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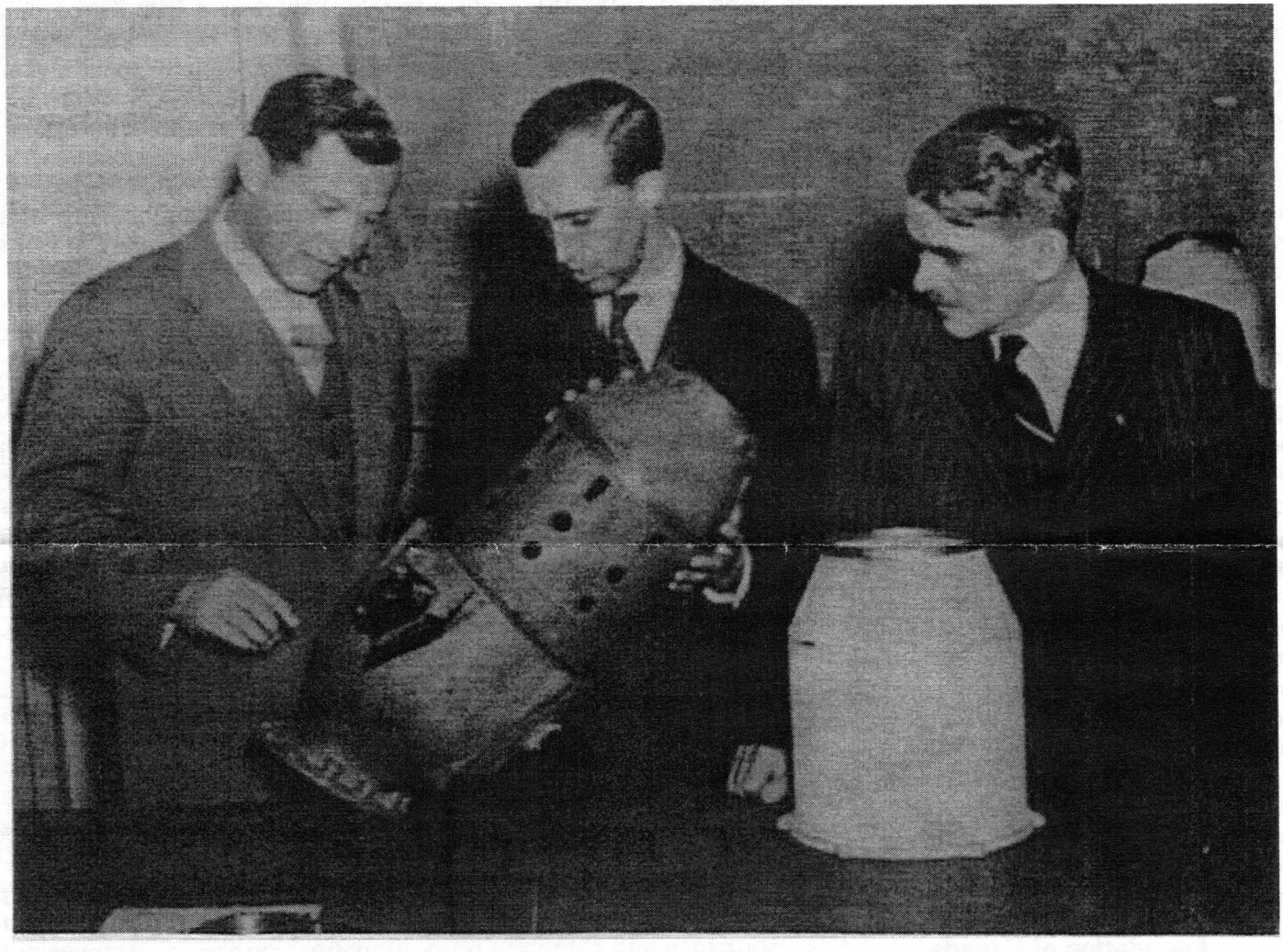
Pre-Flight

A Publication of the Aerospace Heritage Foundation of Canada
P.O. Box 246, Etobicoke "D", Etobicoke ON M9A 4X2

Vol. 18, No. 3 **May - June 2007**

Paul D. Dilworth
Canadian Engineer Extraordinaire
1915 – 2007
Jim Floyd remembers.



