R I S - Christie Ltd. v. Canada

Between
R I S - Christie Ltd., Appellant, and
Her Majesty the Queen, Respondent

[1996] T.C.J. No. 1056

[1996] A.C.I. no 1056

[1996] 3 C.T.C. 2827

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Court File No. 91-2556(IT)G

Tax Court of Canada
Toronto, Ontario

Sarchuk T.C.J.

Heard: July 4 and 5, 1994, June 8 and 9, 1995
Judgment: August 28, 1996

Intellectual property law -- Patents -- General -- Appeal from assessment made under Income Tax Act for scientific research leading to patent -- Appeal allowed in part by partial consent -- Appellant was unable to show that it was drawing inference from proven facts, which was required in order to conclude that the essential element of repeatability had been established -- Repeatability of the experiment was an essential attribute of scientific research.

Taxation -- Income tax -- Computation of tax -- Tax credits -- Scientific research tax credit -- Appeal from assessment made under Income Tax Act for scientific research leading to patent -- Appeal allowed in part by partial consent -- Appellant was unable to show that it was drawing inference from proven facts, which was required in order to conclude that the essential element of repeatability had been established -- Repeatability of the experiment was an essential attribute of scientific research.

Appeal from assessment made under Income Tax Act for 1982 and 1983 -- Appellant had deducted $160,000 for scientific research -- Minister of Finance disallowed the deductions for research and development expenditures -- Appeal allowed in part -- Partial consent filed by parties -- HELD: Appeal allowed for 1982, appeal dismissed for 1983 -- Although the plaintiff embarked on a project which ultimately led to a patent being granted, that did not resolve the issue of whether the work was scientific research within the meaning of the Income Tax Act, s. 37.1 -- Appellant was unable to show that it was drawing inference from proven facts -- This element was required in order to conclude that the essential element of repeatability had been established -- Repeatability of the experiment was an essential attribute of scientific research.

Statutes, Regulations and Rules Cited:

Income Tax Act, s. 37(1)(a), s. 37.1, s. 37.1(1), s. 37.1(5) (e), s. 37(7)(b), s. 127(9)

James C. Morton and David Israel, for the Appellant.
David Spiro, for the Respondent.

JUDGMENT:-- Upon reading the Partial Consent to Judgment filed;

The appeal from the assessment made under the Income Tax Act for the 1982 taxation year is allowed and the assessment is referred back to the Minister of National Revenue for reconsideration and reassessment on the basis that the mortgage reserve claimed in respect of the Appellant's 1982 taxation year is allowed. The Appellant is not entitled to any further relief.

The appeal from the assessment made under the Income Tax Act for the 1983 taxation year is dismissed.

REASONS FOR JUDGMENT

1 SARCHUK T.C.J.:-- This is an appeal by R I S - Christie Ltd. (RIS) from assessments of tax with respect to its 1982 and 1983 taxation years. In calculating its income for the taxation year ended December 31, 1982, the Appellant deducted the sum of $160,000.00 in respect of scientific research pursuant to the provisions of paragraph 37(1)(a) of the Income Tax Act (the Act), an additional research allowance in the amount of $80,000.00 pursuant to the provisions of subsection 37.1(1) and an investment tax credit in the amount of $40,000.00 pursuant to the provisions of subsection 127(9). In assessing the Appellant for its 1982 taxation year the Minister of National Revenue (the Minister), disallowed the deduction of the research and development expenditures, the additional research allowance and the investment tax credit. As a consequence of the adjustments to the Appellant's taxable income in 1982, the Minister reassessed its 1983 taxation year by reducing the small business deduction claimed in that year in accordance with section 125 of the Act.[1]

Appellant's Evidence

2 Leon Slonimsky (Slonimsky) (since deceased) and Daniel D. Dorcich (Dorcich) were the principals of Plyform Construction Company Limited (PCCL). In 1982 they conceived the idea of developing a concrete forming medium for cast-in-situ concrete construction (the panel),[2] a concept designed to decrease costs and increase the quality of insulation in the formation of concrete panels for use by the residential and non-residential construction industry. Dorcich described the panel as a composite structure which is used as a mould to retain concrete in its plastic state until such time as it cures and becomes self-supporting and a structural member itself. In his view, there existed considerable uncertainty as to whether such a system could technically be developed and whether it could be produced at competitive market prices. More specifically, the uncertainty involved was whether one could design and develop an ultra-light or very lightweight composite structure unlike anything available in the existing market.

3 In November, 1982 PCCL developed a proposal for the research and development of the panel for distribution to interested investors. A copy of this proposal was received by Brian E. Turner (Turner) of Williams & Turner Consultants Inc. (Consultants) which acted as manager of scientific research and development projects. Turner approached Gilles Christie, the principal of RIS, and it agreed to invest in the project. Shortly thereafter, it was decided that the scientific research and development would be undertaken by a new corporate entity and 541185 Ontario Inc. (541185) was incorporated for that purpose. An agreement was executed as of December 1, 1982 between Consultants and 541185 whereby the latter agreed to perform the research and development of the panel and Consultants undertook to provide the necessary funds for the purpose of developing the panel. It is not disputed that as a result of this arrangement the amount of $230,000.00 was received by 541185 in taxation year 1983.

