDGMENT.

p.60—NO REAL ANALYSIS OF DUST AND KATZ' EXPLANATION NOT IMPRESSIVE.

p.61—KATZ' CONDUCT EITHER VERY SUPERFICIAL OR UNPARDONABLE.

In view of these findings, the Respondent is not dealing with Katz' evidence in any great detail, but would make the following references:

He admitted that the time that an injurious quantity is in the air is of great value, and that in two hours might do tremendous damage (p.1233 l. 25-30; p. 1234 l. 1-5).

Katz definitely fixed .25 as the minimum concentration that would cause injury (p.1237 l. 20-30).

He prepared and filed many charts, all based on the figure .25 as the minimum for injury.

His admissions showed he had no ability to identify disease in plants and that his evidence was based largely on some "peeking" he did from the street outside Walker's plant.

Vol. 3—p.1347 l. 5-12
p.1348 l. 4- 5
p.1348 l. 13-16
p.1350 l. 3- 5

He is not a metallurgical engineer (p.1369).

He never analyzed plants subjected to carbon monoxide (p.1377 l. 15-22).

The more coke used, the more SO_2 fumes would result, and a large quantity of coke is now used at McKinnon's (p.1382 l. 12-27).

At first denies higher readings are obtained by portable than by stationary recorders (p.1395 l. 16-30).

Faced with his own book, he admits they are (p.1396 l. 12-21; p.1400 l. 28-30; p.1401 l. 1-19).

Admits if recorder had been set up in a direct line either side of the cupolas, a correct measure would have been made of fumes passing over Walker's from McKinnon's—yet he put it 1½ miles away uptown (p.1401).

Had the recorder made by a machinist who never made one in his life, although he could have bought one from the Thomas firm of manufacturers (p.1401 l. 20-28).

Over whole period did not concern myself with the efficiency of the device inside the cupolas (p.1403 l. 23-27).

Never made a cupola (p.1404 l. 21-26).

No one reported to me about efficient operation of the cupolas —though I was in charge of the investigation (p. 1405 l. 3-29).

Was told of trouble with the nozzles and that the matter was being looked into in a general way—that is all (p.1406 l. 12-19).

Admits gases and organic solids are being carried over the Walker property and alight on the roof of the greenhouses and on his plants and flowers (p.1408 l. 2-13).

Cannot deny validity of McAlpine analyses as high as 43% and 45% iron oxide—also oily, sticky, tarry substances land on Walker's roofs and plants (p.1409 l. 7-30; p.1410 l. 1-4).

Never had dust recorder nor his air recorder tested by a reputable manufacturer's engineer (p.1418 l. 7-14).

Admits statement in his book that whether automatic recorders are available or not, there will be large areas in which the vegetation present will be the only indicator for SO_2 (p.1425 l. 13-30; p.1426 l. 1-20).

Admits has seen a haze from the operation of the coke ovens and that no attempt is made to treat the gas from same (p.1454 l. 2-18).

Admits dust and soot on the glass in 1945 (p.1457 l. 22-30).

Admits same impeded violet rays and infra-red rays and he does not know how much (p.1460 l. 1-9).

TO THE COURT: He admits he knows of no other source of oil and tar on Walker's, except McKinnon's (p.1462 l. 19-25).

DR. GEORGE LEDINGHAM—(Vol. 4, p.1523)—

Called by defence.

Co-author with Dr. Katz (p.1525 l. 28).

In June, 1945, visited St. Catharines with Katz. Spent short time at Walker's with Katz (p.1526 l. 17).

Saw large tip burns on lily of valley in leaves—in a frame bed which *had been* covered with a glass frame (p.1534 ll. 4-30 and p.1536 ll. 1-8).

Witness swore he did not think the injury was SO_2 but due to cover contacting the leaves.

To the Court he admitted he never saw the frame on and did not ascertain how long since the frame had been on, and that he had no other explanation except his *theory* of the frame cover.

Admitted reddish brown markings on tips of gladioli.

His second visit, August 27, 1947—saw McKinnon test plot —gladioli had some markings on the leaves—"Alladin" were the worst.

Took six leaves to Yonkers, N.Y., to Dr. Crocker.

This witness made only two visits over the years.

His testimony leaves a remarkable situation.

He did not say whether or not he got any report from Dr. Crocker is brought here—deals with other matters—the defendant does not ask him a word about the sample Ledingham brought him.

The court did, however—and he admitted he could *not* say it was *not* SO_2.

Admits the soot he saw on glass would impede the sunlight (p.1550 l. 28-30 and p.1551 l. 1-2).

Knows very little about orchids (p.1550 l. 8-9).

DR. WILLIAM CROCKER—(Vol. 4, p.1562)—

Called by defence.

Would have been in a better position to judge if I had seen that when fresh cut—I would prefer that (p.1571 l. 5-19).

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Same would apply to Exhibits 79, 82 and 91 (Ev. p.1579 l. 1-13).

Took observations at his lab, 17 miles out of New York, where climatic conditions very different (p.1579 l. 14-28).

Had never been in Walker's nor in the McKinnon plant (p.1582 l. 5-8).

If proper dosage of sunlight is interfered with by substances on the roof, it is a real detriment (p.1583).

Not able to identify the cause of the burn on samples sent him (p.1587 l. 25-30).

Not able to give opinion on Exhibit 77 (p.1588 l. 15-27).

In answer to Apellant's ground of appeal that counsel was discouraged, it is submitted the Court gave counsel the widest latitude. (See Court statement, p.1601 l. 24-29; p.1602 l. 2-21).

JAMES CAMPBELL—(Vol. 4, p.1652)—

Called by defence.

Foreman of the Defendant's maintenance department in charge of the water curtains in the cupola stacks (p.1652 l. 27-30; p.1653 l. 1-2).

The water above the cone gets off centre as much as 5/8" (p.1669 l. 14-30)—from where it ought to be (p.1670 l. 1-10).

Took no steps to correct it (p.1670 l. 17-30).

Deviations have been going on since its installation, and growing progressively worse (p.1673 l. 21-30; p.1674 l. 1-13).

DR. GEORGE A. DUFF—(Vol. 4, p.1768)—

Not a plant pathologist (p.1788 l. 27-30).

Admits one of the typical things about a bleach of SO_2 is the sudden occurrence of markings (p.1793 l. 12-16).

Admits there are both acute and chronic injuries by sulphur dioxide (p.1794 l. 8-11).

Shown Exhibit 86, a barley sample taken by Jarvis—admits: "I would not care to comment." (p.1796 l. 17-29.)

A foundry would be a source of SO_2 (p.1797 l. 10-18).

Admits he has no knowledge of the relation of emission of gas to the burns (p.1803 l. 22-25).

LANCE DUNN—(Vol. 4. p.1809)—

A florist in St. Catharines who had been three years in the pay of the defendant, handling its test plots and trying to secure evidence against Walker, his competitor of real significance.

He planted the test plots for McKinnon's on their own property in 1946-7-8).

He exhibited a bouquet of flowers at a flower show in St. Catharines which he says he cut from one of these test plots, although he took them to his own flower shop and sent them from there to be exhibited. He says he won a prize. No evidence was given as to who the judges were, or their capacity to judge.

