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The main production bay at Avro Aircraft, as it appeared when output of CF-100's was near a peak. Aircraft shown on the line are Mk. 4's.

The Chapter Closes

THE 692nd AND FINAL CF-100 IS ROLLED OUT AT MALTON BY AVRO

THE MALTON roll-out of the 692nd and final CF-100 December 4 closed what may someday be looked upon as the most significant chapter in Canada's aviation history. This chapter had its beginnings in the last war, when Frank Whittle changed so radically the traditional concepts of aircraft propulsion with his gas turbine engine. At the time, Canada was producing more aircraft per capita than any democratic country (albeit with no engines). For this reason, the Canadian government hastily despatched a commission to the U.K. to study the Whittle development.

The direct result of this safari was the establishment of a Cold Test Station, the purpose of which was to test the new British development of gas turbines under extreme winter conditions. As a follow-up to this, the government set up Turbo Research Ltd. This Crown corporation was specifically formed to recruit and train staff in the new field of jet propulsion.

By war's end, Canada's industry had produced more than 16,000 aircraft. Commendable accomplishment though this was, there were nagging doubts as to whether Canada should continue to build engine-less airframes. (And even these were, for the most part, designed elsewhere.)

The Dominion's leaders reached the not-too-surprising conclusion that Canada's aviation industry should not again be allowed to atrophy. Experience gained during the war indicated that it was vital to the defence of North America to have military aircraft manufactured on this continent. Further, it was obvious even before the end of the war, that Canada was in need of a specialized fighter aircraft. In early 1945 the RCAF drafted the preliminary specifications of just such a fighter. *(Turn page)*

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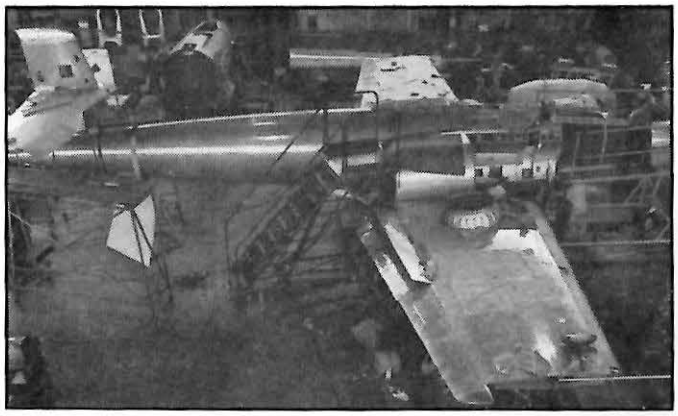
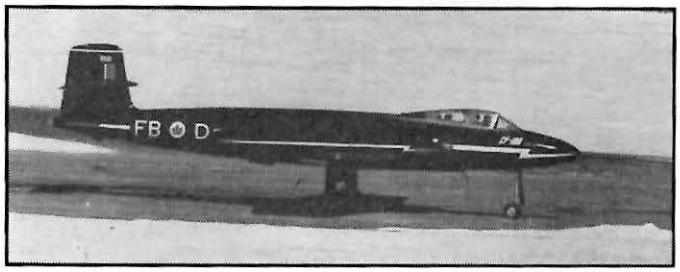
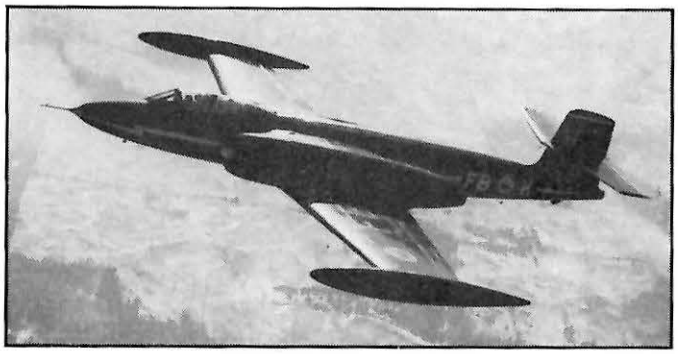
The last of the line is rolled out the door of the now-empty main production bay at Avro on December 4, 1958. This was a Mk. 5.



This was the second prototype Mk. 1 built, also powered by Avons. This airplane was written off in a crash.



The first CF-100 is shown at Rockcliffe, at its first public demonstration. At the controls is Bill Waterton.



The first CF-100, one of the two Mk. 1's built, is shown taking shape at Malton in 1949. Powerplants were Avons.

