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OAKVILLE

May 13th, 1968.

This is only copy belonging to F.T. Smye

Dr. J. J. Brown,
166 Chester Avenue,
Town of Mount Royal,
Montreal 16, P.Q.

Dear Dr. Brown:

I have read the passages of your book "Ideas in Exile" which pertain to Canadian Jet Aircraft Engines, The Jetliner and The Arrow. Although the overall impressions conveyed, are reasonably correct, nevertheless, they contain quite a few errors in detail and by implication.

Because of my respect for the work which you have done and the contribution which you have made in writing your book, I am taking the liberty of providing you with the accurate facts with respect to some aspects of the above-noted projects. Also, I wish to record these facts in order to refute the many, many, widespread irresponsible opinions which have been expressed on the subjects, from time to time. I hope I will be able to do this with reasonable brevity, because, as you point out, it would be very easy to write a good sized volume on each of these three subjects.

In order to qualify myself for making the statements which I do, I outline hereunder the positions which I have occupied:

Executive Assistant to Director General & Director, Aircraft Production, Department of Munitions & Supply, during the war.

Joined Hawker, Siddeley Group, July 1945.

First employee and Assistant General Manager of A. V. Roe Canada Limited, November 1945.

FRED SMYE
RL 901-5

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Executive Vice-President and Director of
A. V. Roe Canada Limited,

President & Chief Executive Officer of,

Avro Aircraft Limited
Orenda Engines Limited
Canadian Applied Research Limited
Canadian Steel Improvement Limited.

It is my hope that my few words may contribute to your volume.

Yours truly,

F.T.S.

FTS:ms

Encls.

ATTACHMENT TO LETTER TO DR. J. J. BROWN, DATED MAY 13, 1968
RE CANADIAN JET AIRCRAFT ENGINES, THE JETLINER AND THE ARROW

JJ Brown book: Ideas in Exile: A history of Cannadian Invention Paperback, Jan 1, 1967

With respect to Canadian Jet Aircraft Engines. As you infer, a small team of Canadian engineers was assembled by the Government during the latter days of the war and was sent to England in order to ascertain what they could with respect to a startling new development, which was known as the gas turbine or jet engine. The leader of this group was Mr. K. F. Tupper.

Immediately after the war, the team returned to Canada and was located in a small section of the facilities which were previously occupied by the Crown company, Research Enterprise Limited. Whilst the Government was endeavouring to determine the disposition or future of this small group, which numbered some 100, they themselves, under the leadership of Winnett Boyd, started the design of a 2,600 pound thrust engine, which later became known as the Chinook.

At this same time, the Hawker, Siddeley Group, represented by Sir Roy Dobson, was negotiating for the taking over of the Crown facilities known as Victory Aircraft Limited, for the purpose of establishing a basic aeronautical design and development activity in Canada. The negotiations with the Government were completed, the takeover of Victory Aircraft Limited arranged and A. V. Roe Canada Limited was established on the 2nd of November 1945. In May of 1946, A. V. Roe Canada Limited, took over the personnel of Turbo Research Limited and located them in its facilities in Malton.

A. V. Roe Canada Limited negotiated a contract with the Government which provided for the completion of the design and the test running of the Chinook on a

purely experimental basis for the purpose of determining the capability of the organization. At the same time, the company was authorized to commence the design and development of a 6,500 pound thrust engine which became known as the Orenda which was to power the CF 100. The company agreed to a fixed amount of money to accomplish these objectives by March 31st, 1948.

On, I believe, the 17th of March, 1948, and within the financial limits established by the Government, the company successfully ran the first Chinook, which for all practical purposes, established its specified thrust and fuel consumption on its first run. This run was achieved at night and the Government representatives who were in attendance were Mr. V. W. Scully, Deputy Minister of the Department of Reconstruction and A/V/M Easton representing the R.C.A.F. If I remember correctly, the person who pressed the button to start the engine was Mr. Fred Stains, who was the Chief Inspector of the Gas Turbine Division.

I cannot imagine where you obtained your version of the starting of the first engine and particularly with regard to the technical aspects. You leave the impression that the engineers were unduly skeptical and that the first engine only ran by a fluke in circumstance. Actually the complete reverse is true. The engineers had complete and utter confidence in the engine and the running of the first engine substantiated this confidence in every detail. The performance of the first engine was slightly better than the second and third because of the fact it was built to more precise tolerances.

I will not comment further in this regard as I understand that Winnett Boyd, the designer of the engine, has already done so.

