

**PROFILE
PUBLICATIONS**

The
Canadair
Sabre

NUMBER

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CANADAIR SABRE Mk. 6 of 2nd Staffel,
Jagdgeschwader 71 "Richthofen,"
Federal German Air Force
(Luftwaffe), c.1958.





by Gerhard Joos

The Canadair Sabre

A Sabre Mk. 6 of No. 439 Sqn., No. 1 Wing, Royal Canadian Air Force from Marville, France displays the Squadron's colourful "Sabre Tooth Tiger" fin insignia. (Photo: R.C.A.F.)

You could be sure of seeing them every clear day over Southern Germany, the Rhine Valley or Southern France; tiny darts, flashing silver in the sunlight at the tips of beautiful swelling contrails. Soon they were criss-crossing the flawless blue of the sky, forming bizarre patterns, soaring straight upwards without warning, hesitating momentarily at the peak of their climb and then falling back towards the earth at ever-increasing speed; then, as they raced down the sky, they would suddenly seem to hang motionless, or to disappear entirely, snatched out of sight by an invisible hand. In stable weather conditions this would continue until the clear sky was completely overcast by their drifting, merging contrails, which took on the shape of high cirrus clouds. They were silently demonstrating the outstanding manoeuvrability of one of the finest fighter aircraft in the history of military aviation; the Canadair Sabre.

But this was not their only significance. They were bearing witness to the approaching close of the most fascinating chapter in military flying; the conventional day combat, challenging to both men and machines, and offering victory to the most successful combination of able pilot and sound aircraft. The fighter had to climb fast, accelerate quickly, turn tightly even at high altitude, and provide a stable platform for weapons delivery after the pilot had placed it in the best possible attacking position. These requirements were laid down in the First World War and remained valid in principle until the closing chapter of the career of the pure day fighter, when the Sabres finally rolled to their last rest.

GENESIS OF THE CANADAIR SABRE

When Canada entered the North Atlantic Treaty Organisation its Air Force had equipment which was rapidly becoming obsolete. A modern first line fighter aircraft was needed to enable the R.C.A.F. to fulfil its new requirement in Europe, and the choice fell logically on the best aircraft which existed at that

time, the North American Sabre (U.S.A.F. designation F-86). (See *Profile* No. 20.)

Since a large number was needed, licence production in Canada was intended. In 1949 an agreement was signed by North American Aviation and Canadair Ltd., of Montreal, to build an initial batch of 100 F-86A's. N.A.A. was to supply the drawings, and about 90% of the components were also delivered by the United States to Cartierville airport, near Montreal, where the final assembly was taking place. (When the Canadian Sabre production finally ended 85% of all components and the engines were produced in Canada.) There was an exchange of engineers and some 46,000 drawings were sent to Canadair.

The Canadian version of the F-86A received the designation CL-13 Sabre Mk. 1. It was identical with the F-86A-5 and was powered by a General Electric J47-GE-13 turbojet engine, producing 5,200 lb. static thrust. It carried the serial number 19101 and flew for the first time on 9th August 1950 from nearby Dorval airport, where it had been towed whilst the Cartierville runway was being extended. This was just a year after the contract had been signed, and a few days later it went supersonic for the first time. Meanwhile N.A.A. had developed the F-86E which offered better performance, thus the sole Mk. 1 was the only aircraft built in Canada to F-86A standards.

The second aircraft built by Canadair was a CL-13 Mk. 2, equivalent to the F-86E. It also used the J47-GE-13 engine, and 350 examples of this type were built, starting with serial number 19102. The first F-86E flew on 23rd September 1950, and the first Sabre Mk. 2 followed just one month later in October 1950!

It was essentially similar to the Mk. 1 but had an "all-flying tailplane", which was introduced with the F-86E after careful flight testing of this new control system. Instead of the mechanically adjustable stabilizer for trim control of the F-86A, the F-86E's elevator and horizontal stabilizer were controlled

and operated as one unit. The horizontal stabilizer was pivoted at its rear spar so that the leading edge was moved eight degrees up and down by normal stick movement. The elevator was mechanically linked to the stabilizer and moved proportionately to stabilizer movement. Elevator travel was slightly greater than stabilizer travel which became effective during the last portion of stick movement at the lowspeed range.