Two events of some consequence took place the following year. First was the purchase by the Hawker Siddely Group in the U.K. of the Canadian Crown companies Victory Aircraft Ltd., and Turbo Research Ltd. During the war the British Group and Victory Aircraft had worked in close liaison as the Canadian firm turned out hundreds of Lancasters and other Group-designed aircraft. With Sir Roy Dobson as president, the two firms were merged into A. V. Roe Canada Ltd. Primarily a development company, A. V. Roe Canada split itself down the middle into the divisions: Aircraft, and Gas Turbines.

Part Two: Second event of 1946 which plays a part of the CF-100 story was the meeting convened by Air Vice Marshal A. L. James, then Air Member for Technical Services.

A short while after the general specifications for an all-weather long-range, two-man interceptor had been agreed upon, a second decision was reached. This was to have the Gas Turbine Division of A. V. Roe go ahead with the development of a suitable turbojet engine for use in the CF-100. Accordingly, as training for the design and development of this engine, the Gas Turbine Division re-proceeded with engineering work on the Chinook, which had been inherited from the original Turbo Research Ltd. On March 17, 1948, the first jet engine to be designed and constructed in Canada, was fired up in the test cell. By late summer, the Chinook I was delivering 2600 lbs. thrust. Only two of these tiny engines were built, and they were used solely for test and research purposes.

At the same time, however, the Gas Turbine Division had plunged ahead with the task of designing a larger and more powerful axial-flow type turbojet. By the end of 1948, the first of these was being assembled. On February 10, 1949, the original prototype was mounted in a test cell and started up. The performance figures for this early model exceeded its designers' fondest hopes and presaged a highly successful series of engines named Orenda.

Avons First: However, it wasn't Orenda engines that powered the first prototype CF-100 off the asphalt at Malton on January 19, 1950. In keeping with the policy of not using prototype engines with a prototype airframe, A. V. Roe Canada elected to use well-proven Rolls Royce Avons. Flying the sleek black CF-100 on that maiden flight was Squadron Leader Bill Waterton, at that time chief test pilot for Gloster in the U.K.

Relatively early in the flight test program, it was found that the main wing spar was not rigid enough for the loads it was meeting, a shortcoming that resulted on at least one occasion in a bent wing. Fortunately there were no accidents resulting from this weakness, which was remedied by beefing up the spar. This modification was retrofitted to all aircraft that had been built up to the time, and of course was incorporated in succeeding production aircraft.

This structural deficiency was months in correcting since production models were well on the way. However, the set-back did not prevent the prototype CF-100 from setting a few speed records around the country. In 1950, with Waterton at the controls, the big black fighter raced from Toronto to Boston at an average speed of 555 mph. Prior to that, he travelled the distance between Toronto and Montreal at an average speed of 638 mph, setting a Canadian record.

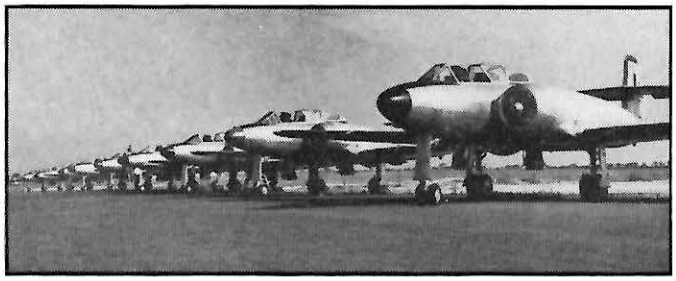
First Delivery: A year later the prototype Mark 2, Orenda-powered CF-100 made its maiden hop. The date was June 20, 1951. Four months later the first all-Canadian jet interceptor was delivered to the RCAF. Neither the Mark 1 nor the Mark 2 was armed, this being left for the Mark 3 (eight

50 machine guns). By late summer, 1953, 70 production Mark 3's had been delivered to the RCAF. During this time, in 1952, the Gas Turbine Division was moved "across the road" to quarters of its own. Here the development and production of Orendas continued.

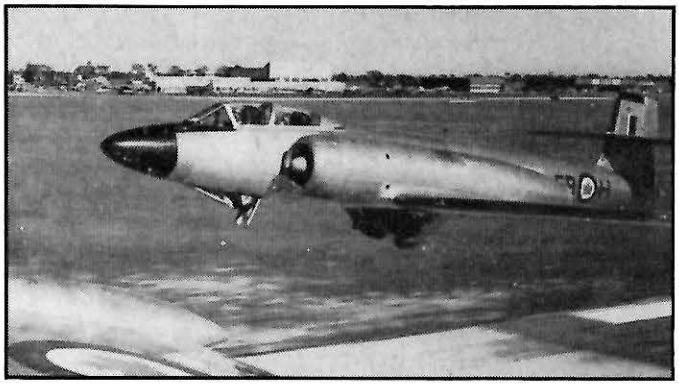
A more powerful prototype, the Mark 4, flew for the first time on October 11, 1952. It was a development of earlier models and differed by having Hughes fire-control radar and wing-tip rocket pods, as well as the standard ventral gun pack. Production models of the Mark 4 began rolling off the Malton assembly line a year later. Early models were powered by Orenda 9's, later models by the Orenda 11 which booted out a respectable 7275 lbs. thrust.

