TALK WITH AIR VICE MARSHAL DOUGLAS SMITH, DEC. 4, 1972

S. I'm not much blessed with memory and a lot of what you wanted to know with regard to the Arrow programme - I knew a good deal more about the beginning of it than I did about the end of it.

R. I see.

S. I was really responsible for the -- I was the initiator of the programme and I was away in England from 1954 to '58 and then I got back as Vice-Chief, actually at the time it was cancelled. But a lot of what went on between '54 and '58 I would only know by hearsay.

R. Well even that would help. I've been reading up on the Arrow to some extent. The earlier part of the programme doesn't concern me really too much - as the later part of the programme. There are one or two articles, or excerpts from articles that I might read to you which you can comment on. Now this first one I have is an article written in Maclean's Magazine by Blair Fraser. I don't have the date for it, but I think it would be about 1958, and he says in part:

> Nobody thought the government would have the courage to make such a painful decision.

and he pointed out the difficulties, that is to say, that the Royal Canadian Air Force wanted it, that an estimated - and these vary, anywhere from 16 to 20 thousand jobs would be in jeopardy if the . . .

S. It was more than that, I would say.

R. That these jobs were in the heart of the Progressive-Conservative country and that it was nourishing the Canadian aircraft industry which we should have, and all that. Now, having said that he asks himself why/the was Arrow started - I suppose this is where we might begin.

According to him, he said the CF-100 would need a replacement. It was all Canadian and the Air Force wanted another and better aircraft for Canadian needs. He said that when the design and specifications were drawn up they were taken to Washington and the Canadians were told that the Americans had nothing like it on their drawing-boards, and the same thing was true in London. He said that the Air Force felt, and sold this idea to the Cabinet, that the United States might buy the aircraft when it was produced and the Air Force continued to entertain this hope. The Arrow had the extra-long range, the extra seat for a navigator, the extra electronic equipment for all conditions of weather and distance that Canada's great northern spaces seemed to require. And then he ends up by saying that what really pulled the rug out from under the R.C.A.F. and the Avro Aircraft Company was the American decision to do what they said they weren't going to do - build a fighter very like the Arrow, the F-106. Well now, that's quite a mouthful there.

S. Well most of what he says there is quite true. I was very much involved in drawing up the specifications for the aircraft and we had a choice to make -- either put more stations in the Arctic - not necessarily in the Arctic, but in Northern Ontario and Northern Quebec - the isolated part of Canada - which would enable us to use a shorter range aeroplane or build an aeroplane that made additional stations unnecessary. Now, no aeroplane that anybody was considering building at that time had enough range, with enough performance to meet our requirements unless we built more bases.

We either had to build bases or build an aeroplane that made the bases unnecessary. So we decided that by long odds the best thing to do was to build the aircraft because the cost of keeping people and the morale factor involved, and so on, where they'd be in isolated northern stations, and one thing and another -- for that large number of people involved and the logistics of their support and all the rest of it, it was quite tremendous. . . . You would have needed more of the little smaller aeroplanes than you would have of the bigger ones. So that when you worked out the economics of it - an aeroplane that cost probably twice as much per copy was in fact a cheaper thing than operating seven or eight more stations with about 3,000 people stationed on them. Now this question . . . the magnitude of the thing - the reason for going for this kind of an aeroplane.

R. That is rarely brought out. That's one thing I hadn't thought of myself.

S. This was the basic philosophy as to why our requirement was different than the American or the British requirement.

R. In other words the idea was that it would be a plane used . . . .

S. The Americans had all sorts of bases that were close enough together that they could use a very much shorter range aeroplane. But to be mutually supporting a place like Ottawa, the next station to it would be Bagotville, or North Bay. From North Bay there was a gap right to Winnipeg - there were no stations in it at all, and we very much didn't want to build any more stations in there. Now, an aeroplane like the Arrow from Winnipeg or from

North Bay could cover that gap.

R. Well, are you thinking of a lateral gap or are you thinking of a northern gap?

S. Both. You've got a lateral gap and a northern gap to counter. I mean, there's no use having a hole that they can come through, that you can't cover at all. So that this was what made the unique Canadian requirement, was our geography.