The new system eliminated many undesirable compressibility effects, such as loss of control sensitivity at high Mach numbers, and more positive action and greater control effectiveness with less control surface movement were afforded by the controllable horizontal tail. It had no trim tabs as trimming was performed by changing the control stick's neutral position and thereby the angle of incidence of the horizontal tail plane. The irreversible hydraulic system eliminated the customary stick 'feel', rendering necessary the installation of an artificial 'feel' bungee system to provide the pilot with the necessary control force feelings. A new flat windshield was introduced with the F-86E-10 which was also adopted for the Canadian Sabres during the production process.

Meanwhile Orenda Engines Ltd. were working on a Canadian designed engine to match the Sabres airframe, and the first example, the Orenda 3, which delivered 6,000 lb. static thrust, was installed in the 100th production aircraft, 19200, which became the sole Mk. 3 version. This engine was the prototype for the Orenda 10 production engine.

The Sabre Mk. 3 was used by Jacqueline Cochran to raise the women's speed record. She achieved 652.552 m.p.h. over a 100-kilometre course on 18th May 1953, and 675.471 m.p.h. over a 15-kilometre closed course on 3rd June 1953.

In 1952 the first example of the new production version, the Mk. 4, was completed. It introduced changes in the compass, cabin air conditioning system, pressurization controls and canopy release mechanism. The canopy could now be jettisoned separately in case of emergency landing, instead of only upon ejection. Beginning with the 555th production aircraft, the elevator trim actuator was moved from near amidships to the rear of the fuselage. Apart from these changes the Mk. 4 was similar to the N.A.A.-built F-86E.

Following experience gained with early Sabres which had automatically extending wing slats, N.A.A. engineers were searching for means to

Sabre Mk. 5, manufacturers' number 1111, at the top of a loop during a production test flight. (Photo: via the author)



improve the Sabre's high-altitude performance. At the suggestion of test pilots a fixed leading edge was tried which eliminated the drag-producing effects of the extended slats. Three test aircraft so modified showed immediate improvement. These fixed leading edge wings were extended six inches at the root and three inches at the tip and were often referred to as the '6-3' extension. Changes of airflow across the wing required the addition of five-inch high wing fences at 70% of the span, and wing area was increased from 287.9 to 302.3 square-feet. The most important advantage was the delay of buffeting at tight turns thus enabling the pilot to fly tighter turns at higher g-loads. It also gave slight improvement in speed and range. However it also brought along a disadvantage, losing the excellent low speed characteristics of the slatted wing, which were of special importance during the landing. The stalling speed increased from 111 knots to 125 knots, thus increasing approach speed and landing run. An undesirable yaw-and-roll effect prior to the stall also accompanied the modification.

Originally it was intended to equip the Mk. 4 with the Orenda engine, but this was changed in favour of similarity with the F-86E. The first version to use the new Orenda 10 engine, which delivered 6,355 lb. static thrust, was the CL-13A Sabre Mk. 5. This model, also called 'The Hard-edge Five', used the new '6-3' extended leading edge with wing fences. The

A section of Mk. 6 Sabres near St. Hubert, P.Q., in the summer of 1955, flown by pilots of No. 1 Overseas Ferry Unit.

(Photo: R.C.A.F.)





Aircraft of No. 441 Sqn., No. 1 Wing, R.C.A.F. in the intermediate markings of 1952. (Photo: R.C.A.F.)

Squadrons as the initial part of the N.A.T.O. commitment.

New air bases for the R.C.A.F. had to be built: Marville and Gros Tenquin in France, and Zweibrücken and Soellingen in Germany. No. 1 Fighter Wing was the first wing to be sent overseas. It moved initially to North Luffenham in England as a temporary home base until its final station, Marville, was ready to receive the unit.

first Mk. 5, 23001, was completed on 21st of July, 1953 and took the air for the first time a few days later on 30th of July. It had a clear advantage over the Mk. 2 by reaching 40,000 ft. in nine minutes, only half the time of its predecessor.

The Orenda engine was slightly larger in diameter than the J-47, necessitating enlargement of the frame openings over the engine bay, provision of different pick-up points, and some minor local structural changes. Empty weight was increased from 11,000 lbs. to 11,365 lbs., and loaded weight (clean) from 14,640 lbs. to 14,936 lbs. Sabre Mk. 5A was the designation applied to those aircraft in which certain radar and gun sight units had been removed and replaced by ballast.