Dunn made an effort to prove that disease existed in bulbs and plants in the test plots that he planted at McKinnon's but that he could not attempt to distinguish SO_2 bleach, and could not distinguish disease.

He did not know where the earth came from, and he bought the bulbs that he planted there. These plants neither came from Walker's nor were ever on Walker's property.

Counsel submits that as against the mass of evidence of conditions at Walker's, this evidence is of no real value.

DONALD T. TOM—(Vol. 4 p. 1839)—

Assistant Controller at McKinnon's and produced production records and table of daily averages of pig iron, scrap iron and scrap steel put through the defendant's foundries over the three years 1937, 1938 and 1940.

He also produced figures showing the tons of coke burned annually in the cupolas for 1946-7-8.

The tonnage was enormous, and it is submitted that this evidence fortifies the plaintiff's case that the resulting damage to him of this fuel consumption was devastating to his orchids and plants (p.1843-4-5).

GORDON MacAULAY—(Vol. 4, p.1847)—

Plant engineer since 1944 for defendant company.

Explained the set-up of the water curtain device.

Admitted that the cupolas produced grey iron, a product which the old company, McKinnon-Dash, could not produce.

Also that there are no smoke stacks from the foundry or the forge shop—also no smoke-consuming devices in either shop—also heavy smoke concentrations out of the cupolas and forge shop are specially heavy when the fires are first laid and the combustion is not so good as later.

PLAINTIFF'S CASE IN REPLY

Mr. Jarvis was called, and after saying that he heard the entire evidence of Dr. Katz and Dr. Ledingham, was not prepared to change his testimony in chief one iota. Mr. Jarvis went over a great many individual exhibits with the Court, pointing out markings, etc., on which he based his opinion but he made it very clear that his opinion was arrived at after close and careful examination almost weekly for long periods, of the actual beds and plants growing therein. He further made it clear that the samples he selected and filed with the Court were not picked samples, but were average run of the plants in the beds.

WILLIAM WALKER, the plaintiff—

Mr. Walker, who was in Court throughout the case of the defence, reaffirmed as accurate his evidence and observations of conditions as given in chief, and was not prepared to alter same. He also stated that he was not at the property and did not show Katz and Ledingham around on their 1945 brief visit, but that it was his son, he learned after returning that evening.

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J. C. BEAUMONT—

In reply, having heard the evidence of Katz and other witnesses, reaffirmed his evidence as given in chief.

He also added important evidence with regard to Exhibits 191, 192 and 193 being the models put in by MacAuley, and from the photograph, 200(a), taken May 9th along with his actual observations made on the inspection on March 14th and along with the admissions of Campbell and MacAuley that the 1⅛" outlet of the cupolas was frequently off-centre to the extent of ⅝"—made it very clear that the washing device was not operating efficiently. Beaumont also made it clear that the volume of water was not sufficient to accomplish the purpose, and was only 1/3 of an efficient volume used by the Ford Company at Detroit.

EXTRACTS FROM REASONS OF TRIAL JUDGE

Respondent relies on the entire Reasons of Judgment, but for convenient reference has extracted the following special findings of fact.

The Reasons appear A.B. Vol. 1.

p.35—PLAINTIFF HAS CARRIED ON BUSINESS SINCE 1905.

The plaintiff purchased and took possession of his property in 1904 and built his first greenhouse in 1905 and since that time has carried on his business, enlarging his greenhouse space from time to time.

p.35 and p.36—NO CAUSE OF COMPLAINT TILL FORGE SHOP AND CUPOLAS BUILT.

Up until the year 1938 the plaintiff had no cause to complain about the manner in which the defendant or its predecessors in title had carried on their business. In 1936 the defendant built the present forge shop and in 1937 enlarged its foundry, when the process of smelting iron was changed from two air-flow furnaces to three cupolas between 50 and 60 feet in height; two were built in 1937, the third in 1938, and in 1947 a fourth was added so that there might be an alternate to enable the defendant to operate three at a time when one was requiring repairs.

p.38—INTENSIVE OPERATION OF CUPOLAS DESCRIBED.

The cupolas are fired by coke with combustion accelerated by a forced up-draft of 8,700 cubic feet per minute. The amount of coke consumed during the years under review ranged from approximately 6,800 to 9,100 tons annually. The amount of metal, including pig iron and scrap iron charged into the cupolas, ranged from 36,000 tons to approximately 50,000 tons. An average of about 3,700 gallons a day of bunker C oil is consumed in the forge shop and large quantities of fuel oil are likewise consumed in the foundry.

p.37—EVIDENCE OF PLAINTIFF ACCEPTED.

Up until the new cupolas were installed the plaintiff says his flowers were healthy and that while there was some small annoyance from smoke there was nothing that would not brush off without difficulty. His evidence is, and I accept it, that after the cupolas went into full production and the defendant started to use the fuel oil and bunker oil in the foundry, the forge shop and foundry fumes, together with organic substances from the cupolas, came over his property and he noticed his plants were not showing the same growth. In 1940 the trouble appeared to abate somewhat but in 1941 it got worse.

p.37—RECORD OF PREDOMINANT WINDS FROM SOUTH-WEST.

The evidence shows that the predominent wind in this area is from the southwest. The following is the record given by a representative of the Meteorological Department of the Dominion Government resident in the area:

The wind blew from the southwest:

in 1946—174 days,
in 1947—182 days,
in 1948—192 days.

p.38 and p.39—AGREEMENTS ADMITTED TO REFUTE ACQUIESCENCE.

Following this, two written agreements were entered into, both dated the 2nd January, 1942 (Exhibits Nos. 8 and 9). Both of these documents provide that in executing them the defendant is not to be taken as admitting any liability and they are no evidence of an admission of liability. They were admitted in evidence in view of the fact that the defendant had pleaded prescriptive right and acquiescence and they are evidence to show that the plaintiff had not acquiesced in the emission of fumes of this character over his property as pleaded in the statement of defence. On the other hand, they are also evidence that the plaintiff was vigorously pressing his claim for redress.

p.39 and p.40—NOT CLAIMED INJUNCTION DURING WAR.

The term of the licence granted under the latter agreement having expired on December 31st, 1944, Mr. Schiller, the plaintiff's solicitor, after a meeting with Mr. Cook, the general manager of the defendant, wrote to the defendant on September 7th, 1945, advising that the plaintiff intended to issue a writ for damages and an injunction. The letter goes on:

> ". . . We could not effectively claim an injunction during the war period, but now that the war is over there is no reason why we could not get an injunction.
>
> "We regret the fact very much, and this letter is written for that purpose, that although we have co-operated to every extent with you, you did not co-operate in the last week

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when it was arranged that your Mr. Cook and your counsel would meet either at our office or at your office to inspect some photographs we have showing the damage done, in fact we had no word from your office whatever."

p.41 and p.42—PREFERS TO ACCEPT BEAUMONT'S EVIDENCE RE WATER CONE.

