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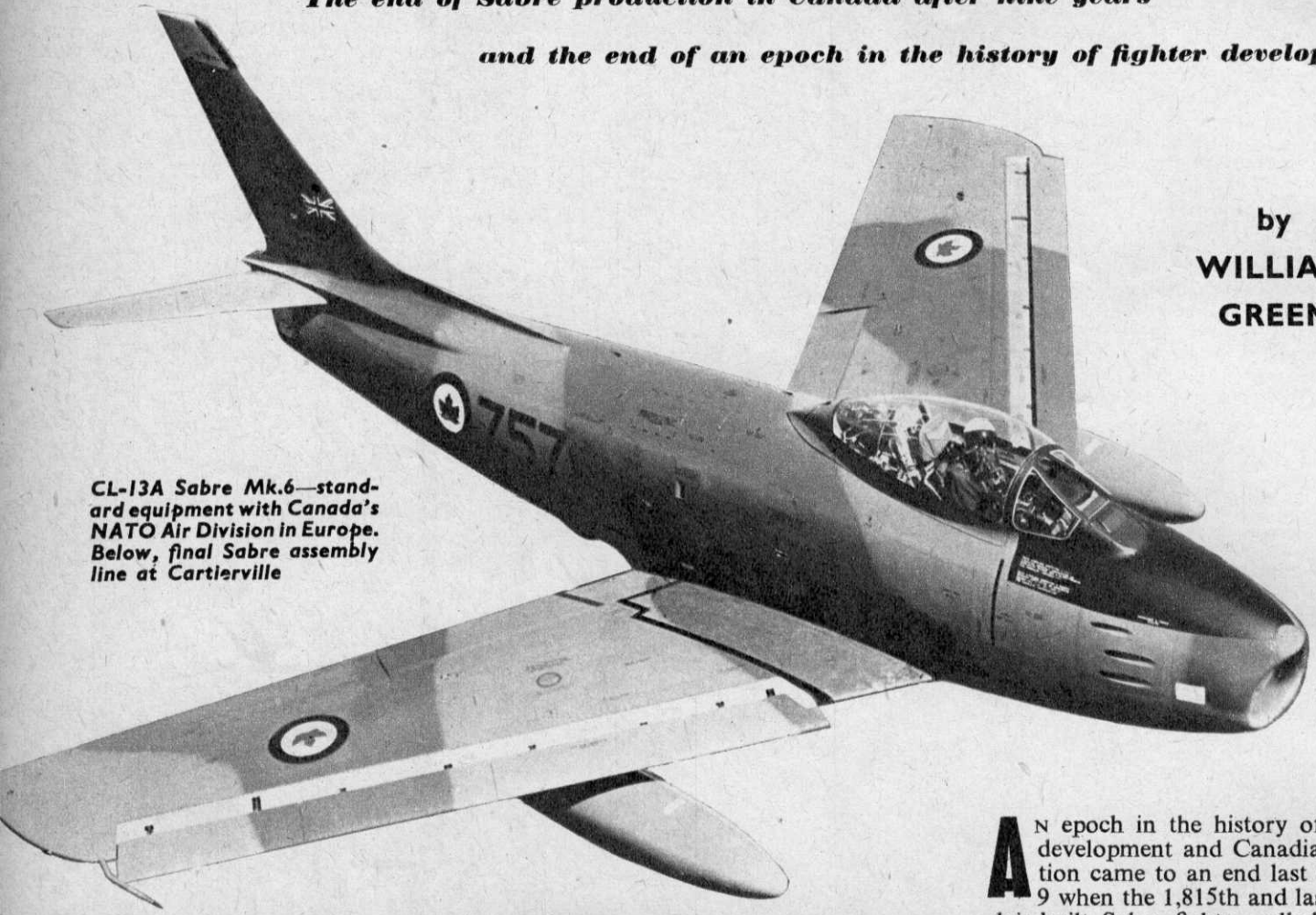
CANADAIR DELIVERS THE LAST

The end of Sabre production in Canada after nine years—

and the end of an epoch in the history of fighter development



by
WILLIAM GREEN

CL-13A Sabre Mk.6—standard equipment with Canada's NATO Air Division in Europe. Below, final Sabre assembly line at Cartierville

AN epoch in the history of fighter development and Canadian aviation came to an end last October 9 when the 1,815th and last Canadair-built Sabre fighter rolled off the company's assembly line in Saint Laurent, Montreal. Destined for the air arm of the Federal German Republic, this aircraft was the *last* production example of the world's *first* swept-wing, transonic fighter; it brought to a close the nine-year programme of Sabre production in Canada which began in 1949 when war clouds once again darkened the horizon, and the western world began to re-arm; it terminated the production life of one of the truly immortal fighters of all time.

Of the 1,815 Sabres built at Cartierville, more than 1,500 are currently flying with the air forces of nine nations—Canada, Germany, South Africa and Colombia, which countries purchased them directly from Canadair, and the United States, Greece, Italy, Turkey and Yugoslavia, which obtained them by inter-governmental arrangements.

