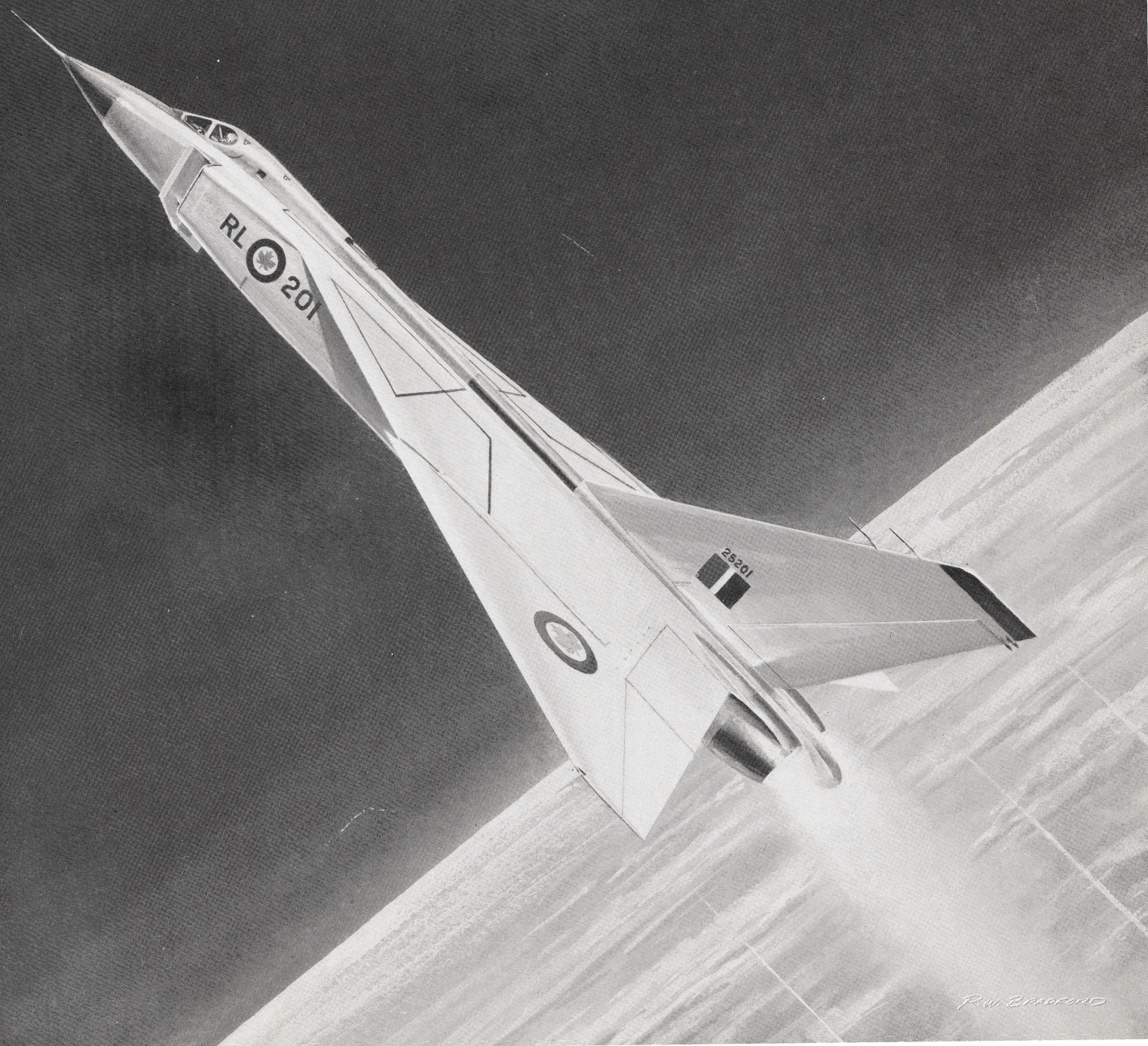


# The *CAHS* Journal



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**VOL. 17 NO. 4 WINTER 79**



*R. W. Emerson*



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This JOURNAL is the official publication of the Canadian Aviation Historical Society. All articles published with authors' names are the opinions of the authors and do not necessarily reflect the policy of the CAHS. All work on this publication is voluntary and no payment can be made for published material.

Members wishing to submit or undertake articles are requested to contact the Editor at his address, given left. All manuscripts for JOURNAL publication should be typed originals (not carbon copies or photocopies), double spaced, using one side only of paper. All material will be returned to owners following its appearance in the JOURNAL.

Membership in the CAHS is for one full calendar year commencing 1st January. A member joining at any time in the year up to 31st December will receive all quarterly JOURNALS for the calendar year of enrolment. Annual membership fees of \$11.00 will be due for renewal on 1st January of each year.

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# President's Message

A new decade is upon us, and as CAHS moves cautiously into 1980, we find ourselves confronted with a growing number of new historical interests. Historical aviation has broadened during my eleven years as your president, and I hope you will allow me a few observations as I see them at this time.

Our progress has been much slower than our years as a society would indicate, but we have produced 17 years of informative, interesting Journals. The fact that we have done it without government grants and without advertising revenue is something unique in this day when the big dollar reigns supreme. Throughout the years, the Journals have come to members at cost or less, and help over that thin line of success or failure has been the steady flow of personal donations, plus a little quiet financial help during one or two critical periods. Combine that with the dedicated work of the ever-present "few" and you have a quick appraisal of what has kept CAHS going all these years. Can it continue this way into the 1980's?

No matter where you look today, there is growing world interest in aviation history of all kinds. It is reflected in the many flying publications and the steady flow of new books. This means that the researchers and writers are busy, but so also are the art and photography people, the stamp enthusiasts, the vintage aircraft buffs, the aircraft spotters, the rebuild and refly groups, the museum enthusiasts, the registration compilers, the modellers and replica builders. New societies are formed and a considerable overlap occurs. Each strives for a publication of its own, and soon we find ourselves competing for each other's money.

Naturally, the CAHS cannot be all things to all people, nor do we try to compete. As far as material for the Journal and Newsletter is concerned, a lot depends on the interests of the contributors and we are bound by their enthusiasm and their generosity. The objective in publishing the Journal is to record valuable historic information and we try for a wide variety of subjects. We make no pretence at being professional for none of our contributors receive remuneration. Many of our articles require years of reworking before they are ready for print. We encourage original writings and first person accounts, for

they all add to the mound of information we wish to leave for the next generation.

Some members feel we should be writing on more recent events, while the details are still fresh and easy to get. There is nothing wrong with that approach and the subject has come up many times. The guideline has always been "anything prior to the last ten years", which should provide a wide enough scope for any researcher. It is encouraging that so many of our members have produced historical books within the last 17 years and they are to be congratulated. These projects are not noted for large royalties and some, although sponsored, are done at considerable expense to the author. A lot of people direct their efforts and their writings to the commercial publications where they get much greater coverage. This is an understandable approach, for most aviation magazines fall back on a good history theme once in a while.

In all these cases, the authors are very much on their own as far as research is concerned and even without CAHS, would be working away on their own pet projects. It is their personal interest and their personal enthusiasm that provides the drive. The society's main effort is to bring these dedicated people of like interests together rather than to provide a clearing house for information. The best we can do in this area, is to point to general sources of historic data and refer to past issues of the Journal. We cannot do research work for members, although we try to attend to any reasonable request. Sure, we have experts in special areas, but they are usually busy putting their own work into print; and when you get right down to it, they dug out the information in the first place.

On the subject of help within the Society, we have slipped badly over the past few years. A certain amount of this can be explained, for death has claimed many of our dedicated workers. Some have moved away, lost their enthusiasm or turned their interest to other things. We need a constant turnover of new inputs in the future, and new workers who will help share the load. This must be the main theme as we move into the 1980's, if we are to survive within this growing surge of competition.

F. W. Hotson

## Editorial

The members of our Ottawa Chapter have always been important contributors to the JOURNAL and an expressed hope of theirs has long been to provide the entire contents of a particular issue of our magazine. This ambition will shortly be realized in our Number Three JOURNAL for 1980 which will be completely written and illustrated by CAHS members from the Capital. While nothing has as yet come into the Editor's hands it is hoped that the material as a whole will have a regional flavour and that there will be transcriptions of some of the presentations made to the Ottawa Chapter by a succession of notable speakers - as recorded in their excellent Newsletter, the Observair.

As well as the contributions from Ottawa, members may look forward, in the new year, to Mike Cooper-Slipper's account of flying in the pre-war RAF, and in the Battle of Britain; to Roland Butler describing the test flying of Hawker Aircraft, most notably the Typhoon and the Tempest; and a stage by stage first-hand narrative by Donald Bell, of the famed Lancaster attack with 12 000 pound "Tallboy" bombs on the Tirpitz as she lay almost impregably berthed in a Norwegian fjord.

And from almost the same period, but on the civil side we have Alan Hunt's "Formative Days of TCA" and "Fifty Years of Aviation Meteorology" by Dr. D. B. Kennedy.

Ray Crone offers two pre-war stories: "The Trans-Canada Air Pageants" and the "Keng-Wah School of Aviation" detailing a venture by the Nationalist Chinese in training pilots on the Canadian prairies, beginning over sixty years ago.

Returning closer to the present we have W/C K. R. Greenaway's story of a flight by a non-rigid airship to the north pole in 1958. The Author was Senior Navigator. Larry Milberry, author of the newly published (and very impressive) book "Aviation In Canada" gives us the Found Story detailing that firm's efforts to produce a light all-Canadian bush plane.

While almost all of the foregoing items are in hand and, in many cases type set, many other articles of comparable interest and quality have been promised and should also appear in the JOURNAL this year.

William J. Wheeler



# TEST FLYING THE ARROW

AND OTHER HIGH SPEED JET AIRCRAFT

JAN ZURAKOWSKI

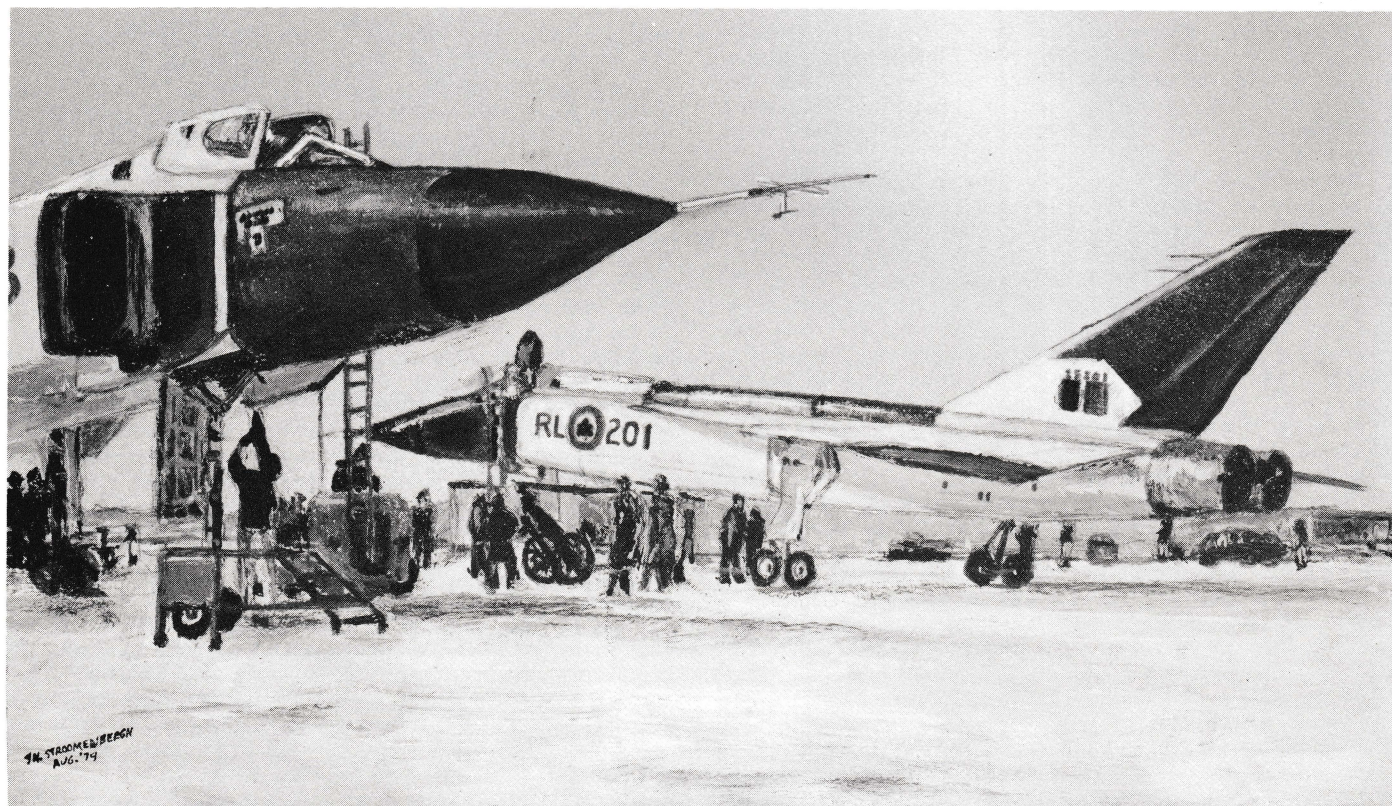


ILLUSTRATION BY JAN STROOMENBERGH

*A talk by Jan Zurakowski, principal test pilot of the Avro Arrow, given to the Toronto Chapter CAHS on 1 March 1978. Introduction by Don Rogers of de Havilland Aircraft of Canada Ltd. Questions moderated by Les Wilkinson, CAHS Librarian.*

## INTRODUCTION: Don Rogers.

I am pleased to introduce our speaker tonight, for I had the happy privilege of spending seven years working with him at Avro Aircraft. Janusz Zurakowski was born in 1914 and had his first flight at the age of 15 when he was in high school. He learned to fly on gliders during 1932 in Poland and joined the Polish Air Force in 1934. Before the end of the thirties, he was an instructor in a Polish fighter squadron, and when Germany invaded Poland, had the rather unique opportunity of shooting down the first enemy aircraft while flying an obsolete fighter-trainer. When Germany finally overran Poland, Zurakowski was able to escape to England and arrived in time to join the Battle of Britain with the RAF. He was credited with three more enemy aircraft during that period.

After the Battle of Britain, he joined the Polish Squadron of the RAF. He was mentioned in dispatches twice for his work with the fighter squadron, and also received the Polish Military Cross of Valour with two bars during that period. At the end of the war, he was accepted as a pilot at the Empire Test Pilots' School at Boscombe Downs, and posted to the Aircraft and Armament Experimental Establishment. He became heavily involved with the acceptance flying and the early development flying on the de Havilland Vampire, which was the first RAF jet fighter. In 1946 he went to Gloster Aircraft as chief development pilot and did much of the early test flying on the Meteor and later the Gloster Javelin, a delta-wing fighter. He came to Canada to join A. V. Roe Canada Limited as chief development test pilot in 1952 and did much of the development work on the CF-100, which was being built at that time.

When he was with the Gloster company, he demonstrated, to the surprise of the people at Farnborough, the first all-new aerobatic maneuver seen in a long time. With a fully-loaded Meteor fighter, he climbed vertically until it was almost stationary in the vertical plane, and then, by cutting one engine, made the aircraft cartwheel in the vertical plane as it fell. This was given the name of the "Zurabatic Cartwheel" and was considered to be quite an outstanding maneuver. He again surprised the folks at Farnborough while demonstrating the CF-100 in the mid-fifties. He didn't try to compete with the rest of the fighter aircraft, swooshing by at high speed, but instead put on an absolutely outstanding display, doing a complete aerobatic performance within the confines of the airfield.

It was during this period that the initial work of the Avro Arrow was progressing. Zurakowski did the first flight of the Arrow in 1958 and was awarded the McKee Trophy during that year for his contribution to Canadian test flying. The sad part of the story comes in 1959, when, as most of you remember, the Arrow project was cancelled and the Avro company went downhill after that. Jan Zurakowski retired from flying in 1959 and built up a thriving resort business. He was appointed as a member of the Canadian Aviation Hall of Fame in 1973, for his contribution to Canadian aviation and Canadian test flying. Despite the various honours, he remains a very quiet, unassuming gentleman. A typical case in point occurred during a reception given for him at the Toronto City Hall a few years ago. He was presented with official City of Toronto cuff links by the Mayor of Toronto. Someone asked him what does it feel to fly so fast, at twice the speed of sound. With his typical understatement, he said: "It feels just like flying slowly, only faster."

So, without any more from me, let us welcome our speaker for tonight, Jan Zurakowski, to tell us about flying slow and flying fast.



Nearly twenty years ago, on the 25th of March 1958, the first Canadian supersonic fighter aircraft, the Avro Arrow, became airborne. The development and proving flights were progressing well, aircraft performance was up to specification, the initial five Mk. I aircraft were flight tested and the production line was set up.

In less than one year, on 20th February 1959, by a decision of the Canadian government, all work on the aircraft was stopped suddenly and nearly everything related to this project was destroyed. This was a very sad end to what were probably the most exciting times of the Canadian aircraft industry: 1949 to 1959.

I would like to present to you my impressions as a test pilot during those times and to add a few remarks about the situation today.

Let me begin a few years before that period.

Close to the end of the war, when victory was only a question of time and my superiors were trying to push me from operational flying into a staff job in London, I discovered that there was a place for one Polish pilot in the Empire Test Pilots' School. I put in my application, was accepted, and started to learn to be a test pilot.

After a year's course I was posted to the Aircraft and Armament Experimental Establishment at Boscombe Down, where I had the opportunity to test most of the Royal Air Force fighters, Fleet Air Arm aircraft and American Navy fighters.

Two years later I left the Royal Air Force and accepted the position of experimental test pilot with Gloster Aircraft Company in England, dealing mainly with the development of the Meteor, a twin-jet interceptor aircraft, which was first flown in 1943.

Five years of experimental testing taught me not to accept much at face value, to doubt nearly everything until proven, and to respect evidence and the importance of collecting flight test information by special instrumentation.

Up to the end of 1955, about 3 500 Meteor aircraft were produced in more than ten variants and about 600 aircraft were exported to seven countries.

In the meantime design of a new interceptor was progressing, and in November 1951 a prototype of the Javelin made its first flight. This aircraft was of 'modern' design, having a delta wing, but a conventional tail.

On the evidence of wind tunnel tests it became obvious to me, more than two years before the first flight, that longitudinal instability was present in the Javelin at lower speeds. I was faced with a difficult problem. Urgent modifications were required, but control of the flight test programme was in the hands of the design office which did not want to face the facts. The stability flight test programme therefore called for stability measurement only within the stable range of speeds.

During one of the flights I decided to check the low speed range. It did not look safe, so I climbed to 30 000 feet and slowly started reducing speed. I reached a condition when, with the tailplane setting fully up and elevator fully down (both controls in diving position), the aircraft was still climbing, and finally stalled and went into a spin. Spin recovery was satisfactory.

Of course, after this experience I made it clear to the design office that stability of the aircraft was unsatisfactory as proven by the flight recorder.

Unfortunately, the design office had the authority to issue the final flight report. Not all the evidence from the recorder was included and the only comments were, if I remember correctly, "Pilot investigated the stalling characteristics of the aircraft and height lost in recovery was recorded." There was no mention of extreme instability or spin.

This report convinced me that I was wasting my time at Gloster, and the conclusion accelerated my move to Canada.

Why Canada? Canada was a young country with high development potential. A. V. Roe Company had the Jetliner, the first jet transport on the American continent, and the CF-100, the first Canadian twin-jet interceptor. I had good flight testing and development experience on fighters, so I could be useful; besides, I hoped for a good future for my

two sons. On 21 April 1952 I landed in Canada, and the next day I started work as experimental pilot for A. V. Roe at Malton.

The Toronto Telegram reported: "The 37-year-old Zurakowski is small and balding, and looks like anything but a test pilot."

I started work on the CF-100. This was the first interceptor aircraft designed and built in Canada to the requirements of the Royal Canadian Air Force for the defence of Canada. These requirements were: two engines for safety of flying in the far north, crew of two, heavy armament, high speed and high ceiling, and ability to intercept at night and under all weather conditions. I think the CF-100 was the best design compromise at the time.

The Flight Test Section was under Mario Pesando, a very experienced engineer, with a clear, practical approach to any problem, and believe me, we had enough problems. This small group of flight test observers and test project engineers was most enthusiastic, and it was a pleasure to work with them.

Peter Cope, the experimental test pilot who arrived from England some time before me, was an excellent and reliable pilot, and helped me a lot by introducing me into the new organization. In the experimental hangar, undergoing all sorts of trials, were the prototype CF-100 Mk. I with Rolls-Royce Avon engines, first flown on 17 January 1950, and a few CF-100 Mk. II and III. A Mk. IV prototype was expected to be ready for first flight in a few months.

Meanwhile the Jetliner prototype, with chief test pilot Don Rogers, was somewhere in California with Howard Hughes, powerful personality in Trans World Airlines, who was gaining experience on jet aircraft and investigating the introduction of jet passenger transport. Flight development work was very similar to that which I carried out at Gloster on the Meteors and Javelin.

