

# AB INITIO TO WORLD CLASS

## CANADA'S BID AS A JET ENGINE LEADER

Paul B. Dilworth

*From the Summer of '42, the Author Was Involved  
With the Development of Jet Power For Aircraft*

**T**he first part of this article is intended as a tribute to some great and well known friends and mentors; their influence and support guided me into a career in aeronautics. I will follow it with an account of the origins of Canada's introduction to jet engine technology and the establishment of Canada's first jet engine test facility during the Second World War.

The second part is an account of the organization and early stages of Canadian jet engine design, development and production. This commenced with Turbo Research Ltd which

evolved through formation of the A. V. Roe Canada Ltd Gas Turbine Engineering Division into what became Orenda Engine Ltd and today's Orenda Aerospace Inc.

### PART ONE

**I**n the summer of 1928 my great friend and mentor, Frank Trethewey, moored his new float-equipped Cirrus Moth G-CANA on floats a few yards away from the camp which he had set up for himself and his wife, Betty (who was, incidentally, my Godmother). This camp was on Dunelg Island in Peninsula Lake, near

Huntsville, Ontario. Our family cottage, "Come Hither," lay on the south shore, a couple of miles to the west.

Frank was the elder son of W. G. Trethewey who discovered and staked the very rich Trethewey silver mine at Cobalt, Ontario about 1905. I recently learned, from Donald F. Parrott, CAHS stalwart and author of *The Red Lake Gold Mines of Ontario*, that Will Trethewey had also staked another famous mine, the "Coniagus" which, shortly thereafter, he sold for a modest \$400,000. Later, in 1924, Will Trethewey purchased a farm at Mount Dennis which subsequently became

the site of DeLesseps Airfield and later, in 1927, the first home of de Havilland Canada. One of DHC's first two employees was George Mickleborough, Betty Trethewey's brother. George served as DH Canada's able chief financial officer for many years. He and companion Geoff O'Brien also made history in a pioneering flight to the west in DH Puss Moth CF-AGO.

At Penlake, Frank was taking his first flying lessons from his great friend, Phillip C. Garratt. Phil, who needs no introduction to Canada's aero fraternity, also became a great friend and mentor to me. He had a summer place at Baysville on Lake of Bays, just

a few miles away. Phil flew Frank's new Cirrus Moth floatplane over to Penlake and give him lessons. It was my good fortune to go up on my first aeroplane ride with Phil at the controls. I was 13. That experience, enhanced by the magnificent panoramic aerial view of the beautiful Muskoka country, with its myriad lakes and lushly treed hills, made a deep and lasting impression. Like countless other youngsters before me, I became firmly hooked on aeroplanes and flying. Regrettably, I no longer have any photos of Frank or Phil of that era, nor of that lovely little Cirrus Moth. Engines had already fascinated me and I learned much from tinkering with that of our family motor boat. This, to my parents' frustration, I was wont to haul out by block and tackle onto the boathouse floor, dismantle, re-fit and rebuild to satisfy my curiosity as to how engines were constructed. Doubtless this put me on the road to becoming a Mechanical Engineer.

the Club's very able and respected aero engineer.

My initial flying instruction by O'B was in G-CAJU, named "The Sir Charles Wakefield". It was one of Canada's first batch of Cirrus Moths donated to Canadian Flying Clubs by its namesake.

Although by no means a record, I congratulated myself that after just under three hours of dual instruction O'B said to me, "Paul, you're ready to solo. Come out tomorrow and I'll see you off".

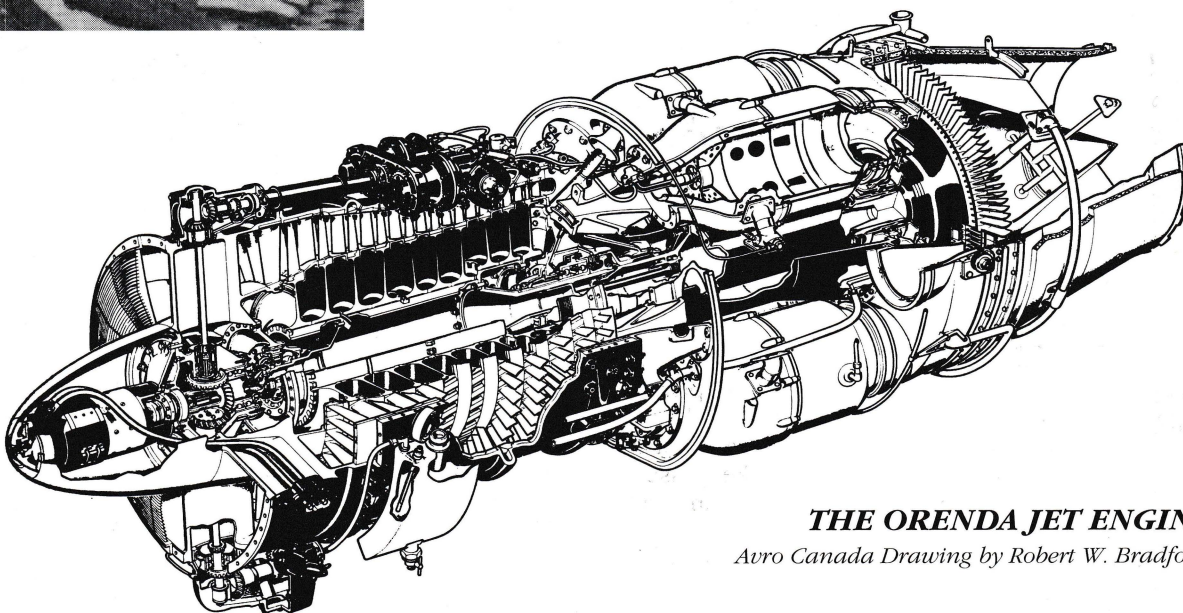
The next day I arrived with the customary nervous gut, all ready for my first solo. It was not to be. Don Long had yanked 'JU out of service. It was slated to have its Cirrus engine replaced by a DH Gipsy. This led to O'B taking me for further dual instruction on one of the Club's Gipsy Moths, CF-ABK. For me 'BK proved to be a most intractable substitute for 'JU. It was just as easy to take off and fly but very different to land. 'JU, with its light weight wooden fuselage, apparently thought of itself as a glider. It would float along happily forever when one was attempting to coax it to a stall on landing. In contrast, and to my surprise, (and O'B's displeasure), 'BK was all too ready to sit down at the earliest opportunity. It took me a further hour's instruction to master 'BK's "vice."

