

TESTING THE JETLINER



The Avro Canada C-102 Jetliner - the first jet-powered airliner to fly in North America, preceded in this respect only by the DH Comet I in England. This rarely seen Avro photo is reproduced courtesy of Neil Christenson.

EDITOR'S NOTE:

The following account of the history of the sole Avro C-120 JETLINER is a transcription of an address given to the Toronto Chapter of the CAHS, on 10 March 1970, by Mr. D.H. (Don) Rogers. Al Martin taped the address and prepared a typed transcript which was then edited by Mr. Rogers.

At the head table were the speaker, Don Rogers, who was Avro's Chief Test Pilot (now DH Canada Assistant Chief Production Test Pilot); A.W. (Bill) Baker, Chief Flight Engineer on the JETLINER (now Vice-President and General Manager, Douglas Aircraft of Canada); R. (Bob) Johnson, JETLINER Production Chief (now Douglas Canada); and Tommy Thompson, JETLINER Flight Engineer (now Douglas Canada).

Introducing the speaker, Fred Hotson, National President of the CAHS, remarked:

"I would like to welcome the ex-Avro group here tonight who played their part when the JETLINER was being tested. That was a time that most of us will remember, because it was one of Canada's 'firsts'. We really had something going then and, for my part, being out at Malton and seeing the airplane go through its early tests was always an event. I am very pleased now, that I was in it even to that extent. I knew many of the people involved at the time and I think my greatest recollection is the day we saw it flying around with the gear tucked up. Jimmy Orrell was in charge then and Don, with the other members here tonight, were with him."

This was a very interesting and very exciting time for me, and for all of us who were associated with the Jetliner. I was asked to look up some of the details and give a few reminiscent facts from my log book about the many happy and exciting experiences. Unfortunately the story had a sad ending; I can't imagine anything more unpleasant than seeing an airplane that you have lived with for seven years and enjoyed flying - a

really beautiful machine - being cut up with saws, axes and hammers, with pieces falling on the hangar floor. I couldn't go in the hangar for a couple of days while they were doing this job because it was a heart-rending experience.

However, before we came to that sad ending we had some very interesting programs and flights and, since I have my log book with dates of historical interest to me and perhaps to you, I am going to give you some background history of the Jetliner.

At this time, I would like to pay particular tribute to Tommy Thompson, who was one of the flight engineers on the Jetliner during its career and was largely responsible for putting this outline together tonight. He has done a lot of work preparing the board displaying photographs and diagrams with newspaper reports, etc. He deserves all the credit for his work in putting this program together.

Next, I would like to introduce Michael Cooper-Slipper, who was my co-pilot and very soon became captain on the airplane also. Mike since then has been with Field Aviation and is now with Bannock Aerospace Sales.

Also, Bill Baker, who is now Vice-President Operations at Douglas, back in the same factory where he was flight engineer on the first flights of the Jetliner. He flew in it throughout most of the initial flying for some period of time.

And with us tonight, a gentleman whom you met last month, speaking on the CF-100; Bob Johnson, who is in the production department at Douglas Aircraft. He was, in the early days, involved with the production and flight program of the Jetliner.

Let us first go briefly into the Jetliner background. Originally the facility at Malton Airport, as it was called in those days, had rather an odd name. It was the Aircraft Division of National Steel Car, which actually builds railroad cars in Hamilton. I guess they saw the 'writing on the wall' that the aircraft industry was the thing to be in rather than railroads, because in 1939 they set up a factory at Malton.

Initially they were building and assembling other people's airplanes - English Lysanders and Ansons. Also they had a contract to assemble a number of Yales, which some of you will remember were the fixed undercarriage version of the North American Harvard. These had been sitting in crates on a wharf in New York to be shipped to the French Air Force. When France capitulated, the Yales were sent to Malton for assembly. They were somewhat peculiar in that the throttle and mixture controls all operated backwards. I don't know why the French thought that this was the way they should be, but they were a bit of a trick to fly until you got accustomed to it. Eventually, of course, they were changed over to operate in the ordinary sense, or what we considered correct anyway.

I joined the company in January 1942 and at that time we were building airplanes from scratch rather than assembling them, and during the next two or three years we built about 840 Ansons (Mk.II's) and 150 Lysanders. Then the company became a Crown Company in November 1942, which some of you will recall as Victory Aircraft. The main object of this company was to build the Avro Lancaster.

I well remember when the first Lancaster taxied in. It was flown by Clyde Pangborn from England to the factory at Malton. We were flying Ansons and Lysanders then, and I looked up at this huge machine taxiing in and wondered to myself if I would ever be able to fly such a big aircraft. Now, of course, while the Lancaster is a good-sized, four-engined airplane, it isn't all that big anymore. Everything is relative.

Going back a bit further, I remember when I was an instructor at the Hamilton Aero Club. Ernie Taylor and I flew a Tiger Moth from Hamilton to Downsview airport - the old sod field where de Havilland Canada started originally - to have a look at an Avro Anson that had been imported and was to be flown there. I thought that this was a big airplane then, too. So you grow up with the size of the airplane.