Let me give you three examples of the problems experienced in our flight test programme.

First example: Diving speed. The CF-100 had a maximum design speed of Mach 0.85 (85% of speed of sound), but its level flight speed at high altitude was slightly faster. I asked the experts what would happen if a pilot accidentally exceeded this speed. The answer was that wind tunnel tests indicated the aircraft could become uncontrollable, and that besides, Pilot's Notes clearly showed Mach 0.85 to be the limiting speed.

For me, this answer was not satisfactory. The CF-100 was an all-weather and night interceptor, and if the pilot was not careful he could exceed aircraft limitations in no time. I considered it my duty to investigate behaviour of the aircraft at higher speeds and, if dangers were discovered, to recommend some action. With an instrumented aircraft I ran a series of dives at high altitude, checking recorded results between flights. Finally I reached Mach 1.08 indicated in a dive at full power. A sonic boom on the ground confirmed passing the speed of sound. Behaviour of the aircraft was satisfactory.

The flight test department, company management and the Air Force were delighted, but to the design office, I discovered, I was enemy number one.

Previously, without the knowledge of either the flight test section or the pilots, the design office had prepared a proposal for the RCAF, recommending extensive redesign of the CF-100 by decreasing the wing thickness, sweeping it slightly back, and increasing the area - all this mainly to obtain a maximum diving speed of Mach 0.95.

The RCAF investigated the proposal, but when the Mk. IV reached the speed of sound and expensive improvements were expected to show lower performance, the proposal was rejected with some sharp remarks.

After this there was hope in the flight test section that the design office understood that cooperation with flight test section and pilots was necessary for future development. Unfortunately the design office took a different view. A decision was taken to safeguard the design office from unexpected flight test results by controlling the programme of every flight test.



Second example. A heating and air conditioning system was designed for the CF-100. A specification was raised for the manufacture of a unit delivering a specified amount of air per minute at a specified temperature and engine speed. The aircraft was instrumented to check this system and flight tests were carried out according to the design office programme. Their technical observer was very happy: the system delivered everything as designed, and in spite of my objections the results were considered as satisfactory.

From my own experience I was sure that the system was poor. The cockpit heating and air conditioning system was designed for maximum cruising power (very close to maximum power) at the highest altitude, but at the most economical cruising speed engine power was so low that the temperature in the cockpit was around the freezing point.

I managed to squeeze in one more test. Before the flight, however, I secretly put on two sweaters and two pairs of thermal underwear, without saying anything to my satisfied observer. After a one-hour cruise, my observer was so stiff from cold that upon landing he had to be pulled out of the cockpit. After a half-hour defrosting he agreed that the system required considerable improvement.

Third example. One of my last flights at Gloster was for canopy jettison on the two-seater Meteor Mk. 7. During jettison a canopy, weighing about 160 lbs and more than six feet long, had to be lifted by the airstream, pivoting at the rear hinge and, after reaching about 300, be disengaged automatically to then pass clear over the tailplane. The test was recorded from another aircraft by cine camera.

The CF-100 had a similar size and shape canopy, but to my surprise the hinge pin at the back of the canopy was a bolt of 1/8" or 3/16" thickness, whilst on the Meteor it was half an inch. Because the cabin of the CF-100 was pressurized I expected loads to be much higher, so I suspected that something was wrong. I was assured that ground tests were satisfactory, but when a test report could not be produced I requested a test.

More than twenty ground jettison tests were carried out, but results were none too satisfactory. Somebody arrived at the conclusion that ground simulations of the air loads are not representative enough, so the only answer was to test the system in flight.

I was sure that if something doesn't work on the ground it was unlikely to work in the air, but we started jettison tests. I jettisoned more than ten canopies over Camp Borden. The system was modified step by step, but results were not satisfactory and it was considered too risky to try at higher speeds.

One day I was sent to Los Angeles for a three-day course about new missiles. I was surprised that the course was about storing and maintenance of Falcon rockets. On my return to Malton I was informed that in the meantime a meeting had been held between representatives of the design office and the air force. Canopy jettison was presented as satisfactory; the air force was convinced and agreement was reached that no more work was needed. I had lost a battle. My own opinion was that Canada, being a rich country, could afford a higher safety for flying crew.

Maybe these battles were useful. On the new design, the Arrow, crew emergency escape system was developed to a very high standard for a much wider range of speed. For cockpit air conditioning, a ground testing rig was built to develop and prove the system and I had no serious problems in flight.

I would like to stress here that although I am making critical remarks about some design features, or some persons, I was fully aware of the problems facing the design office and as a whole I was very impressed by the work done.

An experimental test pilot is not a popular person in the design department. Most of the designers are highly optimistic about their own design, and it is not a pleasant task after a flight to explain or to prove that optimism is just not justified. Quite often the reaction of the designer is to say that everything is excellent, that the pilots are simply too fussy, that they want to have their own way, or that they have the prima donna complex. But if everything was

so excellent, why then, for example, did such a successful aircraft as the Meteor require more than 1500 airframe modifications during its development and more than 500 engine modifications, of which about 30% had to be developed and proven in flight?

Maybe because of the continuous effort to improve the Meteor and its engines, the speed and ceiling of the aircraft was increased by more than 20%, range and armament doubled, with continuous improvement of reliability. Four Gloster test pilots lost their lives on this work.

In the production department, the experimental pilot again is not a popular person. Nearly every production manager would like to set up his assembly line, establish a schedule, and then run the production smoothly without any interruption. He is furious when every week five or more modifications have to be incorporated somewhere on the assembly line, and worst of all when the aircraft is ready for acceptance flight.

Who is to blame? - Of course, the test pilot. Why didn't he discover trouble before? Is modification really necessary? Why did it take so long to prove modifications in flight? - And so on.

The department of technical sales and public relations was usually the only one which was not always cross with test pilots. But when priority was given to an urgent development flight and not to a demonstration of an aircraft for some important or not so important guests, relations were strained quickly.

In September 1952 the A. V. Roe Company purchased a jet engine plant at Malton from the government, later known as Orenda Engines. I would like to mention that, due to their high reliability and serviceability, the Orenda engines in the CF-100 and the Sabre were a great asset in speeding up the development flying. In 1956, if I remember correctly, the RCAF sent four CF-100's to the U. S. A. for comparative armament trials at Eglin Air Force Base. The tests were carried out by U. S. Air Force crews. During our visit there, one of the American officers said to me: "Your armament is the best we have ever tested, but actually I want to congratulate you Canadians on the design of your engines: simple in operation and reliable."

Nineteen fifty-four was an unlucky year for me. The Air Force requested an investigation into heavier armament for the CF-100, and a proposal was put forward to install 50 rockets in the fuselage in a special pack which would be lowered for a fraction of a second to fire the rockets, followed by immediate retraction. Initial tests indicated that lowering of the square pack produced very strong vibrations, buffeting of the aircraft, and strong change of trim.

The Engineering Division insisted on measurement of stability at all speed ranges with the pack up and down, so that an automatic correction system to the controls could be designed to eliminate any change of trim occurring at the critical firing moment. During one of these tests, an unexplainable explosion occurred at 5000 feet in the rear of the aircraft, which locked the flying controls in a position that forced the aircraft to turn and dive. I jettisoned the rocket pack and prepared to abandon the aircraft. After jettisoning the canopy I heard another explosion and assumed that my observer John Hiebert had ejected. Then I used my own seat ejection. When my parachute opened I realized that my right ankle was probably fractured. I landed on my left foot in a hard field near Ajax.

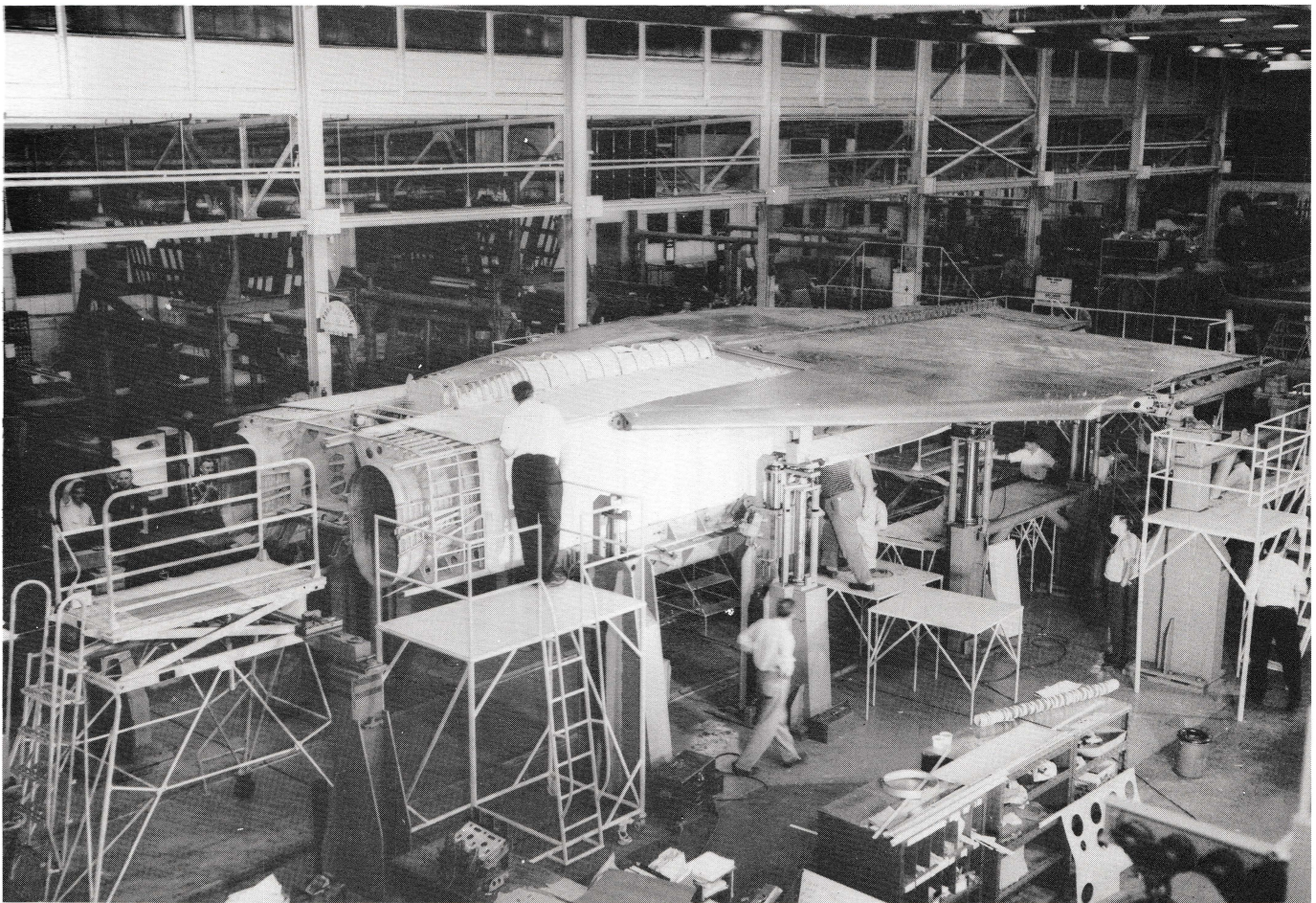
In the hospital I learned that the second explosion was not the ejection of my observer, but rather another explosion which probably damaged his ejection mechanism or incapacitated him. He was killed in the crash.

My impression was that the cause of the accident was probably ignition by an electric spark of fuel spilled in the rear fuselage from fuel lines fractured by excessive vibration of the aircraft with the rocket pack down.

The daily press stories that I was trying to save populated areas by directing the aircraft to open fields have no relation to the facts. After the first explosion I was unable to move the controls even a fraction of an inch.

My second accident in 1954 was a bit strange. After a routine experimental flight in the CF-100 I realized during

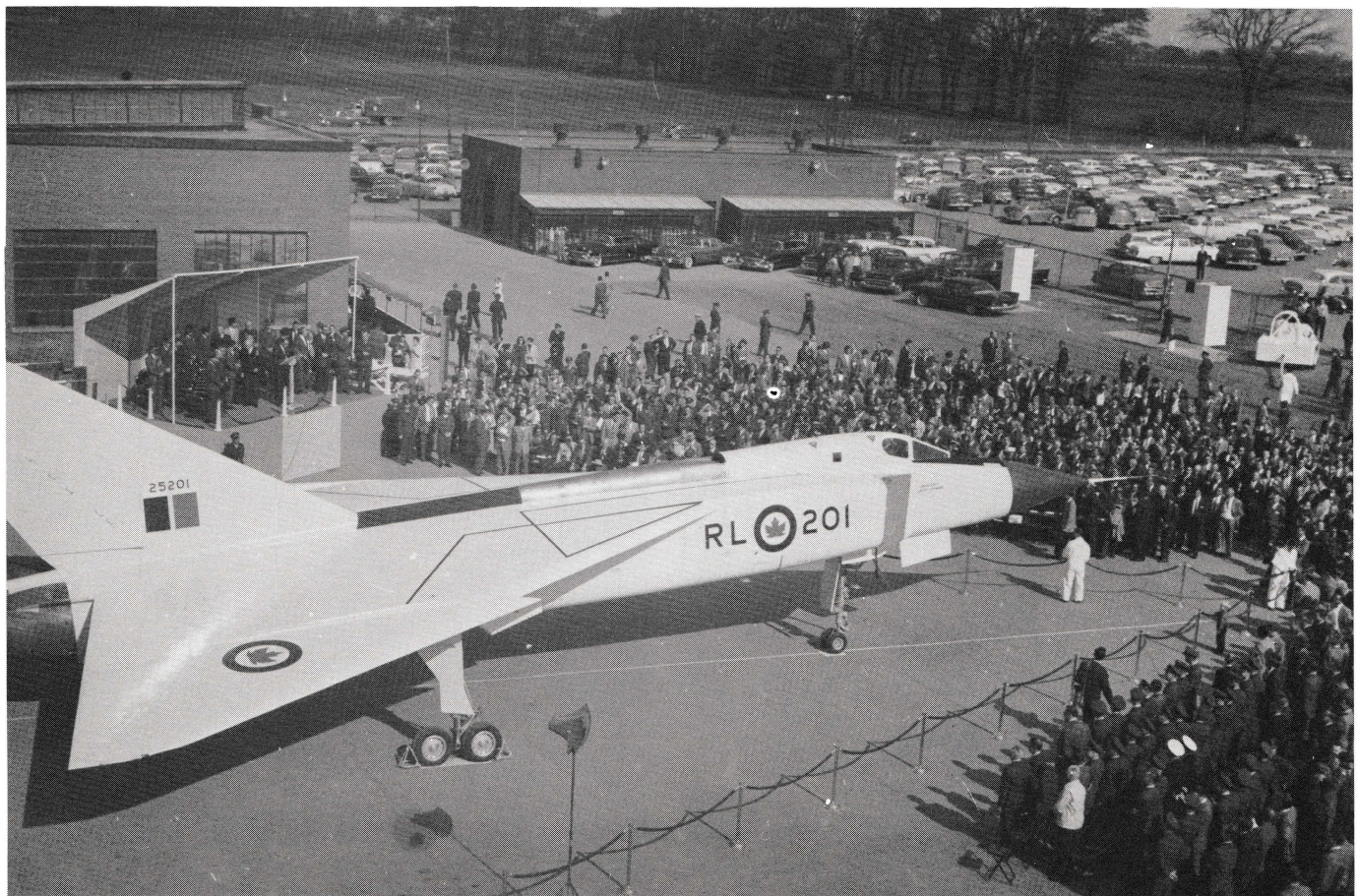




above: The prototype reaches its initial stages of assembly. Here the skin is riveted on the centre section and inner wings are installed.

below: A large crowd attends the roll-out ceremony, 4 October, 1957.

Avro photos via Hawker Siddeley Canada Ltd.





my landing run that the undercarriage was retracting. Since my speed was too low to get airborne again, I switched off the engines and the aircraft skidded to a stop, damaging the flaps badly. After an investigation had been carried out in the hangar, it was determined that everything was in perfect order; lowering and raising of the undercarriage functioned properly and the indicators were correct. Conclusion: pilot error.

I was called to the hangar to see for myself. I set all the controls and switches as I had during landing, operated the undercarriage several times, and, sure enough, everything was just fine. I was just getting out of the cockpit when the foreman said: "You see, that's a really good old aircraft", and enthusiastically slapped the fuselage with his hand. That started it. All by itself, the undercarriage retracted.

It was later established that somehow the wiring of the master auto-observer switch was mixed up with the undercarriage selector wiring and that a short caused by the vibration of the aircraft as it touched down caused the undercarriage to retract. "Too many gremlins." That was how a case like this would generally be described in England.

In the meantime, production of the CF-100 and the Orenda engine was going on at a good pace. The aircraft had a good name in Canada and abroad, and the Avro company decided to demonstrate it at the Farnborough show in England, organized every second year by the Society of British Aircraft Constructors.

I demonstrated the CF-100 Mk. IV at Farnborough in 1955, and we made an attempt to sell the aircraft in Holland and Belgium. The Dutch Air Force had a rather poor fighter aircraft from the U. S. and needed a replacement, but they didn't want to upset their American friends. The Belgian Air Force had had bad experience with American aircraft, so they purchased the Hawker Hunter from England. The Hunter was in its early development and the cost of essential modifications in the first year was higher than the cost of the original aircraft.

In night fighter class the Meteor NF 14 in the Royal Air Force was inferior to the CF-100 in range, speed and armament, and the Gloster company was still solving low-speed instability of the Javelin by redesigning the wings, but loss of two pilots and a few aircraft was delaying development. We were in a favourable position, and a contract for sale of fifty-three CF-100 Mk. V's was signed with Belgium.

In the Canadian Aviation magazine dated March 1975, I noticed the statement that sales to other countries were restricted for security reasons because the CF-100 was equipped with the Hughes radar produced in the United States.

A small comparison: Between the first flight of the Javelin and the first Javelin in a squadron, there elapsed over six years. The CF-100 Mk. II took less than two years. For the Mk. IV it was less than four years.

Looking back 25 years, I think that the CF-100 was a very good and reliable aircraft, which at the time satisfied the operational requirement of the Air Force. Taking into account that it was the first military aircraft designed and built in Canada by a very young company, I think it should be considered a great success.

In August 1955 the U. S. Air Force announced a contract with Avro Aircraft to explore "a new design concept" - later known as a flying saucer. "Spud" Potocki was the development pilot of this project, whilst I was concentrating on the development of the Arrow.

The idea of a supersonic interceptor, known later as the Arrow, started in 1951 when the A. V. Roe team under Jim Floyd submitted a brochure to the RCAF containing three proposals for supersonic fighters. I would like to mention here that for the first time a Canadian, Jim Floyd, was awarded the Wright Brothers Medal for outstanding achievement in aeronautical science. All previous winners had been Americans.

In March 1952 an operational requirement was received from the RCAF for an all-weather interceptor. In June 1952 the company presented two proposals: a single- and twin-engine delta-wing interceptors with crews of two. In

June 1953, after long consultations with the Air Force and the National Aeronautical Establishment, the company presented the CF-105 proposal and obtained instructions to go ahead with design study.

A series of wind tunnel tests followed at NAE (Ottawa), Cornell Aeronautical Laboratories (Buffalo) and NACA (Cleveland and Langley Field). Simulation of free flight at supersonic speeds was carried out by rocket-propelled models.

Later in 1954 changes in the proposed powerplant were made. Because Rolls-Royce RP-106 development was delayed and the Curtiss-Wright J-67 was expected to be too late as well, the installation of a Pratt & Whitney J-75 as an interim measure was accepted with the Orenda Iroquois engine intended for production models.

As design investigation progressed it became apparent that there were new problems connected with the increase in speed from Mach 0.87 of the CF-100 to the more than Mach 2 of the new interceptor. This increase of more than 750 MPH called for a lot of electronic systems needed for successful interception, automatic flight, weapon fire controls and navigational systems. I would like to point out that during the five years of the war, a time of most intensive development, the speed of RAF fighters increased by only about 100 MPH.

We in the Flight Test Section hoped that we would be part of the team, and participate in the solution of problems which we would have to face sooner or later. There was a rumour that the directional stability of our new aircraft was poor, and at this time a number of American fighters disintegrated in the air and some designs were quickly modified to provide a bigger fin area.

We asked the design office for aerodynamic reports. We met with refusal because "there could be a wrong interpretation of the reports by the pilots". I asked my Chief Test Pilot, Don Rogers, for help, but when his efforts were stalled, I tendered my resignation as the Chief Development Pilot. This title created an impression that I am to some extent responsible for development - but how could I be, if I was kept in the dark?

It came to the attention of Jim Floyd, Vice President of Engineering, that the latest estimates of landing speed of the Arrow were much higher than the initial one, so a meeting of aerodynamic experts was called and I was invited. After a short discussion he asked me what I thought about it. My answer was that I did not know, because my request for reports had been refused. It was a bit of a shock to him, because he had previously instructed that reports be made available to the flight test section. After this, one of the aerodynamicists refused once again to supply reports. He was promptly fired, and the next morning all required reports were in the flight test section. Yes, there was a problem with aircraft directional stability under some flight conditions.