L to R – Winnett Boyd, Paul Dilworth and Frank Whittle (later Sir Frank Whittle), inventor of the first really practical gas turbine aero engine, examine Orenda engine components.

Founded 1989

AHFC

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From the President

In this issue of Pre-Flight, I want to remind you of our upcoming Annual General Meeting on June 16th. You will find the details on the last page. Please attend.

It is always a pleasure to present a detailed record of our Foundation's annual activities. It also gives members the opportunity to give input, to ask questions and hear clarifications.

You are invited to stay for refreshments.

It was my honour to represent the Foundation at Paul Dilworth's Celebration of Life, along with family, friends and colleagues earlier this month..

Frank

Paul B. Dilworth

Paul Dilworth, my friend of more than 61 years, sadly passed away on February 18th 2007. He was 92. Paul was a true Torontonian, being born in Toronto during the first world war. He attended Appleby College in Oakville and after graduating from Appleby spent a year in the gold mining industry in the Canadian North. On returning to Toronto he continued his formal education at the University of Toronto, where he graduated with a degree in Applied Science in 1939. He was one of the students of the much-respected Professor T.R. (Tommy) Loudon, the Dean of Aeronautical Engineering at the University of Toronto (U of T), who was the tutor of many of our top engineers at Avro and Orenda.

Dilworth was intrigued with the new technology just emerging at that time in the field of aircraft power systems, particularly with the use of gas turbine engines (jets) to replace the piston engines then in universal use. He was interested in the research work being carried out in the United Kingdom by Frank Whittle and his team and in discussions with Loudon he made it clear that it was his opinion that Canada should become involved in this work by establishing a Canadian facility to study the use of the gas turbine technology and eventually become involved in the design and build of gas turbine power-plants for aircraft. It was therefore not surprising that on graduation from the U of T, he joined the National Research Council's aero engine laboratories in Ottawa, working with 'Mac' Kuring and Ken Tupper, the head of the NRC hydraulic laboratories.

In early 1943, Dilworth and Tupper spent five months in the United Kingdom studying the gas turbine developments that were being researched in England. Their task was to report on the best way for Canada to become involved in these developments, particularly those concerned with using the new technology on military aircraft as part of the accelerating WW 2 efforts. On return to Canada, their report included recommendations for setting up a cold-weather test facility in Canada, to test the British engines at low temperatures, which were readily available in Canada, in order to verify the high-altitude performance and compressibility limitations on the gas turbines at the low temperatures and pressures encountered in flight at high altitudes.

Dilworth, *cont'd.*

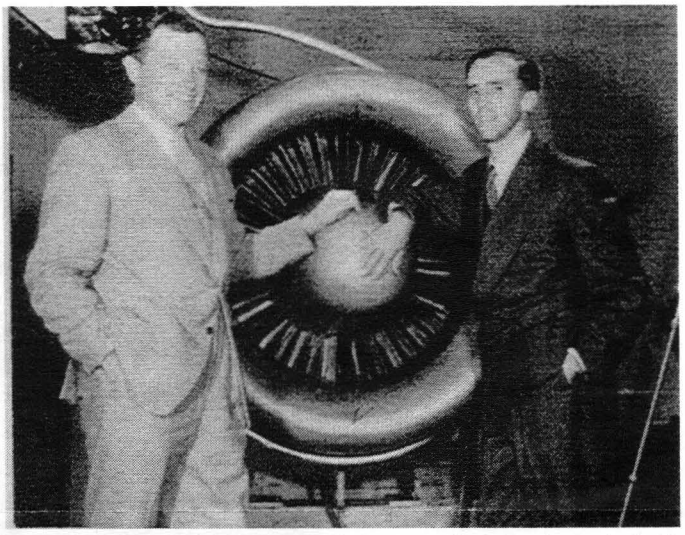
These recommendations were accepted and Tupper and Dilworth were commissioned to set up a cold weather testing station at Stevenson Field in Winnipeg. That facility was completed in less than six months, an incredible effort in itself and their first test engine, a British Whittle jet, was delivered by a United States (U.S.) military transport aircraft in late December 1943. The first test run on that engine took place in the new facility on January 4th. 1944.