In any case, during the war Victory Aircraft built approximately 432 Lancasters, seven of which were converted into the semi-civil version, called Lancastrians, for Trans-Canada Air Lines. With these aircraft, TCA introduced their transatlantic service during the war for VIP's and high priority material between Canada and the U.K.

In the summer of 1945 the European war wound up and it became obvious that the end was in sight for the production of the Lancasters. As a matter of fact, at this time we built one Lincoln because we thought that the Japanese war was going to continue. Also we built one Avro York, which some of you will remember used the same wings and engines, etc., as the Lancaster, but with a very large, deep fuselage. It was converted into a high wing airplane. We tooled up for 30 of those aircraft, I think, and actually built parts for five - with one ultimately being completed about the time the war came to an end.

When it became apparent that this was going to happen Sir Roy Dobson, who was the Managing Director of Avro in England, made several trips between Canada and the U.K. Sir Roy and C.D. Howe in Ottawa had discussed the possibilities of not abandoning this facility at Malton, since by this time it was quite a large organization. Dobson wanted to use the facilities to produce some type of civil airplane and thus keep the Canadian company going.

A general agreement was reached in the Fall of 1945 for A.V. Roe and Co., in England to take over the plant. The original idea was to produce a four-engined airliner for use by TCA. The thought at that time was to make an airplane much like the Viscount - a four-engined, propeller-driven turboprop. Meetings were held with Jim Bain and Gord Dymont, of TCA's engineering and financing departments, regarding the operation and production of an airplane of that type.

However it happened that Jim Bain went to England in the Fall of 1945 and, during a visit at Rolls-Royce, had a chance to see the R-R Avon engines which were in an early production stage for military use. He became so enthralled with the potential possibilities of this jet engine for commercial use that he decided on the pure jet rather than the turboprop for TCA.

The result of this was that on his return from England, he discussed with C.D. Howe, and with some of the other people in TCA, the possibility of building such an airplane for the airline. Toward the end of 1945, a gentleman by the name of Stewart Davis (called 'Cook' Davis) who was, I think, chief engineer of Avro in England, came over along with Jim Floyd who eventually became the chief designer of the Jetliner. They got into a discussion with TCA and also with the Canadian Government. In conclusion, Mr. Symington, who was President of TCA at that time, sent a letter of intent to A.V. Roe of Canada Ltd., as it became known in 1945,

with the intention of building the Jetliner, not with the engines it eventually had but with two Avon engines. The design progressed along those lines and was almost completed - in fact, parts were beginning to be built - when Lord Hives of Rolls-Royce became very concerned that the Avon engine wasn't going to achieve civil certification in time for installation in the Jetliner when it was ready to fly. The result was that the design team at the eleventh hour did a lot of redesigning, changing the aircraft to a four-engined version using Rolls-Royce Derwent engines.

The Derwent was a very good engine. It was a good substitute for the Avon for the time being but, because it was an older-style, centrifugal flow compressor rather than axial flow, its specific fuel consumption was not as good. Also it meant four engines for the Jetliner rather than two, in order to provide sufficient thrust. This meant some added complications, of course.

However, this installation did have one advantage from the early certification point of view. Being a four-engined airplane, the loss of one engine meant losing only one-quarter rather than half the power, thus simplifying the certification requirements of the FAA and the DOT. In fact this resulted in a change in the rudder configuration. The original plan of the Jetliner had a dual rudder arrangement. The rear section was operated by the rudder pedals manually, but then maximum application of the normal manual rudder introduced a powered 'follow up' to the system that would move the forward section of the rudder as well and give additional directional control. This design was to meet the 'engine out' control requirements of the twin-engined, Avon-powered aircraft.

As it happened, with the engines located as close to the fuselage as they were in the four-engined configuration, the 'engine out' handling was so satisfactory that in the cockpit you would hardly be aware of an engine cut as far as yawing was concerned. You could cut a throttle on the plane and, with your feet on the floor, it would go along with a very small adjustment of the trim. Eventually the powered portion of the rudder was locked out as only the manual portion was required.

During this time we were having an interesting period at Avro in the test pilot department. Mike was with me at the time and we had such a variety of airplanes to fly that it kept you on your toes. We had everything from Lancasters - on which we were doing conversion work for the RCAF - to B-25's, Venturas, DC-3's and even some Hawker Sea Furies for the Canadian Navy. I was doing some flying on Vampires also, so we had an infinite variety of airplanes.

Also at this time I had a chance to go to England with Des Murphy, who was the Department of Transport's chief test pilot - in fact, he was their only test pilot at that time. While in England and at Avro's, we flew the jet-engined version of the Avro Tudor, which was a funny kind of airplane because again it was a conversion of the Lancaster using a commercial type of fuselage, still with a tail wheel undercarriage. They had converted this to take four jet engines - Avons, I believe. I flew with Jimmy Orrell, who was the chief test pilot at Avro in England in 1948, prior to our flying the Jetliner.

Finally in 1949 the Jetliner reached a point where it was getting ready to be flown and Jimmy Orrell came over from England. We went over the details of the airplane together and eventually the great day arrived on August 10th, just a little over three-and-a-half years from when the design started, which was pretty good. I should also mention that this was also an exciting time for the engineers, designers, production people and everybody else at Avro, because here was Canada - which hadn't done very much initial design at all before - designing the first jet transport on the North American continent. At the same time Avro was designing pure jet engines since we started out with the Chinook as a sort of trial run and then built the Orenda engine which, by the standard of those days, was a very modern design. Then there was the twin-jet, two-place fighter airplane - the CF-100. All these projects were going on together and you can imagine what a very interesting time it was.