4 With respect to the research and development, the Appellant relied primarily on the testimony of Dorcich and Edward L. Littlejohn (Littlejohn). Dorcich's health did not permit him to attend in Court and by agreement, his evidence was tendered by way of an Affidavit and cross-examination upon that Affidavit.[3] In addition to Littlejohn's testimony his report with supporting documents was filed.[4]

5 Regarding the project Dorcich described his input as being the evaluation and application of the product from the practical standpoint and the financial aspects involved. This included communication with manufacturers and suppliers both from the standpoint of the acquisition of necessary materials as well as the hoped for manufacturing and marketing of the product. Slonimsky was a professional engineer and thus the engineering aspect of the project was his domain. In his Affidavit Dorcich stated that upon receiving the first instalment of funds in March, 1983, they proceeded with the development of the panel. Their "initial emphasis was on data collection which consisted of the review and analysis of technical information and literature in respect of existing marketed concrete forming systems."[5] Included in that review were Canadian and United States patent applications for similar systems. He asserts that upon completing this review, Slonimsky and he "commenced to prepare detailed conceptual drawings and analysis in order to determine the optimum dimensions and materials of the spatial membrane panel".[6] Through the summer and fall of 1983 they continued their "experiments and analysis to determine the optimum dimensions and materials of the spatial membrane panel."[7] By the end of that year a working prototype was completed with a view to testing it under field conditions in 1984.[8] According to Dorcich this was the completion of Phase I. Further funding was sought for Phases II and III of the project and was received in April, 1984. The project continued through 1984 and 1985 and culminated in an application for a Canadian patent, which was filed with the Canadian Patent Office on January 31, 1986. A patent was granted to 589576 Ontario Inc. (589576), a successor corporation to 541185, on April 30, 1991.[9] Dorcich noted that their efforts were successful to the point that "apart from our patent product, there is no such thing in the market anywhere else."

6 Mr. Littlejohn holds a Bachelor of Applied Science in the field of chemical engineering which he obtained at the University of Toronto in 1949. For a number of years he was employed by Union Carbide and was at one time, the manager of new product development. In 1972 he began to publish the Ottawa R & D Report and the Canadian R & D Directory, publications designed for the research and development industry. In 1990, he began his own business as a Consultant and recently has been conducting seminar programs entitled Tax and Technology for companies interested in "understanding tax and technology from the point of view of R & D tax incentives". The Appellant adduced evidence from Littlejohn as an expert in the methodology of research and development. With specific reference to the methodology utilized by 541185, in his report[10] Littlejohn makes reference to nine groups of documents, the Canadian patent application, the Canadian Patent and Income Tax Bulletin IT-151R4 and states:

> " ... I came to the following conclusions of fact which conclusions I have relied on in this report:
>
> 1. From approximately January 27, 1983 to the end of 1983, Messrs. Dorcich and Slonimsky carried out the following steps:
>
> - technical evaluation of competing systems;
> - structural design of panel
>
> - including different configurations, various structural materials; adhesives and insulation,
> - engineering design of working parts.
>
> 2. Such steps ultimately led to the granting of a patent, a copy of which is attached to my report of June 15, 1994, which patent reflected the work described herein.
>
> In my experience, a patent is granted only where a significant improvement in an existing process, or, a completely new process, is achieved.
>
> Broadly speaking, research and development involves the application of scientific and engineering principles to the resolution of a scientific or technical problem. While the exact steps that must be taken in research and development are infinitely variable and depend on the nature of the project in question, certain general principles apply in all cases. The essence of research and development requires a systematic pursuit of knowledge involving the recognition and formulation of a specific problem, the collection of data through observation and experiment and the formulation and testing of a hypothetical, and ultimately practical, resolution of the problem, the spatial membrane.

> From my review of the materials referred to herein, and based on the assumptions set out herein, I am of the opinion that the methodology of the research and development was followed in this case by Messrs. Dorcich and Slonimsky through 1983 and, specifically, they identified a problem dealing with the forming of concrete and temperature variations in the existing environment and, after considerable experiment and data collection, came to a technical resolution of this problem which led to a practical product."

Respondent's Evidence

7 Evidence was adduced on behalf of the Respondent from A. Ghani Razaqpur, Associate Professor of Civil and Structural Engineering, Carleton University. Dr. Razaqpur holds a B.Sc. in civil engineering which he obtained from the American University of Beirut in 1973, and M.Sc in Civil Engineering from the University of Hawaii in 1978 and a PhD. in Civil Engineering from the University of Calgary in 1982. He has taught courses on the design of concrete structures and bridges, prestressed concrete and advanced reinforced concrete. He is a member of the Professional Engineers of Ontario, the Canadian Society of Civil Engineering, the Canadian Standards Association Committee on advanced composite materials and buildings and the American Concrete Institute. He is also a member of the Executive Committee of the Canadian Society for Civil Engineering, Structural Division and a member of the Committee in Advanced Composite Material in Bridges and Structures.