Mr. Beaumont, an experienced engineer called for the plaintiff, with whose evidence I will deal later, stated that the effect of this would be to give an uneven distribution of water over the cone with the result that the continuity of the water curtain would be destroyed. The evidence of witnesses called for the defence does not agree with this and I do not think it is any part of my task to deal with it at any length. This action is not founded on negligence, but is based on nuisance. The evidence, nevertheless, has some bearing on the final disposition of the case. I prefer to accept Mr. Beaumont's evidence as to what he saw when he inspected the cone and his opinion as to the scientific result. There is no doubt in my mind that the water curtain does not operate so as to give the uniform protection that is intended. This view is fully confirmed by a study of Exhibits 121, 122, 123 and 124, which I shall later discuss, together with Exhibits 118 and 119.

p.42—EFFICIENT OPERATION OF GREENHOUSE REQUIRES SUN.

The evidence clearly shows that for eight months of the year the efficient operation of a greenhouse requires all the sunlight that is available in this climate. During the four months commencing about the middle of May and ending the middle of September it is necessary to cut down the strength of the sun's rays by putting a coating of lime on the glass.

p.42 and p.43—EVIDENCE CONVINCING THAT DEFENDANTS CREATED OILY FILM ON GREENHOUSES.

The plaintiff has adduced convincing evidence that, during the period under review when the wind is in the southwesterly direction, and particularly when the humidity is high and the wind light, dense smoke and fumes from the cupolas, the foundry and the forge shop drift over his property, with the result that an oily film forms on the glass which catches the organic substances which congeal and form a slightly amber coating.

p.43—HAS CONFIDENCE IN EVIDENCE OF McALPINE.

The witness McAlpine, in whose evidence I have confidence, made different analyses of the deposit on the glass of the greenhouses.

p.43—McALPINE EVIDENCE SATISFIES COURT OF HEAVY IRON OXIDE FROM CUPOLAS.

Each analysis showed approximately forty-five per cent. iron oxide present. The evidence is that iron oxide that has formed on the scrap iron which is charged into the cupolas is all driven off by the force of the draft and that which is not caught in the water curtain passes into the atmosphere. Mr. McAlpine produced several vials containing samples of the deposit on the glass when removed with distilled water and absorbent cotton. He says the deposit adhered tenaciously to the glass and was only removed with difficulty. These appear to have some of the characteristics of tar. Exhibit No. 44, taken on October 30, 1947, is an example and is said to have a strong smell of crude oil. The witness made magnetic tests from the scrapings from the glass and always found the presence of iron. His evidence is that a deposit of this character would not come from a soft coal furnace. The whole of the evidence satisfied me that that view is correct.

p.44—SUN'S RAYS OBSTRUCTED BY DEPOSITS ON GREENHOUSES.

Mr. McAlpine, by means of a light-meter, frequently measured the obstructions to the sun's rays caused by the deposit on the glass of the greenhouses and found by comparison with readings made in the open that the rays were cut down sixty-five to eighty-five per cent.; the rays passing through clean glass would be cut down from twenty to twenty-five per cent.

p.45—DEPOSITS ON SNOW COLLECTED WERE LARGELY IRON.

In addition to the examination of the glass, on March 19, 1949, Mr. McAlpine collected a great many samples of fresh snow with deposits thereon, which he melted and passed through filter paper for the purpose of ascertaining the character of the deposit on the snow. Exhibit No. 59 was taken from the plaintiff's property just to the west of No. 2 greenhouse. The contents of the filter paper were largely iron.

p.45—WOULD NOT BE GIVEN OFF BY ORDINARY FURNACE.

Mr. McAlpine's evidence is that these deposits would not be given off by an ordinary soft coal furnace.

p.45—DIFFERENT RESULTS WHEN PLANT OPERATED OR CLOSED.

Another test was made and the results produced in evidence on behalf of the plaintiff. By means of an attachment to a vacuum cleaner placed on the roof of the plaintiff's plant, air was drawn through a white porous material. Exhibit No. 62 is a file con-

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taining samples of the material following tests made on November 26th and December 13th, 1948, together with two tests on October 1st, 1948, taken when the defendant's plant was shut down. These show a very heavy black deposit when the defendant's plant was in operation and a very light one when it was not.

p.45—WHEN PLANT CLOSED FOREIGN ORGANIC MATERIAL INCONSEQUENTIAL.

The importance of these exhibits is that they indicate that during the period when the defendant's plant was closed the foreign organic material in the air appeared to be inconsequential.

p.45 and p.46—ABUNDANCE OF RELIABLE EVIDENCE AS TO HEAVY FUMES AND SMOKE.

In addition to this scientific evidence, there is abundance of reliable evidence given by witnesses without scientific training as to the heavy fumes and smoke issuing from the defendant's cupolas, foundry and forge shop, which, when the wind is in the southwest, pass over the plaintiff's property. Leslie Dwyer, an independent witness, said that on some days "it was a smoke screen; it comes down as a haze; you can taste the smoke sometimes."

p.46—REFUSED TO ACCEPT KATZ' EVIDENCE AS MEETING PLAINTIFF'S CASE.

An attempt was made to meet this evidence by showing the results of a dust-meter set up on the south side of Carlton Street and operated under the directions of the witness Dr. Katz, in conjunction with a wind recorder installed under his direction, together with a dust-meter set up near Dunn's greenhouse, about one and three-quarters miles away. For reasons that will become apparent when I come to deal with Dr. Katz' evidence on another branch of the case, I do not accept his evidence as in any sense meeting the case made out by the plaintiff that the organic matter, which gives rise to the plaintiff's complaint on this branch of the case, emanated from the defendant's works.

p.46—REAL DIFFICULTY FROM DEFENDANT'S WORKS —INCONSEQUENTIAL FROM OTHERS.

I find as a fact that the real difficulty arises from the fumes and smoke emanating from the defendant's works and is contributed to in an inconsequential manner by others. The trouble was not present before the cupolas and the new foundry and forge shop were put into operation and it was not present while the defendant's works were closed due to a strike which lasted from July 15th to November 2nd, 1948.

p.47—SOOT AND IRON OXIDE AGGRAVATED CONDITION IN THIS CASE.

Many witnesses agreed that soot is not pure carbon; that it contains varying amounts of tar and that this tar adheres so tenaciously to everything that it is not even removed by rain and is, in short, a kind of varnish. This condition is particularly aggravated by the character of the deposit in this case, which contains a very high percentage of iron oxide (much higher than in soot from ordinary soft coal) and is combined with oil fumes from the forge shop. The evidence is that the plaintiff has had great difficulty in washing the roof of the greenhouse and that he must use muriatic acid to remove the lime that is put on for the summer months, whereas he could formerly do so with a brush.

p.47—DEPOSIT ON GLASS FOUND TO BE A MATERIAL INJURY TO PLAINTIFF'S GREENHOUSES.

I find as a fact that the deposit on the glass of the plaintiff's greenhouses is a material injury to his property, impairing their usefulness for the purpose for which they were constructed.

p.47—OILY SURFACE ALSO SETTLES ON FLOWERS INSIDE GREENHOUSES.