R. Yes. What would be the range of the Arrow? Rougly.

S. I've forgotten exactly at the moment.

R. It's probably in Jane's Weapons Systems.

S. The initial aeroplanes that were coming out weren't go ing to have the performance that we really wanted. This is one of the things that really led to the . . . . When we started out with the aeroplanes - now it might be better to . . . . So that the decision was made that even though the initial engines that we decided on first of all we wanted the J- 75, but it didn't look as though it was going to come in time and we settled on the J- 65. That engine didn't pan out and we were eventually forced to go into J-75. It still didn't, as I say, have the power that we wanted but this aeroplane, as nearly all aeroplanes do if they're any good, had a considerable potential for future growth, and as far as I was concerned - and I discussed this personally with Mr. Howe - we promised him that we wouldn't go into an engine programme because the government was quite naturally concerned about the cost of the programme as it was, so we had agreed not to go into the programme except for the development of the aeroplane and that we would buy our engines and we

would buy our power control system.

R. What date would that be, roughly?

S. Well I left Canada in 1954 - that would be in the spring of '54, about the time we got the go-ahead to take on the programme. We went into the programme - well, I'd hardly got to England when . . . I guess the Company people knew I was out of town - when by some process of which I have never really found the truth of the matter, the decision was made to build the Iroquois engine - specifically tailored to meet the thrust requirement of the and not long after that the decision was made to pick of the Sparrow missile and its associate, the power control system, which was a porgramme that was undertaken by the U.S. Navy and they had abandoned the programme and for some reason, again not fully known, the decision was made to. . . . I observed to the then C.A.S. that we were going to price ourselves out of business with all these development programmes and jeopardize the Arrow.

R. Who was C.A.S. at the time?

S. Slemon. And this is why I suggested to you the other day that perhaps he was as responsible as anybody else for the cancellation of the thing by, in fact, going into the additional development programmes which really was more than Canada could afford. So that I would suggest that perhaps the Air Force was as much to blame as anybody else for the eventual cancellation of the programme by taking on more than the country could really afford. Now I say that on one hand - on the other hand I think the decision to cancel the thing was wrong then and in the light of hindsight even wronger, because over a period of about ten

years when we had built the CF-100 and we'd built the engines and one thing and another - we had built up in this country a technical capability to do engineering work of this kind of sophistication that there was nobody better in the world at it. I mean we understood an engineering capability in Canada not only in the basic firms, in Avro and the Engine Company, but in all the subsidiary companies that had come to Canada - people like Doughty who had come from England to set up a hydraulic plant, people who had come from the United States to set up special plants to fabricate blades for engines, and - I've forgotten how many subcontractors Avro had, but all of these people had within their companies built up technical skill to meet this highly sophisticated engineering requirement. And all the time in military aviation particularly, you're crowding the state of the You're not crowding the if the thing that you have produced is useless before you ever get it. You're always on a high risk programme. If you're not on a high risk programme, the thing isn't worth doing, or building.

R. ANd this, of course, is what costs the money.

S. And this is what costs the money. Now, in the stroke of the pen by cancelling that programme Canada lost that capability in twenty-four hours. We have never regained it and I don't think we ever will, not in our lifetime. That engineering team dispersed to the four winds and in two weeks as far as Canada as a whole is concerned. In my opinion that was the real tragedy of the cancellation of the Arrow - not whether the Air Force got it or whether they didn't.

R. What about this bit that Fraser mentions - and I've heard this elsewhere - about you or someone, someone from the Air Force going to Washington / and going to London and finding out whether or not they had anything on the books. In other words to try and find out the likelihood of additional orders. This comes into it time and time again, that the Arrow wouldn't have been cancelled if there was any possibility whatsoever that the Yanks might buy a batch of them.

S. If my memory serves me correctly the Americans were interested in the aeroplane. At that time they didn't have anything of this nature on their books; they went along with us on the requirement for it. If you're going to do it, we won't do it. At no time could I say that the British had any interest in it because at the time in Great Britain they didn't really need this sort of range, or this big an aeroplane. The Americans were quite sympathetic and quite interested in the programme right from the word go.