8 Dr. Razaqpur reviewed the transcript of the evidence taken on July 4, 1994 (including Exhibits); the Affidavit of Dorcich; the transcript of the cross-examination of Dorcich (both with accompanying Exhibits), and the Littlejohn report.[11] In his view, the notes and sketches referred to by Dorcich in his Affidavit[12] and certain others presented to Dorcich on cross-examination[13] amount to no more than:

> "some very preliminary design calculations which appear to have resulted in initial dimensions for certain components of the panel. The procedures used are quite elementary and do not involve any new knowledge or methodologies."

His analysis of this material led him to conclude that the necessary documentation to make the experiment repeatable was not present. In his view, Dorcich's Affidavit and the Exhibits attached to it such as the synopsis,[14] indicated only that drawings and sketches had been made and that testing and calculations had been done, but that this work had not necessarily been scientific research. His review led him to conclude that there was no proof of scientific research in the documents examined, and that:

> "(a) The technical work presented in the form of drawings and calculations represents a routine engineering exercise which requires no scientific research and which is within the grasp of any competent structural engineer.
> (b) That work would not require more than about a week to perform and would not require any laboratory or field tests.
> (c) There is no indication that any systematic laboratory or field testing has taken place. Such testing would have required detailed technical reports describing the experimental program, the results and the conclusions. Furthermore, it has not been demonstrated why any particular tests were needed and what their objectives were.
> (d) There is no indication that any new technologies were developed as a consequence of the purported "research and development" work.
> (e) There was no scientific research performed in respect of the panel."

Issues:

9 The principal issue for determination by this Court is whether 541185 engaged in scientific research within the meaning of sections 37 and 37.1 of the Act in either or both of taxation years 1982 and 1983. Second, if this issue is determined in the affirmative, was the amount claimed by the Appellant as its scientific research expenditure deductible in the 1982 or 1983 taxation year?

10 It is agreed by the parties that if scientific research was in fact conducted by 541185, the expenses incurred by it were prescribed expenditures within the meaning of Regulations 2901 and 2902 of the Income Tax Regulations. The Respondent has also agreed that if conducted, the scientific research was sufficiently related to the business of the Appellant.

Appellant's Submissions

11 Pursuant to paragraphs 37(7)(b) and 37.1(5)(e) of the Act scientific research has the meaning given to that expression by Regulation 2900. The Appellant relies on the evidence of Dorcich and that of Littlejohn whose expert opinion was that the work conducted by 541185 was scientific research and experimental development. Their testimony and a review of the proposal[15] and the synopsis[16] provide ample support that 541185 followed a formalized, scientific methodology and engaged in "systematic investigation or research carried out in the field of science or technology by means of experiment or analysis". More specifically, it conducted applied research with respect to the electro-heating elements of the panel and the adhesives and other materials to be used therein and engaged in the collection of technical information and literature with respect to marketed concrete forming systems that went beyond routine data collection. It was also engaged in extensive development activities in which it analyzed and reviewed existing materials and products to develop the panel. Thus the work performed by it involved a real technical uncertainty, resulted in a new product and the product was developed by using an organized and systematic approach. Furthermore, the research undertaken by 541185 included activities "with respect to engineering and design" as evidenced by its work with respect to the structural, engineering and electrical design aspects of the panel. This included the building of prototypes, the existence of which was confirmed by the testimony of Dorcich, McCabe and Turner.

12 The Appellant asserts that it has met the Department of National Revenue's technical guidelines as to what constitutes scientific research and development for the purpose of subsection 2900(1) of the Regulations[17] in that it has satisfied the criteria of scientific or technological advancement; scientific or technological uncertainty; and scientific and technical content.

13 Counsel for the Appellant further submitted that the granting of patent protection was relevant and persuasive evidence that scientific research occurred.

Respondent's Submissions

14 It is the position of the Respondent that the work performed by 541185 in 1982 and 1983 was not scientific research. Section 2900 of the Income Tax Regulations defines scientific research for the purposes of the credit and the deduction. Scientific investigation within the meaning of that section involves repeatable steps which are clearly noted. While it can be acknowledged that 541185 had produced something and that work had been done by it and even that the methodology of Dorcich and Slonimsky had been reasonable, this work did not involve scientific research.

15 The evidence of Turner and McCabe was silent on the issue of whether the work conducted by 541185 had been scientific research and in any event, they were not in law capable of commenting on that subject. Dorcich for his part was unable to provide any documentation for the experiments that he asserted were performed by 541185. Furthermore, the opinion of Littlejohn should be given no weight since his conclusion that scientific research had been done was not adequately supported or explained[18]. In this context, the opinion of Professor Razaqpur should be preferred since the scientific method he described is that used both in industry and academia.