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I believe that your book deals all too briefly with the significance of the gas turbine engine development, because in my opinion, it was as significant if not more so, that the aircraft development programme.

As of 1946, no one had dreamt of even making aeronautical engines in Canada, let alone design them. Furthermore, this small band of some forty young Canadian engineers undertook to design the Orenda to meet the same specification as the Rolls Royce Avon of 6,500 pounds thrust, which at the time, was the most powerful power plant ever devised by man. What is more, Rolls Royce had a substantial head start. The great General Electric Company was the only other organization even attempting such a feat, but even so, the thrust of the engine which they were endeavouring to develop was, I believe, 5,000 pounds; it may have been 5,500 pounds. The point is, that the small group of enthusiastic amateurs at Malton, beat both Rolls Royce and General Electric in accomplishing the basic specification performance of their engines.

I believe I can say without contradiction, that the Orenda Engine Programme, from start to finish, including the magnificent achievement of its efficient production, was one of the most successful engine projects ever undertaken anywhere.

When the first development Orendas were being manufactured, a very high percentage of the engine had to be imported. This included blade forgings, other specialized forgings, certain castings and the entire fuel and combustion systems, etc. When the engine was in full production it was built almost in its entirety in Canada. This greatly enhanced the technological capacity of Canadian industry. All such development of this nature, of course, abruptly ended with the cancellation of the Iroquois project.

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One could go on to include the design and development of the Iroquois, which in its time period, was the most powerful power plant in the world. Its specification and its demonstrated performance far exceeded its closest competitor, which was the Pratt and Whitney J 75, which currently powers almost all of the jet transport aircraft in operation today. The Iroquois was a very advanced and I believe, magnificent achievement which contained many technological breaksthrough and which was put to the junk heap by Diefenbaker.

With regard to the Avro Jetliner. As part of the overall agreement between the Honourable C. D. Howe and Sir Roy Dobson, to establish a basic aircraft industry in Canada, arose the consideration that such an organization could design and produce commercial aircraft for TCA and hopefully, in turn, other airlines of the world. During the fall of 1945, both before and after A. V. Roe took over Victory Aircraft, preliminary discussions took place between Sir Roy Dobson, Mr. Stuart Davies of A. V. Roe Manchester and myself, with Jim Bain who was the Chief Engineer of T.C.A. We initially proposed that T.C.A.'s DC3 replacement should be a turbo prop and virtually, the airplane which subsequently became known as the Viscount. During these deliberations, however, Mr. Bain visited Rolls Royce in England where he saw the Avon under development. He returned to Canada and specified that any airplane to be adopted by T.C.A. must be a pure jet. On Mr. Bain's insistence, Mr. Davies returned to England to consult with Rolls Royce, and in conjunction with Mr. Floyd, who was then a member of Mr. Davies English design team, projected an airplane, which subsequently became known as the Jetliner. The projections of this airplane were brought to Canada by Mr. Davies.

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They were agreed to by Mr. Bain on behalf of T.C.A., and I negotiated a contract in the form of a Letter of Intention with H. J. Symington, the President of T.C.A. This letter of intent provided that T.C.A. would buy thirty airplanes provided they met specifications and the estimated price, which was $350,000, if my memory serves me correctly.

Not long after this time, Mr. Symington decided to resign from T.C.A., but before doing so, arranged with Mr. Howe for the Government to take over the contract for the development of the Jetliner. Mr. Symington felt that the administration of a development contract of this nature was not a proper function of the airline, but rather, one for the Government. In principle, Mr. Symington was completely right and it was for this reason alone that the Government negotiated a development contract with A. V. Roe for the development of the Jetliner, the primary purpose, of course, being for the ultimate use by T.C.A. I am almost positive that the aircraft configuration, at that time, included two Rolls Royce Avons, and in any event, the transfer of the contract had nothing whatsoever to do with technical considerations. The Government contract provided for a joint financial participation.