The same oily substance that adheres to the glass entered the greenhouses through the ventilators and settled on the leaves and flowers of the plants.

p.47—McALPINE FOUND PLANTS INSIDE COATED WITH OILY SUBSTANCE.

The plaintiff stated that all the plants in season had to be washed, some two or three times, before sale. Mr. McAlpine said that he examined the plants in the greenhouses and found them coated with an oily substance.

p.47 and p.48—TIENKEN, AN EXPERIENCED ORCHID GROWER, CONFIRMED McALPINE.

Mr. Tienken, a chemist and an experienced grower of orchids, made an analysis of the deposit on the leaves of the plants as well as the deposit on the roofs of the greenhouses. The result is shown in Exhibit No. 73. It compares closely with the analysis made by Mr. McAlpine to which I have referred. The sample taken from the plants showed 43.97 per cent. iron oxide and that from the greenhouse 44.52 per cent. Both samples showed the presence of sulphuric acid, the sample from the plant 1.63 per cent. and that from the greenhouse 1.37 per cent. The evidence shows that a deposit of this character prevents the rays of sunlight getting to the stomata, interfering with photosynthesis.

p.48—EVIDENCE SATISFIES COURT THAT FOREIGN MATTER DESCRIBED IS MATERIAL DETRIMENTAL TO GROWTH OF PLANTS.

The evidence satisfies me and I find as a fact that the foreign matter described by the various witnesses, which is deposited on the plants, is a material detriment to growth and particularly to those plants that are grown in the greenhouses. The extent of this detriment is hard to measure disassociated from the evidence that the deposit of the film of oil and organic matter was accompanied by fumigations of SO_2 in varying concentrations.

p.48—

That SO_2 gas is given off by the cupolas cannot be questioned.

p.49—CONSIDERABLE QUANTITIES OF SO_2 GAS PASS THROUGH THE WATER CURTAIN.

These exhibits show that considerable quantities of SO_2 gas are given off in the cupolas and pass through the water curtain, depending on its efficiency.

p.51—EVIDENCE OF PLAINTIFF AS TO DETERIORATION CORROBORATED BY SEVERAL WITNESSES.

Evidence was given that in November, 1947, a chrysanthemum known as "Detroit News", which is naturally bronze, came out an insipid yellow. This is said to be due to chronic SO_2 injury. The evidence of the plaintiff as to the deterioration of his flowers and plants is corroborated by several witnesses, particularly John Walker, a son of the plaintiff, and Messrs. Tieken, Armour and Gautby. Mr. Armour and Mr. Gautby are florists with many years' experience. Both gave detailed evidence of the injury to the plants they observed. Mr. Gautby visited the plaintiff's greenhouses from time to time in 1946, 1947 and 1948. He saw the plants in an unhealthy condition, suffering from what he described as some outside influence. He saw no evidence of disease. He gave evidence as to the improvement of the plants during the time the defendant's plant was closed due to the strike.

p.51—TENNYSON JARVIS, OF LONG EXPERIENCE, "IS A WITNESS IN WHOSE EVIDENCE I HAVE GREAT CONFIDENCE".

The chief witness called by the plaintiff on the subject of SO_2 injury was Tennyson Jarvis, a plant pathologist of very long and wide practical experience in the field of SO_2 injury to plant life, including fourteen years with the International Nickel Company in charge of the investigation of fume damage and the settlement of claims. He is a witness in whose evidence I have great confidence, both as to statement of fact, and his scientific opinion.

p.51—"CONVINCED ME THAT HE IS A MAN OF INTEGRITY".

His demeanour in the witness box and manner of giving

evidence convinced me that he was a man of integrity and one who gave scientific opinions only after most careful consideration.

p.58—MANY JARVIS SPECIMENS NOT DEALT WITH BY ANY DEFENCE WITNESS.

All the other specimens collected from the plaintiff's property and the immediate area and filed by Mr. Jarvis were not dealt with by any defence witness. Many of these have very extensive and pronounced markings. An examination of them shows the extent of these markings. Mr. Jarvis' evidence is that the specimens he took were not isolated samples but fair examples of the general condition in the beds or on the trees from which they were taken. He says the small vineyard from which the grape leaves, Exhibits 90A and B, were taken was all affected in the same way.

p.56—"I ACCEPT MR. JARVIS' EVIDENCE".

I accept Mr. Jarvis' evidence as to these facts. My conclusion is that the witnesses who say they looked for evidence of SO_2 injury in the area either did not look at the right time or in the right place, or were careless in their investigation. It is worthy of note that an extensive blight was found on gladioli plants in the area but, notwithstanding that no effort was spared to produce expert evidence in this case, no witness was called by the defence who examined the growing plants, who offered any opinion as to the cause of the blight.

p.57—KATZ AND LEDINGHAM'S SUGGESTION REGARDING GLASS FRAME REFUTED.

Both Dr. Katz and Dr. Ledingham testified that on their visit to the plaintiff's greenhouses on June 17th, 1945, they saw a bed of lily of the valley suffering from some sort of blight. The only suggestion they could make as to the cause was that the glass frame had been kept on too long and the plants had come in physical contact with the glass. The evidence is that at no time did the glass on this bed come in physical contact with the plants.

p.58—NO EVIDENCE KATZ' MACHINE WAS TESTED FOR ACCURACY.

In the first place, these tests of the air made at the Carlton Street test house were made on a machine that was built by the defendant under the direction of Dr. Katz and was not tested in any scientific laboratory. The galvanometer was purchased from a reliable manufacturer of instruments of that sort but other than that we have no guide as to its accuracy. There is no evidence that it was tested with any instruments for accuracy at any time nor inspected by any engineer trained in the special work of building these instruments.

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p.58—"A MACHINE CANNOT BE CROSS-EXAMINED".

I think in the administration of justice one must accept mechanical tests with great care where the tests conflict with what appears to be reliable viva voce evidence. This is especially true where the test is not made under the joint supervision of mechanical or engineering experts appointed by both sides. A machine cannot be cross-examined.

p.59—KATZ' RELIABILITY QUESTIONED — HIS EVIDENCE WOULD BE AN UNSAFE BASIS FOR A JUDGMENT.

In addition to the difficulties that arise from accepting these mechanical tests in preference to the evidence of Mr. Jarvis and other witnesses called for the plaintiff, there is the fact that this instrument was under the exclusive direction of Dr. Katz and the results of these tests must be affected by Dr. Katz' reliability as a witness. After the most careful consideration of the demeanour of this witness in the witness box and the whole character of his evidence, I have come to the conclusion that it would be an unsafe basis for judgment. The witness appeared to me to be more anxious to advance the case of the defendant than to produce to the Court an impartial result of scientific experiment. There was a certain lack of frankness, probably more evident in his demeanour than will be in the written record, that characterized his evidence throughout. When this witness was retained by the defendant, it was quite evident that a lawsuit was likely to develop. The whole course that was followed, in my view, was planned with great care but not the care that one would have expected if it were designed to show all the facts. If it had been the desire to ascertain what contribution, if any, the defendant was making to the injury complained of by the plaintiff, it would have been quite simple to set up a test house to the northeast of the source of the alleged pollution and one to the southwest.

p.60—RECORDS FROM DUNN'S GREENHOUSE OF LITTLE VALUE.