To the great sorrow of all who knew him, O'B was later killed in a flying accident at the Club, along with a student pilot. He was very much

**Opposite, top insert:** the Chinook, Canada's first jet engine. **Opposite, lower insert:** the author addresses Avro employees at a fifth anniversary dance. **Heading:** the mighty Orenda Iroquois. CLIFF HECKEL. **Below:** Sir Frank Whittle (L) on a visit to Canada discusses a jet engine component with Winnett Boyd. **Bottom:** a Robert Bradford cutaway of the highly successful Canadian-designed Orenda. Close inspection of the tailpipe insulation will reveal the artist's name, R. W. Bradford, highly stylized. ALL ILLUSTRATIONS AVRO CANADA

#### LEARNING TO FLY

In the summer of 1933, before starting University, I joined the Toronto Flying Club at Downsview. Here I met my instructor J. T. (Jimmy) O'Brien-Saint, affectionately called "OB" by all of his students and associates, and the late Don Long, early stalwart of the Canadian Aviation Historical Society (after whom the *Don Long Award* is named). He was, at that time,



#### THE ORENDA JET ENGINE

Avro Canada Drawing by Robert W. Bradford

missed by all who had known him.

We were fortunate to get two fine successors, J. R. K. (Ken) Main, and later, Ray Goodwin. The latter chewed me out over the intercom with "What the hell are you doing?" when I took too long in selecting a field during a forced landing check-out.

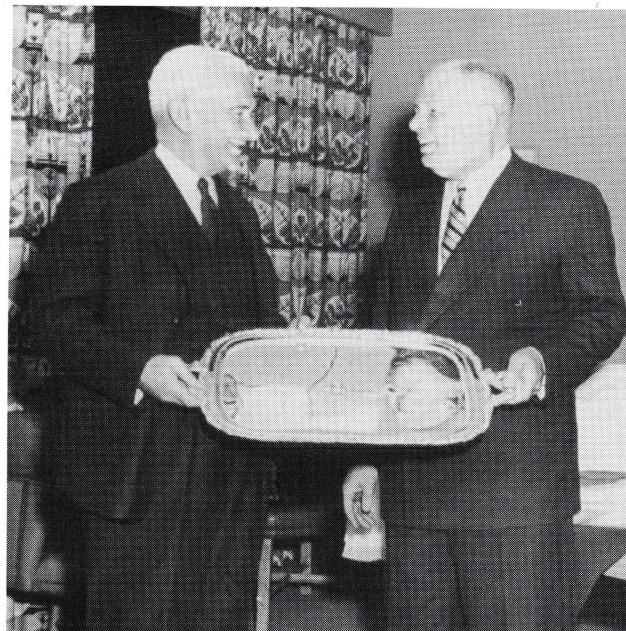
I went on to get my Private Pilot's license and, in 1934, even managed to win the Club's Ellis Trophy for flying proficiency. Later, when studying Mechanical Engineering at The University of Toronto, the University Flying Club was resurrected from that formed during the first world war. This new club's formation was at the initiative of our dearly loved and highly respected Professor T. R. (Tommy) Loudon. I had the honour of becoming one of its Charter Members. Regrettably, one of these, H. W. Kerby, who later joined the RCAF, was killed in action over Hamburg in 1944. [A12]

During what turned out to be a severely foreshortened flying career, I was able to get a few hours in on Moths, a Taylor Cub and the Club's Tiger Moth, CF-APL. In the latter, I had the pleasure of taking the late "Terk" Bayly, a fraternity brother, for his first aeroplane ride in 1937. Terk later made history as a member and ultimately C/O of RCAF No 413 "Cat" squadron, based on Ceylon during World War II. He capped this off by becoming, Deputy Minister of the Department of Lands and Forests in the Ontario Government. As a side line, Terk became one of Canada's leading glider pilots. Up to the time of his sudden and unexpected death in June 1998, at age 80, Terk served as Chief Instructor of the Meaford Soaring Club where, in 1996, he took me for my first glider flight. Terk's story on 413 Squadron in his book *Cats* is must reading for all interested in RCAF WWII lore.