16 Counsel argued that it is not possible to meet the definition of scientific research unless it is possible to provide a recorded basis upon which others can perform the same experiments and are able to verify or disprove the hypothesis by setting up the exact same test parameters, with the same material, the same sizes, the same weight, the same measurement instruments. All of these requirements have to be specified and noted. There was no evidence that 541185 conducted "repeatable experiments in which the steps, the various changes made and the results were carefully noted".

Analysis:

17 The evidence before this Court regarding the manner in which this project was carried on by 541185 in the taxation years in issue is found principally in the testimony of Dorcich and in the various documents produced in support. I turn first to the documents. Substantial reliance was placed by Dorcich, Littlejohn and by Counsel for the Appellant in argument on the 'proposal'[19] and the 'synopsis'[20]. The proposal was prepared by PCCL (Dorcich and Slonimsky) in November, 1992, was forwarded to Consultants, who upon receipt sent it on to Brook, Carruthers, Shaw, Architects for an engineering review. The reviewer, William Carruthers, in a report dated January 18, 1983[21] was somewhat critical of the proposal and ended by noting:

> "The concluding statement in the proposal[22] implies a thoroughness of exploration and evaluation and is not apparent from the rest of the document. A much more comprehensive feasibility study would appear to be required before being able to properly arrive at such a conclusion, and before being able to properly appraise the validity of a full-scale research and development study."

While this may be fair comment, the proposal, such as it was, did outline the basic requirements for a new concrete forming medium.

18 The synopsis referred to was written by Dorcich and Slonimsky in September, 1987. He was unable to recall the reason it was prepared but did say that it was based on a review of a number of documents, on their recollection of events and "whatever was available to them to enable them to put it together" and that all of the steps that were taken in the research and development of the panel were enumerated therein.

19 This document provides limited support for the Appellant's argument that 541185 followed appropriate research methodology. It is an abbreviated summary of the development of the panel in the course of which general comments are made inter alia with respect to such matters as the design of the panel frame and the composite core; the selection and testing of adhesives and insulation material. Less than one page of the synopsis is devoted to the subject of testing, the gist of which can be exemplified by the statement "testing procedures went through all phases of research and development" and "along with the testing of panels and components, all necessary testing facilities, testing equipment and sample fabrication technology was developed to suit specific needs". While the synopsis suggests that certain problems were resolved, it provides no evidence regarding the manner in which this was done. By way of example with respect to a reference in the synopsis to the testing of adhesives, Dr. Razaqpur made the following comment in his report:

> "21. On pages 8-9 of the Synopsis, reference is made to the selection of the adhesive used to join the two facings. It is stated that "a wide number" of products were "analyzed and tests conducted" and that after "extensive search and testing", adhesive 2216 B/A was selected. There is nothing to indicate that any scientific testing was conducted. Even if they were performed, these "experiments" are not repeatable as there is no record which provides the following critical information:
>
> (a) What was the experimental set-up?
> (b) What test specimens were used?
> (c) How many specimens were tested?
> (d) What were the test parameters?
> (e) What temperature ranges were used?
> (f) What loading procedure was used?
> (g) Was foam injected and then temperature measurements taken?
> (h) What device was used to measure the temperature?
> (i) At what location were the temperatures measured?
> (j) As this is a composite system, even thermal rise would produce substantial stresses in the various components. Was any attempt made to model the problem analytically and then measure the thermal deformations? This would be crucial if a flat pouring surface is to be guaranteed.
>
> There is nothing to indicate that any scientific tests were performed to arrive at the final selection. There was no need, in this context, to develop new methods or devices for applying glue on a wood surface. If any novel process was developed, there is no indication of it here. The process described is routine and is not specific to the panel.
>
> These concerns apply equally to the insulation, working components and electroheating elements referred to on pages 10, 11 and 12 of the Synopsis."

20 Other documents tendered on behalf of the Appellant include a letter from a firm of consulting structural engineers to Dorcich dated January 27, 1983; the agreement between Williams & Turner Consultants and 541185 and a status report from Dorcich to Turner dated June 30, 1983.[23] None of these documents contain any information regarding the nature of the research being carried on. Also filed as exhibits were letters dated December 16, 1983 from Dorcich to Turner (a year end status report) and a proposal dated February 27, 1984 seeking more funds and setting out various budgets and schedules.[24] While not irrelevant, neither document provides any real assistance in the determination of the issue in this case.

21 The remaining documents are those referred to by Littlejohn as "working papers, notes and diagrams" prepared by Slonimsky[25]. In total, they consist of some 39 pages of sketches and handwritten notes (some quite illegible). More regarding these documents later.

Testimony of Dorcich:

22 Mr. Dorcich is a businessman with many years of experience in the concrete and construction businesses. His testimony with respect to the development of the panel was given from the perspective of a non-engineer concerned primarily with its evaluation and practical application. While involved in the engineering aspects of the project, which he described as best he could, they were carried out by the late Mr. Slonimsky and another engineer, aided by a generalist. They were responsible for the actual design and the engineering calculations for each part and component of the panel.