At the beginning of Canadair's Sabre programme, when a manufacturing licence was obtained from North American Aviation, almost ninety per cent of the 15,000 parts and components for each aircraft had to be obtained from the United States because the Canadian aircraft

Sabre

Sixty-first production Sabre Mk.6

CANADAIR CL-13B SABRE MK.6

Power Plant: One Orenda Engines Orenda 14 axial-flow turbojet with two-stage turbine rated at 7,275 lb.s.t.

Armament: Six 0.5-in. Colt-Browning machine guns.

Weights: Empty, 10,811—11,143 lb.; loaded, 16,094—16,426 lb.; maximum, 17,611 lb.

Performance (at 14,044 lb.): Max. speed, 710 m.p.h. at sea level, 680 m.p.h. at 10,000 ft., 620 m.p.h. at 36,000 ft.; initial climb rate, 11,800 ft./min.; time to 40,000 ft., 6 mins.; tactical radius (clean), 363 mls.; max. range (with 333 Imp. gals. in external tanks), 1,495 mls.

industry lacked the facilities and the technicians to produce them. But Canadair immediately began the establishment of Canadian sources of supply, assisting sub-contractors and suppliers to establish facilities, providing complete design data, and training sub-contractors' personnel in specialised processes and techniques. Canadian electrical, electronics, hydraulics, plastics and rubber industries had to expand to meet the demands of the Sabre programme, and the result was that, by 1956, nearly eighty-five per cent of the Sabre's components were made in Canada.

The Canadian government first decided to manufacture the Sabre under licence early in 1949, and, in August of that year, placed an order for one hundred machines with Canadair. Little was it thought at that time that more than eighteen times this number of Sabres would be produced over the nine years that were to follow. Initially, it was planned to manufacture the F-86A, and the first aircraft of this type to be built by Canadair, dubbed in Canada the CL-13 Sabre Mk. 1, and bearing the RCAF serial number 19101, flew for the first time on August 9, 1950, with A. J. ("Al") Lilly—at that time Canadair's chief test pilot and now the company's sales director—at the controls. This was just a year after the contract had been signed, and four months before the F-86A was to make aviation history by meeting the MiG-15 in combat over Korea.

Because the main runway at Cartierville Airport, which Canadair's factory adjoins, was in course of being lengthened, the aircraft had to be towed to Dorval for its first flight, and a few days later, Lilly became the first man in Canada to exceed Mach unity while flying this machine, which, incidentally, is still intact, and cocooned at Lethbridge, Alberta.

The first Canadair-built Sabre Mk. 1 was destined to be the sole example of its type for, in the meantime, North American Aviation had evolved the F-86E with the "all-flying tail," and Canadair immediately introduced this major change on the preliminary production line, the first Canadian F-86E, or Sabre Mk. 2 (19102), flying a mere two weeks after the first F-86E built by North American at Los Angeles!

The first Sabre Mk. 2s were delivered to the RCAF early in 1951, and by 1952, when Canadair supplied sixty Sabre Mk. 2s to the USAF under the designation F-86E-6-Can to supplement deliveries to Korea, the original order had been increased by nearly 800 per cent. Some of the Sabres supplied by Canadair to the USAF seven years ago are still flying with the USAF at Tucson AFB, Arizona, and with the Utah Air National Guard, and with other units.

In December, 1951, Canadair was asked by the RCAF to study the possibility of installing the Canadian-designed Orenda turbojet in a Sabre airframe. The 100th production airframe (19200) was selected for the test and, with a 6,000 lb. s.t. Orenda 3 engine, was designated Sabre Mk. 3. This aircraft, which was to be used in May, 1953, by Jacqueline Cochran to raise the women's air speed record, served as a prototype for later Orenda-powered Sabres, and still exists at St. Johns, Quebec.

During the early 'fifties, there was considerable anxiety in RAF Fighter Command Headquarters over the state of

The first of 1,815 Canadian Sabres: the original CL-13 Sabre Mk.1.

First production CL-13 Mk.2 — second Sabre built by Canadair

285th production Sabre Mk.2 now serving with Turkish Air Force

CL-13A Mk.5—first production version with Orenda engine. Below, Sabre experimentally fitted with afterburner

Britain's air defences. No British swept-wing transonic fighter appeared likely to achieve service status for two or three years and, to ease this anxiety, early in 1953 it was decided to obtain a supply of Canadair Sabres for the RAF. The original allocation was 376 aircraft, although a further batch raised this number to 400, and the first of these were standard Sabre Mk. 2s.

With the 353rd (19453) aircraft off the assembly line, Canadair had introduced a number of modifications to the cabin air conditioning and related cabin layout, and this version was dubbed Sabre Mk. 4. Like the Mk. 2, the Mk. 4 retained the General Electric J47-GE-13 turbojet, and for some three years twelve RAF squadrons flew these aircraft, logging more than 120,000 flying hours before they were overhauled and passed on to the air arms of Italy, Greece, Turkey and Yugoslavia.