Shortly after, No 10 *City of Toronto* Auxiliary Squadron RCAF was formed, circa 1935, I was invited by Frank Trethewey, one of its founding officers, to enlist. Others were Phil Garratt, the squadron's C/O; Dwight Ross, Adjutant. and Wilf Curtis. Later, as the RCAF's Chief of Air Staff, Wilf became a great friend and supporter of our jet engine development work at A.V. Roe Canada and eventually the company's Chairman. Enlist I did. Unfortunately, after having been accepted, it was discovered that I would require a new medical. This was carried out by the same doctor who had earlier examined me for my

Private Pilot's License, Dr. Easson Brown. This time, to my great dismay, I was judged medically unfit for flying duties by reason of a heart arrhythmia.

**Right:** Frank L. Trethewey (L) presents Phillip C. Garratt with a silver tray on the occasion of his 50th anniversary as an active pilot. F. HOTSON **Below:** the second HQ building of de Havilland Canada at the Trethewey Farm, Mount Dennis, Ontario. The first was a Moth shipping crate. DORIS MICKELBOROUGH. **Bottom:** "Sir Charles Wakefield" (G-CAJU) after conversion as a Gipsy Moth. F. HOTSON. **Opposite, top:** G-CAJU as a Cirrus Moth. The author took ab initio instruction in 'JU in 1933. F. DILLING. **Opposite, bottom:** Toronto Flying Club instructor J. T. O'Brian-Saint in one of the Club's Moths about 1931. F. HOTSON.



Evidently the RCAF's medical requirements were more stringent than those of the Department of Transport at that time. Thus ended the shortest of all Short Service Commissions on record. In all probability this saved me from a similar fate to that of Kirby. In addition, my private license was cancelled. This was later re-instated but, with an endorsement rendering me ineligible to take passengers. As a result I lost interest in flying as a pilot. In retrospect I overlooked the option of flying gliders, much to my present regret.

My undergraduate education at University of Toronto was completed in the spring of 1939 with a degree in Mechanical Engineering. Two of my

classmates, Winnett Boyd and Herb Ronson, are involved in the ensuing story.

## THE ROAD TO CANADIAN ENGINE DESIGN AND DEVELOPMENT

With enthusiastic support, once again, from Tommy Loudon, Herb joined me immediately after graduation in successive visits to Pratt & Whitney Canada, and to the Lycoming and Jacobs engine companies in the USA. We made a determined but unsuccessful attempt to interest them in initiating aero engine design and development in Canada.

Jim Young, President of Pratt & Whitney Canada, at the time, said that



*"Jim Young,  
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we were 25 years ahead of schedule. With the western world struggling out of the Great Depression and World War II threatening to break out, his judgement appeared to have much merit. Later events, however, proved his prognosis rather pessimistic.

Within two years, at Canadian Car and Foundry in Montreal, a seven-

cylinder air-cooled radial piston engine, the *Maple Leaf*, was designed, built and tested. In December 1945, but six years from Jim Young's prognosis, jet engine design was initiated in Toronto at Turbo Research Ltd, out of which initiative came the *Chinook*, *Orenda* and later the *Iroquois* turbojet engines. Pratt & Whitney Canada initiated their first turbine engine design study, the DS-3J in 1957, still some seven years short of Jim Young's 25 year forecast. P&W Canada proved to be the tortoise running against the Orenda hare. They built a solid international business in designing, making and marketing a world leading stable of small aero gas-turbine engines, outliving the meteoric rise and fall, under the Diefenbaker axe, of the Orenda company's highly successful but short lived challenge to world leadership in large military jet engines.

Herb Ronson's path and mine then separated. He joined the Ford Motor Company and was later assigned to the wartime Canadian military motor transport service. Our paths again crossed in London, England, in 1943. Winn joined the Canadian Navy and was seconded to the engineering department of ALCOA. I joined the Engine Laboratory (now The Propulsion Laboratory) of the National Research Council at Ottawa under M. S. (Mac) Kuhring. This post I had accepted just before learning that through his first world war friend, Bill Lappin at Rolls Royce, Frank Trethewey had secured a job offer for me to join Rolls at Derby. To pass up this opportunity was difficult in the extreme. In addition to great reluctance to decline the NRC offer, which I had accepted, I had become engaged to be married. The added prospect of taking "Ollie" (Olive), my prospective bride, to what then appeared to be a certainty of life in wartime England put finis to this opportunity. I decided to stay the course with the job at NRC, hoping, at some future time, to find an opportunity to work on aero engine development in Canada.

Under Mac Kuhring, one of this world's real gents, and a great boss to work for, an early assignment was supervision of an official type test of the above mentioned Maple Leaf engine at CANCAR. Unfortunately the engine suffered a severe mechanical failure early in the test and the project was evidently abandoned. Although it has not been too surprising to be proven wrong, I believed, until recently, that this project stood as the first serious effort in Canada at aero engine design and development. On doing some recent research, however, I found reference to Ken Molson having unearthed information on an aero gas turbine engine designed and built by L. E. Lasley at Fort William, Ontario, as far back as 1930. The fate of the Lasley engine remains to be revealed. It was written up in the June '32 issue of *Canadian Aviation* magazine.