On 20th April 1954 the 1,000th Canadair Sabre was completed, and the Mk. 5 version production run had reached a total of 370. It was followed by the last and best Canadian Sabre version, the CL-13B Sabre Mk. 6. This aircraft was equipped with the two-stage Orenda 14 engine, which delivered 7,275 lb. static thrust. The first example, 23371, was completed on 2nd November, 1954, and climb rate and altitude performance were again considerably improved. Empty and loaded weights were less than those of the Mk. 5. With the exception of some early aircraft the Mk. 6 reverted to the slatted wing to combine its excellent low-speed characteristics with the advantage of the '6-3' leading edge. This, in combination with the weight saving and increased thrust of the Orenda 14, made the Mk. 6 the best of all Canadair-built Sabres. In fact it was the best version in overall performance of all Sabre versions built, including the FJ-4 Fury. For comparison, performance data for the Mk. 5 and Mk. 6 can be taken from a table appearing at the end of this Profile.

A total of 655 Mk. 6s were built, and the complete number of Sabres built by Canadair totalled 1,815, the last one being completed on 9th of October, 1958. 36 Mk. 6s ordered by Argentina were cancelled due to lack of foreign exchange, and 24 Mk. 6s intended for Israel were cancelled for political reasons.

SERVICE RECORD

The Royal Canadian Air Force received the lion's share of the Canadair Sabres to form Canada's N.A.T.O. contingent in Europe, the No. 1 Air Division. It consisted of four day fighter wings, Nos. 1, 2, 3 and 4, each comprising three squadrons. The first Sabres coming off the assembly lines were delivered to No. 1 Wing with Nos. 410, 439 and 441

With the European commitment, the R.C.A.F. started a new scheme of sending its aircraft to the old world. After official formation of No. 1 Wing, on 1st of November 1951 at North Luffenham, and the preparation of the airfield to accommodate the whole wing, the time was ripe on 30th May, 1952 for a complete squadron of Sabres Mk. 2, No. 439, to take off from Uplands, outside Ottawa, to make the first leg of their Atlantic crossing to their new base. The operation was called 'Leap Frog One', and the first part of the route was via Bagotville, and Goose Bay, Labrador, where the actual ocean crossing began. Next stop was at Bluie West One, Greenland, then Keflavik, Iceland, and across to R.A.F. Kinloss in Scotland. The final leg was from there to North Luffenham. Despite some bad weather, which kept the squadron grounded during their trip for some days, the crossing was safely and successfully completed, and on 15th of June, 21 Sabres shut down their engines at North Luffenham for the first time. Only the Squadron's C.O. was forced to give up early during the crossing due to an attack of appendicitis.

This first Atlantic crossing acted as the pattern for many more crossings in both directions. The majority of the squadron's ground crew were flown over before the Sabres' departure, and other ground crews accompanied the Sabres to provide maintenance *en route*. Two days before their departure from Uplands the squadron was inspected by Defence Minister Claxton, who referred to their coming flight as "... one of the greatest demonstrations of teamwork yet to be found in any operation, civil or military."

Sabre Mk. 5 23314 over Ontario.

(Photo: R.C.A.F.)



(Right, top) a Sabre 6 in the red nose and tail flashes of 1 Staffel, JG 71 "Richthofen"; (right, below) yellow decoration at nose and tail identifies JB-238 of JG 72 as a 2 Staffel machine. (Photos: Stephen Peliz). (Below, left) a Sabre Mk. 6 of JG 73 in flight. (Photo: the author).

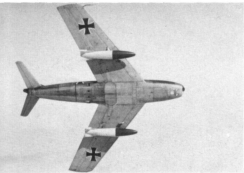


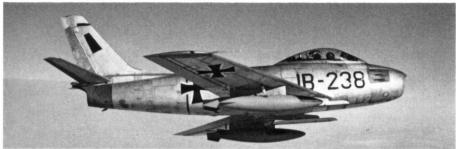
Arrival of 439 Sqn. brought the R.C.A.F.'s No. 1 Fighter Wing to its full complement of three Sabre squadrons. Aircraft for the first two squadrons (Nos. 410 and 441) made the ocean crossing aboard *H.M.C.S. Magnificent*. The example set by No. 439 Sqn. was soon to be followed as R.C.A.F. fighter strength in Europe was building up. No. 2 Wing, comprising Nos. 416, 421 and 430 Squadrons, flew its Sabres over the Atlantic to Gros Tenquin in October 1952; No. 3 Wing, Nos. 413, 427 and 434 Squadrons, flew to Zweibruecken early in 1953; and No. 4 Wing, Nos. 422, 414 and 444 Squadrons, made it to Soellingen in September 1953, bringing the Air Division up to its operational strength of about 300 Sabres. No. 1 Wing moved to Marville, their final home base, early in 1955.