Which solution was right? First, to increase stability by aerodynamic changes which would involve a weight penalty without any guarantee that all the flight conditions would be satisfactory. Or second, introduce reliable electronic stability augmentation needed anyway for the weapons system.

The latter choice was made, but it involved the risk of developing and proving the system on an aircraft otherwise unsafe under some conditions if the system failed. Loss of an aircraft in early development could be a disaster for the company.

Cooperation of other sections with the flight test section was good. Freshly introduced human factors engineers helped in finalizing the cockpit layout. The number of instruments, switches, etc. was reduced in the Arrow to 70% of that in the CF-100, and a master warning light was introduced, with a panel indicating the trouble.

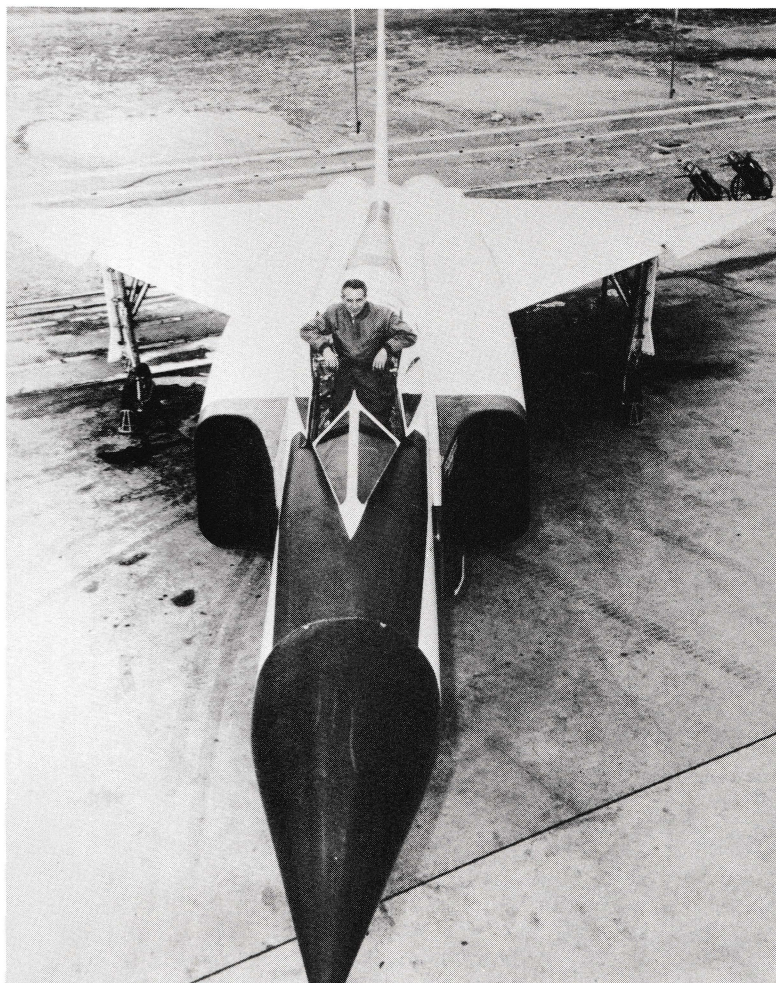
A Royal Canadian Air Force detachment was established at the Company under S/L Ken Owen, with F/L Jack Woodman, a highly experienced test pilot. This detachment was most useful in an advisory and cross-checking capacity. The problem we had with wheel brakes can best illustrate the need for a cross-checking system.

An engineer was instructed to write the specification for





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## TEST FLYING THE ARROW

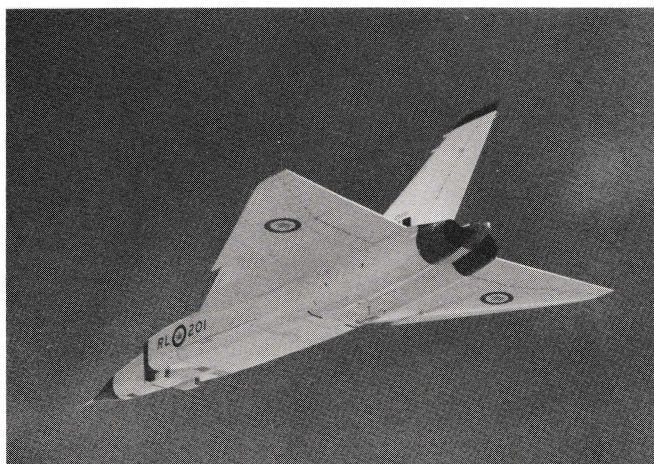
1 Ray Harper, line chief, was the first up the ladder to greet Jan Zurakowski as he emerges after the first flight, 25 March, 1958.

2 'Spud' Potocki, who succeeded Zurakowski as Chief Experimental Test Pilot, prepares for the first flight of Arrow 204.

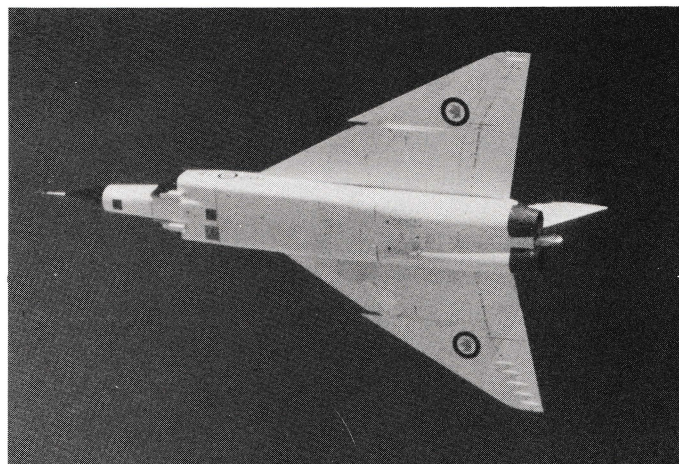
3 A fully developed drag chute as used on early tests.

4 & 5 Two excellent studies of the Arrow geometry from below.

Avro photos via Hawker Siddeley Canada Ltd.



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wheel brakes for the Arrow. The standard specification at the time, if I remember correctly, required brake capacity to have kinetic energy absorption equal to 1.2 times stalling speed squared, multiplied by the aircraft landing weight. Checking by phone, he got his figures, but the stalling speed quoted was completely unrealistic for use in estimating landing speed. Wings of 60° delta reach stalling speed at an angle of attack of about 45°; during landing the geometry of the undercarriage does not allow the use of more than about 15°.

The specification went to the subcontractor and after the necessary design, development and proving time, the brakes were found to be completely inadequate for the aircraft when the wheels arrived, specially since in the meantime the aircraft weight was increased. A crash programme to develop new brakes was required to prevent delay in the flight testing.

The Flight Test Instrument Section was developing a system known as telemetry, which would provide in-flight information consisting of a large number of parameters transmitted automatically to the ground. This system increased safety of the flight, helped to warn the pilot if he was approaching a limiting stress or other limiting conditions, and could be of high value if an aircraft crashed or disintegrated in unknown circumstances.

With the help of an IBM 704 computer, a flight simulator was created using as many parts and systems from the aircraft as possible. Designers were very optimistic, promising to teach the pilots to fly the Arrow. Unfortunately the simulated aircraft was very difficult to fly; I lost control of it in three seconds; Spud Potocki, who was much better on instrument flying, managed to fly eleven seconds before crashing.

I was completing taxiing tests in preparation for the first flight on an actual Arrow Mk. I. An unpleasant situation was created: if the simulator is unflyable, is the aircraft safe for flight? A specialist from the U. S. was called to assess the situation, but was not very optimistic.

What next? To develop this simulator to flyable condition, or to fly the actual aircraft? I recommended disregarding the simulator for the time being and going ahead with the first flight. It turned out later that there was much more to the art of simulating flight than just feeding parameters into a computer and transmitting the results into cockpit instruments.

The first flight of the Arrow on 25 March 1958 was very simple. Just check the response of controls, engines, undercarriage and air brakes, handling at speeds up to 400 knots, and low speed in a landing configuration. There certainly was more excitement for the several thousand Avro employees watching my first flight than for myself seated in the cockpit trying to remember hundreds of do's and don'ts.

The aircraft flying characteristics were similar to that of other delta wing aircraft like the Javelin or Convair F-102, but the Arrow had a more positive response to control movement. The unpleasant part of my first flight was the feeling of responsibility, combined with the realization that the success of this aircraft depended on thousands of components, especially electronic and hydraulic, with only a small percentage under my direct control. But total responsibility for the flight was mine.

Flight by flight, with ground monitoring based on telemetry results, I was going a bit faster and a bit higher. On flight No. 7, climbing at 50 000 feet, I exceeded 1 000 MPH, and that was the only performance released at that time by Air Force headquarters.

Phase One of the Arrow flight test programme was successfully completed, and F/L Jack Woodman made a familiarization and initial assessment flight. In August of the same year I started tests on a second prototype (No. 202) and in September on the first flight of the third prototype (No. 203), I exceeded the speed of sound.

Shortly after, Prime Minister John Diefenbaker in a statement released to the press declared that two Canadian bases for U. S. Bomarc missiles would be established and the current development programme of the Arrow and Orenda Iroquois engines would continue, but would be reviewed in the next March.

Development flying was speeded up when Spud Potocki and Peter Cope joined in testing. For me, the time to retire from testing had arrived. Normal retirement age from high speed flying was 40, and I was already 44. I was leaving experimental flying in good hands. Spud Potocki, Peter Cope, and F/L Jack Woodman were all excellent pilots, already with some experience on the Arrow. I moved to Engineering Division as staff engineer. Spud Potocki did the first flights on two more Arrows (No. 204 and 205), increasing the number of test aircraft to five. Testing was progressing well, but was slowed down by two accidents.

I was involved in the first one. During a landing run on 201 I suddenly realized that the aircraft was pulling to the left and I could not maintain direction. Suspecting that the braking parachute had not opened evenly, I jettisoned it: there was no improvement, and at about 30 MPH the aircraft left the runway and the undercarriage collapsed in the soft ground.

On investigation it was established that the left undercarriage leg had not completed the lowering cycle and during the landing run the wheels were at about a 45° angle to the direction of travel, producing a higher drag than the brakes on the right side could compensate for. With decrease of speed, rudder effectiveness decreased and the aircraft could not be prevented from changing direction.

This accident probably could have been avoided if the warning light had indicated that the undercarriage had not locked properly, or if the chase plane pilot had watched me during landing and reported the trouble by radio. Unfortunately, he was short of fuel and landed first. If I had known of the fault, I could have landed slightly across the runway, making correction for the expected turning moment.

The second accident took place on aircraft No. 202, flown by Spud Potocki. During a landing roll all four wheels skidded and the tires burst. The pilot lost directional control and the aircraft ran off the runway, damaging the right undercarriage leg. The initial impression was that it was pilot error. The pilot was thought to have applied too much braking pressure too early and locked the wheels.

As I mentioned before, we had the telemetry system recording basic parameters of flight. It was recorded that during touchdown the elevators suddenly moved full 30° down.

Spud was sure that he did not move the controls. Instrumentation experts suspected an error in recordings. Fortunately, a photograph of this landing run was discovered in the possession of a suspected spy, showing the elevators fully down. Now the cause of the accident was clear. The Arrow's elevators were large and when deflected fully down, acted as powerful flaps, increasing wing lift so much that only 20% of the aircraft weight was on the main wheels. The pilot was not aware of this and normal application of brakes locked the wheels.

During this landing, a small aircraft vibration as the wheels touched the ground had resulted in a wrong electrical signal to the stability augmentation system, calling for full elevator down.

The pilot was lucky; if the elevator had moved fully down in flight at any speed faster than 300 knots, disintegration of the aircraft was likely in a fraction of a second.

Performance results collected on flights of five Arrow Mk. I aircraft fitted with Pratt & Whitney J-75 engines were used to estimate the performance of Mk. II Arrow fitted with Iroquois engines. The Arrow with J-75 engines was heavier than with Iroquois and had to be ballasted for a correct centre of gravity position, Mk. II with Iroquois engines did not need ballast and was about 5 000 lbs lighter, and had 40 to 50% more thrust. It was estimated that we had a high chance of beating the world speed and altitude records held at that time by the United States.

The first Mk. II (No. 206) was expected to fly at the end of February 1959.

On 20 February 1959, the President of the Avro Company informed all working personnel over the public address system that the Prime Minister had just announced the termination of the Arrow and Iroquois programmes.

A telegram received later in the day by the company instructed: -





above: The prototype '201' poses over historic Niagara Falls for the Avro cameraman.

below: Arrow 25201 during early taxi tests at Malton.

Avro photos via Hawker Siddeley Canada Ltd.





"You shall cease all work immediately, terminate sub-contractors or orders and instruct all your subcontractors and suppliers to take similar action."

From this moment, approximately 13 000 workers were no longer employed. The next day in Toronto's Royal York Hotel, representatives of American companies were hiring our specialists for work in United States industry, and thousands of unemployed were looking for jobs.

The destruction of everything connected with the Arrow followed. The five aircraft which had flown and others on the production line were cut to pieces for scrap. Blue-prints, brochures, reports and photographs were all reduced to ashes. There was a common impression at the time that politicians wanted all tangible evidence rubbed out to prevent it returning to haunt them in later years.

For many months before the cancellation of the Arrow, a strong anti-Arrow campaign was run by the press. Many arguments were presented in a highly misleading manner and to my surprise suddenly we had plenty of experts on aviation. The press was full of articles by high-ranking retired army officers about the uselessness and obsolescence of the Arrow. The Telegram on 24 September 1958 reported a statement by Lt-Gen. Guy Simmonds: "The day of the airplane is finished as a defence mechanism. It has been replaced by the missile as the primary weapon." Gen. Simmonds said that he had criticized from the beginning any plan to spend large sums of money on "the last of the fighters. The Arrow is just that - the last of its line and kind."

Canadian Air Force officers were prohibited from discussing or even asking questions about the Arrow.

The Globe and Mail, dated 21 February 1959, reported the statement by Air Marshal Roy Slemon, second in command in North America Air Defence: "Regardless of what the actual decision is, and it certainly must be a proper one, I will be unable to comment on it."

Reading 19 years later the text of the Prime Minister's announcement of the decision to scrap the Arrow, I have the impression that army and American experts convinced Mr. Diefenbaker that the aircraft was dead as a weapon and only missiles had any future.

I like best this statement: "Although the range of the aircraft has been increased, it is still limited." I suppose that the Voodoo which the Prime Minister ordered shortly afterwards had unlimited range?

The press was quick in catching the idea. In the Toronto Telegram the next morning were the headlines: "Arrow short range." - and later: "Operational range of the Arrow (700 miles) was less than the Government had hoped for." I do not know what the Government had hoped for, but certainly the Canadians were convinced of the short range of the Arrow.

The employees of Avro and Orenda were shocked by the Prime Minister's statement: "And frankness demands that I advise that at the present there is no other work that the Government can assign immediately to the companies that have been working on the Arrow and its engine."

Going back for a moment to the aircraft industry in England, I remember that only a small percentage of new prototypes flown ever reached the production stage, and probably even a lower percentage reached operational use. Cancellation of programmes in the initial stages of development or during initial production was quite common, but I had never heard of sudden cancellation without preparations being made to use released manpower and facilities. In England it was generally accepted that the aircraft industry was a national asset, one which helped so much in saving the country in the most difficult times like the Battle of Britain, and that destroying it would be against the national interest.

It appears that the Canadian government did not make any effort to save the design teams or production facilities of Avro and Orenda. As I mentioned before, everything about the Arrow was destroyed, no attempt was made to save the results of millions spent in research, results which could have been used in other countries like England and France, which were working on the design of a super-

sonic transport, or useful to other industries in Canada where experience of Avro and Orenda companies in electronics, hydraulics and air conditioning manufacturing could have been a tremendous asset.

For the cost of one or two percent of the money already spent on research, the knowledge accumulated could have been properly collected and documented to be useful in the future. I am sure that the designers of the Concorde or, even fifteen years later, the designers of the Tornado built by the joint effort of England, Italy and Germany could have learned a lot from our experience, even from our errors. It is strange how the same problems are showing up in design and development of nearly all aircraft.

During the development of the Arrow and Iroquois we were using the experience and knowledge of other countries, mainly England and the United States, but we destroyed the results of our work. Does that make sense?

With the cancellation of the Arrow, and without any programme for a large part of the aircraft industry, Canada lost the opportunity to establish an advanced industry, which had a very good chance to become an economical means of satisfying a large part of our demand in defence and to become an exporting industry.

Last year saw the publication of a book by John Diefenbaker, called "One Canada". In Volume III of this book a number of pages deal with national defence and the Arrow. I quote from page 35: -

"There is no doubt that from a construction standpoint the Avro Arrow was an impressive aircraft, superior to any other known contemporary all-weather fighter - something all Canadians could be proud of as their product. The Orenda Iroquois engine boasted the highest thrust, the lowest specific weight, the greatest mass flow and the greatest growth potential of all known engines under development. I said at the time it was a tribute to the high standards of technological achievement and development of the Canadian aircraft industry."

But on page 36 Mr. Diefenbaker wrote: -

"And (the Arrow) would be out of date by the time it got into production..."

About the Bomarc he wrote: -

"Our decision to introduce the Bomarc did not work out well. To begin with, the Bomarc was very soon proven to be virtually obsolete even before it was set up."

From the same book we also learn that the proposal by Defence Minister General Pearkes for procurement of the F-101B interceptor aircraft was made during June 1960, just over a year after the Arrow cancellation. The F-104 purchase followed shortly. Canada purchased over 400 fighter class aircraft after cancellation of the Arrow.

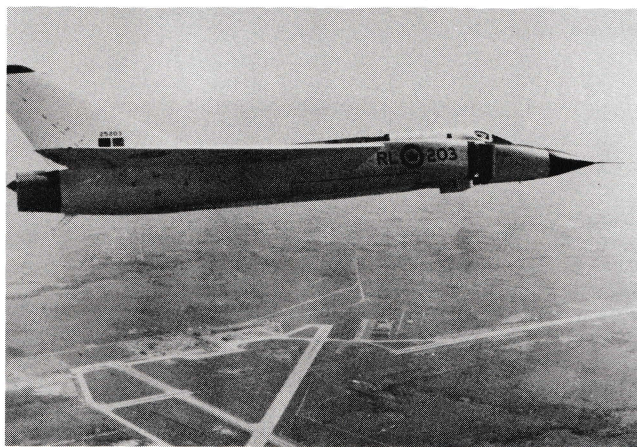
This year the government is deciding which type or types of aircraft it will buy to replace the CF-101B, CF-104 and CF-5. And twenty years ago they thought the Arrow was obsolete because it was only an aircraft!

A special report in the Financial Post, dated 19 February of last year, shows some photographs of aircraft likely to be in future Canadian service. Apparently all these aircraft in the fighter attack class carry external armament and fuel. There was one feature of the Arrow which I liked very much, and this was an armament bay. A really big armament pack, sixteen feet long by eight feet wide and three feet deep. It was attached to the aircraft at four points and easily removable. An arrangement like this allowed quick changes in the type of armament (missiles) and a flexible role for the aircraft. For example, long-range reconnaissance or bomber. Internal carriage of armament and fuel did not alter flying characteristics and performance of the aircraft. Somehow on the latest aircraft I cannot see good high-speed performance with all these stores under the wings or fuselage.

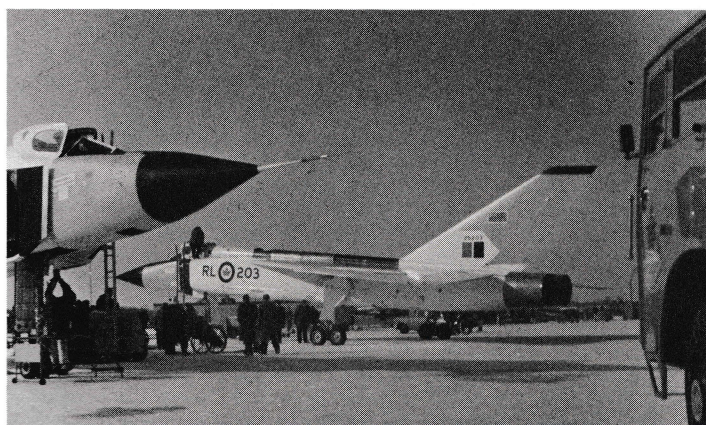
It is a bit funny to see a graph in the Financial Post showing that Canada will buy a fighter with delivery dates between 1980 and 1988 - about thirty years after the Arrow was declared obsolete because it was an aircraft and not a missile. Where are our Bomarc missiles today?