This in itself would not impress me so much, but what did impress me was that a second test house with a recorder was set up at Dunn's greenhouse a mile and three-quarters to the southeast. The records taken from there can have little value compared with those that might have been taken had the plan I suggest been adopted. Dr. Katz did not satisfactorily explain why this plan was not followed.

p.60—NO REAL ANALYSIS OF DUST AND KATZ' EXPLANATION NOT IMPRESSIVE.

Notwithstanding all the elaborate preparation that was made over a period of years, for the trial of this case, at no time was

a real analysis of the dust caught in the dust recorder made by Dr. Katz or under his direction. I was not impressed with Dr. Katz' explanation as to why the dust recorder was not operated while the defendant's plant was closed during the strike. He offered as a reason that they could not have access to the defendant's laboratory for making the tests of the dust that were made (none of these tests could be called an analysis). I cannot help but think, if the witness had seriously desired that the Court should have the information that could have been obtained by operating the test recorder during this period, it could have been made available.

p.61—KATZ' CONDUCT EITHER VERY SUPERFICIAL OR UNPARDONABLE.

As to Dr. Katz' visual examination of the foliage in the area, if he did not see those injuries to plants that Mr. Jarvis saw, specimens of which have been produced, I do not think he made a sufficiently close examination. The fact that he left the Court with the impression that the gladioli roots and plants taken in June. 1948, from the bed in front of the forge shop and given to Dr. Saville for examination, were representative of gladioli in the district, and from which it might be inferred that the blight that was shown on the plants was due to fusarium yellows, is disturbing. If Dr. Katz did not know that the bed which was dug up a day or two after he removed these specimens was a bed of gladioli that had been in the ground over the winter for two or three years and was a poor enough specimen that the gardener saw fit to dig it up, it would indicate that any examination of the foliage he was making was a very superficial one. If, on the other hand, he did know that was the character of the bed from which he took the samples, his failure to tell the Court is unpardonable.

p.61—THOROUGHLY CONVINCED ON WHOLE EVIDENCE I FIND IT A FACT THAT PLAINTIFF'S PLANTS DURING 1946, 1947 AND 1948 WERE SUBJECTED TO ACUTE INJURY BY SO2 FROM DEFENDANT'S WORKS.

Considering the whole evidence, and I must not be taken to have referred to all the evidence that has affected my mind, I am thoroughly convinced that certain plants on the plaintiff's property and in the area were, during the years 1946, 1947 and 1948, subjected to acute injury by SO_2 gas emanating from the defendant's works and I so find as a fact.

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p.61—EVIDENCE CONVINCING THAT SAME ALSO SUBJECTED TO CHRONIC SO_2 INJURY BY GAS.

The evidence also convinces me that the plaintiff's plants were subjected to chronic SO_2 injury by gas emanating from the same source.

p.68 and p.69—EVIDENCE FAILS TO JUSTIFY DEFENCE OF STATUTE OF LIMITATIONS, PRESCRIPTIVE RIGHT AND ACQUIESCENCE AND DEFENCE COUNSEL WISELY ABANDONED THESE DEFENCES.

The defendant pleaded that the plaintiff's claim, if any, was barred by the Statute of Limitations, and prescriptive right and acquiesence. The evidence in this case falls far short of justifying any finding of fact sufficient to establish any of these defences. On the argument counsel wisely abandoned these defences.

p.69—

"On the law and on the facts I find the plaintiff is entitled to relief."

p.71—DAMAGES ALONE ARE INAPPROPRIATE.

In my view this is a case where damages are inappropriate. It is impossible to find, with any degree of precision, what damage to his business the plaintiff suffers by reason of the injury to the plants. Some plants are more susceptible than others. He is restricted in the use of his property in the way that he wishes to use it by reason of the fact that he is unable to grow certain plants with success. There is, in fact, no standard against which monetary loss can be measured.

CASE LAW AND TEXT BOOKS RELIED ON BY TRIAL JUDGE, WITH PAGE IN A.B. 1 WHERE SAME ARE REFERRED TO IN HIS REASONS

A.B. 1

p.64—*Fleming v. Hislop*, 11 A.C. 688 at 695.
Bamford v. Turley, 3 B. & S. 62.

p.65—*Rushmer v. Polsue and Alfieri Limited* (1906), 1 Ch. 234, Vaughan Williams, L. J., at p.245.
Salvin v. North Brancepeth Coal Company, 9 Ch. App. 705, reported in the foot note on page 706.

p.67—*Walter v. Selfe*, 4 DeG. and Sm 315.
Crump v. Lambert, L.R. 3 Eq. 409.

p.68—*Salmond on Torts*, 10th Ed., p.229.
Thorpe v. Brumfitt, L.R. 8 Ch. A.650.

p.69—*McKie v. The K.V.P. Company Limited* (1948), O.R. p.398 at p.416; (1948), O.W.N. 812.

The respondent relies also on the following cases:

McNiven v. Crawford, 1939 O.W.N. 414, affirmed; 1940 O.W.N. 323.

Godfrey v. Goodrich Refinery Co. Ltd., O.R. 1939 106; O.R. 1940 533. (Injunction granted against a large refinery although no actual money damage was proven.)

Charlesworth (Liability for dangerous things—1922 Ed., p.156).

Rousseau v. Lynch, 1931 4 D.L.R. 595 (New Brunswick Supreme Court—en banc).

Jones v. Chappell (1875), L.R. 20 Eq. 539.

CASE LAW EXTRACTED FROM

McKIE v. THE K.V.P. COMPANY LIMITED, DECIDED BY THE SAME TRIAL JUDGE, McRUER, C.J., as reported in: *O.R. 1948, p.398 (at trial).*

1949 D.L.R., Vol. 1, p.39 (in Ontario Court of Appeal).

C.L.R. part X, unbound, 1949, p.698 (Supreme Court of Canada).

NOTE: Respondent submits that this very recent case contains within itself an almost complete digest of the law applicable in the case at Bar.

McKIE v. K.V.P. COMPANY LIMITED, O.R. 1948, p.398 (McRuer, C. J., at trial).

p.400—

"While I have given this class of evidence every consideration, I find great wisdom in the following words of Sir G. J. Turner, L.J., in *Goldsmid v. The Tunbridge Wells Improvement Commissioners* (1866), L.R. 1, Ch. 349 at 353:

" 'Speaking with all possible respect to the scientific gentlemen who have given their evidence, and as to whom it is but just to say that they have dealt with the case most ably and most impartially, I think that in cases of this nature much more weight is due to the facts which are proved than to conclusions drawn from scientific investigations. The conclusions to be drawn from scientific investigations are, no doubt, in such cases of great value in aid or in explanation and qualification of the facts which are proved, but in my judgment it is upon the facts which are proved, and not upon such conclusions, the court ought in these cases mainly to rely. I think so the more strongly in this particular case, because it is obvious that the scientific examinations which have been made of the water of this brook must have depended much upon the state of circumstances which existed at the times when those investigations took place. They might well have been affected by the force of the stream at the times of investigation, and probably by the state of the weather, as tending or not tending to the diffusion or dispersion of noxious smells. In my view of this case, therefore, the scientific evidence ought to be considered as secondary only to the evidence as to the facts.' "