When they first arrived in Europe the Canadian Sabres had a superior performance to any other N.A.T.O. aircraft and provided a powerful reinforcement for the alliance. Their main task was patrolling the Air Defence Identification Zone along the 'Iron Curtain' and standing 'Zulu alert' to intercept unidentified aircraft. In all exercises, especially gunnery competitions, the Canadian Sabres and their pilots proved again and again their superior qualities and remained to this standard to their last days, when the Sabres gave way to the CF-104. To maintain their performance margin, the original Sabre 2s and 4s were replaced early in 1954 by the Sabre 5, and these in turn gave way to the Mk. 6 at

the end of 1956. None of the R.C.A.F. Sabre squadrons had remained in Canada after their formation, leaving air defence there solely to the CF-100, which eventually also replaced one of each European Fighter Wing's Sabre squadrons. In mid-1956 two non-regular units in Montreal, Nos. 401 and 438 Squadrons, received some of the discarded Sabre 5s, and later on six of the Auxiliary squadrons flew eight each of these fighters, together with Vampires, T-33s and Harvard Mk. 4s. Pilot training was given by the No. 1 (Fighter) O.T.U., the Sabre Transition Unit at Chatham, New Brunswick, which operates the last Sabres within the R.C.A.F. in order to provide pilots with experience in high subsonic performance and in low level tactics before they start flying the Mach-2 CF-104.

The direct ferrying of the Sabres for the Air Division to Europe led to the formation of a special unit for the purpose of bringing new aircraft from the manufacturer to the customer. This was No. 1 O.F.U. (Overseas Ferry Unit), R.C.A.F., which was formed in October 1953. This unit worked most successfully during its existence, using the route which was first tried by No. 439 Squadron until it was disbanded in June 1957 after the last Sabre 6 had been delivered to Europe and the last Sabre 5 had been flown back to Canada. More than 1,000 Sabres and T-33s were flown across the Atlantic without a single accident, the pilots of the O.F.U. setting a safety record for thousands of jet hours, a trans-Atlantic ferry record and also a cross-Canada speed record. The latter was set by two pilots of the O.F.U., F/L. Ralph Annis and F/O. R. J. 'Chick' Childerhose, on 29th August 1956, when they flew their Sabres from





This natural-metal-finish Sabre 6 of JG 72 is fitted with Sidewinder launch rails inboard of the drop-tanks. (Photo: via the author)

Vancouver to Halifax, Nova Scotia, in five hours and 30 seconds with one intermediate landing at Gimli for refuelling which was completed in nine minutes.

THE CL-13 FOR EXPORT

Sixty Sabres of the Mk. 2 version were delivered to the U.S.A.F. in 1952 to accelerate the build-up of fighter strength in Korea. They were built by Canadair on contract AF-9386 and served with 4th and 51st Wings, and later with Air National Guard units.

The next nation to use the Canadair Sabre was Great Britain, where it was decided in 1952, despite some criticism, to adopt it until the first British swept wing jet fighter became available. The R.A.F. received 430 Sabres, both Mk. 2 and Mk. 4 aircraft, under M.D.A.P. funds. The first three Mk. 2s (with R.C.A.F. serials 19378, 19384 and 19404) arrived at Prestwick, Scotland, in October 1952. They, and the others to follow, were flown to England by No. 1 Long Range Ferry Unit (later No. 147 Sqn.) of Transport Command in an operation known as 'Bechers Brook', which lasted from 8th December 1952 to 19th December 1953. The first batch was handed over to the R.A.F. in a ceremony at Abingdon in January 1953, and in May shortly before the end of the Korean war, Nos. 3, 67 and 71 Sqn. were the first units to receive the type, thus becoming the first swept wing R.A.F. fighter squadrons. Most of the Sabres went to ten R.A.F. squadrons in Germany (Nos. 3, 4, 20, 26, 67, 71, 93, 112, 130 and 234) as part of N.A.T.O. Second A.T.A.F., but two U.K.-based fighter command squadrons, Nos. 66 and 92, were also flying Sabres. They gave the R.A.F. a fighter in the 700 m.p.h. class at a critical period when East-West relations were tense. In the spring of

1955 the first Hunters arrived in Germany, gradually replacing the Sabres, and by the end of June 1956 all the Sabres had been replaced by Hunters, the last to leave being XB670 of No. 3 Squadron.