In due course, Mac gave me wide latitude of action with other assignments on a variety of experimental projects and tests on several other aero piston engines, including a new Bristol sleeve-valve engine, the Perseus. Later I was assigned to design work on the new Engine Laboratory and its test gear for construction at the new Montreal Road Mechanical Engineering Division Laboratories complex under J. H. Parkin, its Director. At the new

Engine Lab I was finishing work, in the fall of 1942, on an experimental flame-damping system for the Wright Turbo-Cyclone engines which powered the Boeing B-17 bomber. This was aimed at rendering them usable for night time bombing operations. Although the experiment was successful it was never implemented. A decision to assign the B-17s to daylight bombing operations rendered flame damping unnecessary.

At this juncture, on recommendation from Mac, the Director assigned me to a new mission. It became the opening which led to my second engineering career, namely jet engine development.

## BRITISH JET ENGINE DEVELOPMENT

During the winter of 1941-42, Mac Kuhring and Dr. J. J. (Johnny) Green, then head of the NRC Aerodynamics Laboratory, were sent on a scientific mission to the UK. Their assignment was a broad brush study and report on British wartime aeronautical science and technology. This was conducted at the height of the Blitz which they managed to survive.

Concurrently, Air Marshall Breadner, the RCAF's Chief of Staff, had assigned A/V/M Steadman, Director of Research for the RCAF, to investigate development in the UK of a radically new aero engine. This was in pursuit of the RCAF's search for a solution to the chronic shortage of engines from the UK and USA for Canada's wartime aircraft production.

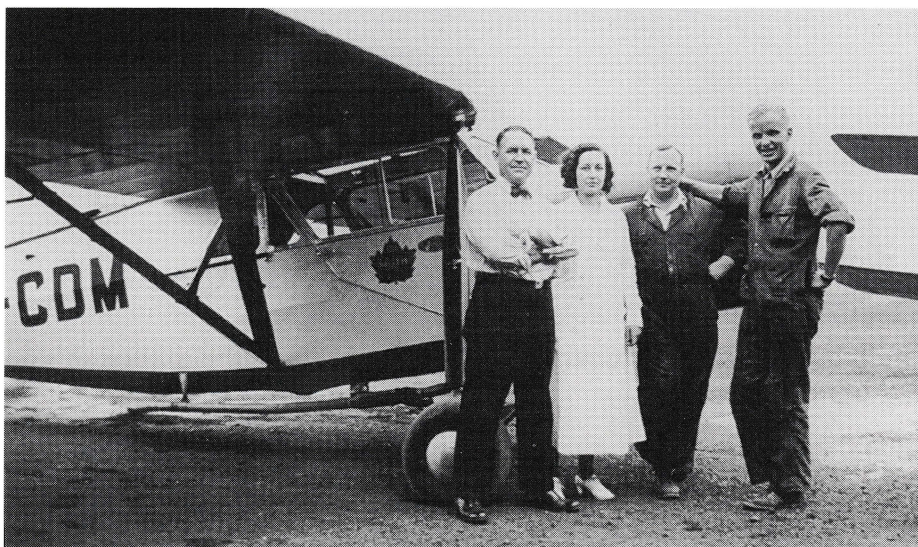
Although Kuhring and Green had not themselves visited Whittle's organization they brought back word of a radically new aero engine concept under development at Power Jets Ltd. by its inventor W/C Frank Whittle. It was a simple gas turbine employing a two sided centrifugal compressor and a single stage turbine. Its most revolutionary feature was its use as a means of pure jet propulsion of aircraft, eliminating use of a propeller.

The basic principle of jet propulsion goes back to before Christ and is attributed to a man named Hero of Alexandria. The Italian Caproni Campini company had also anticipated Whittle with a concept of propelling an aircraft by an air jet

using an engine driven compressor installed behind the pilot's cockpit. It was Whittle, however, who first conceived use of a simple gas turbine engine for this purpose, directing its exhaust through a nozzle to produce a high speed jet. The resultant very large momentum increase, from a light weight engine, would produce impressive thrust, particularly at high speeds and altitudes.

The Whittle engine was reported as so simple that it could be manufactured in the average garage machine shop. Hives (later Lord Hives), at that time Managing Director of Rolls-Royce,

**Right:** George Mickleborough and Geoff O'Brian with the D.H. 80 Puss Moth, CF-AGO, which they flew to the west coast in July 1930. D. MICKLEBOROUGH. **Below:** Don Long (R) with an unidentified group of TFC employees in front of the Club's D.H. 80 Puss Moth CF-CDM. F. HOTSON. **Bottom:** the University of Toronto Flying Club executive. **Second row:** D.R.B. McArthur, R.G.N. Laidlaw, J.W. Rogers. **First Row:** N.J.M. Simpson, H.W. Kerby, Professor T.R. Loudon, E.E. Robertson and the author, P. B. Dilworth. UoT ARCHIVES. **Opposite, top:** Malcolm "Mac" Kuhring, Head of NRC Engine Laboratory. NRC ARCHIVES. **Opposite, bottom left:** Sid Chambers, senior technician at engine on test in old NRC Engine Laboratory, John Street, Ottawa, circa 1939. NRC ARCHIVES. **Opposite, bottom right:** new (1941) NRC Engine Laboratory, Montreal Road, Ottawa. NRC ARCHIVES.



is reported to have said "Wait 'till we get our hands on it. We'll bloody soon engineer the simplicity out of it." His promise was certainly fulfilled.

Reports by Kuhring/Green and Steadman on this British initiative appeared to open a profitable avenue for exploration to solve the chronic shortage of aero engines in Canada.