R. But there was no indication that they would actually buy?

S. There was never any . . . . I would say yes. There was a degree of interest, such that if the aeroplane had gone into service in Canada I think that quite likely we could have sold it to the United States. Particularly as the Americans did produce an aeroplane very much like it. They were producing the Voodoo which was a very similar kind of aeroplane.

R. But wouldn't that be introduced right behind the Arrow?

S. No. At that time we were five or six years ahead of the Americans.

R. But I mean by the time it was cancelled.

S. Well, of course, as usually happens in Canadian . . . you know, this is the history of Canadian development programmes, because of financial implications and one thing or another, and the inability really of the layman to comprehend the requirement in military aviation to be on time with these things -- I mean, these programmes kept getting stretched out for financial reasons and development would be delayed. We'll say, well we can only give you so much money this year, so that instead of the programme coming out . . . . The Arrow flew, I would think, about nearly two years after it should have flown, basically because of financial limitations. To some degree because all of the engineering problems weren't solved in as short a time as originally contemplated, but I think at least half of the fault lay in the fact that because of budgetary limitations we weren't able to put the engineering effort into it that was needed and to bring it out in time.

R. Could one say that they budgetary limitations were again brought on because Canada tried to take too much of the task to herself?

S. Well, at the time I wouldn't say so - no. Because at that time we were concentrating only on the aeroplane. We weren't putting any effort into the engine or the power control system. We had gone to Hughes and the decision had been made to use the Hughes power control system and the engine and this was the basis on which the programme got started.

R. But even before Slemon engaged the Air Force more deeply, shall we say, committed it more deeply, you would still have the

financial limitations then that held you back up to the point where you left.

S. To a degree, yes.

R. There's another point - again with respect to criticism of the Arrow - this one you'll probably expect. This is from an article written, again in Maclean's Magazine, June 1956 - I won't tell you who wrote it, let's see if you can guess in the first instant. He says:

> The wisdom of embarking upon the development of the CF-105 fighter is open to serious military objection. It should be abundantly clear by now that the ground-to-air missile offers the only prospect of eventually counter-balancing the existing ascendancy of the offensive in terms of aerial warfare. If, as many believe, there may be a dangerous time gap to be covered by some form of defence after existing fighters are obsolete and before a really reliable ground-to-air guided missile is available in operational quantities, then it would have been both more sensible and economical to have adopted a prototype fighter developed by the U.S. or Britain as a gap-filler rather than to embark on an expensive venture of our own the product of which at best would have a very short, if any, useful operational life. The combined vested interest of the Air Force, the aircraft industry and defence research scientists burning with zeal to participate in a project they could call their own, coupled with the known desire of ministers to maintain a defence effort with a strict manpower ceiling swept aside any opposition to this venture.

Now this is General Simonds.

S. I lost the thread of that somehow.

R. Well what he suggested in general is that it would have been far better for us until we were able to get a ground-to-air missile to . . .

S. . . . to have adopted an interim fighter. On what date did he say that?

R. That's 1956.

S. Well, now, you see in 1956 that may have sounded all right. The Arrow was first under consideration in 1949.

R. That early?

S. . . . or 1950, and at that time the prospect of an efficient and reliable guided missile to replace the manned fighter was not nearly so clear as it was in 1956. I think you've got to keep these things in perspective. The time from the decision that you need a new aeroplane till you have one in the squadron is somewhere between 8 and 10 years. Now this . . . before the CF-100 was really in operation we were considering its successor.

R. The old story that if it is on the tarmac it's obsolete.

S. At that period in time guided missiles were under intense development but there was no real guarantee that they would be successful. I mean, again they were crowding the state of the too. It's again dare you - again, there was no interim fighter that would fill the role unless we built more bases.

R. Have you any idea what it cost at that time to build a base for one squadron of aircraft?

S. Well, a good deal would depend on where the base was. Something in the order of 25 to 50 million dollars.

R. Of course, that's just the building - there's the maintenance of it as well.

S. I mean, it depends if you have to put in your own power supply and your own water system and your own sewer system and all your housing - everything else that goes into a northern site where you start out with nothing, it's a very expensive undertaking.