In referring to the early days and particularly to Mr. Bain, I think it worthwhile to point out that Mr. Bain was certainly one of the fathers of the commercial jet transport. He, together with a handful of people at DeHavilland Aircraft and B.O.A.C. in the U.K., were the only ones to grasp the potential of the Jet airplane as a commercial transport. Such a prospect was frowned upon by the leaders in the U.S. industry and this was still true as late as 1950. I personally,

had many conversations with C. R. Smith of American Airlines, Captain Eddie Rickenbacker of Eastern Airlines and others, and it was their general opinion that whereas the jet aircraft may have an excellent military application, that this could not be the case for commercial airplanes. They made reference to the noise, the jet thrust, etc., with regard to airport handling and felt that the fuel consumption was such that the jet airplane could never be an economic proposition. In this regard there was absolute astonishment and disbelief by the aeronautical world when we flew the Jetliner to New York. In reflection, this situation is reasonably understandable because only the British and the Germans had any knowledge or experience with jets until the end of World War II. It took a little time, and in the case of commercial application, it took considerable time for the Americans to catch up. It is amusing to me now, to hear of and to see in being, the enormous advantages of the commercial jet, both technically and economically, all of which we projected in those very early days and almost all of which was rejected by the so called leaders of the air transport industry.

When Gordon McGregor succeeded Mr. Symington as President of T.C.A., he immediately made it abundantly clear that T.C.A. was not interested in becoming involved with the development of a new airplane nor did he wish T.C.A. to be the first airline to go through the growing pains of a new aircraft. He made it clear that he would only buy airplanes for T.C.A. which have been proven in service by other airlines. This was Mr. McGregor's very positive attitude which became the policy of T.C.A. and which, of course, seriously affected, if it was not instrumental in the demise of the Jetliner. In spite of Mr. McGregor's attitude,

the company worked with T.C.A. on the specification and on the design and development of the airplane, but it appeared to be a halfhearted attitude on their part, and it seemed to us, right or wrongly, that their requirements were unjustified and impractical. As a result of this lack of interest or almost outright rejection by T.C.A. - our own airline - it was somewhat difficult to interest other airlines outside of Canada. It was for this reason that I asked Mr. McGregor to fly with me on that historic first flight to New York.

I cannot recall the exact timing of the decision to change the engines, but I can vividly recall the circumstances. The decision was not Sir Roy Dobson's, but rather, Lord Hives, the Managing Director of Rolls Royce. Lord Hives realized that we were committing our airplane to the Avon engine and he felt that it was fundamentally wrong insofar as the engine did not have and would not have sufficient military experience before its intended commercial use. Lord Hives explained his feeling in the matter to me personally and convinced me that the design should be changed to four Derwents. It was, of course, fully realized that this change was detremental to the economics of the airplane's operation, but it was still considered to be an economical proposition for the airlines and it still would have been. Furthermore, it was felt that a limited operation of the airplane in this configuration, would provide the airline with invaluable jet experience. Thereafter, and on the basis of military experience, the Avon would be available for commercial use. This seemed a very reasonable proposition at the time and nothing since has altered this opinion.

In spite of T.C.A.'s attitude, the company endeavoured to interest U.S. airlines in the Jetliner, particularly Eastern on its New York, Miami run, but our efforts were met with only a limited success. However, Mr. Baker, President of National Airlines, grasped the possibility in the airplane and we were in the process of working out an arrangement whereby National would acquire ten Jetliners. If this transaction had been concluded there is no doubt whatsoever that Eastern Airlines and others would have had to follow. As you mention in your book, the U. S. Air Force was also interested in the airplane. At this time and before the negotiations with National Airlines could be concluded, C. D. Howe determined that the project should be put aside so that the small and relatively young company could concentrate on its primary undertaking, namely, the continued development and production of the CF 100 and Orenda. In your book you question the validity of this decision, but I did not at the time and still do not, and I think I am in a position to know insofar as I was responsible for the operation of the company at the time. It is true that aircraft companies produce more than one type at a time, but it must be remembered that this was a very young and inexperienced company undertaking the design of not only two airplanes, but a gas turbine engine as well, for the first time. Mr. Howe did not terminate the work on the Jetliner, but merely and quite rightly asked that it be deferred. To place this matter in its proper prospective it must be remembered that the Korean War was hotting up to a considerable and very serious degree.

Although the Jetliner project was deferred, we continued to fly the airplane in order to gain experience and by so doing established record after record as referred to in your book.

Realizing that it would be most unlikely for us to complete the development of the Jetliner and to put it into production in the reasonably near future, it was felt that we should endeavour to have it made by someone else in the United States. We approached Mr. Howard Hughes in this connection because it was felt that being the pioneer that he was, he would grasp the enormous potential of the airplane. Furthermore, that he would be able to have it adopted by T.W.A. which he controlled and possibly arrange for its manufacture. An agreement was entered into with Mr. Hughes which provided for his experimental use of the airplane and the rights to have it manufactured under licence in the United States. Mr. Hughes endeavoured to have the aircraft produced for T.W.A., but without success and primarily because of the pressures arising out of the Korean War. As a matter of interest and for the record, I should mention that Mr. Hughes asked us to produce thirty of the airplanes for T.W.A. and the proposition was rejected because it was felt that our company did not have the capacity to do justice to the project and to successfully undertake our commitments to the Government in the production of the CF 100 and the Orenda. I should properly point out that Mr. Hughes's specification for the airplane involved certain modifications and the use of 4 axial flow turbines. Either the Avon, the American version of the Sapphire or the Orenda would have had sufficient military experience at the time to justify their commercial application. This time period was in 1952, projecting the commercial use of the airplane in 1954.