Other graphs are not that funny, One shows that Canadian capital spending in defence in the last twenty years dropped

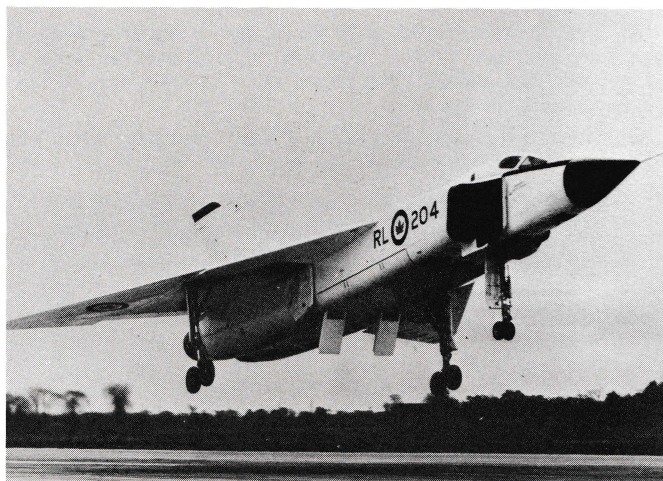




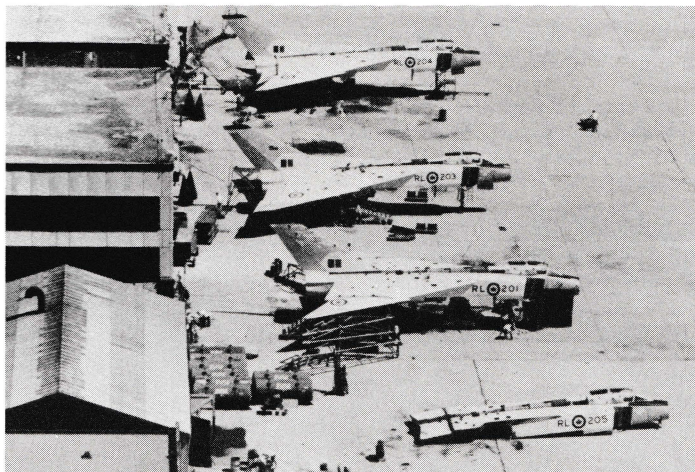
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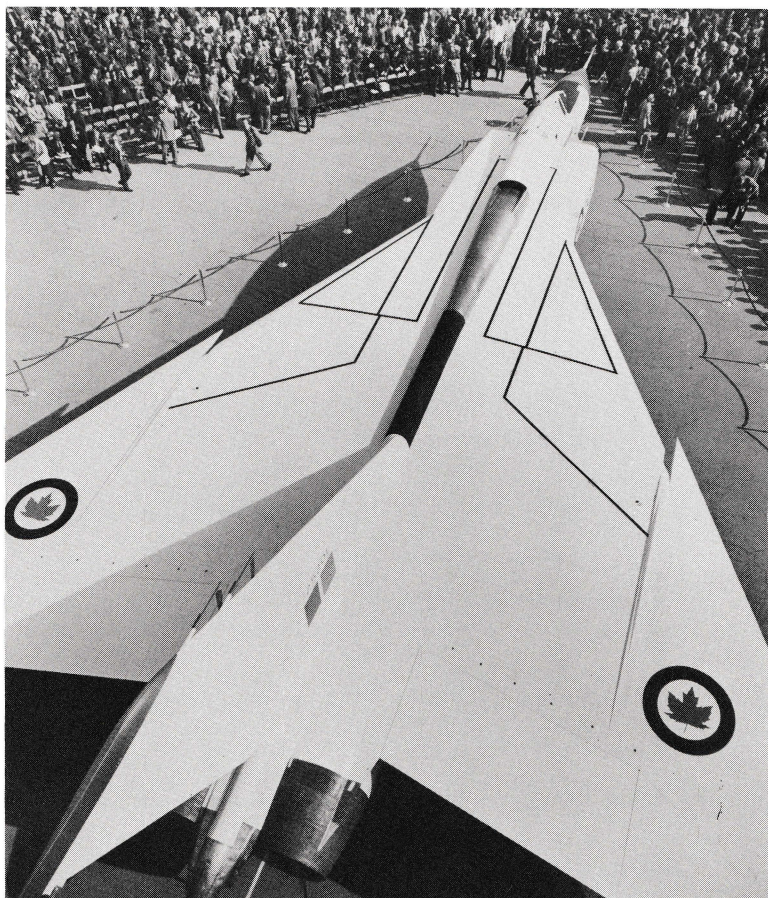
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## TEST FLYING THE ARROW

- 1 The third Arrow from the production line flies over the early runways at Malton Airport. Clearly shown is runway 14-32 which was extended to accommodate the Avro test program.
- 2 A cold winter morning on the tarmac as '203' is readied for flight.
- 3 'Spud' Potocki & Arrow 204, on the test flight, 27 October, 1958.
- 4 Cameras were banned when these Arrows were lined up for destruction. However, one airborne camera recorded the 'execution' for history.
- 5 An excellent plan view of the delta-wing Arrow taken on the occasion of the official roll-out.

photos 1, 2, 3 & 5 — Avro via H.S. Canada Ltd.  
photo 4 by Herb Nott.

### PHOTO CREDITS

There was no shortage of photographers at Avro Aircraft Limited, during the days of the Arrow test flights. The Hawker Siddeley Group, combining Avro and Orenda, had a photographic department of 30 people, including 18 cameramen. Joe Wise was in charge and his assignment was to prepare a complete photo coverage for engineering and publicity purposes.

The Avro photos used in this issue are from the files of R.G. Bob Halford, former Editor of AIRCRAFT magazine who is now publishing THE AIRCRAFT OPERATOR. Also assisting with this issue is Ron Nunney - one of the Avro cameramen - presently chief of photography at de Havilland.



from one billion dollars in 1956 to about 400 million dollars in 1976, and the next graph shows that Canada spends 2.3% of its gross national product on national defence. I think this year the figure is 1.7%. This is the lowest of all NATO countries except Luxembourg.

The Globe and Mail reports the statement on 10 February by the American Chief of Staff General David Jones: "The Soviets are outproducing us in fighter aircraft by a factor of approximately two to one. In 1976 they produced 1200 new fighter and fighter-bomber aircraft. The Russian Backfire bomber has the capability to strike the United States."

Are we in Canada taking our defence seriously?

Mr. James Eayrs, a reporter for the Ottawa Citizen, writes: "The Arrow was a superb piece of machinery, a really splendid aircraft. It also happened to be the wrong aircraft, produced by the wrong country, at the wrong time." I agree with the first statement, and disagree with the second. The Arrow was the right aircraft, produced by the right country, at the right time, only our leaders did not realize that not everything can be calculated in dollars and cents.

How is it possible, for example, to assess the effect of a Canadian success or achievement on an average Canadian? If he is proud to be a Canadian, how will his effort compare to one who is forced to believe that Canadians cannot succeed in anything? I think that if a Canadian is not proud of common achievement and success in Canada and doesn't feel he is taking part in successful efforts he doesn't care about Canada. It is easy to understand that a gentleman from Alberta doesn't care for eastern provinces, and a gentleman from Quebec doesn't care for the rest of Canada, or that someone from British Columbia sees his better interests in the United States. I think the cancellation of the Arrow was a nasty shock to the pride of the average Canadian, and this was probably a highly depressing factor for years ahead.

This has been my recollection of a very interesting period in Canadian aviation. I do not claim that it is 100% accurate, but that is how I remember it.

**QUESTION AND ANSWER SESSION:** L. Wilkinson, moder.

Q: Did our speaker ever meet Bill Waterton?

A: Yes, certainly I met Bill Waterton. I was working with him in England. He was chief test pilot and I was chief experimental pilot at Gloster Aircraft. When he went to Canada to fly the CF-100 I took his job with Gloster.

Q: Did our speaker ever perform the Zurabatic Cartwheel in the CF-100?

A: No, not the CF-100. The Cartwheel was possible only on aircraft like the Meteor, which was a twin with widely spaced engines. The CF-100 is bigger and has its engines close together, which gives too little turning moment to start the cartwheel. When I tried it, I would go into some sort of inverted spin or flat spin, but simply couldn't do it. There is not enough yaw moment to build up inertia.

Q: Did our guest perform the falling leaf in the CF-100?

A: Yes, the CF-100 did the falling leaf quite well.

Q: Were there any test flights of the Arrow after the cancellation, with the Iroquois engine?

A: No. The cancellation order was that all work is to stop immediately, and since this was government contract work, the aircraft was not the property of the company, and we couldn't continue with any of the work after cancellation.

Q: What was the maximum speed the Arrow achieved?

A: The maximum speed any of the test aircraft achieved was Mach 1.98, flown by Spud Potocki. The highest I reached was 1.89 on an earlier flight. We must bear in mind that this was not the maximum possible. We were still progressing slowly, recording every step we took, but there was no correct test for speed, as we did not have any priority in reaching maximum speed.

Q: Have you ever missed flying since retirement from test flying?

A: Certainly, yes. But I have accustomed to new conditions and a new way of life.

Q: How close was the Arrow to being an operational aircraft at the time of cancellation?

A: Cancellation took place in February of 1959, and the Arrow was to become operational in the sixties, so perhaps another one and a half or two years.

Q: What was our guest's experience with the approach and landing speeds of the aircraft?

A: The Arrow had quite a high landing speed. As far as I remember, it was of the order of 170 knots across the threshold, 160 at touchdown, but I had hoped we'd lower it quite a lot, through experience and some modification. I think the same would have been done on the Russian supersonic transport, or the Swedish delta-wing fighter. Perhaps by placing an elevator at the front of the aircraft, which allows us to use elevators as flaps whilst in landing configuration. That would reduce the landing run quite a lot. The Swedish requirements were for an 800 metre landing run, which is about 2000 feet, and they reached it.

Q: Was the Arrow ever rolled? Was it ever flown with an observer?

A: Yes, it was rolled quite often, but although somebody once told me that it was flown with an observer, I never did so. We had enough instrumentation in the rear cockpit, which we used in place of an observer.

Q: Since the Arrow was quite a large aircraft, what was its maneuverability, perhaps as compared with modern day aircraft?

A: What is meant by maneuverability? There is turning maneuverability, rolling maneuverability. Rolling was extremely fast, especially at higher speeds, it was faster than the pilot would have liked to have it. The wingspan was only fifty feet, so the aircraft was very long. Now, turning maneuverability is a very difficult problem to assess on a high-speed aircraft, because it is not the limitation of the aircraft, but its strength and the ability of the pilot to withstand high acceleration for a long period. Turning at Mach 2.0 takes a radius of about ten miles with 5G, if I remember right, so doing a 360° turn at this speed takes quite a long time, so it's actually the ability of the pilot to withstand the high acceleration. Some of the later aircraft have the pilot more in a lying down position rather than sitting, to help him to withstand the force. What the questioner probably has in mind is something like a dogfight, which is very difficult to describe, because there's such high kinetic energy involved. From Mach 2, for example, you can climb without any power some 30 000 feet, or you can convert it into turning or any other kind of maneuver. In older fighters, say the Spitfire, which had optimum maneuvering speed of the order of 160 knots, he had little kinetic energy to be converted into anything.

Q: About how many hours of testing was done on the Arrow up to cancellation?

A: I think about sixty or seventy.

Q: What was the maximum cruise altitude and zoom altitude that was achieved in the aircraft?

A: Cruise altitude, about fifty; zoom altitude - we didn't try. As I mentioned, we had a high priority on testing the actual systems. Our engines at the time were not typical production engines. We were using the American engines, so we didn't spend much time investigating this engine at high altitudes. We knew the actual production engines would be the Iroquois, more powerful, on which we could do full investigation. What we were trying to do on the first five aircraft flying with the Pratt and Whitney engines was to get all basic information. I didn't mention this before, but the total number of aircraft intended for experimental work was about fifteen. These aircraft were intended after testing to go back to service, because they all were built to the same production drawings. I see that some of you are surprised at such a high number. There were about 120 Meteors engaged in experimental flying. Now, that was not all for the Meteor development, I must admit, since Meteors were used for engine development, or rocket development, for brake development, for all sorts of tests. The pace at which we were going was so fast that every day we were finding requirements for new knowledge which made new testing necessary. That is what I mean by going from Mach



0.87 to Mach 2 plus, because Mach 2 was only a specification; we knew we could go much faster, specially with Iroquois engines. The only limitations actually were those of the structure of the aircraft, which was temperature limitation. But the number of tests required to prove the aircraft is really colossal, and that's why we decided from the start to use as high a number of test aircraft as possible to reduce the time before introducing the aircraft into service.

Q: Would our guest like to comment on American influence on the Canadian government to cancel the aircraft?

A: American influence on Canadian government? I don't know whether there was any influence. My own personal impression is simply that our government had no experience. Take, for example, the case of our government saying that we cannot sell the Arrow; that we have failed to win any contracts for it, or that it became too expensive because development costs are too high. Take, for example, the aircraft the Canadian Air Force is trying to buy now. There is only one that has never been flown, but all the others

have been flown for four, five or up to seven years. You cannot sell the aircraft before or soon after first flight; you have to prove that the aircraft is good. At the same time, the Prime Minister sent his General Pearkes to sell the aircraft. So he goes to his American counterpart, and the industry, and tells them, look, we've got this Arrow, we're not sure it's any good, we've had a bit of trouble with the development programme, and everyone says it's too expensive... will you buy it?

So, if that is the approach of a salesman, of course the Americans will have a good laugh and say no, we don't want to buy it, but we can sell you anything you like, ready to go.

Jan Zurakowski  
P. O. Box 94  
Barry's Bay, Ont.  
K0J 1B0







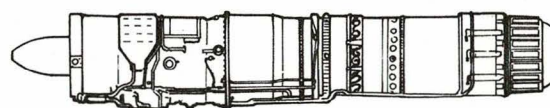
# AVRO CF-105 ARROW mk.1

Roll-Out : Oct. 4, 1957  
First Flight: March 25, '58  
Cancelled : Feb. 20, 1959

Span: 50 ft. 0 in. Armament: Hughes MX-1179 weapons  
Length: 77 ft. 9.65 in. system with 8 Falcon Missiles or  
with probe: 82 ft. 2 in. 4 Sparrow II with Astra I fire control.  
Height: Tail 21 ft. 3 in. Fuel: 19,561 Lb. (2,508 Imp. gal.)  
over Cockpit 14 ft. 6 in. plus 3900 Lb. (500 Imp. gal.) Drop Tank.  
Wheel Base: 30 ft. 1 in. Combat Weight: 64,000 Lb  
Wheel Track: 25 ft. 5.66 in. Max. Speed: Mach 2 range  
Wing Area: 1,225 sq. ft. Service Ceiling: 65,000 ft.-plus

## Mk.1 Engines (Two)

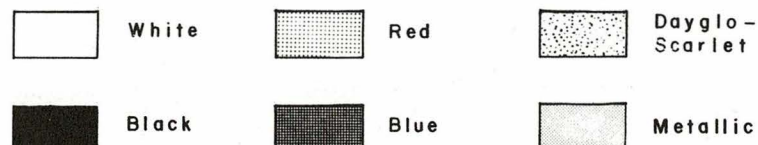
RL-201: Pratt & Whitney J75 P-3  
RL-202-205: Pratt & Whitney J75 P-5  
12,500 Lb. Static Thrust (dry)  
18,500 Lb. Thrust with Afterburner  
15 stage-2 spool compressor, 8 flame tubes.



J75 (REPRESENTATIVE VIEW)

SCALE  
0 ft. 6 ft. 12 ft.  
(ORIGINAL DRAWN AT 1/72 SCALE)

## Colour Scheme



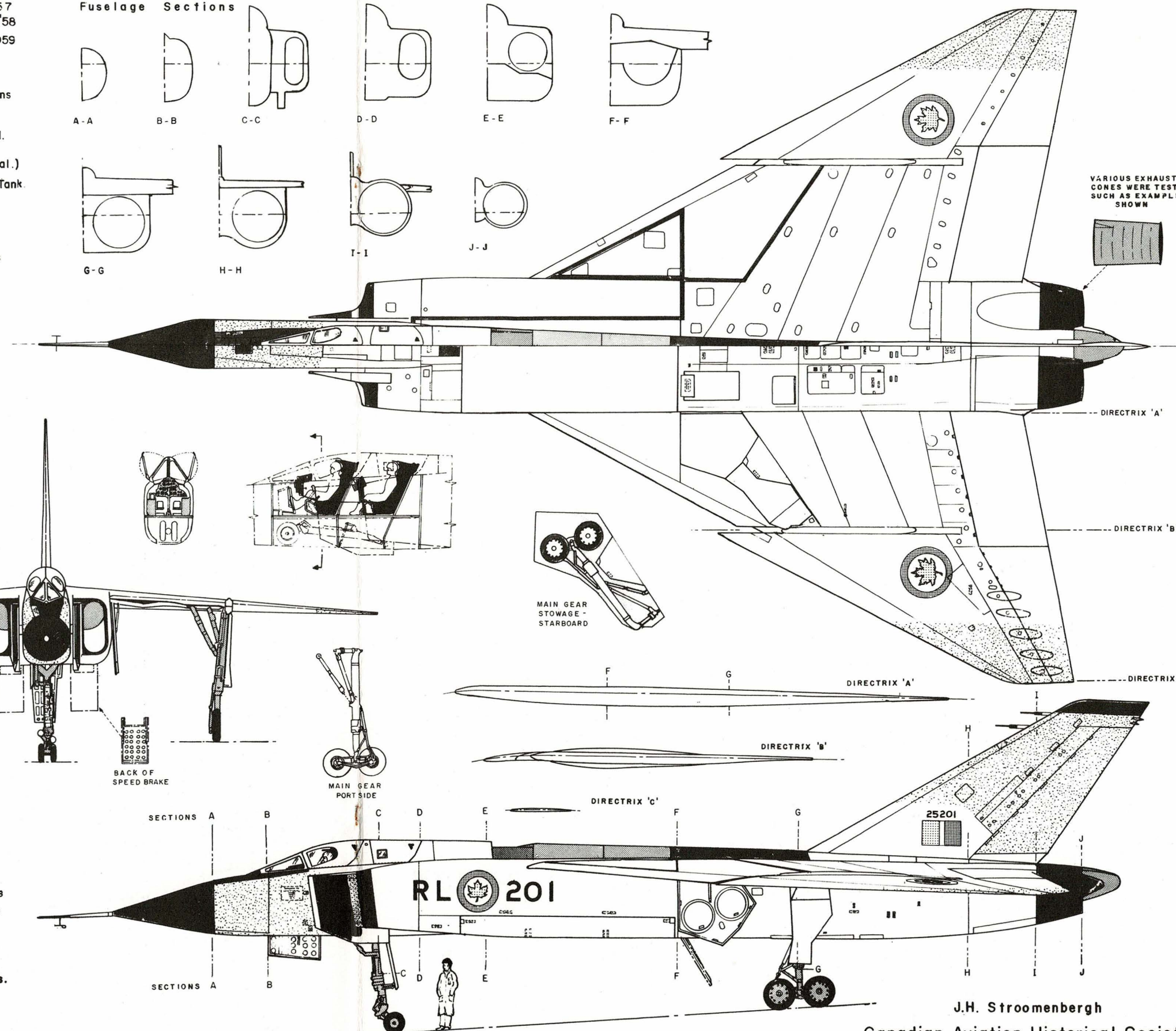
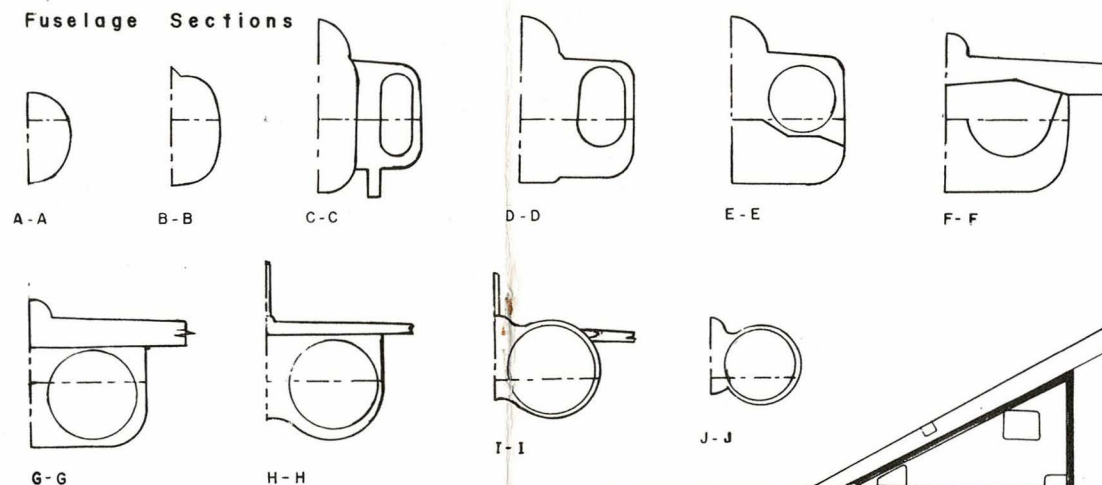
Dayglo was applied and changed frequently during the later stages of the flight test program. The example illustrated here was also seen on the following aircraft:-

RL-203, same plus the Canadian-(Red Ensign)-Flag shown above the fin flash.