R. Do you know John Gellner, by the way?

S. No, I don't.

R. He was in the Air Force. Well he wrote in December 1958 something about the Arrow and in this article he was talking about the government's decision to cancel, and he says that the real issue was the question of Canadian independence. If the Arrow was not built, it would be highly unlikely that a foreign-built interceptor of that class would be purchased. Canada would rely on the Nike Hercules or the Bomarc, and the Bomarc, he pointed out, is a point defence weapon. It would be unmanned and he felt that it would be more out-dated as the stand-off bomb becomes operational. In other words, the old . . . .

He says that Bomarc is cheaper to build and maintain but it lacks the mobility and flexibility of an aircraft. Its striking weapon is much more expensive than the Arrow side-winder, and more important the Bomarc cannot survey the air and therefore he asks the question, would Canadian air surveillance be in the hands of the American fighter pilots; even if they were under Canadian direction he points out that this would be dangerous.

S. Well, that is quite correct. At that time there was a 24-hour surveillance of all unknown radar contacts as a precaution against a sneak attack by the Russians. I don't just recall when that was called off. It went on for a period of five to eight years when any track that appeared from the DEW Line or any place else that could not be identified, fighters were intercepted to go and see

what it was. Now, that's the sort of task that a guided missile cannot do at all. If your defence system was a totally guided missile defence system, you're very much more likely to get into an accidental war, or take the grave risk of a surprise attack.

R. Or alternatively whacking one of your own aircraft.

S. Or alternatively whacking one of your own aircraft, because you have no surveillance capability. Now, this again, brought out the requirement in our Arctic country for a long range aeroplane.

R. There's another comment - this is by Dr. J.E. Keyston.

S. I've heard of him.

R. Yes, I gather he's with the Defence Research Board and he's speaking in December of 1959. He says and I quote:

> It seems that everyone knows we are rushing rapidly into the missile age and that in the next decade Russia is more likely to be producing inter-continental ballistic missiles than long range bombers. So why put any more money into defences against bombers? I would like to make the following observation - if we are to deter Russia from attacking NATO must provide a deterrent that is balanced. I can think of no better way of encouraging Russia to use missiles as a threat and bombers for the actula surprise attack than by deciding that she will not use bombers and our allowing NATO's bomber defences to decay . . . . It is also in the nature of a deterrent and it must not only be balanced but continuous. At any moment in time one would have to deter attack by the bombers, missiles or other weapons available to the enemy at that time.

S. That is a perfectly valid argument and one that was very much on our minds at the time. But if you went entirely on the assumption that the Russians were going to go into ballistic missiles and drop consideration of attack by any other means, well almost any other means is far cheaper than ballistic missile offensive system

and if you get yourself into a position where you have no defence against the manned bomber, then obviously that's the weapon we would use. I mean, you can't afford to take that risk, especially in a country where security is as good as it is in Russia. They may keep large numbers of bombers in mothballs and they could bring them out and get them back into active service within a year. Well, you couldn't re-institute any defence against them in a year. Now you are, of course, in this business and are very much more aware of the political climate at that time than I am now, but at that time there was a very real concern of another world war. A very real concern - much more so than there is today.

R. I can remember that, I can remember it quite well.

S. . . . and no one in their right mind was going to put all their eggs in one basket, and say well, they're going to use missiles therefore we don't need bomber defences. Or vice versa.

R. And yet change, of course, was in that area. Talking about politics, again let me read you another quote. This is just an excerpt of an interview that I had with Mr. Harkness.

S. Oh, the Minister.

R. Yes. Talking about this period and talking about Pearkes. He says, "There was quite a period when poor old George was almost going crazy because the continuation of this [that is to say, the Arrow] was costing a million-odd dollars a day and he was quite certain and knew in his own mind that this wasn't possible. It wasn't a possible or practical thing to complete a programme that every day it went on was just another million dollars thrown down the drain, and he

was having at the same time terrible difficulty in trying to get a cabinet decision to take this step.

S. Take the step - what do you mean? To cancel it?

R. For cancellation.

S. I don't think that is correct. I'd like to turn this off . . . .

R. The thing that comes out in the Harkness Papers, and elsewhere with other people I've interviewed, was primarily the cost factor, that if there had been any chance, or any straw that he could have grasped to show that the Arrow would sell elsewhere that he would have pushed it. But with the situation as it was - don't forget, four months after he came in, Sputnik came on . . . .