23 Nonetheless, on the positive side, Dorcich outlined the engineering uncertainty quite adequately, and although occasionally vague and imprecise with respect to detail, for the most part his description of the development of the panel and of the tests and experiments conducted were relatively clear and concise. He said that in order to determine the optimum dimensions and materials for the panel, they conducted a technical review of various systems the purpose of which:

> "... was to determine certain basic engineering ratios that involved weights, usually prescribed for the various systems and calculations on their maximum allowable - or maximum weight that they would carry, or resist, prior to failure."

This analysis and subsequent calculations provided sufficient information to confirm a basis for the development of their own product. According to Dorcich, at this stage, Slonimsky and his assistants began to produce "the actual design and the engineering calculations for each part and component of the product."

24 On June 30, 1983, in a report to Turner, Dorcich stated that the structural design aspects were well advanced and referred to a number of modifications which had been made. In response to questions by Counsel for the Respondent, he described these as:

> "Modifying certain ribbing patterns, on the aluminum, either by making them wider, or narrower, to carry the load better,distribute the load better. Determine the best possible radius, whether it was 1/16" of an inch, or 1/4" of an inch, or 1/8" of an inch for the extruded components. Which components, of course, were done only in theory, because we could not even entertain the idea of spending maybe - well, large sums of money, on Aluminum Company of Canada, something like that. It was all theoretically."

He went on to say that although theoretical at this stage they ultimately became practical modifications. Alcan was contacted and provided a computer design of the special shapes required. The initial design was not satisfactory and was redesigned by Slonimsky and then redesigned again through Alcan's computer program. Eventually, the segments which were the subjects of these modifications, were extruded by Alcan. Dorcich also noted that while he has no recollection that the reasons for the redesigning were recorded, he was certain that the comments expressed in their various reviews were noted on the relevant drawings (none of which have been produced).

25 Dorcich also had a firm recollection that in the course of the development of the panel, discussions took place assessing the advantages and disadvantages of various alternatives. He believes that sketches were probably made but likely discarded once the final element was selected. If any alternative was seriously considered, it was hand-manufactured by the generalist for testing. As he noted: "How many times they redesigned it, I have no idea, but it was redesigned over and over again, until they felt it was ready for testing to destruction".

> In due course, he said, the panel was developed: "... to a point where all the members were working properly. Structurally, we knew that it would carry a certain load, with the determined and required safety factor. The consensus, based on the regulatory requirements, and our knowledge of the industry, we found the product was complete. Then we had to test it under real-life conditions, that was in the field."

A working prototype designed to determine the insulation factor was apparently ready in December, 1983 and was field-tested at a construction site in 1984 under winter conditions. Dorcich also testified that at a later stage the struc-

tural aspects of the panel were similarly tested. Both tests produced very good results which were, to the best of his recollection recorded.

26 On the negative side, Dorcich's testimony with respect to the collection of data and the recording of essential elements of an experiment such as the test set-up, methodology and parameters and the analysis and interpretation of that data was far from illuminating. Again, by way of example, in his Affidavit Dorcich stated that testing went on through all phases of research and development. He also testified that certain experiments began shortly after they received the funding in March of 1983. When asked what they were about, his response was:

> "The experiments at that time were for, and again we covered that somewhere else in our conversations this afternoon. The experiments were bits and pieces of metal put together to see how it looked, see what our gut feeling was. If we can call it gut feeling from a technical point of view, or any point of view. It could have been a bent piece of aluminum, or a bonding, fastening, of aluminum to plywood, rebonding it, hitting it, putting weight on it, or just jump over it. It was anything that we felt was necessary to give us a feel for it."

The results of these tests were not necessarily recorded in writing because as Dorcich said:

> "... these are tests that you do in the shop, and the fellow there is showing you, in visual form, what it is, sketch or design. That's what it looks like, is "oh, fine, what's this, did I do it right?". Then put a load on it, see what happens, put in on, it holds, that's fine. If it doesn't hold, then back to the drawing board, then you throw it out. You don't record tests for all of these things in this application."

If tests were to be repeated, then they "simply would have done them again". Asked whether a record was made of what was different about each test and of the different variables, he responded:

> "Not for the purposes that we needed at that time. They were not of a real scientific nature ... they were just to get the feel of the matter." and "No, I could not show you that, because if anything was on that, in written form, it would just be of no consequence to us, and we probably discarded it. The parts and items that were tested were thrown into the garbage".

Dorcich conceded that the only person who could repeat the experiments would be Slonimsky based on his recollections and whatever material he might have retained.

Testimony of Littlejohn:

27 Littlejohn stated that he examined the documents listed in Appendix "A" of his first report. As previously noted, they are comprised of 39 pages of sketches, notes and drawings. In his supplementary report, Littlejohn wrote: "in coming to the conclusions in this report, I reviewed certain documentation, copies of which are attached as exhibits to my report of June 15, 1994." On the face of this evidence, one was entitled to assume that Littlejohn's opinion was based strictly on the material appended to his report. However, in the course of his testimony, it became evident that prior to completing his supplementary report, he attended at Slonimsky's former residence and:

> "... reviewed a number of documents in five or six large boxes in a barn in Georgetown that had sketches, drawings, conclusions, calculations, etc., that Mr. Slonimsky had collected during his period of doing work."