The first flight of the Jetliner took place on 10 August 1949 and was a very successful flight. We flew for an hour and five minutes with Jimmy Orrell as captain, Bill Baker as flight engineer, and myself as co-pilot. This flight occurred during the plant shut-down and management, in their wisdom, decided it would be a good idea to have the second flight with all the plant employees out along the fence to watch the flying as soon as they returned from vacation.

The second flight occurred on 16 August. That was the flight where we ran into a little bit of a problem and the demonstration became more exciting than we had

intended. Before we came back to do some flying across the field, we had some test work to do on stalls. We did our tests and the airplane shook and buffeted as it does in the stall. We went through the test program followed by our flight across the field to show the fine performance of the airplane to the employees. We then circled the field and selected the button that lowers the undercarriage, but the main wheels did not come down - only the nosewheel. So we selected the gear up again, but nothing happened at this point. This became discouraging. However, we had three methods of getting the undercarriage down so we were not too concerned as yet. We had the push button (the regular way), an auxiliary hydraulic pump that you could switch on, with another system to operate the foregoing, a hand pump (also hydraulic), and in the main cabin under a panel in the floor was a neat little handle that said 'emergency release'.

Bill Baker probably wouldn't tell you this, but I will. He actually broke a rib pulling and yanking on that handle and, in fact, eventually broke the cable trying to release the undercarriage. But none of this would avail and finally, in spite of the pleas of the airport manager that we go over the lake and ditch the airplane there rather than on the airport, we eventually landed the craft on the field with no problem at all.

The nosewheel was down, which people thought was pretty hazardous with the main wheels up, but actually this turned out to be the best situation we could have, because the aircraft rolled along on its nosewheel and the end of the tail-pipes, much like an ordinary landing. There was almost no damage at all. We ran across a taxi-strip as we were coming to a stop which caused some scraping on the bottom of the jet pipes, flaps, and so on. It was a very smooth landing and we suffered no discomfort in the airplane. Afterward people came crowding around wondering if everything was OK, but there was no problem at all as far as we were concerned.

The reason that the undercarriage would not come down was pretty simple. In the course of our stalls, with the nose up and the aircraft shaking in the pre-stall buffet, the undercarriage oleos had shortened and allowed the undercarriage lugs to come back into the up locks to the point where pulling the emergency, or anything else, just wouldn't withdraw the locks enough to free the gear. The remedy to this was so simple that you wonder why you didn't think of it beforehand.

What the engineers did was put a little cam-shaped fitting in the up lock so that, as it came up, the undercarriage pin rode ahead of this cam and couldn't come back too far to prevent the up lock from releasing. It was just that simple, but it caused a lot of heart-rending to the people on the ground watching us fly around with the gear half down.

However, the airplane was very little damaged. This happened on the sixteenth of August, and about a month later, on the twentieth of September, we flew the airplane again and the test program began seriously.

On the fourth of October, which was less than a month later, we had the first public demonstration of the Jetliner and we have quite a few pictures of this occasion. We had officials from the government, the Air Force and the airlines come to look at the airplane and see it fly.

By the middle of October, I had done quite a bit of flying on the Jetliner with Jimmy Orrell and Mike Cooper-Slipper. Jimmy returned to England to continue flying for a number of years there. He is now retired and is still living in a beautiful little cottage right on the edge of Woodford aerodrome where he spent so many years as chief test pilot. We correspond occasionally although I haven't seen him for quite a few years.

One interesting flight that occurred during the airplane's life was on the eighteenth of April, 1950. We made the first international air mail flight in North America in a jet transport when we carried air mail from Toronto to New York. Gordon McGregor, who at that time was president of Trans-Canada Air Lines, flew along with us. The mayor of Toronto sent, among other things, a peace pipe that we were to take to the mayor of New York. I don't know which one of us was supposed to puff on the thing to keep it going. I think Bill lighted it just before we landed. Anyway we took this peace pipe along, lots of pictures were taken, air mail letters were carried back and forth and some of you may still have some of the covers that were on that flight. This flight was interesting from an historical point of view, not only because air mail was carried but it was also the first flight in the United States of a jet transport.

During 1950 and 1951 the test and demonstration program continued. We did demonstrations for the RCAF

at Ottawa and St. Hubert, the USAF at Dayton, Ohio, and also some flights for the air force and for other officials at Washington, D.C.; and down to Miami for the airlines there, as well as Chicago.

On the tenth of January 1951, we had an interesting flight that attracted considerable interest in the press. This was a triangular operation from Toronto to Chicago to La Guardia to Toronto. Toronto to Chicago took an hour and thirty minutes, Chicago to New York was an hour and fifty-five, and New York to Toronto was an hour and ten which, by today's standards, is not unusual. But in those days, when they were still flying DC-3's and -4's, this was considered quite spectacular.