In December, 1954, Orenda Engines Ltd., was established as a wholly-owned subsidiary of A. V. Roe Canada (as was Avro Aircraft Ltd.). In the autumn of 1955, Jan Zurakowski dazzled the aviation world with his performance at Farnborough in a Mark 4 CF-100. Around the same time, the 14th version of the Orenda engine was being installed in the Canadair Sabre.

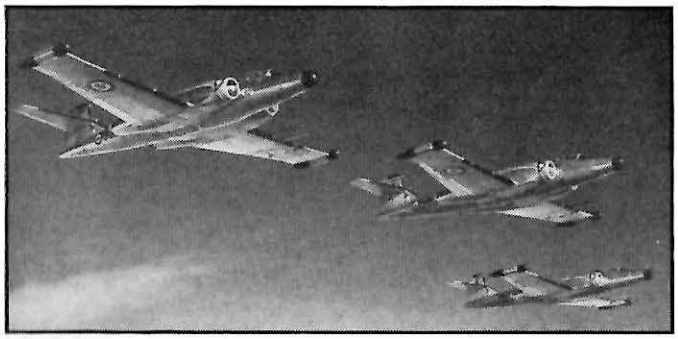
By February of 1956, 3000 Orenda Engines had been delivered. At the same time, Avro Aircraft made delivery of the first CF-100 Mark 5. This version of the Avro product eventually replaced the Mark 4 in general squadron service in the RCAF in Canada. In November, 1956, the first CF-100 squadron proceeded to Europe to join the RCAF's NATO contribution, No. 1 Air Division. By July, 1957, the fourth CF-100 squadron had joined the Air "Div.". These squadrons all fly Mark 4's.



Production Mk. 3's are shown ready for delivery. Many were converted into pilot trainers for service at OTU.



Shown taking-off at Malton is an Orenda-powered Mk. 2, one of a pre-production batch of ten that was built.



Extended tips of wings and stabilizer of Mk. 5 are evident here. High altitude Mk. 5 also has more powerful Orendas.

Belgian Choice: It was this same year that saw the Belgian government choose the CF-100 as the most desirable all-weather fighter for the Belgian Air Force. Some 53 of the big fighters were ordered, with Canada and the United States sharing the bill under the Mutual Aid Agreement. In December of 1957, the first batch was delivered to Marville, France, by crews selected from the RCAF. Belgian pilots (trained at the RCAF all-weather OTU), picked them up at Marville and ferried them the remainder of the way to Belgium. The last of the Belgian order was delivered in June, 1958.

The CF-100 chapter was closed on December 4, with the last CF-100 coming off the Malton assembly line. For Canada, it has been a remarkable chapter. A total of 692 CF-100's were built. Orenda Engines was a few weeks ahead of the sister company in finishing its last contract for Orendas. An amazing total of 3794 Orenda turbojets had been produced for the air forces of five different countries.

Of the total of 692 CF-100's built, 610 were Mk. 4's and 5's. There were two Mk. 1's, ten Mk. 2's and 70 Mk. 3's. Included in these major versions were a number of variants, namely the Mk. 2T (dual), the Mk. 3CT (dual), the Mk. 3D (dual), and the Mks. 4A and 4B. The dual control versions were mostly conversions, these being effected by Bristol Aircraft (Western) Ltd. and its predecessor, MacDonald Bros. Aircraft Ltd. These CF-100 pilot trainers have mainly seen service with the all-weather operational training unit.

Economics: The value of the CF-100 program, including spares and associated equipment, amounts to approximately $450,000,000; while the Orenda program (including $135,000,000 for engines to power Canadair Sabres) totalled approximately $440,000,000.

Canada may go on to design more advanced aircraft and engines, but none will have the significance to Canada's Aircraft Industry of the CF-100 and its Orenda powerplant. These marked a general acceptance of the necessity for Canada to remain independent of foreign sources in military aircraft. They also showed that in the big leagues of advanced aircraft and engine development, Canada could more than hold her own.