There followed successively, in Sept-October 1942, a series of initiatives, including visits to Power Jets,

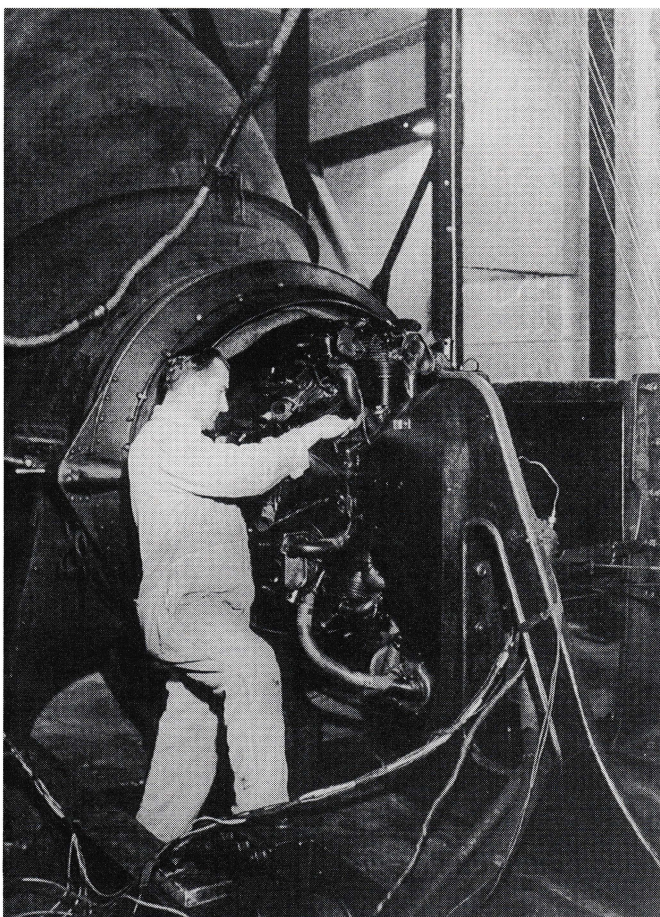


transatlantic cables, meetings and reports involving senior officers of the RCAF, the Ministers for Air and Munitions and Supplies, Director General Aircraft Production, External Affairs and the British Minister of Aircraft Production, Sir Archibald Rowlands.

All these concerned possible research and development work on Jet Propulsion in Canada during the war under license from Whittle and with a view to wartime production in Canada — the latter, a most unrealistic concept.

At the NRC Engine Laboratory, the Kuhring/Green revelation of this fledgling jet engine ignited keen interest. One of our staff, F/L D. G. Samaras, "Sammy," as he was affectionately known, who was on attachment from the RCAF, was assigned to do theoretical studies on the subject. Sammy was an expatriate Greek who had come to Canada to enlist. He had been educated in engineering at the Berlin Gymnasium prior to the war. Exceptionally well grounded in engineering science and applied mathematics, he became immersed in thermodynamic cycles of gas turbines.

Based on the reception given some of his early reports which were sent to the Royal Aircraft Establishment in England, he was transferred in 1942 to continue his work at the RAE at Farnborough and Pyestock. There I met up with him again in early 1943.



#### **THE UK JET ENGINE MISSION**

Ensuing action was organized under direction of a special government committee.

On a directive from this committee, On 29 October 1942, a team was formed to carry out

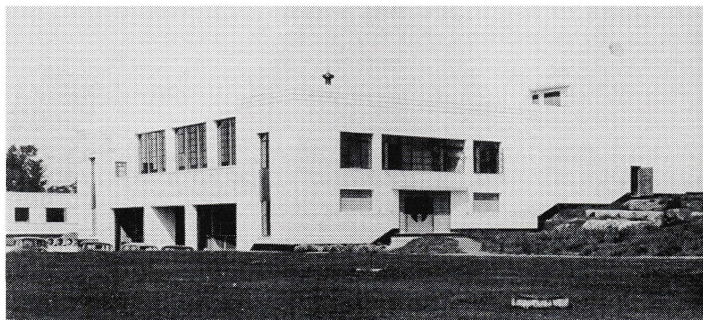
an exhaustive investigation of jet propulsion in Britain under terms of reference as follows:

1. To study and report upon the historical record of the development of jet propulsion in England.
2. To investigate and report on the present state of development of jet propulsion engines in England.
3. To make recommendations upon what way Canada can usefully contribute to the development of jet propulsion engines and to report on the facilities, machinery, staff, and cost involved for this programme of research.
4. To report in a qualitative manner upon the organization, facilities and machinery required for the manufacture of jet propulsion engines.

The formal head of this team was Charles A. Banks (later to be knighted and become Lieutenant Governor of British Columbia), Kenneth F. Tupper and myself.

My appointment was made on Mac Kuhring's recommendation to our Director, J. H. Parkin. Ken Tupper, then head of the NRC Hydraulics Laboratory and ten years my senior, was subsequently assigned as senior technical member of our team. This turned out to be an extremely happy choice, not only for the project but for me also. In addition to being one of the three great bosses I was lucky to work for throughout my early career, Ken became a great companion, a stalwart collaborator in my later consulting engineering business and life long great friend. Endowed with the keenest of scientific engineering minds and sound common sense, he was held in the highest esteem by all who worked for and with him.