As the newer Mk. 5 and Mk. 6 Sabres became available for the R.C.A.F., most Mk. 2s and 4s were fitted with '6-3' extended leading edge wings and otherwise modernized. They were then designated F-86E(M)—the 'M' denoting modified—and under the M.D.A.P. programme delivered to other N.A.T.O. nations. Beginning in July 1954, Greece received 104, and Turkey 105, of these fighters. Most of the ex-R.A.F. Sabres were also transferred to other European nations, with 180 going to Italy and 121 to Yugoslavia. Italian units using the Sabre included the 4^a *Aerobrigata*, comprising the 9^a, 10^a and 12^a *Gruppi*, and the 2^a *Stormo*. These Sabres reached international fame with thrilling displays executed by the various aerobatic teams of the I.A.F., the R.H.A.F. and T.A.F., and in Canada Sabres were used by the R.C.A.F.'s 'Golden Hawks' aerobatic team which was disbanded after having finally used the Mk. 6.

The Mk. 6 version was also exported. Six aircraft were built for Colombia, and delivered in June 1956. Thirty-four Mk. 6s were completed for South Africa, where they equipped Nos. 1 and 2 Squadrons until their replacement in 1964 by the Mirage IIICZ.

Largest foreign customer, apart from the R.A.F., was West Germany. This country received the final Mk. 6 production batch of 225 aircraft which equipped three day fighter wings, JG 71 'Richthofen', JG 72 and JG 73. Pilot training was provided by *Waffenschule* 10 in Oldenburg. When the F-104G (see *Profile* No. 131) became available JG 71 exchanged all its Sabres for the new type, but JG 72

Scramble take-off by four Mk. 6's of No. 434 Sqn., No. 3 Wing, R.C.A.F., at Zweibrücken, Germany. (Photo: via the author)



The first of 34 Sabre Mk. 6's purchased by South Africa; and (below) a line-up of S.A.A.F. Sabres of No. 2 Squadron at Waterloof Air Station in Pretoria. (Photos: via the author, and S.A.A.F. Official)



and 73 continued to use Sabres in the fighter-bomber rôle with one squadron each, the other squadrons using the Fiat G-91R3 (see *Profile* No. 119). Both units' designations were changed to JABO G (for Jagdbombergeschwader) 43 and 42 respectively, and a number of Sabre 6s are still flying at the time of writing. Germany also received 75 Mk. 5s, which were primarily used by WS 10 for conversion training*. During 1966 ninety surplus Sabres Mk. 6 were sold by Germany to the Imperial Iranian Air Force.

MODIFICATIONS AND DEVELOPMENTS

Canadair had also worked on further developments of the Sabre to increase its production and extend its usefulness. One of these projects was the CL-13C. This was a Sabre 6 using an afterburner. One aircraft was test-flown with such an afterburner at the National Aeronautical Establishment, and the last ten Sabre 6s for the Luftwaffe were in fact held back by Canadair for possible use in the test programme before being delivered to Germany about a year after the others.

The CL-13D was another suggested variant, which was to have an Armstrong-Siddeley Snarler rocket motor, while the CL-13E was the 21st Mk. 5 with the fuselage faired to the so-called 'Coke Bottle Shape' to test an application of the area rule. This last variant was said to show no discernible improvement in performance.

Other projects were the CL-13G, a two-seat training version similar to the American TF-86F; the CL-13H, with all-weather radar equipment, and the CL-13J, which was to utilize a simplified Bristol Siddeley afterburner for better climb and acceleration. None of these variants however passed the design

* For a relatively short period.

stage, and the Mk. 6 remained the final production version.

A number of aircraft were modified for various purposes. One of the R.A.F. Sabres, XB982, had a Bristol Siddeley Orpheus engine installed and was test-flown in 1958. A number of German Mk. 6s were equipped with Sidewinder rocket-launching rails, mounted between drop tank and fuselage. The Sabres Mk. 6 of JG 71, JG 72 and WS 10 of the Luftwaffe were equipped with Mk. 5 Martin Baker ejection seats. (This modification was first introduced in the F-86F's of the Norwegian Air Force). The installation required some minor changes in the cockpit and a new canopy opening and lock mechanism. Ejection is through the plexiglass of the canopy. Another modification applied to a few of Germany's Mk. 6s was the installation of Del Mar RADOP weapons training systems. This consists of a wing-mounted launcher, a radar reflective, lightweight tow



When the F-104G Super Starfighter became available, the day fighter wings JG 72 and JG 73 were redesignated as Jagdbombergeschwader (fighter bomber wings) and continued to operate the Sabre Mk. 6 in this rôle under the designations Jabo 43 and Jabo 42 respectively. JC-121 displays the early markings of Jabo 42, and JC-362 the unit's latest style with black identification codes outlined in white. A colour illustration of the fin insignia may be found on page 11 of this *Profile*.