While we were happily flying along on our way from Chicago to New York, we didn't realize the commotion that was happening. The airport manager at La Guardia said that he wouldn't have this fire-spitting jet aircraft landing on his fine airport. Our representative at La Guardia was having a terrible time arguing that we weren't going to burn down the terminal and the other aircraft but, fortunately, we didn't know all this arguing was going on. Finally he did get an approval for us to land, with the understanding that we would not taxi anywhere but on the runway. We would stop on the taxi-strip and they would send out a tractor to tow us in if necessary and they'd monitor the burning up of their tarmac. If there was any danger we were to shut down right away! Of course we know now that we can taxi a jet around without causing all this damage. The airport manager didn't know, but fortunately we were able to show him that all was well. It is interesting to think back now to the misunderstandings that existed in those times about the advent of jet transports.

A couple of days later, on the twelfth of January, we flew to Winnipeg and back with Ron Baker who was TCA's chief test pilot. We went out in two hours and forty minutes and back in two hours and thirty-five minutes, which again, is no problem today, but at that time it was quite interesting.

Those of you who are pilots will appreciate the fun it was flying cross-country in this airplane because most of the transports operated in the five thousand to fifteen thousand foot level. We were cruising at thirty thousand feet at 420 or 430 miles an hour. Every time we reported over a radio fix and gave our altitude as 30,000 feet and our estimate to the next fix, the ground controller would come back and say "Do you mean three thousand?"... "No, thirty thousand!" And then they would say "We've checked your estimate; there must be a mistake here somewhere..." The folks in Air Traffic Control were not accustomed to those speeds. So this was all quite fun for us sitting in the cockpit in pressurized comfort flying on autopilot and working the computer across the countryside. Of course this sort of thing is all 'old hat' now, but in those days it was new and exciting.

On the twenty-second of January - we had a busy January that year - we flew to Tampa with Gath Edward of TCA. That was a three-hour flight and we did some demonstrations for the airlines down there. And from there to La Guardia in two hours and twenty minutes and then to Toronto.

We had one of our few mechanical delays on that landing at La Guardia. The nosewheel anti-shimmy hydraulic jack failed so we had to stay there a day while awaiting a replacement from Toronto.

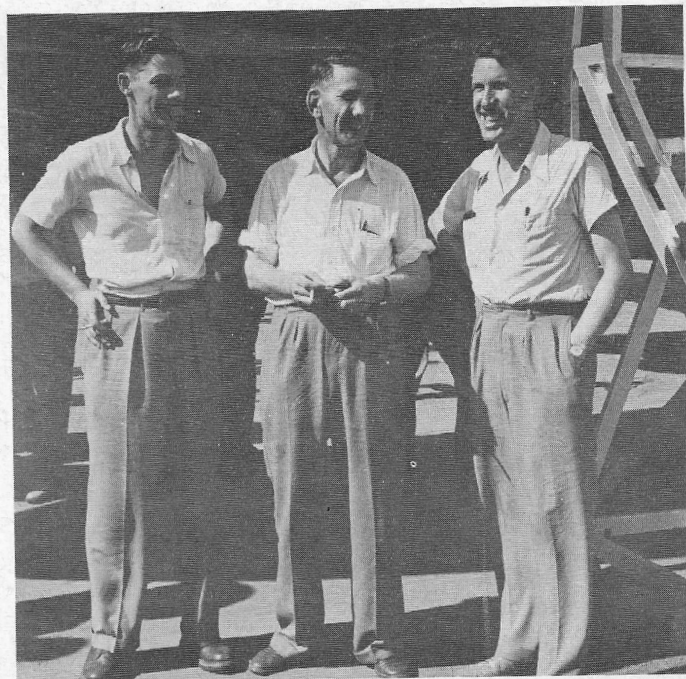
The airplane was fantastically reliable. I can never remember having an engine failure in the air. We had one foreign object damage to an engine on the ground in Chicago while on demonstration there. We made a three-engine ferry flight to Toronto. (The speaker enquired of Michael Cooper-Slipper if he recalled any in-flight engine failures.) I guess that there may have been one - I know we had fire warnings, but they were false alarms. Anyway, in total we did 425 hours and the aircraft's reliability was outstanding.

In July of 1951 we flew to Washington again and did some more demonstrations for the United States Air Force and the Navy. At about this time there was enough interest on the part of several of the air lines that they were getting serious about writing orders for the Jetliner. United Aircraft in Chicago, C.R. Smith, who was the president of American Airlines, Eddie Rick-enbaker, for Eastern, and so on - these folk had all flown with me in the airplane as well as with Mike. Some had come to the point where they were ready to sign a production order for the airplane.