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p.406—Quotes Blackstone's Commentaries, Book II, p.14, as follows:

". . . there are some few things which, notwithstanding the general introduction and continuance of property, must still unavoidably remain in common; being such wherein nothing but an usufructuary property is capable of being had; and therefore they still belong to the first occupant, during the time he holds possession of them, and no longer. Such (among others) are the elements of light, air, and water; which a man may occupy by means of his windows, his gardens, his mills, and other convenience; such also are the generality of those animals which are said to be ferae naturae, or of a wild and untamable disposition: which any man may seize upon and keep for his own use and pleasure. All these things, so long as they remain in possession, every man has a right to enjoy without disturbance."

p.410—

"Some evidence was given on behalf of the defendant to show the importance of its business in the community, and that it carried it on in a proper manner. Neither of these elements is to be taken into consideration in a case of this character, nor are the economic necessities of the defendant relevant to be considered."

p.411—

"In *The Stockport Waterworks Company v. Potter et al* (1861) 7 H. & N. 159, 158 E.R. 433, Baron Martin discussed whether the jury should have passed on a question as to whether the defendants' business was carried on 'in a reasonable and proper manner', and after expressing the view that there was no evidence as to whether it was or was not, said, at pp.168-9: 'But, suppose there was, how could it affect the people of Stockport? The defendants carried on their trade primarily for their own profit, and the public are benefited by the carrying on of all trades, for they have an interest in persons using their industry and capital. But what answer is that to an action by persons whose water for drinking is affected by arsenic poured into it by persons carrying on such a trade?' "

p.411—

"In *The City of Manchester v. Farnworth* (1930), A.C. 171 at 203, Lord Blanesburgh makes some observations in dealing with a claim for damage on the ground of the emission of poisonous fumes from a chimney that are aptly applicable to this case: 'Very readily would I decide, if I felt at liberty so to do, that the loss resulting to the plaintiff from the defendants' operations should without any qualification be borne by the Corporation. That loss is truly just as much part of the cost of generating their electrical energy as is, for example, the cost of the coal whose

combustion is the original source of all the mischief. In a question between the plaintiff on the one hand and the Corporation on the other I can discover no sound principle why this loss should not be theirs.' "

p.411—

"In my view, if I were to consider and give effect to an argument based on the defendant's economic position in the community, or its financial interests, I would in effect be giving to it a veritable power of expropriation of the common law rights of the riparian owners, without compensation."

p.414—

"The right of action for an injunction is not dependent on proof of actual damage. Where interference is shown to exist, damage is presumed. This aspect of the subject is fully discussed by Lord Wright in *Nicholls v. Ely Beet Sugar Factory, Limited*, (1936), Ch. 343. In considering the final result in that case it is to be borne in mind that the relief sought was in damages only, there being no claim for an injunction or any suggestion that the injury would recur or that a prescriptive right might accrue."

p.414 and p.415—

"In addition to the right of action based on interference with riparian rights, the plaintiffs claim a right to maintain an action for nuisance. The claim is that the smells from the river, caused by the effluent entering the water from the defendant's mill, are sufficiently offensive to be an actual and substantial interference with the comfort and enjoyment of the plaintiff's properties measured by ordinary and reasonable standards."

p.415—

"The tests to be applied in respect of this claim are expressed with concise clarity in the oft-quoted words of Knight Bruce, V.C., in *Walter v. Selfe* (1851), 4 DeG. & Sm. 315 at 322, 64 E.R. 849: '. . . and both on principle and authority the important point next for decision may properly, I conceive, be thus put: ought this inconvenience to be considered in fact as more than fanciful, more than one of mere delicacy or fastidiousness, as an inconvenience materially interfering with the ordinary comfort physically of human existence, not merely according to elegant or dainty modes and habits of living, but according to plain and sober and simple notions among the English people?'

"They are also laid down by Lord Lindley in *Rapier v. London Tramways Company* (1893), 2 Ch. 588 at 600: 'The question is whether the defendants do or do not create in the conduct of their business such a smell as diminishes the reasonable enjoyment and comfort of the plaintiff's house. The fact that somebody with a sensitive nose smells some ammonia and does not like it will not prove a nuisance; it is a question of degree.

In the Supreme Court of Ontario No. 66 Statement of Law and Fact of Plaintiff on appeal to Court of Appeal Continued

You can only appeal to the common sense of ordinary people. The test is whether the smell is so bad and continues as to seriously interfere with comfort and enjoyment. No one says it is so bad as to interfere with health.'

"The evidence of reliable witnesses is convincing that the smell from the river has rendered much less desirable that which was an attractive resort for tourists, and if the nuisance is permitted to continue it will in greater measure interfere with the plaintiffs' business as well as their personal enjoyment of their properties."

p.416 and p.417—

"The principles on which the Courts act in granting an injunction in cases of this sort are fully discussed in *Shelfer v. City of London Electric Lighting Company; Meaux's Brewery Company v. The Same* (1895), 1 Ch. 287. Lord Lindley at p.314 quotes from the judgment of Lord Kingsdown in *Imperial Gas Light and Coke Company v. Broadbent* (1859), 7 H.L.Cas. 600, 11 E.H. 239, as follows:

" 'The rule I take to be clearly this: if a plaintiff applies for an injunction to restrain a violation of a common law right, if either the existence of the right or the fact of its violation be disputed, he must establish that right at law; but when he has established his right at law, I apprehend that unless there be something special in the case, he is entitled as of course to an injunction to prevent the recurrence of that violation.'

"And Lord Justice Smith says at p.322:

" 'Many Judges have stated, and I emphatically agree with them, that a person by committing a wrongful act (whether it be a public company for public purposes or a private individual) is not thereby entitled to ask the Court to sanction his doing so by purchasing his neighbour's rights, by assessing damages in that behalf, leaving his neighbour with the nuisance . . .

" 'In such cases, the well-known rule is not to accede to the application, but to grant the injunction sought, for the plaintiff's legal right has been invaded, and he is prima facie entitled to an injunction.' "

p.417—

"The witness Heurter gave evidence that some kraft mills he had visited disposed of their effluent through settling basins. Before the defendant's plant started to operate, the plaintiff Dr. Downe interviewed the manager, Mr. Hunter, and suggested to him that the effluent be disposed of by being piped to a sand flats nearby. To this Mr. Hunter replied: 'It is a matter of economics.' The course of action that followed shows an indifference towards the rights of others which a Court should not hesitate to control by measures appropriate in the circumstances."

McKIE v. K.V.P. COMPANY LIMITED, 1949, D.L.R., Vol. I, p.39 (in Ontario Court of Appeal).

p.41—

Chief Justice Robertson maintained the actions against the appellant, both on the ground that there had been a violation of the rights of the plaintiffs as riparian proprietors, and on the ground that the pollution of the waters of the Spanish River by the appellant constituted a nuisance, for which the several plaintiffs were entitled each to maintain an action.