As you say in your book, the Jetliner truly represented technological world leadership for Canada. We were far ahead of the world and would have remained

in that position for some considerable time, to the enormous advantage of Canada both economically and in many other respects had the project been properly and enthusiastically supported in its initial stages by the Government, and particularly by its wholly owned airline.

I would now like to turn to the most important of the three subjects, namely, the Arrow. In your opening remarks concerning the early days of A. V. Roe Canada and its outstanding successes, you question the validity of these successes as being truly Canadian. You seem to credit them to the English parent company. In fact, these successes were purely Canadian, as it was the policy of Sir Roy Dobson and Hawker, Siddeley, that A. V. Roe in Canada should be truly Canadian. The parent company in the U.K. contributed two individuals, E. H. Atkin who was Chief Stress Engineer and J. C. Floyd, who was in the Projects Office at A. V. Roe in Manchester. It is true that we engaged many engineers from England and elsewhere, but we did so as a Canadian company and in competition with our associate companies in the U.K.

There is another fact which I wish to establish concerning the creation of A. V. Roe in Canada and an aeronautical design industry. It is true that C. D. Howe and Sir Roy Dobson had great foresight to sponsor and support this activity. However, the man who had the initial vision was Ralph P. Bell, Director General, Aircraft Production Branch, Department of Munitions and Supply. It was Mr. Bell who had the original concept of creating a Canadian design and development organization, capable of providing our Air Force with its basic equipment so that we would be in a position to defend ourselves. During the war, Mr. Bell encouraged

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Hawker, Siddeley to come to Canada and to remain in Canada to sponsor a creative industry in the post war era.

In your book you contend that the Arrow was cancelled in September/58. You say that you know this to be true because you were at Avro on the day Mr. Diefenbaker made his infamous statement and because the R.C.A. Fire Control System was cancelled. The R.C.A. contract was in fact cancelled at the instigation of the company, as was the Sparrow missle contract which reduced the Arrow programme cost by some $350,000,000, as mentioned in Diefenbaker's statement. In his September statement, Diefenbaker said that the Arrow programme would be reviewed in March/59 in the light of military requirements and other considerations at that time. He inferred that the manned interceptor was becoming obsolete and that the project had become too costly.

At the time in September/58, the press assumed the Arrow was virtually finished and would receive the coup de grace, after the low employment winter months in March. This made it somewhat difficult to retain our key personnel and only did so, and in fact continued with the programme, on the assurance of the Government that the press interpretation of the statement was untrue. They reassured the company that the Arrow was not cancelled and that it would be continued if the costs could be reduced and if the Military stated a firm requirement. The Military did state a firm requirement for the Arrow and the R.C.A.F., in fact, stated that it was their first and basic requirement. The projected costs were substantially reduced and in fact the company undertook to deliver 100 fully equipped airplanes in accordance with the specification for a fixed price of $3,500,000 each. However, it appeared that the Government in fact had

determined to cancel the Arrow, to bury it forever, and the company, and its personnel with it.

As an alternative the Government bought inferior manned interceptors from the United States. It installed two Bomarc missle sites with a further expenditure of U.S. dollars; these two sites filling a gap in the system for the defence of the U.S. against manned bombers. It changed basic Government defence policy (I believe unknowingly) by buying strike, attack fighters to replace defensive interceptors for the R.C.A.F. in Europe.

Reverting to the Fire Control and Missle systems, I would like to express the opinion that these two items were one of the main underlying reasons for the Arrow cancellation. The company strongly felt that the armament should be compatible with that being developed by the U.S.A.F. for their own interceptors. One of the major reasons being the gigantic cost involved. However, in its wisdom, the R.C.A.F. did not feel that the U.S. system was good enough, that it did not meet their requirements, and set off with R.C.A. in the United States to outdo the U.S.A.F. Furthermore, the R.C.A.F. chose the Sparrow III missle which had just been abandoned by the U.S. Navy and awarded a contract to Canadair for its continued development. As stated, the company fought vigorously against this decision, but was directed to accept it. In doing so, the company warned the R.C.A.F. that the decision would threaten, if not kill, not only the Arrow project, but the Air Force itself. At the time of the cancellation, I think the costs of the armament development contracts were about the same or possibly more than the airplane itself.