RL-204 and RL-205, same minus the black stripes on the wings.

RL-202 and RL-206 (mk.11) had no dayglo applied.

## Fuselage Sections



VARIOUS EXHAUST CONES WERE TESTED SUCH AS EXAMPLE SHOWN

DIRECTRIX 'A'

DIRECTRIX 'B'

DIRECTRIX 'C'

DIRECTRIX 'A'

DIRECTRIX 'B'

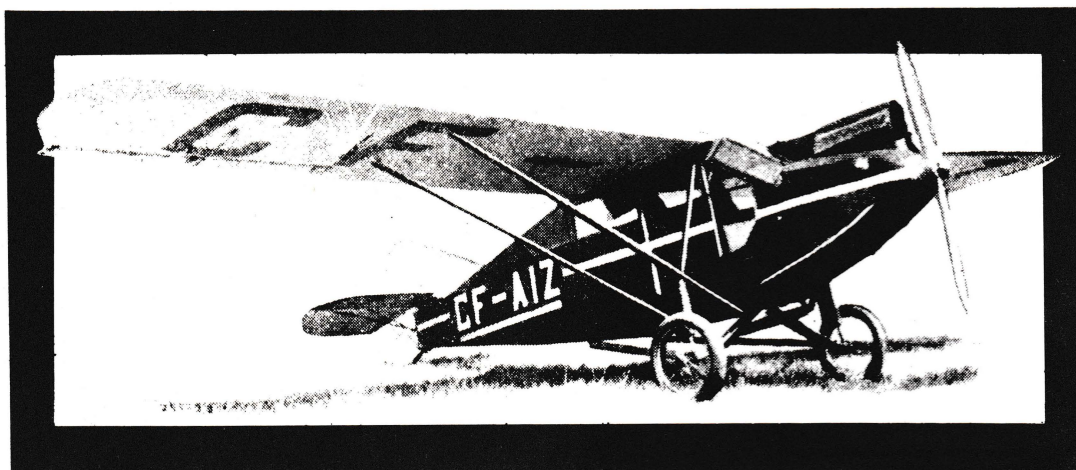
DIRECTRIX 'C'

J.H. Stroomenbergh

Canadian Aviation Historical Society



# TRAGEDY AT GLEICHEN



## WALTER HENRY

Early one afternoon, 48 years ago, a small monoplane took off from Bassano, Alberta, heading westward toward Gleichen, a small community of some 400 people about 25 miles away. At the controls was Irvin Henker; his passenger was William Ernest Sambrooke, the builder and part-owner of the aircraft. They landed a few minutes later in a field near Gleichen where they were met by a few friends of Mr. Sambrooke and by Harvey Menard, a bank clerk in Gleichen and friend of the pilot.

For the remainder of the afternoon, Henker spent his time taking up Sambrooke's friends for short flights to show them their little town from the air. After the third flight, Bill Sambrooke suggested that they should perhaps start back to Bassano but Henker protested, saying that he would like to take up his own friend, too. Sambrooke agreed and stood back to watch as the little plane took off once more. Circling the town until he reached an altitude of about 1500 feet, the pilot proceeded to do a few short dives and steep turns, probably for Mr. Menard's benefit. He circled the town once more, then headed back toward the landing field, gradually losing altitude until he turned into his final approach whereupon he executed several S turns.

Suddenly, in the third turn, the aircraft stalled, the nose whipped down viciously and the machine dove into the ground from about 150 feet, bursting into flames a few moments later. In less than five minutes there were only the charred remains of the aircraft and its occupants. At 3:20 PM, 30 September 1930, tragedy struck Gleichen.

William Sambrooke was born in 1892 in Wolverhampton, England, and came to Canada in 1906, eventually settling in Bassano, Alberta, where he operated a garage and machine shop. Bill Sambrooke was, however, more than just a mechanic; indeed, he seems to have been quite adept at many things. In earlier days, he became interested in radio and built his own receiver utilizing many parts which he had to make himself. At the time of the Jack Dempsey - Louis Firpo fight, he set up the radio in his garage and invited many of the local people to come and hear a blow-by-blow description of the match. The next morning, his son, Lowell, cleaned up the place, removing two wheelbarrows full of bottles. One wonders if many of the locals ever heard the outcome of the fight that night!

Bill Sambrooke became a close friend of Dr. Alexander G. Scott, a medical practitioner who will be known to some readers as one of the early owners of the famous Gipsy Moth, CF-APA. It was while he owned 'APA' that Dr. Scott became known as Alberta's "Flying Doctor". In an attempt

to make Dr. Scott's work a little easier for him, Bill Sambrooke constructed a snow sled made of heavy angle iron and plywood, using an old OX-5 engine for power. With a large twelve-foot propeller, the snow sled proved to be very fast on ice, but its heavy construction made it quite unwieldy in snow, especially in heavy drifts. Sambrooke had a good idea, but it did not work out exactly as he had anticipated, so at this point, he and Scott decided that the only feasible answer was an aeroplane. Bill agreed to build the planned aircraft and Dr. Scott was left to provide an engine for it.

The origin of the design used by Sambrooke is unknown, but his son, Lowell, thinks he obtained a set of partially finished drawings which he completed, making some changes and modifications along the way. It was a cabin monoplane, seating the pilot in front and two passengers in the rear with a small baggage compartment behind the rear seat. Lowell says, "I can remember all the drawings in the loft as they worked over them to get what they wanted." At any rate, they produced what is believed to be the first home-built aircraft in Alberta and possibly the first home-built cabin monoplane in Canada. It had a wingspan of 35 feet, one inch, and a six-foot chord. The fuselage, of steel tube construction with plywood formers and spruce stringers, was 21 feet six inches long. The wing was of wooden construction, using a thick airfoil section and the entire aircraft was fabric covered with the exception of the engine cowling and nose panels, which were aluminum alloy. Fitted with large 'air wheels', the finished machine stood 7 feet 8 inches high.

The original plans called for an air-cooled radial engine, so the partners tried to locate one which would be within their requirements and price range. In fact, they did find a Cameron engine of 150 HP, but the negotiations with the owner failed and they were unable to find another suitable substitute. Finally, they modified their drawings and installed a Gipsy I engine of 92 HP. At first they had estimated that their design would probably cruise at about 100 MPH, but they had to revise that figure when forced to use an engine of less power. The exact performance figures of the aircraft are unknown, but it is a fact that it cruised at about 115 MPH, which astounded everyone, including the builders. An attempt was made to find the ceiling of the airplane, but at 14700 feet the intense cold forced the pilot to abandon the attempt. At a later date, the aircraft won an altitude contest at a Regina air meet in 1930, but Lowell Sambrooke is of the opinion that its true ceiling was never ascertained.



## TRAGEDY AT GLEICHEN



1



2



3



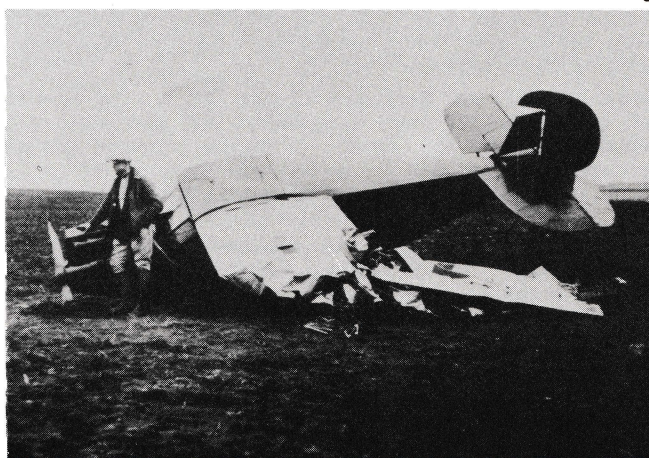
4

- 1 The Sambrooke monoplane CF-AIZ as a participant in the trans-Canada Air Pageant. L. Simpson photo.
- 2 Mr. Sambrooke (left) with Gill McLaren.
- 3 Joe Patton (left) with Mr. Sambrooke, beside the Gipsy Moth in which the latter probably received instruction.
- 4 A proud Bill Sambrooke with aircraft he built.
- 5 Joe Patton and Gill McLaren.
- 6 CF-AIZ after its first crash and prior to modifications to the tail-plane.

all photos via Joe Patton.



5



6



On 4 October 1929, the aircraft was given a Certificate of Registration and became CF-AIZ. Although the aircraft was apparently never given an official name, it was referred to by the local newspapers as the "Bassano Monoplane" and that name seemed to stick. It should be noted here that in those days, aircraft were not given a Certificate of Airworthiness which required a complete stress analysis by the Department of Transport. When granted a C of R, however, the registration letters had to be underlined, unless the aircraft was to be used commercially, indicating that it was for private use only. Sambrooke did approach the Department of Transport regarding a commercial C of R, but was refused until a complete set of engineering drawings were submitted for the required stress analysis. As was so often the case in the earlier days of aviation the drawings were not forthcoming (in fact, they often didn't exist), so consequently, any commercial potential of 'AIZ' was not realized.

The Bassano Monoplane proceeded to amaze all those who flew it with its speed and agility in the air. In fact, it was so nimble in flight, the pilots around Great Western Airways in Calgary nicknamed it the 'Fizz-Cat' and that name became much more widely known in local circles than Bassano Monoplane. L. Dunsmore (now retired from Air Canada) flew the aircraft on occasions and recalls that it handled very well, but he noted a tendency to whip-stall at low speeds, although recovery was rapid. The president of Great Western Airways, Capt. Fred McCall, also gave 'AIZ' full marks for performance. Phil Lucas and Joe Patton were two more pilots who found her to be satisfactory in the air. However, all was not well with the Fizz-Cat, and she eventually embarrassed Dunsmore one day by going into a flat spin from which she did not recover, spinning 1800 feet to the ground. The landing gear was wiped out and the left wing was demolished, but repairs were quickly started. Fortunately, Dunsmore required no repairs. While the aircraft was being rebuilt, Sambrooke strengthened the landing gear and modified the tail assembly, after which 'AIZ' was considerably safer to handle. With her bright red fuselage and silver wings, she was considerably admired wherever she appeared during the summer months of 1930.

While 'AIZ' was under construction, Bill Sambrooke decided to take flying lessons at the Great Western Airways base in Calgary, feeling that some flying experience would help him in his work on the aircraft. One of his instructors was Joe Patton. Sambrooke soloed after 6 1/2 hours of dual instruction and was considered to be a very apt student with above average ability, but, at the time of the Fizz-Cat's flights, he still had no licence. It is not known whether or not he ever got around to getting one. His partner, Dr. Scott, had no licence either, but did qualify for one some time later. Be that as it may, Irvin Henker enters the story at this point as a young 24-year-old pilot who learned to fly at the same time as Phil Lucas. Upon receiving his licence, Henker logged about 60 hours of flying time in Gipsy Moths and was then engaged by Dr. Scott to fly him around in the Bassano Monoplane. The aircraft must have been used rather extensively during those summer months of 1930 for Irvin Henker added another 90 hours to his log book, receiving \$100 a month while doing so. He apparently had no problems with 'AIZ' and seemed to be a competent pilot, having been recommended by those who knew him at Great Western Airways.

As stated in the first part of this article, the Fizz-Cat and her occupants came to grief on the afternoon of 30 September 1930. The official investigation which followed produced evidence that, in spite of the force of the impact, the basic airframe withstood it well. All welding joints held, which was indeed a tribute to the skill of Bill Sambrooke as a welder. In fact, no structural failure was to be found. The engine had been driven back into the cabin and both occupants had suffered fractured skulls which would indicate that they were probably dead before the ensuing fire destroyed what remained of the aircraft.

Further investigation revealed that Sambrooke, upon more than one occasion, had remonstrated Henker for his habit of making semi-stalled S turns during his final approaches as well as for his habit of sometimes turning to speak to those in the rear seat. The official conclusion was that

Henker had lost control at approximately 100 feet in his third S turn that day, the cause of the crash being termed, therefore, "pilot error". It may be seen from the photos of 'AIZ' that the aircraft had a high line of thrust. This, combined with an upright, in-line engine, may have obscured Henker's vision and perhaps explains why he made the fatal S turns on approach that day.

As usual, rumours spread rapidly after the accident. One witness stated that the engine stopped in flight, but there was no official evidence of that. Several others claimed that Menard, the passenger, had suffered an epileptic seizure and had wrapped his arms around Henker thus preventing him from pulling out of the dive (at hundred feet, it is doubtful if he could have recovered anyway). There may have been some truth in these conjectures and I think it would be quite logical for us to assume that the passenger did, in fact, incapacitate the pilot in this way, but perhaps from sheer terror. He probably sensed that a crash was inevitable.

In spite of the demise of the Fizz-Cat, Bill Sambrooke did not lose his interest in aviation. When the British Commonwealth Air Training Plan was established early in the Second World War, he found himself working as a civilian air engineer at numerous training stations in Alberta and British Columbia such as Bowden, Penfold and Edmonton, completing the war years as chief engineer at Abbotsford in 1945. During those years, he became widely known for his skill in producing new and more efficient ways of doing things to keep the aircraft in the air and many inventions and innovations credited to him, among them being a quick release mechanism to jettison cockpit canopies. He also introduced the policy of having a member of the ground crew accompany the pilot on a test flight. His theory was that, if one of the mechanics had to go along, the ground crew would see to it that all work was carried out properly.

Returning to the thirties, Dr. Scott continued to utilize the aeroplane as a means of transportation in his practice. In 1931, he purchased a Gipsy Moth, CF-APA, and that aircraft became a household word in Alberta in the prewar years. He was forced to put 'APA' in storage during the war and finally sold her in 1945. After passing through several owners within two years, the old Moth once again went into storage where it remained for 16 years until it was acquired by Jack Landage of Calgary who rebuilt it and flew it for some time. The aircraft then was purchased by the makers of Belvedere cigarettes and made a name for herself by taking part in several of the Cross-Canada Air Dashes of a few years ago. For part of that period in her career, she was piloted by Glen Norman, the organizer of the first Air Dash. Eventually, 'APA' met up with another accident in which it was severely damaged and the Belvedere company sold it to Ed Zalesky in Vancouver. Present plans are for it to be rebuilt and preserved in a museum in the Vancouver area. Dr. Scott finished out his working years and retired to live in Ottawa where he is known to have been residing in 1967.

Although 'AIZ' departed 48 years ago, her memory was revived on two occasions in more recent times. The American publication Air Progress ran an article on homebuilt aircraft in their 1955/56 issue and the Fizz-Cat was pictured in it, being the only Canadian homebuilt to be included. (As the publisher of Air Progress was unable to supply the back issue, I would very much appreciate it if any reader could supply a copy of the magazine or a photocopy of the article.) A few years after 'AIZ' was mentioned in Air Progress, Bill Sambrooke's daughter Donna learned that the remains of the aircraft were thought to be still in existence and that an attempt was to be made to restore it in Calgary. She was unable to trace this rumour to its source, but the date and time coincide closely with the period in which 'APA' was being rebuilt by Jack Landage and it is thought that the Moth, being an old aircraft of the "flying doctor", was confused with the Fizz-Cat.

Today, most aviation enthusiasts are aware of the vast number of homebuilt aircraft which are currently flying, but few are familiar with the more obscure ones which made the scene in the prewar era - aircraft such as the Bayamos, Hotties, Straith Mallard, etc. 'AIZ' was one of them, and like the others which I have unearthed so far, was a good



airplane, designed and built by people with little technical training, but with a tremendous amount of practical ability and natural instinct. To quote the late Ernie Taylor: "If it didn't *look* right, then it wasn't right". This is the story of the "Fizz-Cat" which flew in an era when flying really was fun.

#### Acknowledgements

When I surveyed the first rough draft of this article, I was quite dismayed to find that I had scarcely half a page and no immediate hope of adding to it. However, some persistent digging resulted in much more information than I had hoped for. Fellow member Carl Vincent was, as usual, of inestimable help in getting things started by supplying all the information in the files of the National Archives of Canada. Lowell Sambrooke of Winnipeg and his sister Donna Sambrooke of Mission, B. C. added more invaluable data while Mr. Joe Patton and Mr. Phil Lucas of Calgary gave me some very interesting personal stories about the aircraft. To Mr. Patton must go the credit for supplying

the only photos of the Fizz-Cat which I could find. My sincere thanks must go also to H. B. O'Neill of Alberta Transportation, John Rohrich of Calgary Power Ltd., Mrs. Georgeen Barrass of the Glenbow-Alberta Institute, J. Blower of the Alberta Provincial Archives and to the Abbotsford Air Show Society. I must also extend my appreciation to another CAHS member, Mr. Fred Winters of the Alberta Aviation Council, for taking the time to search through many Alberta telephone books and make numerous telephone calls on my behalf in order to locate some relatives of the late Mr. Sambrooke. Among those relatives are Mr. and Mrs. Arnold Sambrooke of Eckville, Alberta, who kindly supplied photocopies of newspaper clippings.

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#### FALL OF AN ARROW

by Murray Peden

Published by Canada's Wings  
182 pages, illustrated, \$12.95

1979 is the anniversary of what must be one of the more bizarre events in Canadian history - the cancellation of the Arrow aircraft and the Iroquois engine programme at a time when their development had been carried to a point where success was assured. The irony of the present situation, in which the government is now planning to spend over two billion dollars for a foreign-designed aircraft very similar to the Canadian design the government destroyed twenty years ago, adds a special interest to the anniversary. This is reflected in the number of articles, programmes on radio and TV, and books on the subject coming out this year. Murray Peden's *Fall of an Arrow* is the first of the books to be published.

Mr. Peden's book traces the history of the Arrow aircraft and the Iroquois engine development from their inception in 1951 to the cancellation in 1959. With the CF-100, A. V. Roe's successful twin-engined, all-weather interceptor, coming into service in 1951, the RCAF started to look for a successor - a supersonic version - for use in the early sixties. As with the CF-100, no foreign aircraft could be found that would meet the requirements and so it was decided to "go Canadian" again. The book describes the inevitable trials and tribulations faced by any design team working on the frontier of an advanced technology. In this case the programme was crowned with success and by 1958 it was evident that Canada had a world beater. The sour note in this success story was the rise to power of the Conservative party under John Diefenbaker. This government challenged the programme and, in February of 1959, when its technical success was assured, suddenly cancelled the programme. Mr. Peden chronicles at some length the political actions at the time when most of the actors appeared to be ill informed, short sighted, and in some cases vindictive. The worst political act - one that has been called obscene - was the total destruction of the Arrow, including the scrapping of five airworthy aircraft within a few weeks of the cancellation order.

The book goes on to describe Canada's floundering attempts at an air defence policy after the cancellation, including the acceptance of the American Bomarc weapon, a ground-to-air missile of very questionable effectiveness that required a nuclear warhead, and the purchase of some American supersonic interceptors, weapons considered inferior to the Arrow.

The book is well researched, appears to be accurate, and is profusely illustrated with photographs of the men and machines involved. It is a report in layman's language of

## Book Reviews

a sorry tale of technical success being crowned with disaster. A politician, John Diefenbaker, stalks the disaster part of the story as the villain of the piece.

Beyond this, the book is a bit disappointing in some areas. One could wish for a more detailed description of the Arrow and the Iroquois including such items as design, special features and performance data. These are sketched in only very lightly and, some twenty years after the event, tend to leave the technically inclined unsatisfied and somewhat frustrated. On the personal interest level, the laying off of 14 000 people on a Friday afternoon with no premonition or warning was a highly traumatic experience for the people involved. While the author touches on this, he does not explore what is perhaps the most dramatic aspect of the Arrow story. In another area the book raises unanswered questions. The author, while concentrating on the Arrow story, paints a picture of a highly successful company that, in the thirteen years between 1946 and 1959, developed two successful engines - the Orenda and the Iroquois - designed, built and flew a successful prototype - the C-102, the first jet transport built in North America - designed a successful interceptor - the CF-100 - and built over 600 of them, and topped these off with the Arrow success. This was a remarkable achievement that went a long way toward dispelling the traditional picture of Canadians as "hewers of wood and drawers of water". This design team was surely a major asset to Canada. However, no major aircraft firm in the world has survived without government support and the Conservative government of John Diefenbaker in 1959 saw fit to withdraw support in a manner that wrote off the firm and the design team. The implications of this deserve to be explored in more depth than the author has in this book. Even accepting these criticisms, the *Fall of an Arrow* is a significant addition to the literature of the troubled history of aviation in Canada.

George Shaw

#### THERE NEVER WAS AN ARROW

by E. K. Shaw

Steel Rail Educational Publishing  
P. O. Box 6813, Stn. A, Toronto, Ont. M5W 1X6  
261 pages, illustrated, \$7.95 (paperback only)

Here is another revival of the Arrow controversy. In *There never was an Arrow*, Kay Shaw sets out to cover the many facets of the argument from the point of view of one who was employed at Avro Canada from day one to "Black Friday", and of one who undertook the study and

(Continued on Page 126)



# MEMORIES OF BLATCHFORD FIELD



## R. MURRAY SHORTILL

The author (L) and Jack Koenen pose with American Eagle CF-AHZ

The Edmonton and Northern Alberta Aero Club had their de Havilland D.H.60X Cirrus Moth aircraft - G-CALB, G-CAUE, G-CYYG and G-CAKJ; they were two-place, open land biplanes of wooden construction, powered by a de Havilland Gipsy upright engine of approximately 85 horsepower. They came equipped with hard wheels, but it was decided to equip all club aircraft with the new low-pressure (Donut type) which were coming on the market. In doing so, the landings and takeoffs became much smoother and easier on the land gear.