Orenda Turbojet

In 1953, the first fruits of the exhaustive testing of the sole Sabre Mk. 3 were reaped. Tests with the Orenda-powered Sabre had been highly successful, and Orenda Engines had evolved a special version of the Canadian turbojet for Sabre installation—the Orenda 10 of 6,355 lb. s.t. The 791st machine (23001) off the Cartierville assembly line was the first aircraft to receive this new engine and, dubbed CL-13A Sabre Mk. 5, was completed on July 21, 1953, and flew for the first time nine days later, on July 30. The Orenda engine was slightly larger in diameter than its American predecessor, necessitating the enlarging of the frame openings over the engine bay, the provision of different pick-up points, and some minor local structural changes.

The Sabre Mk. 5 employed the "6-3 leading edge," in which the chord of the wing was increased six inches at the root and three inches at the tip, and the slats removed and replaced by small fences at roughly seventy per cent span. This wing had been introduced on late production Mk. 4s, and although it raised stalling speed and produced a yaw-and-roll effect before the stall, which necessitated a faster landing approach, it resulted in benefits at the upper end of the Sabre's speed range, 1.5 g at Mach 0.92 at 30,000 feet being gained before buffeting appeared. The Sabre Mk. 5 could attain an altitude of 40,000 feet in half the time taken by the Sabre Mk. 2, despite a 500-lb. increase in loaded weight, this height being attained in nine minutes.

On April 20, 1954, Canadian Defence Minister Claxton, officiating at a ceremony marking the completion of the 1,000th Canadian Sabre, said: "It is the first time in Canada's history that an aircraft company has produced one thousand first-line planes." Seven months later, on November 2, 1954, the very much improved Sabre Mk. 6, or CL-13B, began to leave the assembly line with aircraft number 1161 (23371). Three hundred and seventy Sabre Mk. 5s had been manufactured, and seventy-five of these were later to be presented to the German Federal Republic by the Canadian government.

The Sabre Mk. 6 differed from its predecessor in having the 7,275 lb. s.t. two-stage Orenda 14 turbojet, which radically improved the fighter's climb rate and altitude performance. Normal loaded weight was reduced from the 16,900 lb. of the Sabre Mk. 5 to 16,094-16,426 lb. (varying according to modifications on individual aircraft), and an altitude of 40,000 feet could be reached in two-thirds of the time taken by the Mk. 5—six minutes! In 1955, the RCAF's No. 1 Air Division in Europe began to receive the improved fighter, which, although primarily a high-altitude interceptor, could be used for ground attack with bombs and rockets. The CL-13B Sabre Mk. 6 was undoubtedly among the finest day fighters extant.

Despite its greatly improved climb and altitude performance, the Sabre Mk. 6 was still, of course, subsonic in level flight, although Mach unity could be exceeded in a 45° dive, and the day and age of the level-flight supersonic fighter had dawned. The Canadair design staff accordingly began investigations into the possibility of extending the Sabre's life well into the supersonic age. Without a complete redesign, the Sabre could not attain supersonic speeds on the level, but this is not all-important if an interceptor is equipped with supersonic homing missiles, whereas rapid climb to altitude is! One Sabre Mk. 6 was, therefore, experimentally fitted with an afterburner and tested by the National Aeronautical Establishment. A proposed production version with an afterburner was designated CL-13C, and the CL-13D was a project in which climb and acceleration were to have been boosted by an Armstrong Siddeley Snarler rocket motor. The CL-13E was a standard Sabre Mk. 5, in which the fuselage was refaired to take some advantage of the area rule theory, while the CL-13F was a proposed two-seat all-weather version of the Mk. 6.

Last Sabres

A two-seat training variant based on the North American TF-86F but powered by the Orenda 14 was designated CL-13G, although this progressed no further than the project stage, as did also the single-seat CL-13H with all-weather radar. The CL-13J was another proposal for increasing the fighter's climb and acceleration by installing Bristol simplified afterburning. The Sabre Mk. 6 was, however, destined to be the last production version of this remarkable fighter. In 1956, the Colombian government purchased six Sabre Mk. 6s, and the South African government acquired thirty-four fighters of this type. The last 225 Sabre Mk. 6s produced at Cartierville were for the German Federal Republic, and more than 300 members of the Luftwaffe were sent to Canada to be trained by the RCAF to fly these aircraft. The majority of the Sabre Mk. 6s built reverted to the automatic leading edge slats which were modified in order to combine their low-speed handling benefits with the high-speed benefits of the "6-3" leading edge. In all, 655 Sabre Mk. 6s were built.

The Canadair Sabres now flying can be expected to remain in service of the various nations for some time to come, particularly the Mk. 6 version, and it is possible that the RCAF will extend their service life by adapting them to carry infra-red homing missiles.

A successor? At the present time, the RCAF have not finally chosen its future single-seat fighter, but that it will be of U.S. design is certain. Whatever the fighter chosen, it will have to be good if it is to endear itself to its pilots in the same way as the immortal Sabre. ●