(Photos: Stephen Peltz, and the author)



target and a tow reel for high speed target towing. The tow target can be extended to a maximum length of about 25,000 feet at speeds up to 400 Kts. or Mach 0.9. Aircraft thus equipped have been handed over to a civil contractor and are flying with civil registrations. They are probably the only jet fighters so far to be entirely used by a civilian operator and for some years to come will be the last Sabres flying in Germany.

THE SABRE DESCRIBED

The following description applies to the Mk. 6, principal differences between earlier Marks having been discussed in the preceding text. The Canadair Sabre was primarily designed as a single-seat, high speed, high-altitude day fighter, characterized by a swept back wing and empennage, but has also been used to attack ground or naval objectives with gunfire, bombs, chemicals or rockets.

The wing is a cantilever monoplane featuring a modified NACA 0012-64 wing section. Its depth is 10.8 ft. at the root (fuselage centre line) and 5.4 ft. at the tip, with maximum thickness at 50 per cent. chord. Sweep back is 35° 41' along 25 per cent. chord line. Dihedral is 3 degrees and wing area is 287.9 square feet. Automatically extending leading edge slats are fitted, extension depending on airspeed and angle of attack.

The fuselage is an all-metal, flush-riveted, stressed-skin structure of oval section with hydraulically-operated lateral dive brakes, which open within two seconds. The tail is a cantilever monoplane, all-metal structure with 35 degrees sweep back on all three surfaces. The horizontal stabilizers have 10 degrees dihedral.

The pilot is protected fore and aft by armour-plate bulkheads. Powerplant is the Orenda 14 axial-flow,



An F-86E(M), ex-Mk. 4, of the Italian Aeronautica Militare in the markings of the Lancéri Neri aerobatic team.

(Photo: via the author)

turbo-jet engine, providing approximately 7,275 lb. static thrust at sea level. An electric starter-generator unit is provided for starting on an external power source. The engine fuel system consists of two engine-driven variable-delivery pumps, a proportional flow control unit, acceleration control unit, jet pipe temperature limiter and other components. Engine requirements are sensed through a servo-mechanism which controls pump delivery according to throttle opening. Ram pressure and altitude are also controlling factors. An emergency fuel system is also installed, providing manual control of the fuel flow upon being set in operation by a switch in the cockpit.

The aircraft fuel system consists of five self-sealing fuel cells; two in the fuselage, one in the centre wing section and one in each outer wing panel. Fuel is supplied by gravity feed from internal cells to the centre wing cell and to the engine. Two fuel booster pumps in the centre tank normally supply fuel under pressure to the engine fuel system.

The main fuel supply can be augmented by installing a 120-U.S. Gall. or 200-U.S. Gall. drop tank under each wing, from where it is forced to the forward fuel



Mk. 5's of the R.C.A.F. aerobatic team "The Golden Hawks" in their earlier colour scheme and (below) the team's latest marking style, with "GH" for monogram.

(Photos: R.C.A.F. and Stephen Peltz)



Mk. 5 Sabres of the R.C.A.F.'s No. 2 Wing at Gros Tenuin, France; 'AS' code indicates No. 416 Sqn., 'BH' No. 430 Sqn. (Photo: R.C.A.F.)

A low-speed study of a Sabre 6; note partially extended wing slats. (Photo: R.C.A.F.)



SERIAL NUMBERS FOR CANADIAN SABRES

Type	Manufacturing No.	R.C.A.F. serial No.	Other Serial No.
Sabre Mk. 1	1	19101	
Sabre Mk. 2	2-199, 201-352	19102-19199 19201-19452	60 of these were delivered to U.S.A.F. receiving U.S.A.F. Serial Nos. 52-2833 to 52-2892
Sabre Mk. 3	100	19200	
Sabre Mk. 4	353-790	19453-19890	
Sabre Mk. 5	791-1160	23001-23370	
Sabre Mk. 6 for R.C.A.F.	1161-1590	23371-23760	
Sabre Mk. 6 for Luftwaffe	1591-1815		
Sabre Mk. 6 for Colombia			2021-2026
Sabre Mk. 6 for S. Africa			350-383

R.A.F. serial numbers for Mk. 2 and 4 aircraft delivered to the R.A.F.:—XB530-XB550, XB575-XB603, XB608-XB646, XB664-XB713, XB726-XB740, XB790-XB839, XB856-XB903, XB941-XB996, XD102-XD138, XD706-XD736, XD753-XD781.

cell by compressed air drawn from the engine compressor section.