In July 1944, a new crown company, Turbo Research Ltd. was established to carry out studies on the future possibilities of designing and manufacturing gas turbine engines in Canada for use on military aircraft for the RCAF. A number of design studies were carried out on both centrifugal engines, similar to the Whittle designs and the newer-technology axial-flow gas turbine designs. These projects were given the designations TR1, TR2 and TR3 for the centrifugal designs and TR4 and TR5 for the axial flow designs, which were later developed into the Orenda Chinook and Orenda engines respectively. These studies resulted in designs that included many unique features not previously found in the gas turbine engines being designed in other countries and the possibility of setting up a design and manufacturing facility in Canada to produce gas turbine engines appeared to have been established.

In early 1946, the newly established aircraft company of A.V. Roe Canada Ltd. (Avro), had taken over the Malton plant previously occupied by Victory Aircraft and Avro made an arrangement with the Canadian government to take over the activities of Turbo Research (TR). The TR team was transferred to Malton as the Gas Turbine Division of Avro. Paul Dilworth was appointed Chief Engineer and Winnett Boyd was made Chief Designer. They were supported by a talented and dedicated team of engineers and manufacturing staff and from that time on Canada was firmly established in the design and development of gas turbine (jet) technology.

The first jet engine designed in Canada, the TR4 Chinook, had its first test run on March 17th. 1948 and the TR5 Orenda engine, which was to power the Avro CF-100 fighter aircraft and later the Canadian Sabre, had its first run in February 1949. By the end of 1956 more than 3,000 Orenda engines had been delivered for installation in the CF-100 and the Sabre. Paul Dilworth was in charge of all engineering at Orenda from 1946 to 1952 and under his guidance the Orenda engine became one of the most successful projects ever undertaken in Canada.

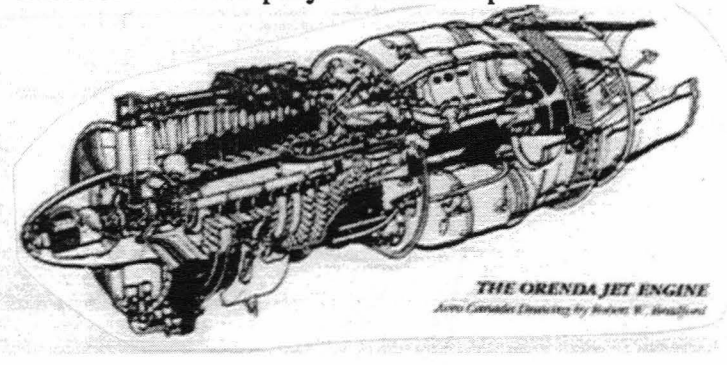
The Orenda-powered Canadair CF-86 Sabre fighter went on to break the world speed record and the Orenda engine saw service in the air forces of Canada, the Netherlands, Belgium and South Africa.



Winnett Boyd, Orenda chief designer and Paul Dilworth, manager and chief engineer of Orenda, with one of the first Orenda engines.

Paul left Orenda in 1952 to establish the engineering consulting company of P.B. Dilworth Associates in Islington, Ontario west of Toronto. He was later joined by Lloyd Secord who had been on his engineering staff at Orenda and George Meagher, who was previously at the National Research Council in Ottawa. The name was changed to Dilworth, Secord, Meagher and Associates (DSMA) and became one of the major hightech, engineering consulting companies in Ontario, with a large and highly qualified group of engineers and technicians.