He added that:

> "... there are a host of different documents that are not included in this particular Appendix C or identifi (sic) ... . whatever we call this.[26] There are a host of additional documents that I didn't include in this. What have I given you, 42 pages? There are hundreds of pages of documents that are still in Georgetown, I hope."

None of these documents were produced nor was any explanation for their absence proffered by Littlejohn. He did say, with reference to the material appended to his report that:

> "... these are representative drawings; they are not the complete experiment that was undertaken in each of the areas referred to by Counsel. These are not the complete set of sketches, drawings and other work that was done. There was more material, more information that I am not able to relate to you at this time that what was undertaken."
>
> and
>
> "The documents here, and we've got 42 pages of sketches that show us, Your Honour, some of the experiments that were done, and I was trying to use them as an example."

Based primarily on the Georgetown documents Littlejohn made certain assumptions and came to the conclusion that scientific research and development was carried on. Since Littlejohn did not itemize or categorize the documents available to him at Georgetown and made no record regarding the specific documents examined and relied upon, it was not surprising to hear that he was at a complete loss to support his conclusion. More specifically, he was unable to provide any substantive evidence to demonstrate that an analysis and interpretation of test data from any experiment had in fact been performed by Slonimsky; was unable to refer to any document or indeed to describe how or whether Slonimsky had ever correlated test data to the original hypothesis, nor could he describe the test set-up or the number of specimens used in any particular experiment.

28 With reference to the Littlejohn report generally, Dr. Razaqpur's comments were:

> "(a) [The] statement that Messrs. Slonimsky and Dorcich "identified a problem dealing with the forming of concrete and temperature variations in the existing environment and, after considerable experiment and data collection, came to a technical resolution of this problem which led to a practical product" is difficult to support. First, he fails to identify the nature of the particular "problem". Second, his assertion that "considerable experiment" was done is without any factual foundation. Third, he has not identified the "technical resolution" of the "problem". Finally, there is no support for his statement that the "technical resolution" led to a "practical product" of any kind.
>
> (b) [His] opinion as to whether any research and development was carried out, quite apart from the fact that it appears to be based on his own incomplete and incorrect "conclusions of fact", fails to take into account the facts disclosed at the cross-examination of Mr. Dorcich on September 30, 1994."

These are fair comments.

Conclusion:

29 There is no dispute that in 1982 Dorcich and Slonimsky embarked on a project which ultimately led to a patent being granted for the panel. However, that does not per se resolve the issue whether the evidence before the Court establishes that in the taxation years in issue 541185 did in fact engage in scientific research within the meaning of section 2900 of the Regulations. This section defines the term "scientific research" for the purposes of section 37.1 of the Income Tax Act as follows:

> "For the purposes of this part and paragraphs 37(7)(b) and 37.1(5)(e) of the Act, "scientific research" means systematic investigation or search carried out in a field of science or technology by means of experiment or analysis, that is to say,
>
> (a) basic research, namely, work undertaken for the advancement of scientific knowledge without a specific practical application in view,
> (b) applied research, namely, work undertaken for the advancement of scientific knowledge with a specific practical application in view, or,
> (c) development, namely, use of the results of basic or applied research for the purpose of creating new, or improving existing, materials, devices, products or processes, and,

> where such activities are undertaken directly in support of activities described in paragraph (a), (b) or (c), includes activities with respect to engineering or design, operations research, mathematical analysis or computer programming and psychological research, but does not include activities with respect to ..."

30 It is the Appellant's responsibility to adduce evidence establishing that "scientific research and experimental development activity" was carried on by 541185 in the taxation years in issue. In this case, there is some evidence that an engineering uncertainty existed, that a hypothesis was formulated and that by testing models and by observation of the results, 541185 resolved the problem and created a practical product which embodied a technological advance. The fact which remains in issue is the adequacy of the evidence relating to the repeatability of the scientific experimentation. In Sass Manufacturing Ltd. v. M.N.R.[27], I said:

> "Regulation 2900 requires an Appellant to adduce cogent evidence of such investigation or search. Systematic investigation connotes the existence of controlled experiments and of highly accurate measurements and involves the testing of one's theories against empirical evidence. Scientific research must mean the enterprise of explaining and predicting and the gaining knowledge of whatever the subject matter of the hypothesis is. This surely would include repeatable experiments in which the steps, the various changes made and the results are carefully noted."