Three separate hydraulic systems are provided: utility, normal flight control and alternate flight control. The utility system is powered by an engine-driven pump and supplies the landing gear, speed brakes, nose wheel steering and wheel brakes.

The landing gear and wheel fairing doors are hydraulically actuated and electrically controlled and sequenced. Upon raising the gear handle to UP-position the main gear doors and the nose gear door open and close automatically when the gears are retracted. For lowering the gear sequence is similar.

The normal flight control system is also powered by the engine-driven pump and operates the ailerons and horizontal tail surfaces. The alternate flight control system is powered by an electrically-driven pump and operates the ailerons and horizontal tail surfaces in the event of normal system failure. The rudder is cable-operated and is provided with an electrically actuated trim tab. In emergency the main landing gear is lowered by gravity and the nose gear by an emergency accumulator. The nose wheel steering system is electrically engaged by depressing a switch on the control stick grip and hydraulically powered and controlled by the rudder pedals.

Electric power is provided by a 28-volt, 400 ampere engine-driven d.c. generator. A 24-volt, 36 ampere-hour battery serves as a stand-by source. A main and an alternate three-phase inverter supplies alternate current to the flight instruments.

Electrically-operated slotted-type wing flaps are

(Below) Sabre Mk. 4's of the R.A.F.'s famous "Shark Squadron", No. 112, were based at Bruggen, Germany with the 2nd Tactical Air Force.



In the foreground, a Sabre Mk. 6 of No. 410 Sqn., No. 1 Wing, R.C.A.F., in the background can be seen the tails of two No. 439 Sqn. aircraft. The wing was originally based at North Luffenham in England while its facility at Marville, France, was being prepared. (Photo: Stephen Peltz)



The R.C.A.F.'s No. 4 Wing arrived at its Soellingen base in September 1953; shown here are machines of (above) No. 422 Sqn., and (below) No. 414 Sqn.; the latter was photographed in 1958. (Photos: Stephen Peltz and R.C.A.F.)



fitted. Each flap is actuated by its own electric motors and circuits. They are mechanically interconnected to prevent uneven operation and to provide protective operation should one motor fail.

The Sabre is equipped with conventional navigation lights. For night operation two retractable lights are located in the fuselage nose. They are controlled by a switch on the left forward console. When the

(Photo: Air Ministry/Ministry of Defence)

Sabre Mk. 6 of No. 459 Squadron, No. 1 Wing R.C.A.F.; Marville, France.



No. 459 Sqn., R.C.A.F.



No. 427 Sqn., R.C.A.F.

Sabre Mk. 6 of No. 427 Sqn., No. 3 Wing R.C.A.F.; Zweibrücken, Germany.

No. 234 Sqn. R.A.F.



Sabre Mk. 4 of No. 112 Sqn. R.A.F.,
2nd Tactical Air Force;
Brüggen, Germany.



No. 234 Sqn.
R.A.F.



1 Staffel, JG 72 ('Viking').

Sabre Mk. 4 flown by F.Lt. R. A. Brown of No. 234 Sqn. R.A.F.,
2nd T.A.F.;
Gelsenkirchen,
Germany.



Sabre Mk. 6 of 1st Staffel,
JG 71 'Richthofen', Luftwaffe.



JG 71
'Richthofen'.



Sabre Mk. 6 of 2nd Staffel,
JG 72, Luftwaffe; Leck, Germany.



Sabre Mk. 6 of 1st Staffel, JG 72, Luftwaffe;
Leck, Germany. (Fin as JB-235, red.)



Sabre Mk. 6 of No. 2 Sqn., South African Air Force;
Waterloof Air Station, Pretoria, S.A.



Jabo 42, Luftwaffe
(see photos.)



2 Aerobrigata.

Sabre Mk. 6 of Colombian Air
Force; German Olono
A.F.B., Palanquero,
Colombia.



Colombia.