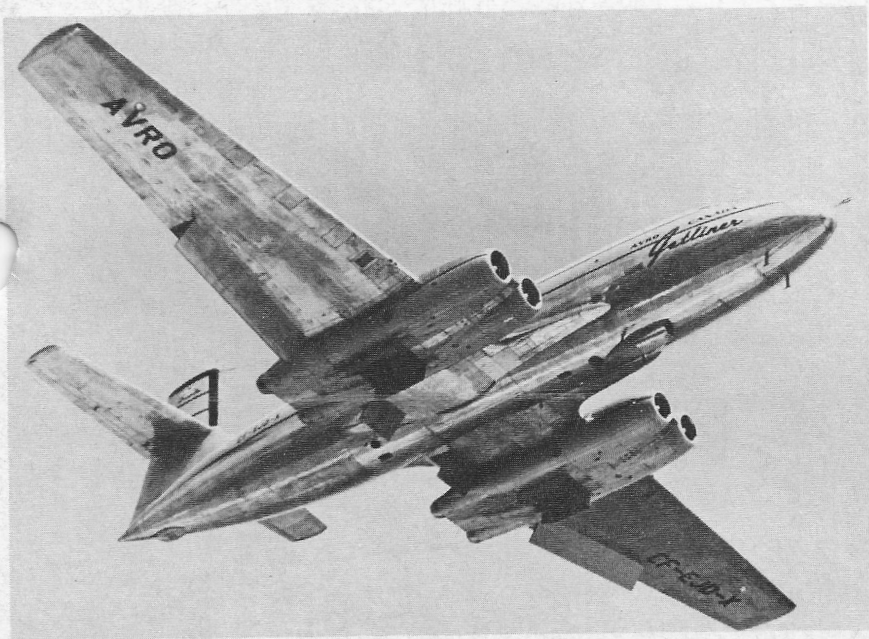
Now this is where the rot set in for the poor old Jetliner and, personally, I think for Avro Canada's future. The Jetliner, of course, was a Government-funded project, as was the CF-100 and Orenda engine. Unfortunately for the Jetliner program, the Korean uproar got going at the wrong time. We were having teething problems at that time getting the new jet fighter and jet



Don Rogers, Avro Canada Chief Test Pilot, with a model of the Jetliner, which was then undergoing highly successful test trials.



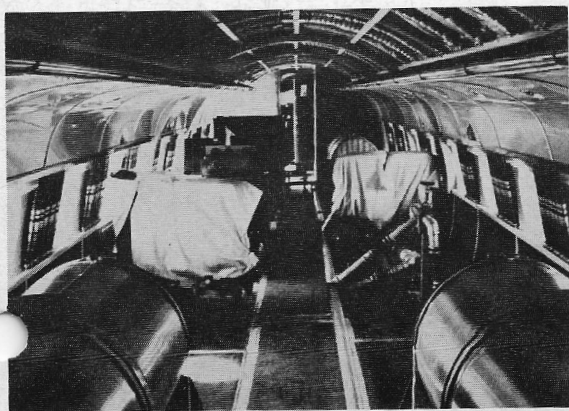
Three important men in the Jetliner program (left to right: Bill Baker, Flight Engineer, Avro Canada; Jim Orrell, Chief Test Pilot, Avro Manchester; Don Rogers, Chief Test Pilot, Avro Canada, author of this article.)



A revealing study of the Jetliner taken on an early test flight.



The crew on a flight, 22 November 1949, on which the Jetliner exceeded 500 mph: (left to right) Frank Spink, Don Rogers, Bill Baker, Mike Cooper-Slipper, Jim Floyd, and Mario Pesando.



The water ballast system designed to simulate all-up loads and CofG changes during flight testing.



The Jetliner comes in for a landing possibly during three-engine practice.

engine into production. Since all three programs were government funded, Ottawa decreed that we should stop work on the Jetliner until we got the two military projects underway.

This sounded the death knell of the Jetliner. We couldn't give a production schedule to National Airlines and the whole program was set aside. I personally feel that the company made a very bad decision at that point because, rather than resurrecting this program or keeping it trickling along gently, the lure of military orders for the CF-100 and Orenda, with the possibility of continuing military orders, resulted in the company stopping Jetliner development, and never putting it into production.

Now you must realize that this all happened in 1951 and '52. This was some seven years before the 707 and the DC-8 flew with the airlines in commercial use, and many years before the DC-9. If the Jetliner had gone through its normal development, with a thinner wing using some sweepback and with more powerful engines such as the developed Orenda, perhaps - if it had once got into production, it was such a fine flying airplane and had such good performance and handling that, in its normal course of development, I am sure it would have been a DC-9 type aircraft about ten years before that aircraft eventually arrived on the scene.

It was not in direct competition with the 707 and DC-8. They were intended for transcontinental and transatlantic routes, but the Jetliner was designed as an intercity transport, and it would have been ideal in this service. I think that if Avro Canada had retained the Jetliner program until their military production was going smoothly, Avro might very well still be in business today in the commercial field. When the basket containing all the military eggs was dropped, the loss of the Arrow program eventually broke the company's back. This is something that I would rather not go into at this or any other time.

Another blow happened to the Jetliner at this time and, oddly enough, this was the result of another airplane which was in Canadian production - the North Star. Some of you will probably remember the tremendous newspaper noise that was going on and the criticism of the Government and Trans-Canada Air Lines over the North Star program. The North Star was a combination DC-4/DC-6 converted to take Rolls-Royce engines, similar to the Merlin engines that had been in the Lancaster. Now these were very good engines and did a fine job; actually a very fine job for TCA. But the aircraft did have some teething problems, the engines were very noisy, and the old political problem reared its head. The opposition made a tremendous 'song and dance' about TCA having taken on this new project instead of buying DC-6s and '7s. TCA's engineers had been involved in all of the original design specifications and operational characteristics of the Jetliner, but they decided they couldn't face up to introducing such a radical aircraft as a jet transport into their airline at that time. This precluded the prospect of a sale to TCA and I'm sure contributed to the company's decision at that time not to continue into production.