31 Both Dr. Razaqpur and Littlejohn agree that scientific research and development is considered to be the application of scientific and engineering principles to the resolution of a scientific or technical problem. In Dr. Razaqpur's view all scientific research involves the following steps: formulating the problem, constructing the model, testing the model, deriving a solution from the model, testing and implementing the solution. The repeatability of the scientific experiment is an essential attribute of scientific research. In this context, he referred to the following comment by James K. Feibleman:[28]

> "As a matter of fact, this is the established practice in scientific procedure. The repetition serves to ensure the elimination of experimental error and often produces refinements of observation that may have gone undetected in the original trials. ...
>
> The repeatability of scientific experimentation is responsible for what has been called the self-corrective nature of the scientific method. What is proposed by an hypothesis cannot be established by a single experiment; the scientific method makes this impossible because of its demand that all experiments must be repeated. ..."

32 There are substantial shortcomings in the direct evidence adduced on behalf of the Appellant with respect to this issue. While I do not propose to completely disregard the testimony of Littlejohn, as urged by Counsel for the Respondent, his report and testimony raised a question regarding his expertise in "research methodology". Indeed, Counsel for the Appellant, although contending that his testimony was "worthy of considerable weight", noted that "it may have come in a form not as felicitous as he (Counsel) would have sought" and that "the Court should consider Mr. Littlejohn's evidence in a fairly narrow way".

33 First, his failure to produce the "Georgetown" material or at the very least, to properly document and summarize what he examined, is in my view unpardonable. Second, his assurances that he could have established repeatability by sorting those documents and that he satisfied himself from his examination of the material that scientific research was carried on are unacceptable, since they are based on inferences drawn from facts not proven. As was noted by Mahoney J. in The Queen v. the Capitol Life Insurance Company[29] "the weight to be given expert evidence is a matter for the trier of fact and an expert's conclusion which is not appropriately explained and supported may properly be given no weight at all." Given the quality of Littlejohn's testimony generally, I give no weight whatsoever to the conclusions he reached. In so doing, I wish to make clear that I draw no adverse inference from the failure of the Appellant to produce any relevant documents viewed by Littlejohn at Georgetown.

34 Counsel for the Appellant further argued that in circumstances such as these, it would be proper to give some meaningful weight to Littlejohn's evidence on the basis that it was the testimony of a direct witness in which case, he was testifying as to what he saw rather than as an expert. It is a fact that some of the Georgetown documents referred to were initialled and dated by Slonimsky and, Littlejohn said, reflected work done and tests carried out in various areas such as adhesive systems, aluminum extrusions, insulation and heating devices. However, nothing he said or produced established on a balance of probabilities the existence of recorded information capable of making the experiments or

tests repeatable. As to the weight to be given this testimony, it must be remembered that he described the 42 pages of sketches and drawings appended to his report as representative of the "complete experiment that was undertaken" by Slonimsky. He made specific reference to two of these pages captioned "Selection of Panels - Table" and suggested they were proof of the recording and analysis of test data. With respect to this Table, Dr. Razaqpur made the following comments:

> "These are elementary calculations. All you're saying is: If I make the panel a bit longer or wider or apply the load in one section or another, what would be the, what we call the forces that would cause it to rupture in, what we call sheer vertically or it would flex and cause it to fail? But even that is incomplete. This is a calculation; this does not relate to any experimentation." and "... this is not experimentation, this is simply calculations that you do in order to arrive probably later at an experimental model but ... "

and added that: "It would be fair to say that this work can be performed by a junior engineer in about a week."

35 If indeed the sketches, drawings and notes before the Court are, as Littlejohn stated, representative of the material at Georgetown, it would be extremely difficult, given the evidence of Dr. Razaqpur (which I accept) to attach much weight to his assertions that appropriate research methodology was utilized.

36 Dorcich's testimony confirms that investigation and experimentation to develop a product was conducted in the taxation years in issue and that a new product was created. However, as I understood his testimony, while not all minutiae were noted, the results of some tests were recorded and, Dorcich implies, were available for analysis and reference by the engineers. Beyond that, other than in most general terms, he was not able to describe the nature of the tests, the hypotheses which were being tested, the results and whether the results were recorded. Viewing Dorcich's testimony as a whole, it falls short of establishing the essential element of repeatability.

37 As previously noted, the proposal and synopsis provide little assistance to the Appellant. With respect to the patent, the Patent Act[30] defines an invention as "any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter". In this case, the Patent Office granted a patent for a new invention and while this is some evidence that a new or improved product was created, it is not dispositive of the issue before me.

38 Pieces of evidence, each by itself insufficient, may together constitute a significant whole and justify a conclusion by their combined effect. The question in this appeal is whether on a reasonable balance of probabilities one can draw the logical inference that a requisite element of scientific research, that is, the element of repeatability in all that that term entails, has been established. I am cognizant of the fact that in this case we are dealing with the development of new technology and that it might be appropriate to consider a less rigorous standard than that espoused by scientists involved in pure or applied research. In my view that would still not assist the Appellant since there is very little evidence that essential information such as the type, size and number of specimens; the test set-up; the test methodology; the instrumentation and data acquisition system; the test data collected; the analysis and interpretation of test data; and the correlation of test data to the original hypothesis was recorded. As Dr. Razaqpur wrote in his report:

> "This existence of a complete written record of the experiment ensures the essential element of repeatability. As Russell L. Ackoff states in Scientific Method, at 425:[31]
>
> > ... Every research project should yield a document which makes it possible to duplicate the study in essential details, since the ultimate test of much research lies in its ability to be duplicated. Certainly the possibility of progress depends on the ability to study past work in great detail."