All the Club aircraft were acquired on the attractive terms offered by the Dominion Government to stimulate flying in Canada. The offer was that any organization that could provide one aircraft with a licensed flying instructor and a licensed air engineer, would be given free of charge an exact duplicate of the same aircraft. This was how all the flying clubs in Canada acquired their machines.

One of the Cirrus Moths, G-CALB, was destroyed on an unauthorized flight by personnel connected with the Club. Nobody was killed, but the aircraft was written off. Her sister ship, G-CAKJ, was the best performer of all the Moths - and seven miles an hour faster. She too was written off, in a crash on the north end of Blatchford Field by a Club member whose name was Ted Heath. He was not injured and the parts from both machines were salvaged for further use. The other two Cirrus Moths stayed in service for a considerable length of time with the Club.

Later on the club obtained two advanced Gipsy Moths, powered by Gipsy 100 horsepower engines. They were of tubular metal and wood construction and were registered as CF-CBN and CF-CBX - both excellent machines. A Fleet Finch CF-CEN, and a 50 horsepower Luscombe Silhouette, CF-BLW, later on became new arrivals for the Club's benefit. The Fleet was used on the weather flight mainly, flown by Club members Jack Ross and Art Haldin. When the war came along, CF-CEN was dismantled and

sent to the No. 2 Wireless School in Calgary for ground school instruction.

Much has been written of the Club's activities. Some of early instructors were Cy Becker, with a distinguished First World War record and later on a well known Edmonton lawyer, and Wop May of whom much has been told. There was also Alvin D. Kennedy, a former RCAF instructor, who joined the Club's instructional roster and who was associated with the Edmonton Journal for a long number of years. The Club's office staff comprised two Edmonton men, Alex Clarke and Bud Potter, both very capable. Bud Potter later on pursued a distinguished flying career in the north as a bush and airline pilot. The engineering staff was comprised of a chief engineer, Frank Burton, with assistants Red Grey, Tom McLaughlin, Bill Mullins, Felix Mullins, Alf and George Taylor, Mickey Sutherland, Ralph Marshall and myself as an 'airport rat' who helped as gasser-upper, tire-kicker, prop-puller and passenger-getter.

All of us helped on dismantling, overhauling, rebuilding, doping fabric and all the work. We did it for free, providing our own transportation and lunches, as you hoped to acquire an aircraft ticket and advance up the ladder. Many did, managing to carve out a career in aviation and even became well known. The Club's Presidents were successively Wop May, James Bell and Chester Moffett. With Alex Clarke acting as secretary, things ran along quite smoothly. The Club had many influential businessmen as directors; one in particular was Enoch Loveseth, a well known oil man, and others were Frank Brown and John Michaels, the news operator. The Blatchford Field airport manager was genial James Bell, the airport janitor was Harry Allen and the airport engineer was James Hoddow. Blatchford Field itself was operated by the City of Edmonton.

The first and only Lockheed Vega monoplane registered in Canada was CF-AAL, one of a long line of famous planes which left their imprint on aviation. This machine was



brought to Edmonton from the factory at Burbank, California by Wop May. It was originally powered by a Wright J-5 of 220 horsepower, but was underpowered and was returned to the factory for the installation of a more powerful engine, a Wright J-6 of 330 horsepower, which made the aircraft a far better performer. This machine later on belonged to Canadian Airways and, in conjunction with their two Fokker F-14's, CF-AIK and CF-AIL, became the nucleus of aircraft flying the Prairie Air Mail circuit. There were also three Boeing 40 B4's and one more machine, a Consolidated Fleetster, was stationed at Lethbridge to complete the circuit. The Prairie Air Mail Service was discontinued by the Bennett Government as an austerity measure and the four aircraft involved later on were scattered over Canadian Airways routes. The Lockheed Vega operated out of Winnipeg for a while on the Minneapolis-Fargo run, but the last I heard of her she was in Central America, and flown by a well known Edmonton bush pilot, Harry Hayter. Later the machine became the property of Jimmy Angell, an operator in that vicinity.

The two Fokker F-14's were sent to Winnipeg. These machines were of an unusual design having parasol wings with a span of 76 feet and a fuselage 42 feet long. It had an enclosed cabin, and carried eight passengers, while the pilot sat out in an open rear cockpit. This was typical of the air mail designs of that time and compared with other American air mail types. The pilots seemed fascinated looking ahead and picking out a rocker arm for horizon. The F-14's were powered by a Pratt and Whitney Hornet of 525 horsepower. The Fleetster was a very fast parasol with an enclosed passenger cabin and open cockpit in the rear fuselage, a type of aircraft, popular in the United States. It was said to be the fastest aircraft in Canada in its day. It was written off in a crash in Calgary in November 1931. All three Boeings were also written off. Two 40 H-4 models were returned to the Boeing Company. Pilots for the above machines, based out of Blatchford Field, were: H. Hollick-Kenyon, John Bythell, Con Farrell, Paul Calder, J. Moar, A. E. Jarvis and others. The west end residents of Edmonton complained about the noise from the F-14's, but Canadian Airways pilots tried to be considerate and throttle back as they passed overhead.

Several well known companies operated out of Blatchford Field. Canadian Airways with three Fokker Super Universals - G-CASK flown by Punch Dickins and air engineer Lou Parmenter, G-CASN flown by Andy Cruickshank and air engineer Bill Nadon, and G-CASL flown by Paul Calder and air engineer Red Kelly; a tri-motored Fokker, G-CASC, powered by three Wright J-5's was flown by Leigh Brintnell; and two Junkers W 34's, CF-ARI flown by Wop May and CF-AMZ flown by Matt Berry and air engineer Frank Hartley. The two Junkers W 34's were powered by either a Pratt & Whitney Hornet of 525 horsepower (ARI) or a Wasp of 420 horsepower (AMZ). When Commercial Airways went bankrupt after a brief time flying down north, Canadian Airways purchased their three Bellanca Pacemakers - CF-AKI, CF-AIA, CF-AJR - and the Lockheed Vega CF-AAL. Canadian Airways pilots included Wop May, Con Farrell, Punch Dickins, 'Westy' Westergaard, Paul Calder, Matt Berry, Jack Moar, John Bythell, Norm Forrester, and many more.

A graduate of the Edmonton and Northern Alberta Aero Club who was destined to become a very famous personage in Canadian aviation was W. G. W. (Grant) McConachie, a very good personal friend and a fine pilot. Grant's background was railroading, since his father held an important position with the CNR. But Grant became interested in flying and, after getting a standard commercial ticket, bought his first machine, G-CAGD, with the help of a family member. This machine was a used Fokker Universal from the 1926 Hudson Strait Expedition. He found the machine in a Vancouver junk yard and ferried it back to Edmonton where it was then overhauled with myself helping in a modest fashion.

He eked out a precarious living with G-CAGD operating in and out of Blatchford Field, but later purchased a de Havilland Puss Moth, CF-APE, and started a company called Independent Airways. Some of his financial backers were a titled couple from Europe who were trying to start

a dude ranch in the Edson-Jasper area, but were unsuccessful. After a disastrous crash with G-CAGD which nearly cost him his left leg he regrouped his equipment and started a new company called United Air Transport with three Fokker Universals G-CAHJ, G-CAFU and G-CAHE. Then he added G-CARC, a Ford Trimotor, powered by three Wrights of 220 horsepower each, and a Fairchild FC-2W2, G-CARM. He also had several Waco UIC cabin jobs and two Fleet Freighters. CF-BDX and CF-BJT, of which only the former flew for UAT. BDX burned in Chicago on the flight out. He then purchased another tri-motored Ford, CF-BEP, powered by three Wright J-6-7's of 330 horsepower. After expansion into another company called Yukon Southern he obtained three Barkley-Grow transports and called them the Yukon King, Queen and Prince; they were registered as CF-BLV, CF-BLW and CF-BMQ. These machines were the first twin-engined, low-wing monoplanes carrying a crew of two and between six and eight passengers. They had a fixed and panted landing gear and were adaptable to wheels, floats and skis. They were powered by Pratt & Whitney Wasps of 425 horsepower. When the CPR merged all the lines, a lot of small companies folded. Grant had a great group of pilots some of whom were Ted Fields, Sheldon Luck, Gil McLaren, Ralph Oakes, Ernie Kubicik, Len Waagen, Stan Warren and, of course, many more. Grant's air engineers were Ralph Marshall, Bill Mullins, Red Gray, Chris Green, George Taylor and myself (as passenger getter). It was a good organization.

Mackenzie Air Services operated out of Blatchford Field, ram-rodged by Leigh Brintnell, a very capable and shrewd operator and also one of Canada's great bush pilots. He formerly was with an opposition company, but quit and started up MAS, his own company. His first two machines were Fokker Super Universals, CF-ATJ and CF-ATW. He later acquired other aircraft: two Fairchilds, CF-AKN and CF-ATZ, then Bellanca Air Cruisers, CF-AWR, CF-BKU and CF-BTW, a Norseman, CF-AZA, a Staggerwing Beechcraft, CF-BBB, a Fairchild Sekani CF-BHE and numerous other machines. Several of the above were leased to service the Yellowknife area which was experiencing a boom in mining.

One of Mackenzie's famous planes and a mighty good one was Bellanca Air Cruiser, CF-AWR. This plane was brought into Canada and allowed to operate, even though it was second hand, on the basis of developing the natural resources of the country. Its unique capabilities and general all-round performance in the hands of Brintnell and Stan McMillan, a remarkable pair of bush pilots, made it a name to remember. They freighted pitchblende ore from the Eldorado Mines at Cameron Bay on Great Bear Lake to Edmonton where it was trans-shipped to the Port Hope refinery in Ontario. The aircraft actually was owned by Eldorado Mines and operated by Mackenzie. It was known as "The Eldorado Radium Silver Express". This operation cut the price of radium in half. Formerly it had been a monopoly held by the Belgian Congo.

Brintnell's pilots were as follows: Leigh Brintnell, Stan McMillan, Archie McMullin, Bob Randall, Matt Berry, Archie Van Hee, Bud Potter, Stan Warren, Harry Hayter, Chris Moon, Fred Melickie, Al Brown and Marlow Kennedy. His air engineers were: Al Dyne, Bob Hodgson Sr. and Boddy Hodgson Jr., Fred Staines, Jack Bowen, the Moon Brothers, and several others. The office staff was in charge of J. C. McDougall, a very efficient chap familiar with flying operations. They also had a girl, Florence Reidford, who could use the sewing machine on fabric work; she was very good on rib stitching and lived close by. Everyone was careful of their language when she was working. Later on, during the war, she became an inspector for Northwest Industries who were located on Blatchford Field and who were overhauling Fairey Battles as trainers for the RCAF in Canada after the disastrous results with them in France.

Blatchford Field was used to test fly the Van Valkenburgs, three Edmonton-manufactured machines. They were: CF-ATT, the Van Valkenburg M-2; ACN, the Bayamo BM-3 and AUZ, the Bayamo called BA-1, rebuilt from a monocoupe. These were all designs by an American called Van Valkenburg who built them at 96 Street and 105 Avenue along with a welding machine which he also manufactured and sold



on the market. They were three-place, high-wing monoplanes said to be of an advanced design with an enclosed cabin, powered by a Kinner B-5 of 125 horsepower. They were flown by Joe Irwin, a very capable pilot. After test flying, one of them, a cross-country flight was arranged for demonstration purposes. This flight originated at Blatchford Field and ended up in Sarnia, Ontario, piloted again by Joe Irwin. Joe was a very colourful and capable pilot who retired from CP Air as a Captain.

Many private owners used Blatchford Field and one group were the Koenen Brothers, Hank and Jack. They, with their American Eagle A-129 three-place open biplane CF-AHZ, carried many passengers on Blatchford Field. They also barnstormed around to the country town picnics and I sold tickets for them. Jack later moved to Prince George, B. C. where he operated a private saw mill operation, while Hank, the elder brother, had a successful career in aviation and was one of the operators of Peace River Airways. This company had two Fokker Universals, G-CAHE and G-CAHJ. They also had a Waco AQC-6 cabin job, CF-BJS. Their pilots were Frank Burton, Ernie Kubicek, Stan Warren, Hank Koenen and George Dalziel (the Flying Trapper). Hank became a ferry pilot during the war and in postwar years remained connected with aviation.

From time to time, itinerant aircraft would arrive such as Walter Kiehlbauch in from Chipman with his American Eagle A-129, CF-AHX. Just as the war started he had purchased a Fairchild 24, a three-place, high-wing monoplane, powered with a Warner Scarab engine of 145 horsepower. He went to fly out fish from Calling Lake, Alberta for Jim McIntosh; Jim owned a Curtiss Robin CF-AMA which Walter also flew. He was killed in the Porcupine Hills in a blinding snowstorm during 1941 and when he was found his body was approximately half-a-mile from his aircraft, partially eaten by wolves. He was the object of an intensive search by No. 2 AOS School, which used Ansons and a Lockheed 12 on loan from the DOT. This school based at Blatchford Field and was operated under the capable guidance of Wop May and his assistant 'Westy' Westergaard, another former Canadian Airways pilot.

Jack Lewis might arrive in from Leduc with his Gipsy Moth, G-CARY, Lionel Vines from Saskatoon with his Gipsy Moth, G-CATK, with its advanced Hermes engine of 115 horsepower, or Joe Austin might show up in his Alexander Eaglerock CF-ACR, with its beautiful OX-5 engine which "just purred like a tom cat in a dairy".

Earl Platt might come in from Rimbey with his Curtiss Robin, CF-AHH with its Curtiss Challenger engine of 165 horsepower and its tractor-like noise and Ernie Kubicek in from Vernon, B. C. with his home-built Pietenpol with its five-cylinder Velie engine of 55 horsepower.

Consolidated Mining and Smelting of Trail, B. C. were often visitors with a Hornet Moth flown by flying geologist Mike Finland. President Archibald with his de Havilland Puss Moth or another CM&S pilot, Bill Dewar with a Fairchild 71 or Bill Jewett of the same company with the "Corn Flakes Express", a de Havilland Rapide or Dragon. RCMP Chief MacBrian might show up with his Puss Moth, followed by DOT Inspector Herb Ingram in his Fairchild KR-34 biplane. The other machine used by DOT Inspectors was the custom Waco Cabin job, CF-CCP, with its Jacobs 245 horsepower engine. Also arriving at any time would be Dr. Dixon from Stettler with his 60 horsepower Le Blond-powered Porterfield; he was known as the "Flying Doctor" of Alberta. There were many, many more. At one time the local paper, the Edmonton Journal, carried a column on the arrivals and departures of aircraft coming to Blatchford Field. It was a very interesting time. For myself, going out to work at Blatchford Field was my "seventh heaven" and I spent many happy hours out there even though I was practically destitute. It was a heady time of my life.

Blatchford Field also welcomed visitors from far away places; Captain Ross Hoyt back from his Alaskan trip with his USAAC pursuit ship - a Curtiss Hawk with its Curtiss Conqueror engine of 600 horsepower. In landing at night, he chose the wrong side of the flare path and damaged his machine. However, he finally reached the U. S. A., after slight repairs to his machine. We had the Detroit News Lockheed Vega, with all its special photographic equipment,

purporting to be on a story about the Jimmy Mattern search. Sir Hubert Wilkins arrived with his beautiful Lockheed Electra on a search for the Levanneskys. These were a group of Russian pilots in a four-engined aircraft attempting a flight over the North Pole to California; no trace was ever found of them. Then Wallace Beery, the movie actor, showed up in his Bellanca Skyrocket with its 600 horsepower Wright Cyclone and plush interior; he just gassed up and left.

Another aircraft, a Fairchild 51, came up from Chicago with the Rossbach Expedition. Bonnie Bonnell was pilot and the air engineer, Pete Siemens. This expedition came to survey the possibilities of starting up a Dude Ranch in the Hudson Hope area of British Columbia. They were unsuccessful in finding a suitable site and smashed up the aircraft which was trucked out to Blatchford Field, rebuilt and flown back to Chicago. I became a good friend of a younger member of the expedition and paid him a visit back in Chicago.

In 1931 Wiley Post, along with his navigator, Harold Gatty, paid Blatchford Field a visit in the renowned Lockheed Vega "Winnie Mae" on his around-the-world flight. I was the first person to spot his beautiful Lockheed breaking out of the overcast and yelled to James Bell, our airport manager, to switch on the roof lights. The "Winnie Mae" swung in low, turned left and passed over the airport fence and plopped down in a sea of mud; as usual, June had lived up to its reputation as a rainy month. I helped clean the mud out of the wheel pants along with Jack Riley, a real aviation enthusiast. With the assistance of a City of Edmonton grader, we hauled the aircraft up on the tarmac in front of our hangar.

They used Portage Avenue for this trip and also in 1933 when Post came back solo in the "Winnie Mae", trying to better his record. United Air Transport air engineer Chris Green inspected the aircraft and had it fuelled and readied. Grant McConachie climbed into the cockpit to check the automatic pilot (Black Mike), a Sperry instrument to take the fatigue out of flying. Post was able to get a snooze now and again with the automatic pilot, which was just coming into general acceptance by the aviation industry of that time.

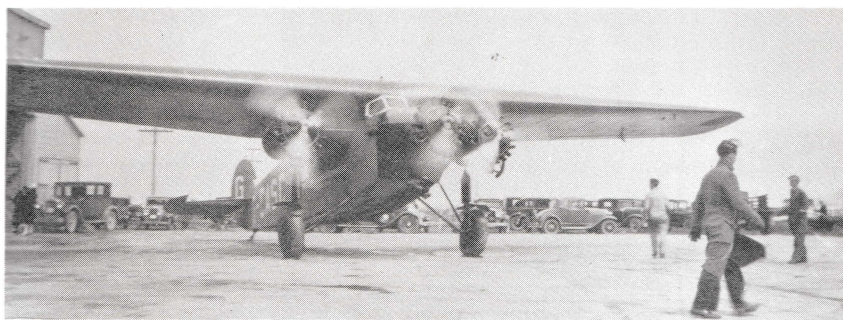
Frank Hawks, the noted American speed pilot, showed up at our 1930 Air Show with his Travel Air Mystery Ship - "Texaco 13". This was a special racing machine and had a 330 horsepower Wright Junior to power it. It was one of the first 300 MPH aircraft and, with its two ironing boards sticking out to represent the wings, was often called "The Flying Prostitute of the Air" - because the wings looked so small. It had no visible means of support. The above expression was often used to describe American racing planes; one case in particular was the Gee Bee line of racers.

Also, on 21 July 1934, Lieut/Colonel H. H. Hap Arnold, of the United States Army Air Corps, paid Blatchford Field a visit with ten Martin B-10 medium bombers on their way to Ladd Field, Alaska. They refuelled and rested here, a very impressive fore-runner of things to come.

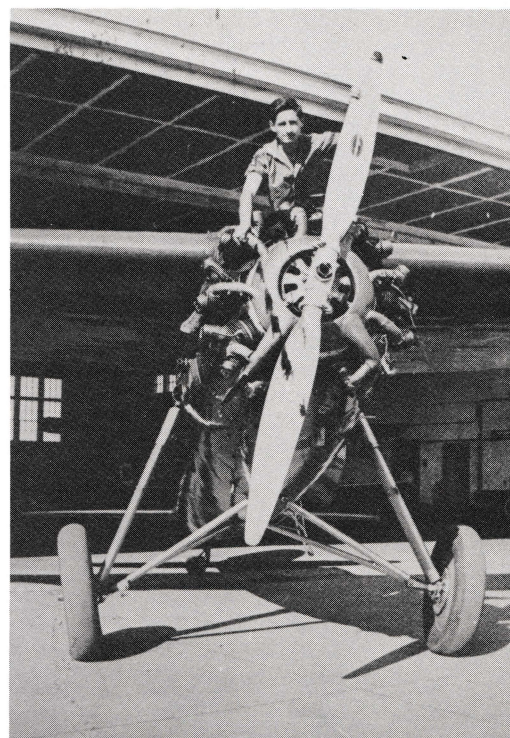
The other air show in 1931 was the Ford Reliability Tour, sponsored by the Ford Aircraft Company. This tour had many unusual types of aircraft that were fairly representative of the era. We had Ford Tri-motors, de Havilland Gipsy Moths, American Eagle A-129's, Alexander Eaglerocks, Kari-Keens, Fleets, DH Puss Moths, Stinson Detroids, Stinson Juniors, Waco 9 and 10's, Waco YMF's, Stearmans, Travel Airs, Bellanca Pacemakers, Buhl Air Sedans, and a Saro Cloud amphibian from England. Two machines, outstanding in appearance were the Lockheed Vegas "Miss Silvertown", owned by Goodrich Tire Co. and flown by Art Gobeil of Hawaii fame, and the "DeForest Crosley", flown by pilot Lee Schoebair. With the Lockheeds making demonstration flights over Blatchford Field, it was a sight to see. This event attracted thousands, as aviation displays of any nature always seemed to fascinate the general public.