This was about 1951 and from then on the aircraft was in a state of decline, but one of the most interesting programs for the crew actually happened in 1952. We took the airplane down to Hughes Aircraft at Culver City near Los Angeles, with the idea of Hughes using it for the development of the MG 2 Fire-Control System. As you will probably recall, the CF-100 that we were building was to have the MG 2 system and Hughes Aircraft was designing and building this new project. When you think back to the new ground that Canada was getting into and exploring with the development of all these projects at the same time, it really is remarkable. It's a pity to think of all the engineering skills that eventually had to leave the company and the country, when some of the projects fell through.

Anyway, to get back to the story. We took the Jetliner to Hughes Aircraft in California with the idea of their using the aircraft as a test bed, because of course they could pop up to thirty thousand feet in a few minutes in pressurized comfort - a very fine test bed for them. Bill Wildfong was the engineer on that flight, and a chap named Sid Holland was the co-pilot. Mike we left at home to look after the shop, flying the production aircraft at Toronto.

The second day we were there I gave Howard Hughes a flight in the airplane. He was so intrigued with it that he, in his usual unique manner, had the airplane moved away from Hughes Aircraft over to the far side of the field with guards put around it. Then no one, including the crew, could get to the airplane without his say so. He did this with various other airplanes. 100. He had a Lockheed Constellation, a Boeing Strato-cruiser, a Convair and a Martin 404 parked here and there around the countryside under guard. Occasionally

he would go and fly them. We went down with the idea of being there for ten days or so, but we were there for six months and only flew thirteen-and-a-half hours total time during that six-month period.

Most of the time we stayed in a hotel. My wife and the engineer's wife were brought down. Later they returned home, but still later all my family was brought to California and we were put up in a beautiful house in Beverley Hills. However, you were seldom really free because Howard Hughes' office would phone us in the mornings and say "Mr. Hughes will probably want to fly this afternoon." After sitting by the phone all day, the office would finally call and say "Very sorry, but Mr. Hughes wasn't able to get away today but perhaps he will fly tomorrow." So we were never off the hook. All of a sudden he'd decide that he wanted to go over to Palm Springs and would come out and climb aboard.

When I had checked him out on the Jetliner, which took only a short time, he went around and did, I think, nine takeoffs and landings in a row on his beautiful nine-thousand-foot grass strip. He was a perfectionist on takeoffs and landings, although he tended to come in a little fast in order to make a nice smooth landing. When we taxied in, I mentioned to a Hughes Aircraft pilot that we'd done nine landings and takeoffs. He said, "That's nothing! When he got his Boeing Strato-cruiser, he did thirty-seven!" I guess he figured the Jetliner was pretty easy to fly, which it was.

After I checked Mr. Hughes out, I was immediately relegated to co-pilot duties because he did all the flying from then on, with a complete and utter disregard for air traffic control. We would climb up VFR through the fog and smog of Los Angeles and out of the area, and he'd say "Don't worry about that."

(In answer to a question from the audience asking if Hughes Aircraft used the Jetliner in the development of the fire control system, the answer was "No.")