39 A distinction must be made between the drawing of inferences from proven facts and speculation. On the evidence before me, the latter would be required in order to conclude that the essential element of repeatability has been established. For this reason, the Appellant cannot succeed on this issue.

40 Pursuant to a Partial Consent filed by the parties, the appeal in respect of the Appellant's 1982 taxation year is allowed and the matter is referred back to the Minister of National Revenue for reconsideration and reassessment on the basis that the Appellant is entitled to the mortgage reserve claimed for the 1982 taxation year. The Appellant is entitled to no further relief. The appeal with respect to the 1983 taxation year is dismissed. Costs to the Respondent.

qp/d/scl

1 In taxation year ended December 31, 1982, the Appellant also claimed an amount in respect of one-third of the capital gains reserve deducted by "Leon Steinberg, Trustee Partnership" in which it had an interest. The Minister reassessed on the basis that the Appellant was not entitled to deduct this reserve in the computation of its income for the 1982 taxation year since on or about December 20, 1982, the Appellant had sold its partnership interest. The parties have indicated to the Court that they consent to Judgment allowing the appeal in respect of the Appellant's 1982 taxation year, without costs and referring that assessment back to the Minister of National Revenue for reconsideration and reassessment on the basis that the reserve claimed in respect of the Appellant's 1982 taxation year be allowed.

2 More specifically described in the proposal to investors as "a Closed body-type Spatial Membrane with integral Heating Element and Thermal Insulation".

3 The Affidavit is Exhibit A-7 with relevant documents attached as Tabs A-P inclusive; the cross-examination is Exhibit R-1.

4 Exhibit A-9

5 Exhibit A-7, Tab 1, Paragraph 12.

6 Ibid.

7 Affidavit - Exhibit A-7, Tab 1, Paragraph 14; Diagrams and Notes and Sketches prepared by Slonimsky annexed as Exhibit "H".

8 Affidavit - Exhibit A-7, Tab 1, Paragraph 15.

9 Exhibit A-7, Tab L.

10 Littlejohn was first called to testify on July 4, 1994 at which time he was qualified as noted above. When counsel for the Appellant tendered Littlejohn's report dated June 15, 1994, counsel for the Respondent objected with respect to its admissibility on the basis that it did not comply with the provisions of subsection 145(2) of the Tax Court of Canada Rules (the Rules) in that it failed to provide a "full statement of the proposed evidence-in-chief of the witness". In fact, the affidavit in question failed to comply, even nominally, with the Rules. The Court directed that Littlejohn's testimony would not be received unless a supplementary report complying with Rule 145 was filed. This was done by way of letter dated May 30, 1995 and the report and supplementary material was filed as Exhibit A-9.

11 Dr. Razaqpur's report is based on the documents before the Court. He had no access to the "Georgetown" material.

12 These documents are found at Exhibit A-7, Tab H and consist of some forty-three pages. They are also duplicated in Exhibit A-9, Tab 6, the Littlejohn report.

13 These documents are Exhibits 2, 3, 4, 5, 6 and 7 referred to in the cross-examination which is Exhibit R-1.

14 Exhibit A-7, Tab M.

15 Exhibit A-7, Tab A - Proposal for research and development of spatial membrane panel for cast-in-situ concrete construction prepared by P.C.C.L. Group, November, 1982.

16 Exhibit A-7, Tab M - synopsis - research and development of spatial membrane panel for cast-in-situ concrete construction prepared by 589576 Ontario Inc. dated September, 1987 (the "exhibits" referred to by the authors of this document were not tendered and are not before the Court).

17 Information Circular 86-4R3, Scientific Research and Experimental Development.

18 The Queen v. Capitol Life Insurance Company, 86 D.T.C. 6164, (F.C.A.) at 6166.

19 Exhibit A-7, Tab A.

20 Exhibit A-7, Tab M.

21 Exhibit A-7, Tab C.

22 The concluding statement reads: "The P.C.C.L. product meets all the criteria imposed by a competitive market and the market demand for this product is unquestionably there and waiting for the entrepreneurial group to launch it and by doing so reap the rightful profit return."

23 Exhibit A-7, Tabs D, E and G.

24 Exhibit A-7, Tabs I and J.

25 Exhibit A-9, Tab 6. The identical documents are also found in the Appendix to the Affidavit of Dorcich.

26 The witness is apparently referring to the notes and sketches found in Tab 6 of his report, Exhibit A-9.

27 88 D.T.C. 1363.

28 Scientific Method: The Hypothetico-Experimental Laboratory Procedure of the Physical Sciences, at pages 128-129.

29 supra, at 6166.

30 R.S. c. P-4, s. 2.

31 Scientific Method: Optimizing Applied Research Decisions, at page 425.