S. Yes, Sputnik flew on the same day as the first Arrow flew, I think.

R. And there was a . . . well, you remember the flap, not only in Ottawa, all over the world! - my God, what have the Russians done! - and I think this had a tremendous impact. I think one has to remember in that first year too, you had the Liberals with a - well, they were a minority government in that first period - and what has puzzled me in a way, is why they may not have cancelled the Arrow earlier. But, to get back to my main point, what comes out is the financial implication.

S. As I recall - when I came back from England in '58 I came back to Ottawa as Vice Chief and during that fall - the cancellation was in February of '59, wasn't it? - I, at least, knew very little . . . .

I spoke to General Pearkes and Doug Harkness on many occasions on the matter - but we were principally being asked for figures of costs. We spent an awful lot of time after all on costs, and I can remember arguing not only with the Minister's office, but also with Defence Production and one thing or another, in the manner in which they were putting these costs together. In every instance they were putting these costs together in such a way as to make the programme seem as expensive as possible. In other words, they were trying to use costs, I think - and again it's only surmise on my part - they were trying to use costs as an excuse for cancellation. For instance, the cost of the Arrow, they were including in it development costs of the Iroquois, development costs for the Sparrow missile, development costs for anything under the sun that was even remotely associated with it. You can do all kinds of things with a set of figures, and obviously somebody - now, who was behind it I never really found out - somebody was trying to use costs to kill the programme. Now, I'm not saying that without justifications, but they were loading the figures against the programme rather than for it.

R. I have the figures - in fact I have a quotation somewhere.

S. things were coming out, the first aeroplane was going to cost 200 million dollars - something like that - well, all right - I mean, General Motors, the first new model of a car comes out, it costs something around 100 million dollars, I suppose - and this sort of figure is very frightening to the public and very misleading. You've got to write your development costs off not on the first aeroplane, but

over the number of aeroplanes that you expect to build.

R. Well, it says here - this is from the Harkness Papers, this is a letter that he wrote to Mr. David Audley, Edmonton, Alberta. He says, "With reference to your comments concerning the Avro Aircraft CF-105, I can assure you that the government carefully examined and re-examined the need for this aircraft before it was finally decided to cancel the contract. A thorough examination made in the light of all the information available concerning the probable nature of the threat to the North American continent in fifty years, the alternative means of defence against this threat and the estimated cost to provide us with such a defence the very painful conclusion which was arrived at by the government was that the development of this aircraft should be terminated. A major reason for the cancellation was the enormous cost of producing an aircraft such as the Arrow in Canada. As an example the CF-105 and its armaments had it been continued into production would have involved additional expenditures in the order of one billion dollars and expenditures in the fiscal year 1960-61 in excess of 300 million."

S. I don't know where they would get those figures. I believe the company, while General Pearkes was still the Minister, at one stage of the game gave the government a fixed price of production aeroplanes of about four and a half or five million dollars a copy - four and a half to five million - something in that order.

R. Well the letter - and I'm trying to spot it here, was from the company itself to the Minister, was much higher.

S. This figure did not include any development costs - that was assuming that the development costs had been written off - the figure I gave you. If you put in some portion of the development costs, of course

I think the figure was something like twelve million dollars a copy. I think, as I recall it, the first fifty aeroplanes were going to cost something in the order of twelve million dollars apiece - something like that. But those were not the automatic production aeroplanes - those were all development aeroplanes.

R. I don't have it right here with me, but . . .

S. Again, as I say I would hate to be quoted on these figures that I'm giving - I'm just giving them as to what my memory says. I kept no papers on this whatsoever which can back up what I'm saying.

R. Well, I have copies of extracts from a couple of letters written to the Minister from the President of Avro - you know, it was the last final gasping stage when they were . . .

S. I think John Plant could give you a good deal more than I can of the death throes of the thing because the company was obviously very concerned over the whole matter and they kept very much . . . . And I think as far as the political end of it was concerned, you were probably more knowledgeable as to what was going on than we were.