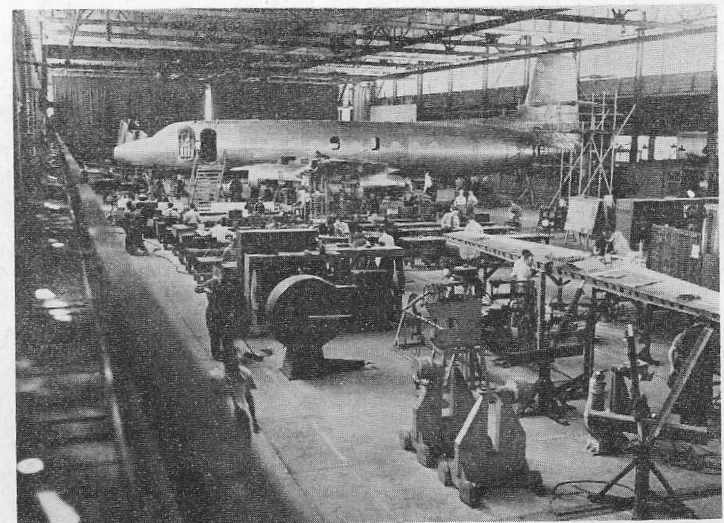
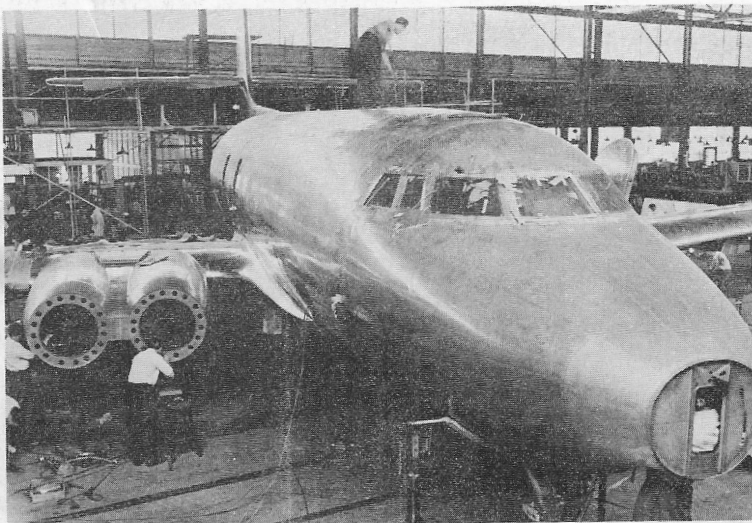
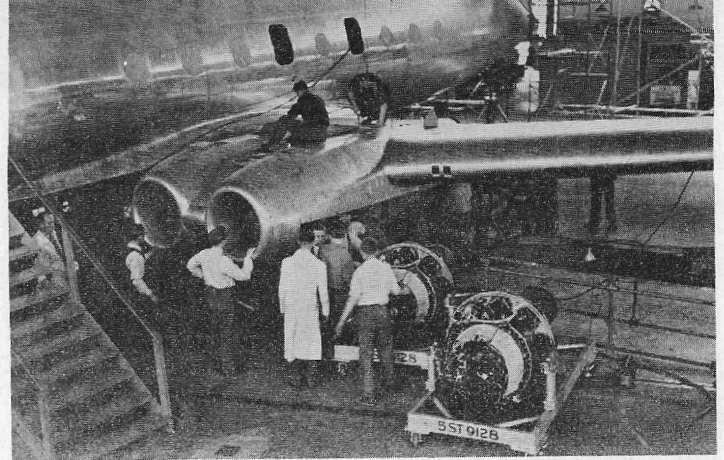
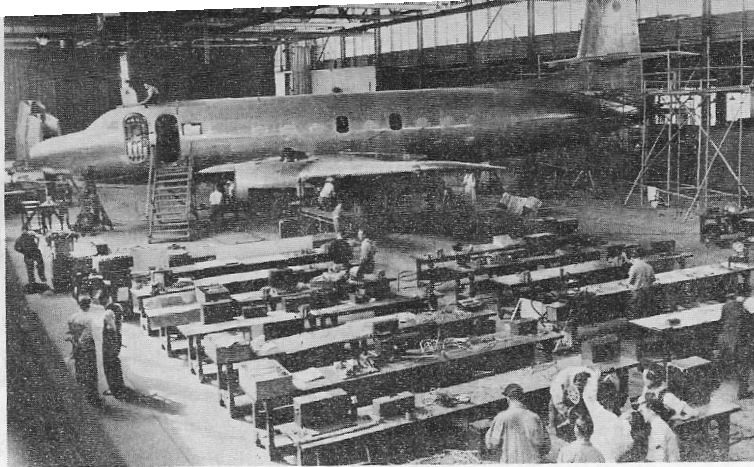
Mr. Hughes kept the airplane in California with the idea of selling it to TWA, since I think at the time he was chairman of the airline. But no TWA people ever flew the aircraft. This was a funny habit he had; he'd lock an airplane and put it under guard just as if it was his own personal property. Eventually Fred Smye got fed up with this procrastination and, after many phone calls and visits to Hughes, the airplane was recalled. Only the engineer and myself were in California by this time since all the other staff had gone home long before. This had been an interesting interlude for me as I had met and flown with a most outstanding man who was an expert pilot, and had seen something of a way of life much different than that to which I was accustomed.

Once the Jetliner was back in Toronto in late 1952, all serious work on the aircraft ended, but I was surprised when I looked in my log book to find out how long it went on flying. It was actually the Fall of 1955 when the last flight took place. In other words, for another four years the airplane did a little bit of test flying once in a while, primarily as a photographic platform for observing rocket firing and other development work on the CF-100. We did a few demonstration flights; we flew in the Toronto air show for two years, and we took the Jetliner to Ottawa for an RCAF show there.

All these flights were made to keep the Jetliner flying, but without doing any development work on the aircraft. One of the most interesting flights on the Jetliner, which many of you, especially those employed by Avro will remember, was on 26 May 1955, when we flew Mr. Martin of the Martin-Baker Company, which pioneered in the development of the ejection seat. This flight was for photographing the first live ejection from the CF-100. He brought a man over from England to demonstrate the seat by making a live ejection. I think Jan Zurakowski was flying the CF-100 and we flew the Jetliner alongside over the flat area near Camp Borden and photographed the rear seat ejection. We then landed at Camp Borden to pick up the jumper and take him and the seat back to Malton.

Then, sadly, I note from my log book the last flight of the Jetliner on 23 November 1956, which was just about seven years from the time that it first flew. Flight time totalled approximately 440 hours with very little trouble; a fine airplane, and a dream to fly. It was so quiet in the cockpit that we never used a headset. It was so much in advance of any aircraft of the time that it is a pity that it didn't continue.

Some unkind remarks were made to explain its cancellation by TCA. I really don't understand the purported press report of C.D. Howe saying that it didn't fly properly and that it had to have sand ballast in the rear of the fuselage. This, of course, was not correct. We did use ballast on many occasions for certification work, in order to position the centre of



MORE JETLINER PICTURES

Photos A, B, C and D were all taken in the Avro plant at Malton during final assembly of the Jetliner. The port engines are about to be installed in Photo B. The tractor is being unhooked, in Photo E prior to a test flight. In Photos F and G the aircraft is in front of the flight test hangar. The crew are being briefed for a test flight in Photo H while the Jetliner is seen air-to-air in Photo I, a well-known shot.