McKIE v. K.V.P. COMPANY LIMITED, C.L.R., Part X, 1949, Unbound, p.698 (Supreme Court of Canada).

Kerwin, J., delivered the unanimous judgment of the Court:

p.699—

"The sole point argued before us was as to the injunction."

p.701 and p.702—

"It is unnecessary to discuss all the decisions referred to by Mr. Cartwright and it suffices to quote the remarks of Lord Sumner, speaking on behalf of the Judicial Committee, in *Stollmeyer v. Petroleum Development Company Limited* at 499:

" 'The grant of an injunction is the proper remedy for a violation of right according to a current authority, which is of many years' standing and is practically unbroken: *Imperial Gas Light and Coke Co. v. Broadbent; Pennington v. Brinsop Hall Coal Co.* In *English v. Metropolitan Water Board*, there is a mere dictum to the contrary. The discretion of the Court in the grant of such injunctions is regularly exercised in this sense.' "

p.702—

"Section 17 of the Ontario Judicature Act provides:

" 'Where the Court has jurisdiction to entertain an application for an injunction against a breach of a covenant, contract or agreement or against the commission or continuance of a wrongful act, or for the specific performance of a covenant, contract or agreement, the Court may award damages to the party injured either in addition to or in substitution for such injunction or specific performance, and such damages may be ascertained in such manner as the Court may direct, or the Court may grant such other relief as may be deemed just.'

"Under the precursor of this section, Lord Cairns' Act, 1858, the House of Lords decided in *Leeds Industrial Co-operative Society Limited v. Slack*, that jurisdiction was thereby conferred to award damages in lieu of an injunction in the case of a threatened injury, but Viscount Finlay, with whom Lord Birkenhead expressly agreed, and of whose judgment Lord Dunedin stated that 'he has exactly expressed my views', pointed out at page 860 that the Courts have on more than one occasion expressed their determination to prevent any abuse of the Act by legalizing the commission of torts by any defendant who was able and willing

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to pay damages. He said it was sufficient to quote two passages from the reports, the first of which occurs in the judgment of Lord Justice Lindley in *Shelfer v. City of London Electric Co.* and the second of which occurs in the judgment of Buckley, J., in *Cowper v. Laidler.*"

p.703—

"In the subsequent case of *Gross v. Wright*, that same learned Judge, in a case from the Province of British Columbia, stated that he had no doubt, as laid down by the Lord Justices in *Kennard v. Cory*, that the primary point for consideration in every case where the question is injunction or no injunction is whether or not the wrong complained of is a wrong 'for which damages are the proper remedy' to use the phrase of Lindley, L.J., in *London & Blackwell Ry. Co. v. Cross*, that is to say, a complete and adequate remedy.

"Pollution has been shown to exist, damages would not be a complete and adequate remedy, and the Court's discretion should not be exercised against the 'current of authority which is of many years' standing.' "

p.705—

REPORTER'S NOTE: On November 21, 1949, the appellant moved before the Court for an Order to vary the judgment to allow it to apply to the High Court of Justice for a further suspension of the injunction in the event of the appellant being able to show special grounds. The Court, without calling on the respondent, dismissed the motion with costs.

SHORT FINAL SUMMARY OF CASE

Walker and his employees showed that they were not troubled by any nuisance from McKinnon's until after the cupolas were set up in 1937 and the new forge shop constructed then.

The defendant came into existence in 1925 but in 1937 set up an entirely new foundry and forge shop in order to manufacture grey iron which had never been previously produced by any of their predecessors.

The cupola system was essential to produce grey iron and the "oil furnace" system used by the McKinnon-Dash could not produce grey iron, but malleable only.

Walker had been conducting his business since 1904 and it is submitted that no prescriptive right to injure same had been acquired by the defendant.

His evidence in chief made it clear that when he complained in 1940 and 1941 and settled on January 2, 1942 (Exhibit 8) for damages incurred in those years, and again accepted settlement by another agreement of damages to cover the years 1942, 1943 and 1944, dated January 1, 1942 (Exhibit 9)—he did so because the war was on—and McKinnon's were engaged in the manu-

facture of war essentials, and that his solicitor advised him that in any event it would be impossible to obtain an injunction to restrain wartime production, and that he did not desire to sue them for that purpose in wartime; hence he accepted a money allowance, but only up to December 31, 1944—a given date.

In 1945, after some negotiations, his solicitors wrote the defendant, on September 7, 1945, expressing dissatisfaction with their efforts and regretfully threatening suit (Exhibit 10).

Further negotiations ensued but as the defendant made no improvement in conditions, and his injuries continued, he entered his action in 1946.

The evidence of Larry Edwards, employed by the defendant as plant metallurgist from 1941 to October, 1944, is specially relied upon to show that Walker complained to McKinnon's in 1942 that they were injuring him—that Edwards was instructed to investigate for the Company and made several visits to Walker's greenhouses—always well received by Walker, who showed him everything and took samples for analysis with Walker's approval. These samples were sent away by Edwards under orders from the Company, for analysis, and the analysis was returned, as a result of which Edwards (being convinced that changes were necessary to prevent a continuance of the injuries to Walker) recommended installing the "Whiting" device to lessen the injurious substances going out the cupola chimneys, both as to gas and solids. The Company declined to take his recommendation because the Whiting device was too expensive, and they set up a home-made device of their own with chains.

SPECIFIC MATTERS OF COMMENT REFLECTING ON THE DEFENDANT'S METHOD OF PRESENTING ITS DEFENCE:

Counsel desires to make it definitely clear that in the following comments it is not intended in any way to reflect upon the solicitors or counsel engaged in the case, but the comment is directed to the policy adopted by the Company officials and not their legal advisors.

(1) Plaintiff calls attention to the fact that the Company, when asked through its engineer, McAuley, to produce the report of the analysis, could not or would not do so; that no one from the Company gave any evidence whatever to shake the full effect of Larry Edwards' evidence, namely that they were injuring Walker back in 1942.

It is submitted that their non-production to this Court of the report they then received, creates the inevitable conclusion that Edwards was justified in his belief that they were injuring Walker, and also supports his evidence that even after the changes made by the Company, the damage to Walker, while it was helped some, was not eliminated entirely.

(2) Suppression of this report or its contents is on a par with the conduct of the Company in March, 1949, when Gaukroger, the chief pathologist, took samples from the cupolas of the contents before and after wash, and then *destroyed* same.

The General Manager, Cook, sat in Court throughout the entire case but was never called to explain this extraordinary conduct, and no one offered the Court any justification whatever for destroying a record taken by them in March this year, just before the trial, thus preventing the Court from having a knowledge of its contents. When they do produce the April, 1949, record, they show as high as nine parts in a million escaping from the chimney after the wash.

(3) Another extraordinary situation was revealed by Gaukroger, chief metallurgist, in the fact that although the defendant Company knew in 1945 that Walker was threatening suit and that from 1946 knew that the suit was in existence, the defendant appears to have deliberately refused to resort to similar tests until April, 1949, on the eve of the trial. The facts in this connection are detailed in this memo under Gaukroger.