R. Yes, I agree. But I've heard others say too, I mean politicians, saying in essence that if the programme was continued . . . well, they put up several arguments. They say first of all that under the circumstances there was evidently no chance whatsoever of increasing the national defence budget - that was that. That under those circumstances since they couldn't get more to continue the Arrow, meant cancelling out requirements of either the Navy or the Army or both - they would have to be cut down. That the cost would remain extremely high because again, at the time the decision

was made there was no indication, in fact the indications were otherwise, that you would get sales of the aircraft and the other factor, of course, was the Russians all of a sudden evidently had this tremendous capability which intimated that ICBMs would be coming in and therefore this, again put a damper on the whole thing.

S. I would go along with that statement. I think that's quite true. Obviously there are limitations to - and this is why I started out by saying that I think to some degree the Air Force was responsible for cancellation of the Arrow by getting into these additional programmes which we could have avoided. I mean we shouldn't have tried to do the whole job ourselves - if we had stuck to part of it and we would have been successful, and very successful. In fact, it was a successful aeroplane.

R. Incidentally, the two or three that were flying. . .

S. Were all cut up.

R. Yes, and why? - and whose orders?

S. We don't know, but I suspect the person who ordered it was Mr. Diefenbaker. I think it was - whether it was to ensure that the thing never raised its head again, or for what reason or whether it was a spoiled child breaking his toys up, I don't know. There was no sense in doing it. In fact it was a great crime it was done because later on quite a few people were interested in that aeroplace and I think we might have sold it even though it had never been completed.

R. Well who would own those aircraft that were actually flying.

S. The government. They paid all the bills.

R. Well this was one thing I wasn't really sure about.

S. There was no Avro money in it. I would say there was no risked money in it.

R. Oh, is that so? I didn't realize that.

S. Oh no, totally paid for by the government. The day when any private enterprise could undertake development of that nature without - oh, many years support . . . . The Americans have had practically world monopoly on civil aviation because they have been willing to put the money into development of military aeroplanes with a view to their civil use and practically all of their successful commercial aeroplanes are adapted from military aircraft. Now that's all right if you're interested in the bomber business - we never were in the bomber business. There's really no civil application for an aeroplane like the Arrow.

R. Yes, although one can always gain the knowledge of building a motor . . . .

S. No - let me make one thing quite clear. When I made my remarks earlier about the dispersal of this engineering capability and talent in Canada, now that kind of engineering capability is very versatile. I mean you can put it to any task, it doesn't have to be restricted to building aeroplanes. We did exactly the same thing over the Bras d'Or. Again we had a first class team of engineers together and built a first class hydrofoil, and threw it all away again. I mean the whole history of development work in this country has been just one series of things like this. I don't think anybody, other than a few people appreciating the value to the country of the expenditures made in getting together and having this engineering

capability

in Canada and now we're all complaining that all the Canadian companies, their design work is all done in the United States and all we're doing is making Chinese copies . . .

Well, that's true because we've not got the engineering capability in this country. We get it together and then throw it away.

R. I have had - and I remember this in an interview about a year ago, oh, several years ago now, with General Pearkes, and one or two others who said that if the Conservatives hadn't cancelled the Arrow that the Liberals would have. In fact, Pearkes told me that after the deed was done several weeks later that he had one or two Liberal cabinet ministers tell him that/- you know, just verbally and personally - I don't think you'd find it anywhere in writing.

S. It could happen, you know. Who can tell? It's quite possible, yes. As you say, I think we priced ourselves out of business. I think the Air Force was as much at fault in that thing as anybody else.

R. Especially, you know . . . that when I was reading up on Pearkes his career as a member of parliament and the criticisms and suggestions that he had as a member of parliament from 1945 to 1957 when he becomes Minister himself, that he was always very much in favour of the Air Force.

S. Yes, he was.

R. Entirely.

S. Yes. I spent most of the war in England, but one of my jobs was as adviser to General McNaughton and as such I had quite a lot to do with the Canadian Army and I saw quite a lot of General Pearkes during the war - as a matter of fact, all the senior Canadian com-

manders, Army commanders - and General Pearkes was very air minded. Well, they all were but I think General Pearkes was . . . .

R. Yes. Well I remember him - and this surprised me, you know, as an army man, how much he favoured the Air Force, in the mid-'50's - that sort of period.