A Pitcairn Autogyro CF-ARO, leased by the MacDonald Tobacco Co., also staged demonstrations. With a Wright Whirlwind which propelled it forward and with its free-wheeling wing it was quite a novelty - a fore-runner of the modern helicopter.

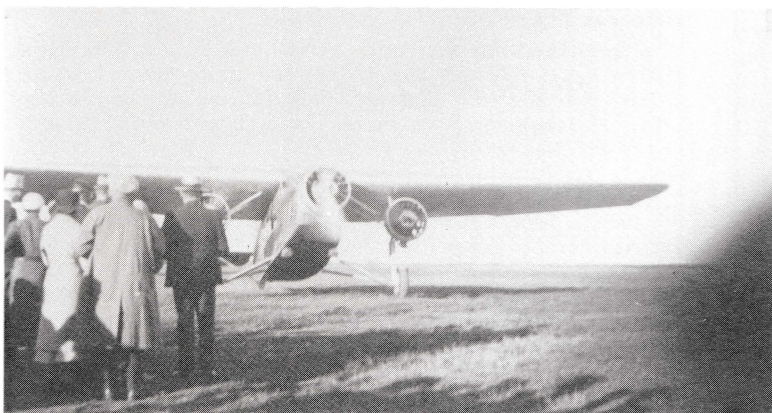




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## MEMORIES OF BLATCHFORD FIELD



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1 Fokker F. VIIIb-3m trimotor of Western Canada Airways at Blatchford Field about 1930.

2 The author atop Commercial Airways Lockheed Vega 1, CF-AAC.

3 Another trimotor, the Ford 4-AT-A, G-CARC of United Air Transport in 1935.

4 Two fair passengers about to board Jack Koenan's American Eagle, A-129, CF-AHZ.

5 The author in the pilot's 'office' of CF-AIL, a Fokker F. XIV of Western Canada Airways.

6 Mackenzie Air Service's Fairchild 71, CF-AKN about 1935.

photos by the Author.



A specially-equipped Fleet, with two carburetors installed, one for upside-down flying, was piloted by Jack Sanderson from the Fleet Aircraft Co., Fort Erie, Ontario. A wonderful display of aerobatics was performed and the machine flew perfectly.

Going back to the 1930 Air Show; one of the outstanding displays of close formation flying was put on by Commercial Airways with their "Red Armada" of Bellanca Pacemaker aircraft looking very snappy. They operated on floats from nearby Cooking Lake air base and were flown by Cy Becker, Idris Glynn Roberts and M. Sherlock.

An unfortunate incident involving M. Sherlock happened at Fort Chipewyan. He had accidentally landed too close to shore and struck some gas drums, killing one child and injuring others who had been hiding behind the barrels. They were the Woodman family and the children when they grew older became involved in aviation - Morley works for Associated Helicopters here in the city, while Dick was a radio operator in the RCAF. Sherlock felt so badly about this incident that he left Canada and flew for Imperial Airways on the Indian run. Mrs. Woodman became Post Mistress of Fort Chip and also MacKenzie Air Services agent there.

Blatchford Field, of course, had its unusual incidents and one of them happened to me. One New Year's Day, I had walked out to the field and managed to snare a lone passenger sitting by the fence in his car (a 1932 Whippet). Frank Burton, the chief engineer of the Club, was out in the hangar. Being the only licensed pilot available, he, with my help, wheeled out G-CYYG and Frank took off. He made one circuit and to his amazement the passenger attempted to get out of the machine and jump. Frank, sitting in the back, hit him with his fist and knocked him down in his seat. After quickly landing, we found out he was in a despondent mood; little did he know how we felt!

One time I had four passengers for Independent Airways' Fokker Universal, G-CASE, flown by Lionel Vines. As we had just topped up the tanks from the nearby underground pumps, the machine was heavy. I was strapping the passengers in the seats and one was getting nervous, saying she didn't want to go. I banged on the wall for Lionel to start, but was unable to get out and became extra baggage. On the takeoff we snared the top strand on the airport fence and pulled it off for several hundred feet. This made us a little tail heavy, so we swung around and came in. Part of the wire was wrapped around one wheel with the rest dragging behind. After that the full length of Blatchford Field's grass runways was used.

Another time, instructor Alvin D. Kennedy had a forced landing in G-CYYG in the potato field just west of Blatchford Field. The crankshaft had broken emitting a long exhaust trail of black smoke. We walked over to the machine and it was smack in the centre of the patch. We dismantled the aircraft, brought it back and gave it a quick overhaul, complete with new crankshaft and then put it back into service.

Imperial Oil pilot, Pat Reid, while flying Puss Moth CF-IOL, was reputed to have touched his wheels on the roof of the CPR station at 109 Street and Jasper Avenue while the Prince of Wales was on his visit to Edmonton in 1929. Then, of course, Wop May in his Jenny had flown under our High Level Bridge and, during the war years, the High Level Bridge was looped by a No. 16 EFTS Tiger Moth. Although I am aware of who looped it, I will not name any names.

Then the "Flying Trapper" George Dalziel, who had learned to fly on Blatchford Field with the Edmonton and North Alberta Aero Club, purchased Curtiss Robin CF-ALZ, the Mackenzie Air Service's machine which had been flown previously by Harry Hayter. The "Flying Trapper" would disappear with his aircraft in the early fall, do his trapping, and fly out in the spring to have the aircraft serviced. A very colourful chap, he was associated with Peace River Airways for a while in its short-lived life and later became a well known operator in aviation.

There is a very amusing incident involving Dalziel at Vermilion, Alta. McConachie had the Ford Trimotor, G-CARC, there along with HJ and HE, two Fokker Universals. Lionel Vines was there as well as Dalziel with his

Robin; all were flying passengers. One Sunday morning, Dalziel announced he was flying back to the city to get a change of clothes - did anybody want to go along? Grant and Frank Burton, who was his spare pilot, said they would like to go. So Dalziel - who had only sixty hours, while Grant had 1100 hours and Frank Burton approximately 600 - climbed into the front seat to fly the Robin. Dalziel weighed approximately 165 lbs, while Grant was 210 and Frank 180; when they started the takeoff, the aircraft was well grossed up. Dalziel with his limited experience could not get enough speed and Grant and Frank became very nervous. All of a sudden Grant yelled to Dalziel "Keep her on" (full throttle), while Frank yelled "Cut 'er" (close throttle). Poor Dalziel was in a fix. However, they finally staggered into the air and flew back to the city. Their story around a beverage table was hilarious.

A tragic incident was the crash of Mackenzie Air Services Fokker F-14, CF-AUD, piloted by Matt Berry with passenger James Bell and air engineer Bob Hodgins Jr. on 24 May 1934. Air engineer Hodgins was burned to death while Matt Berry and James Bell were injured. This particular aircraft, after a very successful freighting job in the north, was due for a new engine. This was done and the aircraft had had its run-in time finished and was being test flown when it crashed. This particular F-14, unlike the other parasol ones, had the wing down on the fuselage. It was cleaner, not unlike a larger Universal, and had a 640 horsepower Wright Cyclone. I had booked off passenger getting that day and went out to a nearby lake with a pal and his girl. I saw the smoke from the crash and felt uneasy. Since the CNR's excursion train to the lake was called "The Moonlight Express", I did not learn of the crash until my mother told me on arriving home that night.

Blatchford Field was the focus for many mercy flights. Wop May once flew a Pulmotor to Alberta Beach on Lac St. Ann, while McConachie flew up to a group of rapids to bring out some injured men. Matt Berry in CF-AKN, a Fairchild 71, brought in many patients to the Edmonton hospitals. So many mercy flights were made out of Blatchford Field that they became commonplace. World attention was first focussed on Wop May and Vic Horner's famous flight to Fort Vermilion with serum for a diphtheria outbreak in a small Avro Avian with open cockpits. It was a very courageous flight and it emanated from Blatchford Field.

We had many interesting makes and types of aircraft on Blatchford Field: D. H. Gipsy and Cirrus Moths, Puss Moths, Rapides and Dragons (aptly called the "Corn Flakes"), Waco 9 and 10's, Waco UIC's and YMF's, Fleets, Fokker Universals and Super Universals, Fairchild FC-2's, FC-2W2's, 71's, 51's, a Sekani, and KR-34's, Bellanca Pacemakers, Skyrockets and Air Cruisers, Junkers W33/34's, Fokker F-14's, Lockheed Vegas, Porterfields, Kari-Keens, Kinner Birds, Travel Air 2000's, Barkley-Grows, Beechcraft Staggerwings and 18's, Cessna Airmaster and many, many more.

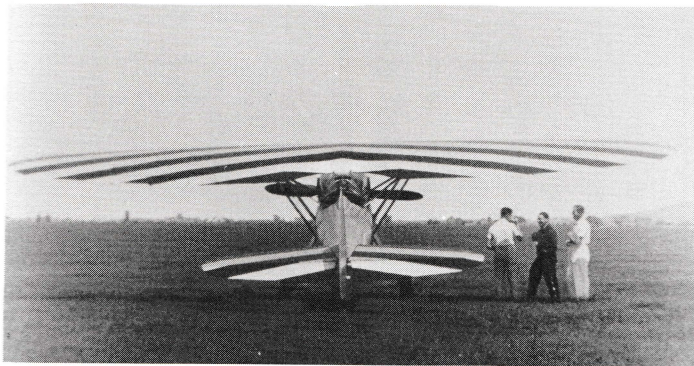
Then of course, when the war started we had P-40's, C-46's, DC-3's, B-25's, B-26's, B-17's, P-39's and P-38's, Ansons, Tiger Moths, Fairey Battles and Airspeed Oxforbs. This was the beginning of another "ball game". I could furnish some history on the war years, but for the present time the pages that I have written here will suffice, and I hope will serve as a bit of Blatchford Field history. I ask my readers' forbearance if the chronological sequence of events is not completely accurate - I am relying upon my memories of forty years ago.

R. Murray Shorthill  
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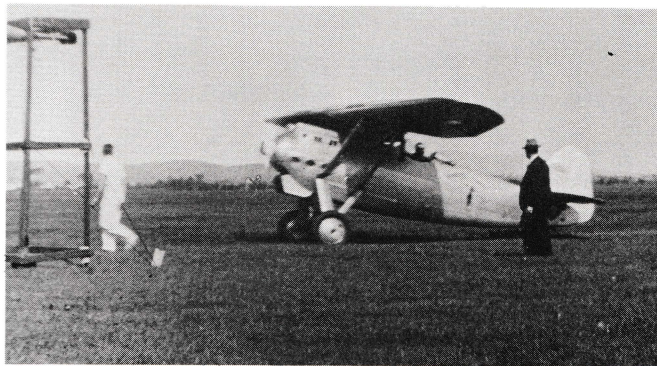
#### MEMBER COMMENT

We encourage members to write us on Journal articles, to add a date, correct a name or suggest an additional source of research. All items of historic importance will be published in the interests of accuracy and detail.



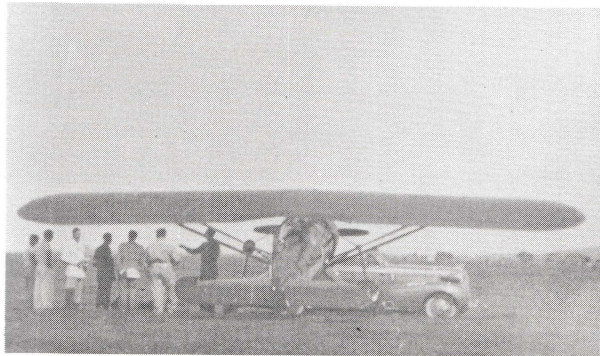


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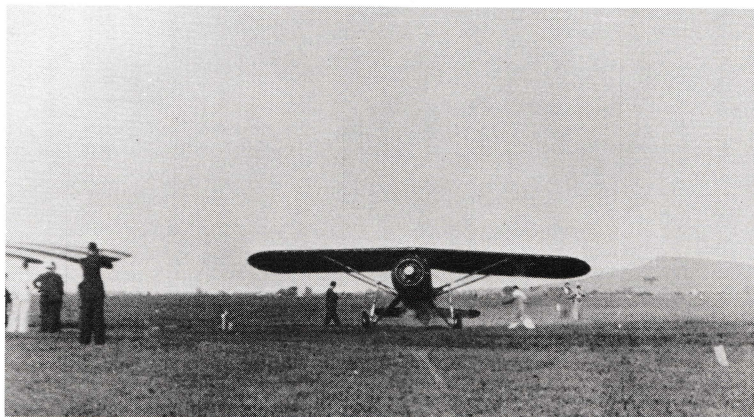


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## FOREIGN VISITORS



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1 & 2 A Dewoitine D 530 visiting St. Hubert' Quebec in 1937. This machine is thought to have been the personal aerobatic aircraft of Marcel Doret and now to be in the Musee de l'air, Meudon, France.

3 & 4 Another French parasol single-seater believed to be a Morane-Saulnier design, again at St. Hubert in 1937.

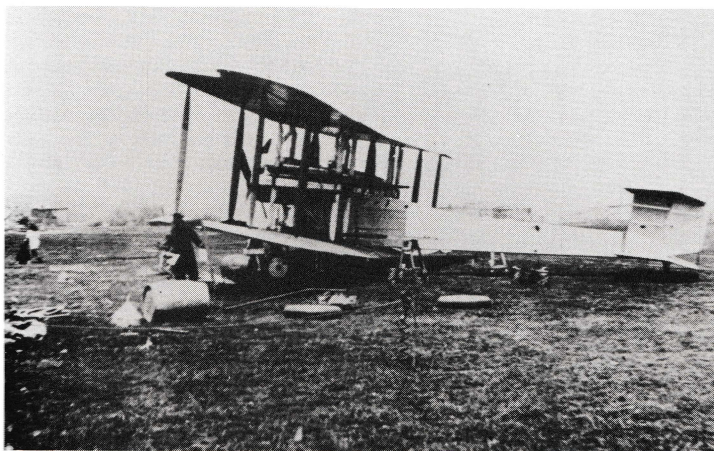
5 The Short 'Empire Class' flying boat 'Cabot' (G-AFCU) at Boucherville, Quebec, in 1939.

6 & 7 Picnicers watch Alcock and Brown's Vickers Vimy being assembled at Harbour Grace, Newfoundland, in 1919.

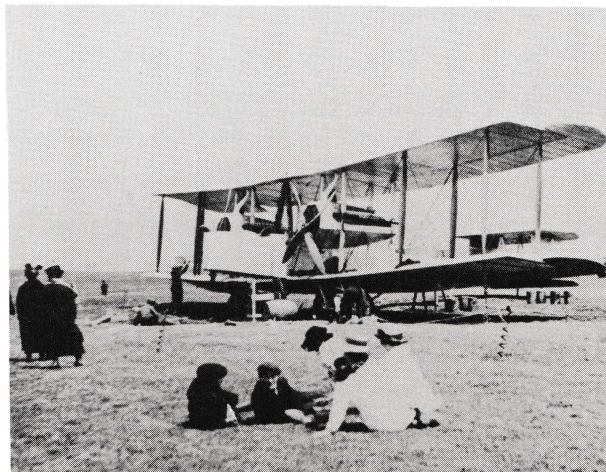


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## BERT JOSS Album PAGE



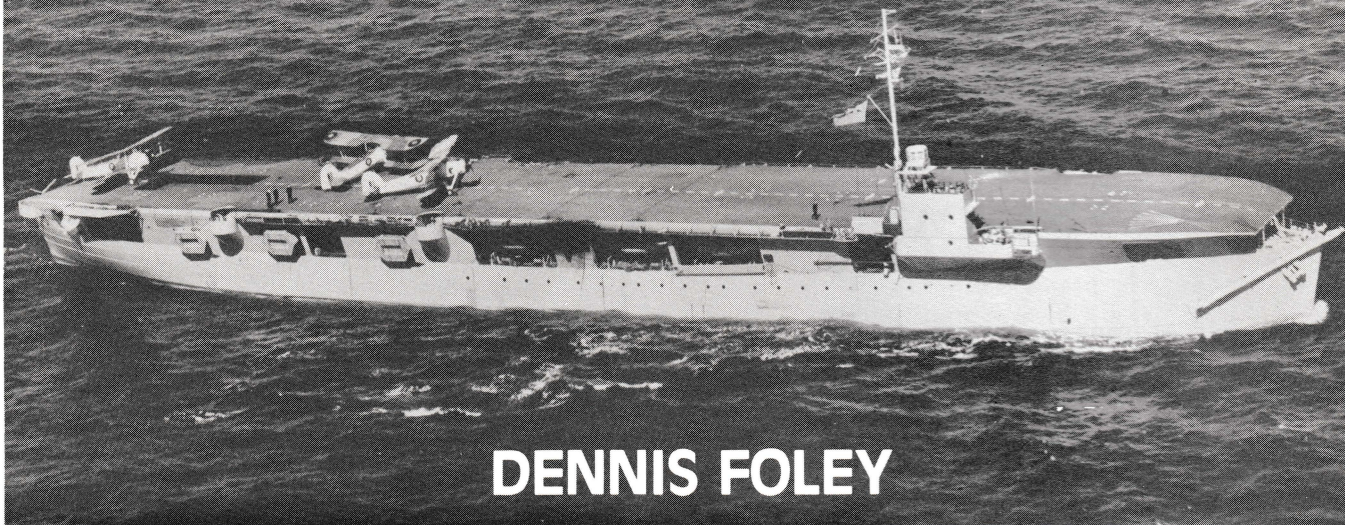
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# LITTLE MAC



## DENNIS FOLEY

ONE OF THE MERCHANT AIRCRAFT CARRIERS OR "LITTLE MAC's" OF THE ROYAL NAVY

After perusing the history of Canadian Naval Aviation and the history of the Fleet Air Arm, it is noted that little is said about the role of the Naval Air Station, Dartmouth, Nova Scotia, during WW II. This is probably due to the fact that it was small, as far as the Royal Navy was concerned, and not RCN, as far as the Royal Canadian Navy was concerned.

One of the most important roles the base played was from May 1943 to June 1945, when it was the base for the Merchant Aircraft Carriers on the Atlantic convoy run. The MAC's, as they were called, sailed under the Red Ensign, and consisted of grain ships and tankers. The grain ships (nicknamed Green Ships) carried four Swordfish aircraft, and had a small hangar. The tankers (nicknamed Black Ships) carried three Swordfish in the deck park, as they were not equipped with a hangar. The Fleet Air Arm personnel consisted of an Air Staff Officer, who ran the Air Department and advised the Master of the MAC on Air Operations, and the Flight Commander, Pilots, Observer, TAG's plus the maintenance personnel.

Life aboard a MAC was not always a bowl of cherries, some MAC's were dry, and this did not go down well with the FAA aircrews. In some, the messing was below Navy standards, and sometimes the Navy and the Merchant personnel did not get along. Of course, on the other hand, many of the MAC's Officers went out of their way to make the Navy personnel welcome and create a happy ship. The aircrews were drawn from 836, 840 and 860 (Royal Netherlands Navy) squadrons, and their home base was at Maydown, North Ireland.