(4) Morris Katz—conduct of his four years' investigation: The following items are referred to in summary of his evidence in this memo and stand out as peculiar:

(a) Instead of purchasing a standard equipment recorder, had a jerry-built one made.
(b) Used no portable recorder.
(c) Swore very definitely to .25 as minimum concentration which would cause injury.
(d) Filed numerous tables based on .25 instead of .20, which are useless to the Court.
(e) Suggested other factors than McKinnon's contributed to the Walker injury.
(f) Then admitted he had neither investigated any such and was unable to pledge his oath to any **such.**
(g) Introduced the Thorold and Merritton myth, intending the Court to draw the inference that they injured Walker, but, faced by the Court with the specific question, admitted—he "was not suggesting for a moment that anything from Merritton had injured Walker."

(5) Repeated suggestions by the defendant to discredit the fact that it was necesasry for Walker to use muriatic acid in cleaning his glass roofs—when it was disclosed by accident only from the defence witness Edward Jackson towards the end of the trial, that the defendant Company had to use acid to get the deposits off the windows in their own plant.

(6) The defendant put forward Cahill, employed as their Director of Public Relations. Cahill knew nothing about plant

growing, metallurgy, fumes or gases, but he gave a list of five other industries operating in St. Catharines, although knowing nothing about the details of their operations. Defendant intended to convey the idea that other industries injured Walker but withdrew Cahill.

Counsel in withdrawing him stated to the Court that he would prove such damage by other witnesses. Not a single other witness was called—the defendant apparently abandoning this branch of its defence.

The evidence therefore leaves the case that the Walker injuries were sustained solely due to the McKinnon plant.

FINAL

Walker has a total investment in his greenhouse business of $133,000.00, free of encumbrance, being land, greenhouses and plant and equipment $63,000.00
and stock of plants, bulbs, etc $70,000.00

During 1947 and 1948 he operated at an actual money loss exceeding $4,000.00 in each year. See evidence and Exhibit 199.

On the investment which Walker has, plus his lifetime experience as a grower of plants and orchids, he should reasonably expect to make a profit of $10,000.00 or $12,000.00 per annum from this property, which means that the actual difference in results to him, due to injury by the defendant, has now become an annual loss of some $14,000.00 to $16,000.00.

This means ultimate ruin of his business and investment unless he obtains relief, and thereby the case comes within the principle that an injunction in addition to damages for past injury is the proper remedy.

The plaintiff respectfully submits, therefore, that in addition to damages and having regard to the defences which this defendant attempted to put forward in an obvious effort to persuade the Court not to grant an injunction—an injunction should also be granted in the usual terms. If this is not done, it would result in the defendant obtaining sanction to purchase Walker's rights to freedom from injury by assessing damages, still leaving Walker with the future nuisance. The defendant is not entitled in this case to ask the Court to sanction such a decision.

THE PLAINTIFF (RESPONDENT)
THEREFORE SUBMITS:

1. That the appeal should be dismissed with costs.
2. That the judgment of the learned trial Judge should be affirmed with costs.

ALL OF WHICH IS RESPECTFULLY SUBMITTED.

ARTHUR G. SLAGHT,
of Counsel for the
Plaintiff (Respondent).

Toronto, March, 1950.

In the Supreme Court of Ontario

In the Supreme Court of Ontario No. 67 Order of Court of Appeal suspending injunction sending appeal to His Majesty in His Privy Council 20th Nov., 1950

Law Stamps Cancelled $2.80

THE HONOURABLE MR. JUSTICE HENDERSON
THE HONOURABLE MR. JUSTICE HOGG
THE HONOURABLE MR. JUSTICE GIBSON

Thursday, the 19th day of October, A.D. 1950.

BETWEEN:

WILLIAM WALLACE WALKER

Plaintiff,

— AND —

THE McKINNON INDUSTRIES LIMITED

Defendant.

S. C. O.
Seal

ORDER

UPON MOTION made on the 18th and 19th days of October, 1950, by counsel on behalf of the Defendant by way of appeal from the order pronounced by The Honourable Mr. Justice Aylesworth on the 21st day of September, 1950, dismissing the application of the Defendant for an order suspending until the disposition of the Defendant's pending appeal to His Majesty in His Privy Council, the injunction in this action as varied by the Order of the Court of Appeal for Ontario, pronounced on the 30th day of March, 1950; and this motion by way of appeal being taken pursuant to leave to appeal granted by The Honourable Mr. Justice Roach by an Order pronounced by him on the 28th day of September, 1950; in the presence of counsel for the plaintiff, upon hearing read the affidavit of John Lauder Pond filed, the exhibits therein referred to, the affidavit of William Wallace Walker, filed, the cross-examination of Thomas J. Cook on his previous affidavit filed, the said Orders of The Honourable Mr. Justice Aylesworth and of The Honourable Mr. Justice Roach and the Reasons therefor, the Order of The Honourable Mr. Justice Aylesworth pronounced on the 21st day of June, 1950, admitting the Defendant's appeal to His Majesty in His Privy Council and approving and fixing the security therefor, the Defendant's Notices of Motion before The Honourable Mr. Justice Aylesworth and The Honour-

In the Supreme Court of Ontario No. 67 Order of Court of Appeal suspending injunction sending appeal to His Majesty in His Privy Council 20th Nov., 1950 Continued

able Mr. Justice Roach, and the Defendant's alternative Motion to the Court of Appeal for suspension of the said Injunction, and upon hearing what was alleged by counsel aforesaid; and the Defendant by its counsel undertaking that its appeal now pending to His Majesty in His Privy Council shall be expedited and shall be completed for hearing and set down for hearing on the February 1951 list for the hearing of appeals by His Majesty in His Privy Council;

1. THIS COURT DOTH ORDER that the order pronounced herein by The Honourable Mr. Justice Aylesworth on the 21st day of September, 1950, be and the same is hereby reversed and set aside except the provision as to costs therein and that this appeal of the Defendant therefrom be and the same is hereby allowed, except as to the provision as to costs therein.

2. AND THIS COURT DOTH FURTHER ORDER that the operation of the injunction in this action as varied by the Court of Appeal for Ontario by its order pronounced on the 30th day of March, 1950 be and the same is hereby suspended until the determination by His Majesty in His Privy Council of the Defendant's appeal now pending to His Majesty in His Privy Council from the said order of the Court of Appeal for Ontario pronounced on the 30th day of March, 1950.

3. AND THIS COURT DOTH FURTHER ORDER that all costs of this appeal for the suspension of the said injunction, including the costs of the said Motion before The Honourable Mr. Justice Aylesworth and of the said Motion for leave to appeal before the Honourable Mr. Justice Roach, and of the defendant's alternative Motion to the Court of Appeal for suspension of the said injunction, shall be paid by the Defendant to the Plaintiff forthwith after taxation thereof by the Taxing Officer at Toronto.

4. AND THIS COURT DOTH FURTHER ORDER AND DECLARE that it is unnecessary to deal with the Defendant's aforesaid alternative motion and makes no order thereon, except the provision as to costs thereof hereinbefore dealt with.

Entered O.B. 210, Page 450
November 20, 1950
G.H.

CHAS. SMYTH
Registrar, S.C.O.