You state in your book that the manner of the cancellation was scandalous. That, in my opinion, is putting it mildly. You may recall that Diefenbaker endeavoured to hoist the entire responsibility of the layoff onto the company. He said that it was trying to embarrass the Government. This, of course, was utterly ridiculous and untrue. The direction which the company received from the Government was to the effect that all work was to cease forthwith and that no further costs were to be incurred. That seems plain enough. Some people, employed on other work were to be retained, but who? The company had to adhere to the seniority provisions of its various Union contracts which involved some 13,000 people with varied seniority of over twenty years. What was the company to do with 13,000 people with virtually no work on Monday morning? There is also another small item which has never been mentioned and that is, that the company had technically exceeded its financial authority by some $50,000,000. The Government had forced the company into this position, the alternative to the company being to stop all work and discharge the entire staff on its own volition. In the strictest sense, had it wanted to, and I personally believe it intended to, the Government could have bankrupt the entire A. V. Roe organization.

In the light of these circumstances the company informed the Government that it had no alternative but to lay off virtually the entire staff and would do so at 4:00 p.m. It asked for their advice and assistance at 2:00 p.m. Having heard nothing from the Government it was forced to this disastrous act at 4:00 p.m., Friday, February 20th, 1959.

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You make reference to the calibre of the personalities involved in the Arrow decision. You mention Messrs. Diefenbaker and Pearkes. I suggest you should have included the others who should share the responsibility, namely, Raymond O'Hurley, George Hees, Donald Fleming, Howard Green and Michael Starr. As you might imagine, I have some observations in this connection, but after the passing of almost ten years, the most generous comment I can make is to repeat the saying of Christ, "Father, forgive them, for they know not what they do."

You make reference to the actions of the Government and particularly Mr. Diefenbaker following the Arrow cancellation. You point out that he ordered the airplanes and the engines destroyed. He went further than that and ordered that anything to do with the project be destroyed so that there would be no trace of its existence. This included many millions of dollars of tooling, all of the drawings, specifications and every single document in the possession of Avro, Orenda and its sub-contractors. In the first place, I should think that this would be a serious offence to the Crown in the destruction of Her Majesty's property. Secondly, I believe this action alone speaks for the mentality of the man responsible.

In your book and elsewhere reference is made to the financial implications of the Arrow project and quite rightly, as the money involved was great. However, as the company pointed out in its brief to the Government, the projected five year annual cost of the Arrow and Iroquois programmes was not greater than the similar five year annual cost of the CF 100 and Orenda programmes. The economy

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successfully sustained the CF 100 and Orenda programmes which additionally brought hundreds of millions of dollars and great prestige to Canada. The Arrow and Iroquois would have done likewise if they had been allowed to continue.

The cancellation of the Arrow and Iroquois contracts was not a simple matter of the cancellation of an airplane and engine contract. It was the liquidation and scrapping of an invaluable technological asset which had been created over fifteen years at a cost of hundreds of millions of dollars. This was a National asset created with taxpayers money. It was the dismemberment of two of the most advanced engineering organizations in the world. It was the abandonment and destruction of two of the most advanced military weapons in the world. It was the abdication of world leadership. It was a devastating blow to Canadian prestige which had been established in recent years through similar advanced military technology. It was a violent disruption to the lives of some 15,000 families and the economy surrounding the projects.

It was a statement of policy not to support advanced technology in Canada. We say to the world - "We burn our gigantic investments and achievements - We are not competent nor can we afford to compete - We will revert to our previous role of farmers, woodchoppers, miners and fishermen - We will take our natural resources from our very soil and peddle them to the world for what they are worth and we do not want any technically oriented foreign control of our industries." Above all, we say that "We will remain virtually defenceless and once again rely completely upon others for our own very survival!" This is the legacy we leave to those who follow us.

In your book you outline the great achievements of Canadian invention and the almost disastrous results that follow and you wonder why we have not learned by our experience and what we should do about it. I have one suggestion as it pertains to projects such as undertaken by A. V. Roe. It is for the public to ensure that it places in authority in our Government, the calibre and experience of men who are qualified to administer the affairs of this great Country.