Sabre Mk. 4
of Lancia Neri aerobatic team, 2 Aerobrigata,
Italian Air Force



Two of the squadrons based at Gros Tenquin, France, with No. 2 Wing R.C.A.F. were (above) No. 421 and (below) No. 430. (Photos: R.C.A.F. and Stephen Peltz)

switch is at EXTEND, both lights illuminate and extend to landing position. When the aircraft touches the ground, the landing light goes out and the taxi light extends further to taxiing position. Both lights are automatically extinguished when in the retracted position.

The canopy is electrically operated, controllable from inside and outside and can be jettisoned in case of emergency. In-flight opening is possible up to 215 Kts.

Eighth-stage air from the engine compressor is delivered to the cockpit at selected temperatures for heating, ventilation and pressurization. Above 12,500 ft. a 2.75 p.s.i. or a 5 p.s.i. pressure differential schedule is available. For breathing, a low pressure oxygen system with normal minimum pressure of 400 p.s.i. is provided.

The communication equipment consisted initially of the following: an AN/ARC-502 V.H.F. transmitter-receiver, an AN/ARN-6 radio compass and an APX-6 I.F.F.-radar. This was later changed, and German Sabres were modernized by installing UHF radio and ultimately TACAN navigation equipment.

For its operational use the aircraft is equipped with an A-4 gun-bomb-rocket sight. Range data for gunnery operation is supplied to the sight by AN/AG-501 radar ranging equipment or by pilot-operated manual range control. Three .50-calibre machine guns are mounted on each side of the engine air intake. (This armament set has been standard on all marks of Canadair Sabres). Three hundred rounds of ammunition may be carried for each gun, although the normal load is 267 rounds. A pneu-



matically-operated gun charging system is installed. A removable bomb rack can be installed on the lower surface of each outer wing panel. Each rack will carry single bombs from 100 to 1,000 lb., bomb clusters up to 500 lb. size, a chemical tank, or one fragmentation bomb rack assembly. The A-4 sight is used for bomb sighting and automatic bomb release. Controls are provided for normal and emergency release of either demolition or fragmentation bombs. Alternatively eight rockets may be carried under each wing on four removable rocket launchers, each holding two rockets one above the other.

Canadair Sabres have formed the backbone of R.C.A.F. fighter strength for several years. Sabres have seen, and still do see, service in many parts of the world, under many flags, and have earned an unrivalled reputation for excellence in performance and dependability; their flying characteristics are superb, and no pilot who ever took a Sabre up into the air has judged it other than enthusiastically.

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LEADING PARTICULARS

	Mk. 5	Mk. 6
Over-all dimensions:		
Wing span ...	37.1 ft.	37.1 ft.
Length ...	37.5 ft.	37.5 ft.
Height ...	14.7 ft.	14.7 ft.
Weights—approximate:		
Empty—clean a/c ...	11,365 lb.	10,850 lb.
Loaded—clean a/c (full fuel, oil, ammunition and pilot) ...	14,936 lb.	14,170 lb.
with two 120 U.S.-gall. drop tanks ...	16,704 lb.	16,135 lb.
with two 200 U.S.-gall. drop tanks ...	17,881 lb.	17,315 lb.
Total internal fuel ...	429 U.S.-galls.	429 U.S.-galls.
Power plant ...	One Orenda 10 providing 5,870 lb.s.t. at sea level	One Orenda 14 providing 7,275 lb.s.t. at sea level
Performance:		
Take off run (clean a/c, +15°C., sea level, no wind) ...	1,850 ft.	1,150 ft.
Normal rate of climb, conditions as above at 93% r.p.m. engine power ...	5,900 ft./min.	6,900 ft./min.
Climbing time to 40,000 feet ...	12.5 min.	10 min.
Military-power rate of climb at 97.5% r.p.m. engine power ...	8,100 ft./min.	9,800 ft./min.
Climbing time to 40,000 feet ...	7.5 min.	7 min.
Maximum power rate of climb at 100% r.p.m. engine power ...	9,700 ft./min.	11,800 ft./min.
Climbing time to 40,000 feet ...	6.5 min.	6 min.
Landing distance ...	2,150 ft.	1,850 ft.
Maximum range with two 200 U.S.-gall. drop tanks at 40,000 feet ...	1,220 air mi.	1,550 air mi.
Stalling speed with 1,500 lbs. of fuel, power off ...	105 kts.	99 kts.
Final speed with 1,500 lbs. of fuel, power off ...	145 kts.	135 kts.