The first MAC to arrive at Halifax in May 1943, was the Empire MacAlpine, a grain ship. When the aircraft landed at Dartmouth, the aircrew caused a few uplifted eyebrows; they were wearing battle dress with Merchant Navy insignia, white submarine sweaters, sea boots, berets with Merchant Navy badges, large handlebar moustaches and no beards. The Flight Commander was Lieutenant the Honourable Ransford Slater, RN, who advised all and sundry that they were from a merchant vessel and therefore they were Merchant Navy Officers. Enough to say that shortly thereafter, the usual rig of the day was assumed. The aircrew of the Empire MacAlpine were frequent visitors to Dartmouth during the convoy runs and had many a tall tale to tell. Lieutenant Slater started out on one patrol and, just after getting airborne, ran into heavy fog. He did a quick about turn, saw the carrier in front of him bow on, came in and made a landing over the bow. As he landed

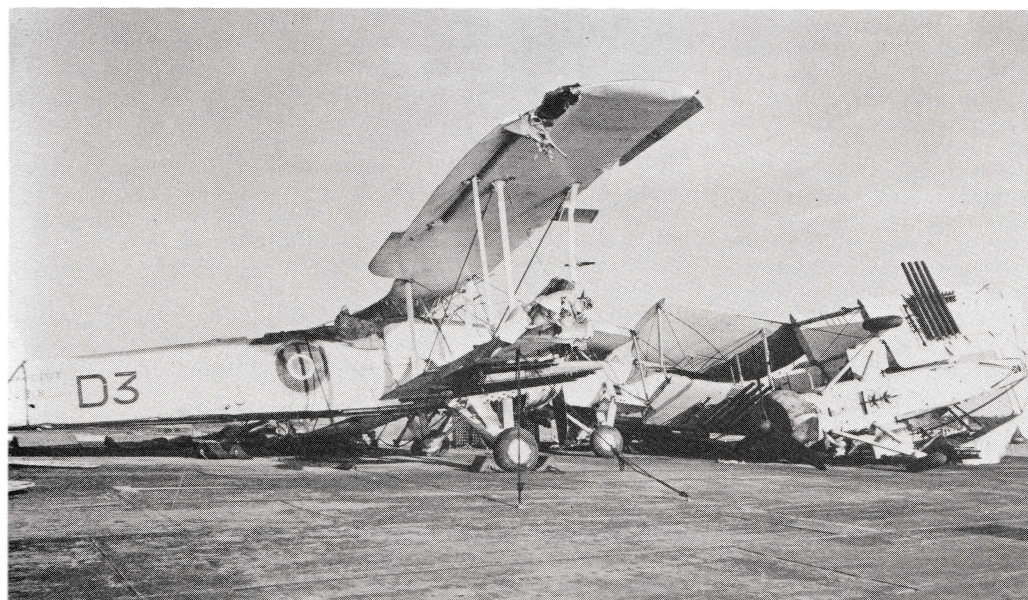
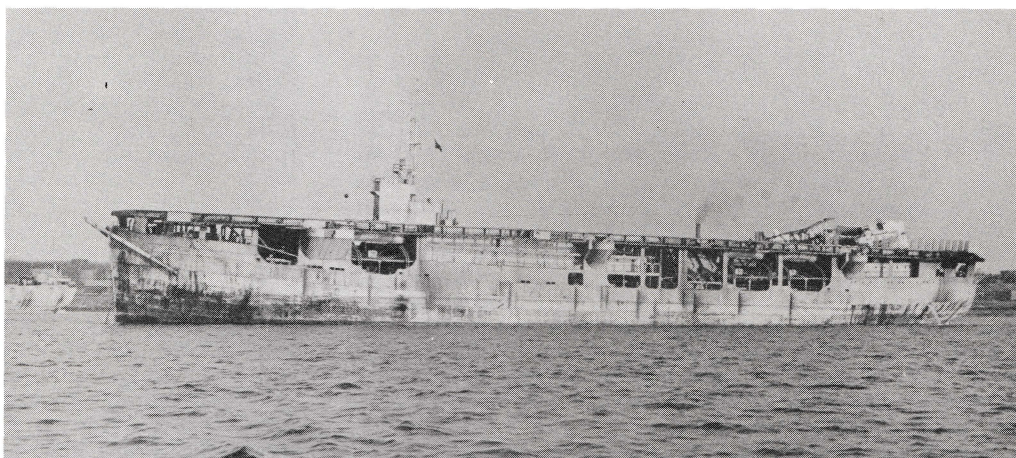
the carrier again was enveloped in thick fog which prevailed for several hours. Lieutenant Slater was later killed in an air accident at Maydown. In another incident, an aircraft was patrolling astern of the convoy. Gale force winds sprang up and the slow Swordfish was unable to make it back to the carrier. It is assumed that they flew until they were out of fuel and ditched, since no trace was found. Another crew on patrol hit fog on returning to the carrier. They picked up the convoy on their radar and, when fairly close to it, went down to wavetop height. As luck would have it, they sighted the fog buoy the carrier was trailing. You might say they flew up it, and landed on.

Dartmouth was set up with its own DF and radio station. This was due to the RN ships and aircraft operating on different frequencies than the RCAF stations and local control frequencies. The station and the MAC air units operated from the RN code and call signs of the day. If I remember correctly, the secret document was published monthly. Once the MAC was within reach of Dartmouth and ready to fly ashore, they came under the control of the RN section. Usually we advised them of the weather in the area and gave them the OK to proceed. Depending on their position, we would offer to meet them 25 to 50 miles up the coast if they had not been into Dartmouth before. They could not use their radio to contact any shore installation other than the RN section, due to the previously mentioned frequency problem. This offer was made as we knew there could be problems finding Dartmouth. This may sound strange to those that know the area, but arriving from the seaward, in sometimes not the best of conditions, Dartmouth was not the easiest place to find on the coast. One unit missed Dartmouth and ended up circling over Mill Village near Liton. After calling on the radio and describing the area, we were pretty sure that they were south and told them to crawl the coast up north, and sent out an aircraft to meet them. On one occasion when waiting for a MAC to start radio watch, after calling them several times we heard a ship and aircraft talking. They were not using their call signs of the day and, although they answered us, they did not make much sense. Suddenly the MAC we were calling came booming in and blocked out the other ship's transmission. When talking to the aircrew after they had landed, they claimed we had not been working with them as they had been late getting on the air. Several weeks later a MAC aircrew were telling us about a radio transmission they received when they were just off the coast of Ireland, and whoever was talking to them did not use the correct



## LITTLE MAC PHOTOS

A MAC (a converted tanker — 'Black Ship') anchored in Halifax harbour off the Imperial Oil wharf.



Swordfish aircraft aboard the MAC shown above. The legend on D3 reads 'MERCHANT NAVY LS 21S'.

photos via the Author.

Another look at the same Swordfish, badly damaged when one of them broke loose in a gale.





call signs of the day. They wondered as to the possibility of a U-boat playing tricks. Not a bad distance for a fifteen-watt transmitter, from off the coast of Ireland to Dartmouth. The members of 860 (Royal Netherlands Navy) Sqdn. were also frequent visitors to Dartmouth. Most of the aircrew came from the Dutch East Indies where they had operated with the Netherlands Navy; others were ex-members of KLM.

One of the problems of operating from such a short deck was taking off and landing with a load and little wind over the deck. The average MAC usually did about 13 knots. The first modification was a fine, fixed-pitch propeller. This gave the Swordfish a good takeoff, but it cut the cruising speed to about 75 knots. The second modification was the addition of a 1500-weight cable which was attached to the jacking points of the landing gear. The cable had enough slack so it cleared the deck and, when the aircraft was dropped on the deck as was often the case, it prevented the landing gear from going "splat".

The damage rate of the aircraft was fairly high, especially those kept in the deck park. Apart from the normal problems of being exposed on the deck in all weather, the heavy seas also caused much damage. In one instance, an aircraft in the deck park broke loose in a storm and played tag with the other two. When the carrier reached Halifax, the aircraft were a shambles. Replacement Swordfish were provided by Dartmouth. These were shipped from the United Kingdom in two or three large crates, partially assembled. The base assembled the aircraft, tested them, and kept them up to the latest aircraft modification. It was not unusual for a MAC to leave with all new aircraft, not necessarily because of prangs, but due to wear and tear on the Atlantic run, especially those in deck parks. No aircraft allotment from Admiralty was required; aircraft were exchanged and their serial numbers signalled to Admiralty. The exchange aircraft were refurbished, if possible, and put back in the pipeline.

The aircraft that were assembled for the MAC's often had their problems. This was mainly due to the standard of personnel where the aircraft were being prepared for shipment. Such things as lines being cut instead of disconnected, batteries not removed or sealed, or improper engine preparation. These aircraft in crates usually came

over as deck cargo and were subject to much heavy weather. On one test flight, after making a steep turn the control column seemed to be stuck and two hands were needed to center it. After landing and checking everything out, it jammed again. We ended up taking out the dinghy compartment in the upper centre section. There in the aileron control connection was an incorrect length bolt which was caught on the centre section drag wire. From the score marks on the wire, it was not the first time that this had happened. On another test, the pilot was sure he could hear an intermittent noise in the engine. After a couple of flights nothing could be pinpointed, so the rocker gear and cylinders were checked. When the rocker gear was removed from the bottom cylinder, the tie rod fell out. It was broken in the threaded portion up in the housing. It apparently had been incorrectly installed. Spares were a problem - many were lost due to sinkings, and many due to human error. After waiting for some engine spares for two months, our shipment arrived. On opening them up, we found they were all Merlin spares and utterly useless. There were many innovations when it came to repairs and lack of spares. In one case, when no spare wings or spare ribs were available the fabric was removed from the wing and a large sheet of aluminum was riveted over the damaged section and strengtheners added, then the fabric was replaced. The Section's job was to let the MAC aircrews spend their time ashore or whatever, and to have the aircraft ready the day before the convoy date so that the aircrew could test and accept them. Flying an open cockpit Swordfish in winter around Nova Scotia or over the Atlantic leaves something to be desired, and many local modifications were made until ultimately a covered cockpit was introduced.

The Empire MacAlpine ended the era of MAC ships when the last flight was made in June 1945.

No higher praise could be given to the MAC air personnel than the fact that, according to records, no U-boats scored on any convoy with one or more MAC ships in the convoy.

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(Continued from Page 117)

practice of economics and political science, hoping to gain an understanding of the complexities leading to the Arrow cancellation.

The author explains in the preface that her book is based on a study undertaken by her, and completed on 30 April 1979. It soon becomes clear to the reader that she is bitter. Not only about the "absurd and unbelievable" event which occurred on 20 February 1959, but also because of the "fundamental Canadian conditions", which she feels were contributory to that result. It is these "fundamental Canadian conditions" that the author dwells on throughout the book. She emphatically develops the thesis that influences from beyond Canada's borders have determined, and continue to determine Canada's defence, industrial and commercial decisions, to the detriment of Canada. Industrial research and development programmes are a Canadian no-no. She further contends that this is with the knowing consent of Canadians, especially some of those in the media, and those with the power to change all this by complementing more enlightened financial policies. The plethora of evidence given adds up to a convincing, but depressing argument.

The author provides all the industry-related detail that one would expect to see in a book concerning the Arrow, from the formation of A. V. Roe Canada, through the Jetliner project, the CF-100, and the Arrow project itself. Development of the Orenda and Iroquois gas turbines is amply covered.

The faulty rationalization of the bomber threat existing in 1958-59 and into the future, comes under critical scrutiny. The performance of the Arrow aircraft, Marks I and II, is weighed against the Arrow's contemporaries such as Bomarc and foreign-manufactured interceptors. Comparative

features and performance of the five candidates in the new Canadian fighter aircraft competition are discussed. The author wryly notes that none of these machines had yet reached the predicted speed of the Mark II Arrow.

This reviewer did not detect any serious errors in the text. The many black-and-white photos and illustrations add much interest. Bitterness and cynicism are eloquently expressed in the author's choice of two double-page photos and their locations in the book. The one that leaps at the viewer when the first page is turned is a nose-on, close-up of Arrow number one, loaded with promise. The second, on the final two pages, shows the hapless Arrows being destroyed. Six helpful appendices are included, as is a comprehensive index.

Kay Shaw has written a fine book, of interest to all Arrow buffs. Perhaps it is weighted a bit heavily with forays into the field of economics and technology, but the reader will probably gain new knowledge of Canadian government and Canadian financial institution insensitivity because of this. It is encouraging to note that the Ontario Arts Council assisted in the publication of this book. This reviewer recommends *There never was an Arrow* to all.

William L. Morgan

#### THE ARROW by James Dow

James Lorimer & Co., Egerton Ryerson Memorial Bldg.  
35 Britain St., Toronto, Ont. M5A 1R7  
160 pages, illustrated, \$15.95

James Dow was only thirteen years old when the Avro Arrow was cancelled. Probably this is why, more than twenty years later he was able to sit down and produce

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with complete objectivity, what in his own words he describes as "an attempt to find contemporary relevance in the short history of A. V. Roe Canada Limited from its wartime origins to the cancellation of the Arrow. It is an attempt to learn something of how Canada is governed, how decisions involving hundreds of millions of dollars are made, how complex technology is amassed and how a company can spring from nothing to become an industrial giant in twelve years."

To some readers, *The Arrow* will be a disappointment. Contrary to the promise of its title, the book is in no way a treatise on Arrow aircraft engineering, technical detail or performance. These areas have very wisely been left to the specialists. Instead, the author has, in pursuing his above stated goal, painstakingly researched and written up the rise and fall of A. V. Roe Canada.

In the first chapter, a review of Canada's wartime aircraft industry is presented, depicting the rise in status of Canadian aircraft workers to the level which convinced Roy Dobson and cabinet minister C. D. Howe in 1945, that the talent required to establish a viable Canadian peacetime aircraft industry existed. Then, under chapter headings of "The Jetliner", "Continental Defence and the Canuck" and "The Arrow", the author goes into the political, corporate and international climates and events which impinged upon A. V. Roe, Canada's drive to reach the pinnacle of excellence in aircraft design and production. The details, including personality profiles of the leading characters, Canada's approach to national defence, major technical problems, written communications and negotiating ploys are laid out in what to this reviewer, is an interest-capturing way.

In striving for his objective, the author recognized that it was necessary to highlight the impact of a weighty commodity - money. Throughout, cost and its escalation and occasional wilful distortion is maintained in perspective. Certain leading contractual terms and conditions are also addressed. It may be misleading however, to those not fully conversant, to read of "cost plus fee", in Canadian government contracts. Readers should be aware that such contracts (post-WW II) invariably included provision whereby maximum fee or profit was achieved at a pre-negotiated cost level, beyond which no further fee was paid.

The remaining two chapters, titled "The Cancellation" and "Conclusion", bring out the turmoil between government and the executives of A. V. Roe Canada, in the face of mounting costs, technical uncertainties, changing defence policies and political expediencies. Many readers will be surprised to learn who did and who did not favour cancellation.

A total of sixteen black and white photos are included. More would have been welcome, however, these chosen by the author obviously were selected for their relevance. Copious notes are provided, identifying sources of data. One appendix is given, showing an organization chart of the DND chain of command, from the minister to the RCAF Arrow project office. A helpful, comprehensive index is

furnished.

It was refreshing for this reviewer to read *The Arrow*, because of the clarity of style, and objectivity in its approach to a subject which has traditionally been discussed within the framework of emotion. Not a large book and fairly expensive, but a book well worth reading.

William L. Morgan

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## Cover Story

This issue of the Journal is graced with another cover by Canada's leading aviation artist, R. W. Bradford. It depicts Avro's famous Arrow in a vertical climb as viewed from a following aircraft. This painting is historic and unique, for it is one of a series that launched Bob into the specialty for which he is now famous - aviation art.

Bob had been working for years as a technical illustrator at Avro and de Havilland with a brand of professionalism that soon caught the attention of everyone in the trade. One of those who paid close attention was R. G. "Bob" Halford, then Editor of the monthly magazine *Aircraft*, published by Monetary Times. Halford ran a 'special' each March highlighting Canada's aircraft industry and in 1954, asked Bob to help with an artist's impression of Canadair's new maritime proposal, the Argus. Another project was a three-view of the Silver Dart and these drawings were so successful that *Aircraft* commissioned Bradford to do a series on current Canadian production types. The March 1956 issue of *Aircraft* is now a collector's item for it contains 10 full page reproductions of Bob's paintings. In March 1958, the list was enlarged to include four more, including the Arrow, and the entire collection was produced for framing by Monetary Times.

By now, the R. W. Bradford signature was becoming well known for a unique blend of technical accuracy and artistic excellence. Other assignments followed, and soon K. M. "Ken" Molson - then curator of the aviation museum in Ottawa - commissioned Bob's talents and directed them toward aviation history. They made a good team, and together turned out the now-famous series of paintings on Canadian aviation highlights. These have brought Bob Bradford awards and recognition from all quarters, and it would be difficult to total the number of paintings he has completed since that start in 1954.

His most recent honour has been the painting of the "Canadian Flying Boats" series of stamps which is now in wide circulation throughout the post office system. Bob Bradford's present position as curator of the National Aeronautical Collection provides the other outlet for his life-long enthusiasm for aviation. CAHS thanks Bob Halford for the use of this early sample of the Bradford art style and the artist himself, for this, his 14th cover on a CAHS Journal.

F. W. Hotson

## THIRTEEN YEARS OF TORONTO CHAPTER "FLYPAST" NOW AVAILABLE

The Toronto Chapter's newsletter, the 'Flypast', has been published almost since the Society's inception and has provided members in the Toronto area with not only notification of pending programmes but concise reports of past meetings, usually synopsis of speakers' presentations. Since the Chapter has hosted so many distinguished guests, discoursing on all phases of aviation past and present, the record afforded by the collected Flypast is a valuable one. Unfortunately, only a few long-time chapter members have had the opportunity to build such a collection.

Happily, thirteen years of the Flypast (some 130 issues) are now available as five bound books through the efforts of Bill Budachs, presently Editor of the Flypast and the person largely responsible for its polished appearance. Many of the early issues had to be completely reconstructed by Mr. Budachs.

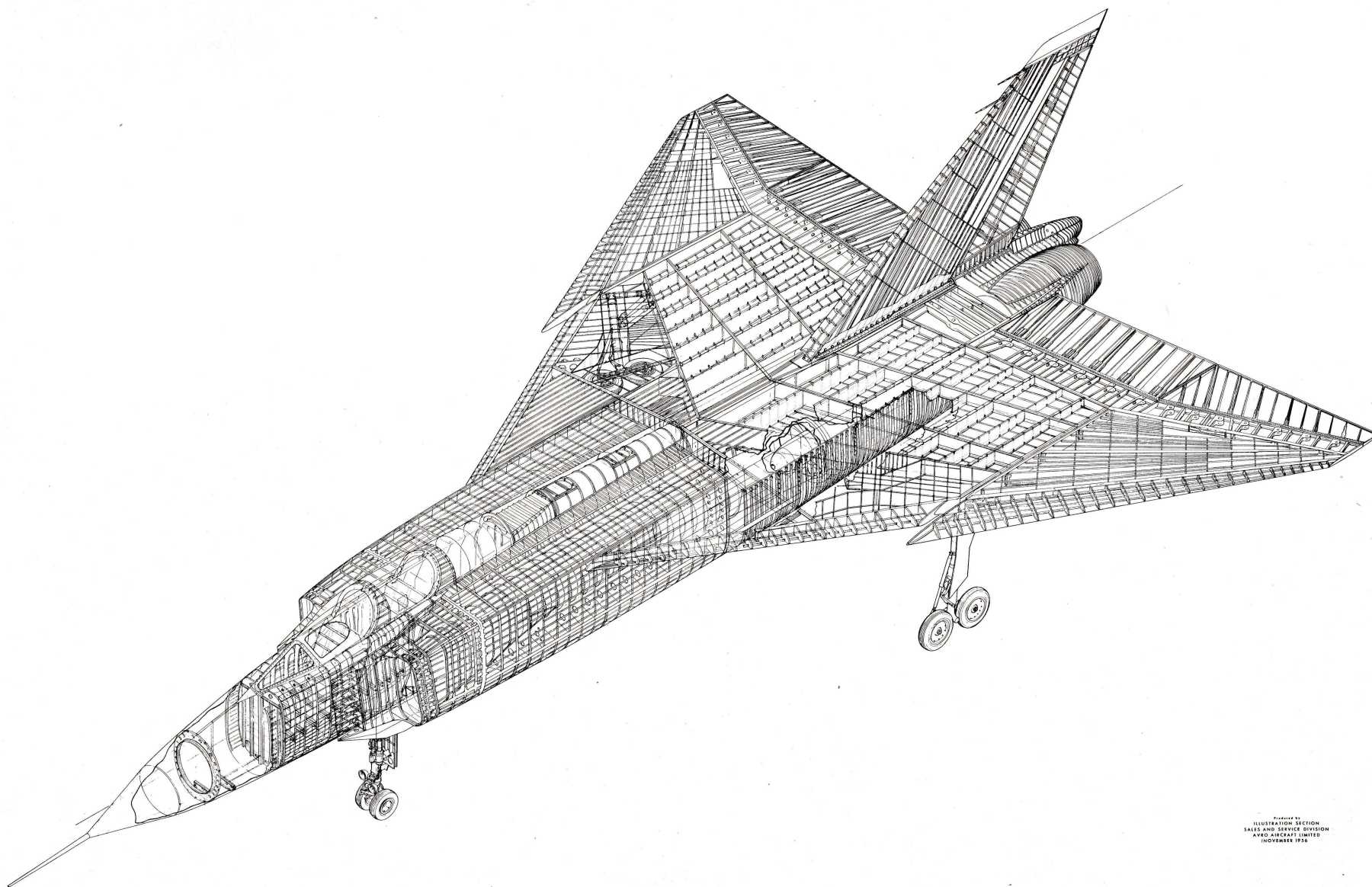
They are available as follows:

|                                     |         |
|-------------------------------------|---------|
| Book 1, comprising Vol. 1, 2, 3:    | \$3.25  |
| Book 2, comprising Vol. 4, 5, 6:    | 4.00    |
| Book 3, comprising Vol. 7, 8, 9:    | 3.25    |
| Book 4, comprising Vol. 10, 11, 12: | 3.25    |
| Book 5, Vol. 13:                    | 1.25    |
| Complete set, by pickup             | \$15.00 |
| Packing for postal delivery         | 1.00    |
| Postage                             | ?       |
| Total                               | ?       |

Postage cannot be quoted, because it varies with distance and class. Check at your local Post Office what the rate is between Toronto and your address in the class (first class or parcel) you wish to be used, for a package weighing over one and under one and a half kilogram, and add that amount. Make your cheque payable personally to V. Budachs who has underwritten the costs of preparing the series.

W. J. Wheeler





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NOVEMBER 1958

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