Among my later business partners and associates Ken became famous for "The Tupper Rule." This was to the effect that when a problem arises one should first be very careful to define whose problem it is. Its axiom is that



one should then consider very carefully before getting involved in its solution or you may become part of the problem. At age 90 Ken passed to his reward in 1994; but his rule is still alive and quoted, in appropriate situations, by many of us who knew him.

#### PREPARATIONS FOR DEPARTURE

In mid August 1942 my wife, Ollie, (she disliked her name "Olive"), to whom I was married shortly after joining the Engine Lab, gave birth to our first child, Geoffrey. In preparation for departure I had packed them both off to live with her family in Toronto during my absence. I stayed with Mac and Ethel Kuhring for the ensuing few days prior to leaving. During last minute preparations for departure from Ottawa on 14 January, I had made a visit to a doctor to clear a sinus blockage caused by a heavy cold. Mac had gone to the Lab and I came downstairs, carrying my suitcase, ready to take a taxi to the station, where I was to meet Ken. Ethel asked me casually if I had my briefcase. "Briefcase? — BRIEFCASE!. Where in hell have I left it?"

Panic!! My briefcase contained *Top Secret* files on the mission and I had visions of being incarcerated in the Tower of London. Since I had carried it with me and slept with it for days and nights I was certain that I must have taken and left it at the doctor's office. It was late Saturday morning and the office would close at noon. A phone call produced a search but no briefcase was found. On a second call, no answer — the office had obviously closed.

In the absence of any other likely repository I took my car instead of a taxi, asked Ethel to phone Mac to meet me at the train Station and drove at high speed to the Medical Arts building. Here, by great luck, I located the janitor who, after hearing my predicament, took me up to the doctor's office on the fifth floor by a rickety freight elevator which took forever to get there. At the door of the doctor's office, the janitor sorted slowly through a huge ring of keys (surely a harbinger of the Tower of London) and finally found one that would fit. I burst into the office area, searched the place diligently and, relief of reliefs, found the briefcase on a radiator lying under a newspaper. Down the snail-paced elevator, into my car and off to the Station. Mac was waiting, the train due to leave in one minute's time. I threw him my car keys with a shouted "farewell" and dashed off to board the train. There I found Tupper sitting

calmly in his seat. He looked up and said, "Paul, what's all the rush? The train is 20 minutes behind schedule." I sank, exhausted, into my seat.

After a two-day delay in Montreal, due to unfavorable weather reports we finally boarded our RAF Ferry Command Liberator at Dorval. Accommodation was austere. There were no seats or heat for passengers, only for crew on the forward flight deck. All ten passengers were fitted with flying suits and oxygen masks and sat in two rows, toe to toe, backs against the fuselage, on sleeping bags laid out on the doors of the bomb bay. An oxygen outlet was provided at each seat location and one aft at a urinal funnel. Without going into detail, suffice it to say that this was a rather dangerous high suction instrument, in the use of which one had to take great care to avoid painful injury.

Our flight on the first leg to Gander Newfoundland was cleared for departure about mid morning. The only mishap occurred at take off. The entry hatch door, which opened inward, in the belly of the aircraft, aft of the

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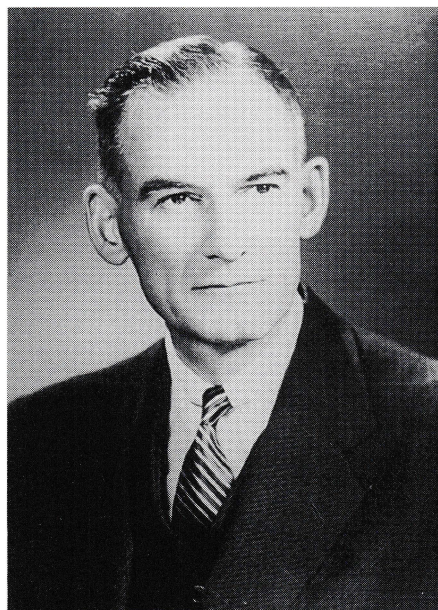
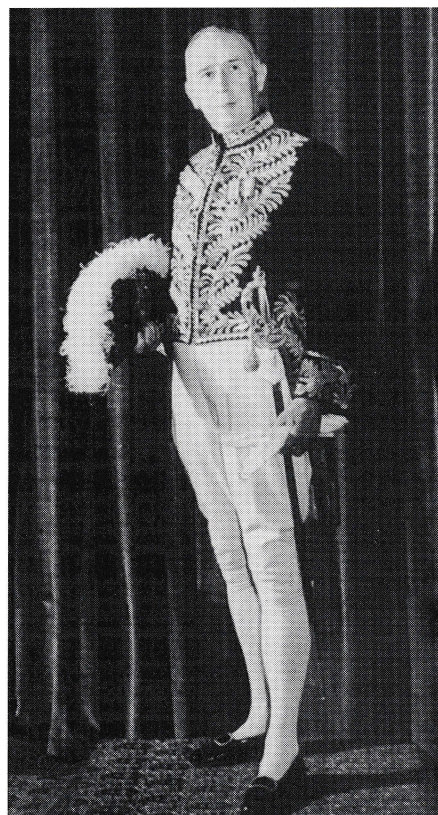
bomb doors, had been improperly latched. It flew open, flapping alternately partly closed and open and had obviously to be secured. Being the closest I took it as my job. I had finally to jump on the door to get it secured — with more than a little concern that an error in timing might have resulted in my jumping out of phase with the door's oscillations, thereby prematurely terminated my participation in the mission. We arrived at Gander at 5:17 pm, just four hours from Dorval.