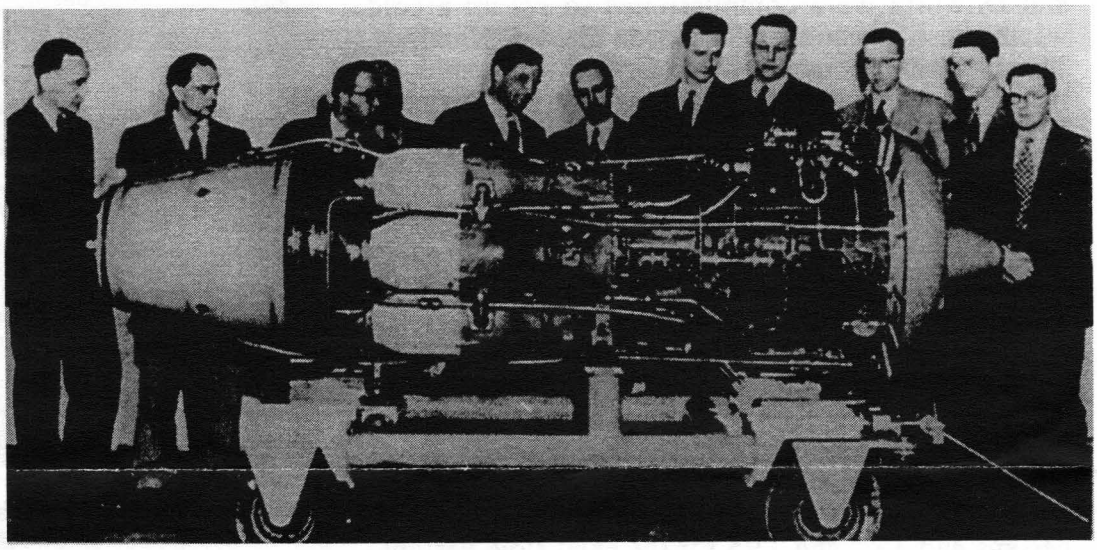
The activities of DSMA included the design and development of aviation wind tunnels, automotive test facilities and other ground-breaking projects. DSMA was also instrumental in bringing the NASA Space Shuttle manipulating arm project to Canada and played a significant role in the development of that project which later became the Spar Aerospace 'Canadarm', used with outstanding success on all Shuttle flights. Paul retired from DSMA in 1977, but remained a Director of the company for a further period.



The Orenda series of jet engines were among the most powerful in the world in the 50s. The Orenda 11 for the later CF-100s and the Orenda 14 for the CF-86 Sabre had a maximum thrust of 7,400 lb.

Dilworth, *cont'd.*

Engineering staff of Orenda Engines with the TR 4 Chinook engine, the first jet engine designed and built in Canada, 1948.



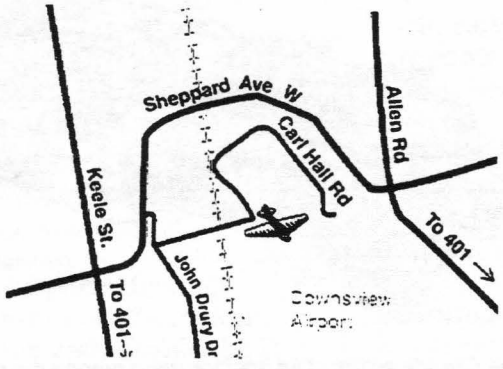
He then went on to establish a new company, 'Ultralasertech' in Mississauga, Ontario, adjacent to Toronto's Lester B. Pearson International Airport. That company's main emphasis was on providing techniques for detecting gases which were of environmental concern. The products of Ultralasertech were developed for and sold on the international market. Paul finally retired in1981.

The recipient of many awards, Paul Dilworth was inducted into Canada's Aviation Hall of Fame in 2000, with the following citation: "*His constant search for perfection in all of his endeavours and his pioneering leadership in the field of aero-engineering development have been of lasting benefit to Canadian aviation*"

Paul is survived by his loving and supportive wife Yvonne, two sons, Geoffrey and Robert from his late wife Olive, a stepdaughter Christine and a stepson David and an extended family of grandchildren and other relatives.

They have all lost a great patriarch. Canada has lost a great Canadian and I have lost a great friend. He will be remembered by us all.

Jim Floyd, May 10th., 2007



TORONTO AEROSPACE MUSEUM

The
18 th

ANNUAL GENERAL MEETING
of the
Aerospace Heritage Foundation
of
Canada
will take place
on

SATURDAY, JUNE 10, 2007

at
10:00 am
in the
Blue Room
of the
Toronto Aerospace Museum
65 Carl Hall Road
Downsview, Ontario.

The Agenda will consist of
The President's Report
Treasurer's Report
Committee Reports
and
Other Business
as necessary which may arise
and the
Election of Officers.
All members
are cordially invited to attend!