All Avro photos courtesy National Museum of Science & Technology.



President's Message

With the first *Journal* of 1972, we take a bold step in our own history to present valuable information in an improved form. It is an appropriate time to thank our regular members for their prompt renewals and welcome new members who are with us for the first time. We had to boost the fees along the way, but think you will appreciate our growing responsibility to produce a better product.

First of all, this year's *Journal* will have a new format, designed and prepared by Montreal chapter member, Jim Bruce, whose artistic talents have graced our covers in the past. The material inside is still the interesting, factual history you have become accustomed to, complete with pictures contributed by fellow members. A new method of binding will complete the change and we think you will like everything about it.

Throughout all these improvements, we are planning a more equitable spreading of the *Journal* workload. We are proceeding with one eye on the future and the other on our tight budget. Our source of working capital is still limited to membership dues and personal donations to the Society work. We ask your continued support in both these vital areas.

Another innovation at this time is the *Newsletter* enclosed with the *Journal*. We hope to make this a regular feature and include not only the new member list on a quarterly basis but a running program by our newly appointed research co-ordinator, M.L. (Mac) McIntyre. There are lots of important projects within reach of our members. We need a co-ordinated program to get them into print.

F.W. Hotson

Editorial

In the above President's Message, Fred Hotson has acknowledged a contribution by Jim Bruce to this and succeeding *Journals*. I would like to explain just a bit more about this contribution.

Our format had remained almost unchanged since our second issue and a face-lifting seemed an appropriate way to mark our tenth year of publication. Jim Bruce was approached for some suggestions. As well as being able to render elegant aircraft drawings, Jim is a versatile illustrator handling everything from sports, to editorial portraiture, to women's fashions. He is also a capable and original designer. He responded handsomely submitting not only a new cover layout but a complete redesign of the entire *Journal* in a crisply contemporary style.

With the approval by the Directors of his designs, Jim prepared working drawings for the cover and the contents page and headings for the various regular features. Although a considerable job in

itself, this represents only part of his concept for a new *Journal*. Unfortunately, full adoption of his ideas must await the expansion of the Society to a stage when funds will be available for a professional assembly job and to pay for other services, most notably the typing, now donated free of charge. With the promise held forth by so many prompt renewals, even in the face of a dues increase, this situation may soon come about. From the standpoint of graphics, we could then boast a magazine comparing very favourably with any of our sister publications.

In closing, I would like to thank Jim Bruce for the many hours of work he has put into a format which will undoubtedly match the near decade of service obtained from the one we are retiring. The old format was evolved to some extent in the Art Department of the old *Toronto Star Weekly* (now defunct); coincidentally, the man responsible for our new one is Art Director of the *Montreal Star*.

W.J. Wheeler

TESTING THE JETLINER - continued

gravity just where we wanted it for a particular test, but this certainly was not a requirement for normal operations. The aircraft was beautiful to fly. We had hydraulic assist on the ailerons, manual rudder and elevators, with an electrically-operated horizontal stabilizer to adjust for different loadings.

Many humorous things happened during the time we were flying the Jetliner. One development program we did was on the de-icing system, which was new at that time. It was an electrically-heated de-icing system with rubber boots on wings and tail; the same kind of boots that are common on propellers nowadays. But this is the first installation I know of where it was used for surface de-icing. They were Goodyear boots with electric elements in them and sometimes, because the material was quite thin and the engineers weren't sure what voltage was needed in them the surface of the boot would burn through and that, combined with the moisture getting in, would cause great sparks to flash out on the wing.

We had an engineering observer who sat at a test panel back in the airplane. This man was not in love with flying and I don't know why he chose to be a flight observer, but in any case, he was sitting back at his panel where a red light would come on to indicate that we had entered an icing condition. This ice sensor would let us know that it was time to start operating the boots. When he saw this red light come on

for the first time, he jumped up so fast he almost knocked himself out on the overhead baggage rack. So, from that flight on, he wore a hard hat - in case he jumped up too fast again. On another occasion, with Mike flying the Jetliner on a stability test, we had large water tanks forward and aft in the cabin with a pumping system so one could, by pumping the water from tank to tank, change the cg for certification work. A few minutes after takeoff, one sense antenna mounting on the nose broke off and started to bang against the fuselage. Mike realized that it would only be a matter of time before it banged a hole in the fuselage and decided to come back in. Of course the airplane was very heavy with the water ballast, so he gave the order to the same observer to 'dump' the water. Our friend heard the word 'dump' and thought he said 'jump'. Another engineer had to go back and restrain this observer from jumping overboard, rather than dumping the water.

Well, so much for the saga of the Jetliner from my log book. I'm surprised that my talk has been so long but there were so many interesting episodes that I have only been able to skim over the high spots. The aircraft was so advanced, and such an ambitious adventure for a Canadian company in 1949 and the early 1950's, that I think it has earned a significant place in the history of Canadian Aviation.