After a very good dinner in the RAF mess a favourable report on weather cleared us for the second leg to Prestwick in Scotland. We donned Mae Wests in preparation for a possible icy swim en route. Take off, at 7:50 pm EDT, followed a squadron of USAAF B-17 bombers bound also for Britain. (My notes and memory leave a ques-

tion as to whether this event occurred then or on my second mission in September of the same year.)

We maintained radio contact with the B-17s during the flight. To our dismay, they encountered heavy icing. Grimly, our pilot kept contact with one which ditched in the frigid North Atlantic. Others turned back or diverted to Greenland. That memory remains vivid to this day. What an awful and useless end to those whose lives were terminated in the ditching that night.

Touch-down at Prestwick was at



10:40 am GMT, 19 January 1943 — just under ten hours flying time from Gander and 14 from Montreal. We were taken to the Mess of the RAF station at Prestwick for breakfast. Pre-war it had been the lovely club house of the Prestwick Golf Course. It was still a palatial establishment and we were treated to a full English breakfast with



**Opposite, top:** Sir Charles Banks, head of UK office of the Canadian Department of Munitions and Supplies (1939-46) and of UK Jet Engine Mission. HEIRLOOM PUBLISHING. **Opposite, bottom:** Kenneth F. Tupper, Head of NRC Hydraulics Laboratory and senior NRC member of 1943 UK Jet Engine mission. S. BROWN. **Top:** the author, Paul B. Dilworth. S. BROWN **Above:** WU — Whittle's first experimental jet engine (1937) with original "elephant trunk" combustion chamber. ROLLS-ROYCE HERITAGE TRUST.

all rationed goodies — bacon, real sausage, eggs, fried tomato, toast, butter, marmalade, and standard (bloody awful) English coffee. We would discover that such sumptuous breakfasts were not to be experienced again during our visit.

From Prestwick we took a night train to London. It was bitterly cold and damp on the train and finding the steam valve to the heater full "on," realized that there would be no heat

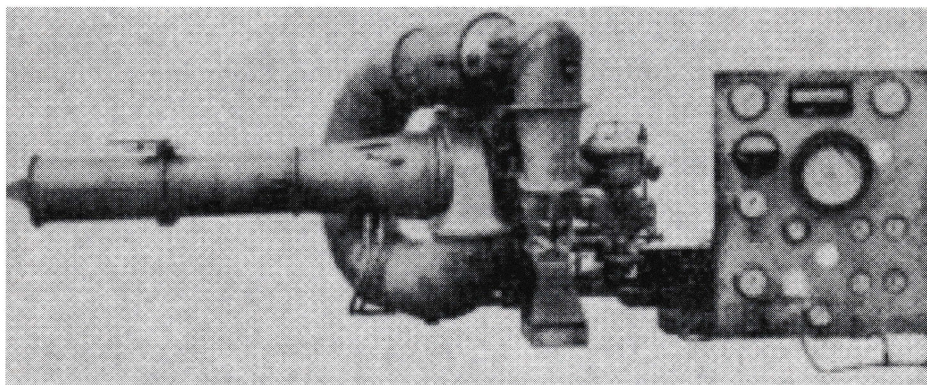
until we were hooked onto the engine. An added frustration was that the train was standing immediately behind the Johnny Walker distillery. We went to bed fully clothed and piled on all available blankets and fell sound asleep.

Some time later, I awoke in stifling heat and sweating like a stoker, the train rattling smoothly on its way to London. Ken awoke in a similar sweat. We removed our clothes, towed ourselves, put on pyjamas, turned down the heat, went back to bed and slept like babes until awakened at Euston Station in the early morning.

## LONDON

On getting off the train, our breakfast at a station platform kiosk, and in stark contrast to that at Prestwick, was a cold bun sans butter or margarine and a luke warm mug of tea with powdered milk and no sugar or even saccharin.

A taxi took us to the NRC office at No 3, St James's Square. This became our operations base throughout our visit. There we met Archie Laidlaw, a young lawyer who was NRC's senior representative in London. Archie intro-



duced us to the two secretaries, Misses West and Pattinson, who looked after us very competently for typing and secretarial services.

Our arrival that day was punctuated by a lone Luftwaffe *tip and run* bomber. He hit a London County Council school, killing nearly all of its youngsters. Heart rending and senseless carnage, and a sobering introduction to the harsh realities of Britain under siege!

Finding good accommodation in wartime London was not an easy task and we were much indebted to Frank Trethewey's old friend Bill Lappin for finding one at 23 Inverness Terrace, in Bayswater — run by a very dear landlady Mrs Coles. Indeed, Bill looked after us like a mother hen throughout

our visit. He put me up as a temporary member at the Royal Aero Club and drove us to and fro from London to the Rolls works at Derby in a high-powered Bentley — the "clock" seldom going below 100 miles an hour on Watling Street. At the direction of Hives (later Lord Hives), Rolls' Managing Director, Bill introduced us to many of the senior engineering people in the firm.

Rolls-Royce had a policy of not using company titles within the firm. Two initials were used for the most senior people, Hives was "Hs"; Lappin was "Lp". He was officially "Personal Assistant" to Hives, a title vastly understating his true status. In the First World War, Bill had been a technician with the RNAS in East Africa. It was here that he met and became a close friend of Frank Trethewey, serving in the army under General Smutz.

Bill joined Rolls-Royce after the war and remained with the firm until his retirement. Prior to the Second World War he was responsible for supervising the installation and maintenance of the Rolls-Royce engines in the Schneider Cup racers. Throughout the Second World War he was Hives' alter ego in liaison with both the British Air Ministry and the RAF. He did such an outstanding job that he became highly trusted by both these organizations, as well as within the company. At his retirement he was accorded public recognition and praise, not only by Rolls-Royce but also by the Air Ministry and, especially by the RAF.

## MISSION EXECUTION

Our mission entailed an extensive program of visits, often repeated, to over a dozen separate organizations in various parts of England. Tupper and I, together and separately, carried out these visits and the many discussions with the principals of the various establishments. We also wrote the report. Banks made all high level arrangements with the British Ministry of Aircraft Production (MAP) and accompanied us on some of our visits. He also made constructive editorial contributions to the report at its completion. The whole Mission took nearly five months from our arrival in the UK to dispatch of the report.

Space does not allow a detailed account of our many visits, or of the considerable volume of technical information gathered. However, the following is an abbreviated account of

some of the principal people and establishments visited, and of their activities.

A good deal of time was spent at the Ministry of Aircraft Production in London on discussions with Dr Roxbee-Cox and other officials and staff. It was necessary to ensure, not only that they fully understood the purpose of our mission. It was equally important to ensure that the future possibility of competitive development in Canada was understood and accepted. On these aspects we were fully assured and given all possible cooperation throughout the mission.

Three successive days were spent at the Royal Aeronautical Establishment including the new Gas Turbine Section at Pyestock. Their principle scientific activities at that

time were experiments on combustion problems with the Metropolitan Vickers F-2 engine and analytical studies on new engine designs. Here we also met up with my erstwhile NRC colleague, Sammy Samaras.

Of prime importance among early visits was our initial visit to Power Jets, the key enterprise formed by the famous Frank Whittle, later knighted in recognition of his pioneering work on the concept and initial development of jet propulsion by gas turbines. The company's main operating facilities were Whittle's main office at Brownsover Hall, its R and D facility at Lutterworth and production plant at Whetstone. All were in the vicinity of the town of Rugby in the Midlands.

Here we were given an historical account of Whittle's early work and his

efforts to overcome monumental resistance to support development work. This introduction was given by W. E. P. Johnson, one of Whittle's early colleagues. It was followed by introduction to Whittle in person. He gave us a two hour lecture on gas turbine jet engine design and development. More of this later.

**P. B. DILWORTH**

THE MASTERS  
G16-300 MILL ROAD  
ETOBICOKE, ON, M9C 4W7

*to be continued*

## RCAF STATION WHITNEY

continued from P.23



There was no shortage of fresh air in the cockpit of a Curtiss HS-2L. District Forester W. Delahay is on the right with (L-R) crew members Jack Gorman, George Brooks and Frank Watson. J. GRIFFIN.

employed to assess the ability of smaller and cheaper-to-operate aircraft to undertake surveys in isolated areas.

Two seats and small payload severely limited their usefulness and most of the real work was done by the bigger flying boats.

Flights were made over Algonquin Park on 127 of a possible 134 days. "Whitney House" was the base for 65 percent of the 299 flights which totalled 616 hours. In addition to forest type and condition surveys, 84 forest fires were spotted. In contrast with modern satellite surveillance techniques, McEwen's pilots had to report a fire by landing at a Ranger station; dropping a message to the "nearest dependable assistance;" or reporting by telegraph on their return to base. On one occasion, a Curtiss flew in equipment when four fires threatened to get out of control.

These pioneer aviators operated in primitive conditions, often with unreliable or unproven equipment. They had minimal outside support and accidents or malfunctions were a constant hazard. Nevertheless, they played a major, perhaps the major, role in developing Canada as a nation "from sea to sea to sea." These men were the

backbone of the Royal Canadian Air Force, established in 1924. It is worth noting that the RCAF was the only military air force equipped with unarmed aircraft. Although the pilots were trained in all aspects of aerial warfare, their experience was gained in "civil" operations such the development and protection of our natural resources. Canada supplied over twenty percent of Commonwealth bomber crews in Europe during WWII. Flight Lieutenant "Black Mike" McEwen himself became an Air Vice Marshal and commanded the famous Six Group of Bomber Command in the closing year of WW2.

This story is largely drawn from the unpublished manuscript of aviation historian John Griffin, a WWII Liberator pilot; author of *Canadian Military Aircraft*; and co-author of *RCAF Squadrons and Aircraft* and *Canadian Aeronautics: A Chronology 1840-1965*. All the photographs are from his collection.

**S. B. SHAW**

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# CAHS

The **Canadian Aviation Historical Society** was founded to record and disseminate the history of Canadian aviation. *To those who have stories that should be told and to those who may wish only to learn more of this rich and varied subject, we extend a sincere welcome.* Our hope is that members will acquaint any interested friends with our Society and its aims. Application for membership may be made to: CAHS National Headquarters, P.O. Box 224, Station 'A', Willowdale, Ontario, M2N 5S8