

Modern Weapons for a

THE RCAF'S CF-100-4 IS THE WORLD'S MOST HEAVILY ARMED FIGHTER

AN AIR FORCE is only as good as the airplanes it flies, a fundamental canon of the science of aerial warfare that was forcibly illustrated by the Battle of Britain. Ergo, an effective air force must have fighting machines that are better than anything a potential enemy might have to throw against it.

This is truly an elastic yardstick and the difficulties of applying it are accentuated by the need to plan military aircraft some five to eight years in advance. Faced with such critical requirements and equipped with such a

crude unit of measurement, Air Force planners have become pastmasters in the use of the educated guess. One result is that the preciseness of the engineering that goes into the design and manufacture of a modern complex military aircraft is likely to be in inverse ratio to the vagueness of the predictions concerning the international situation and the state of the aeronautical art eight years in the future on which requirements must be based.

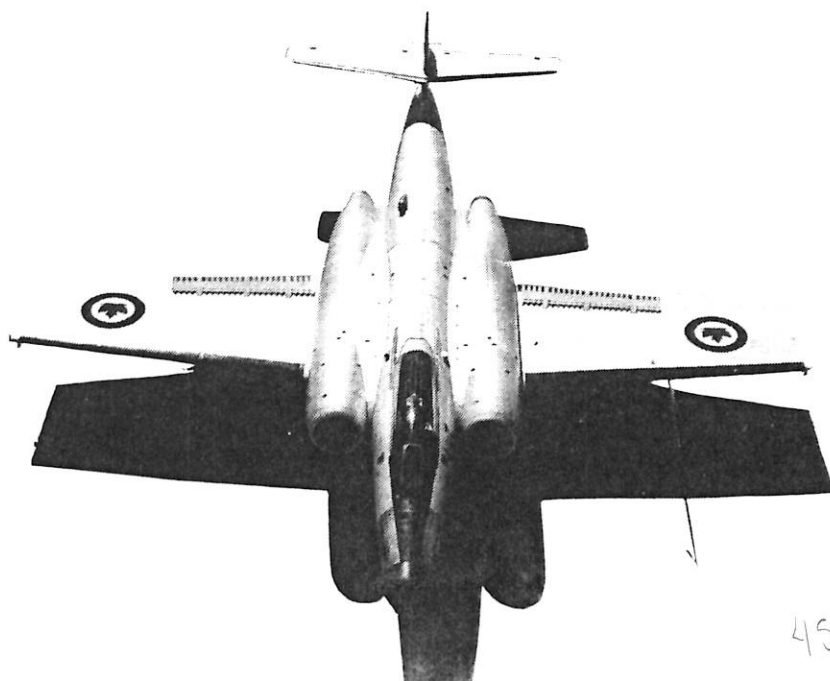
Of course, difficulties do not cease once the outlines of a future require-

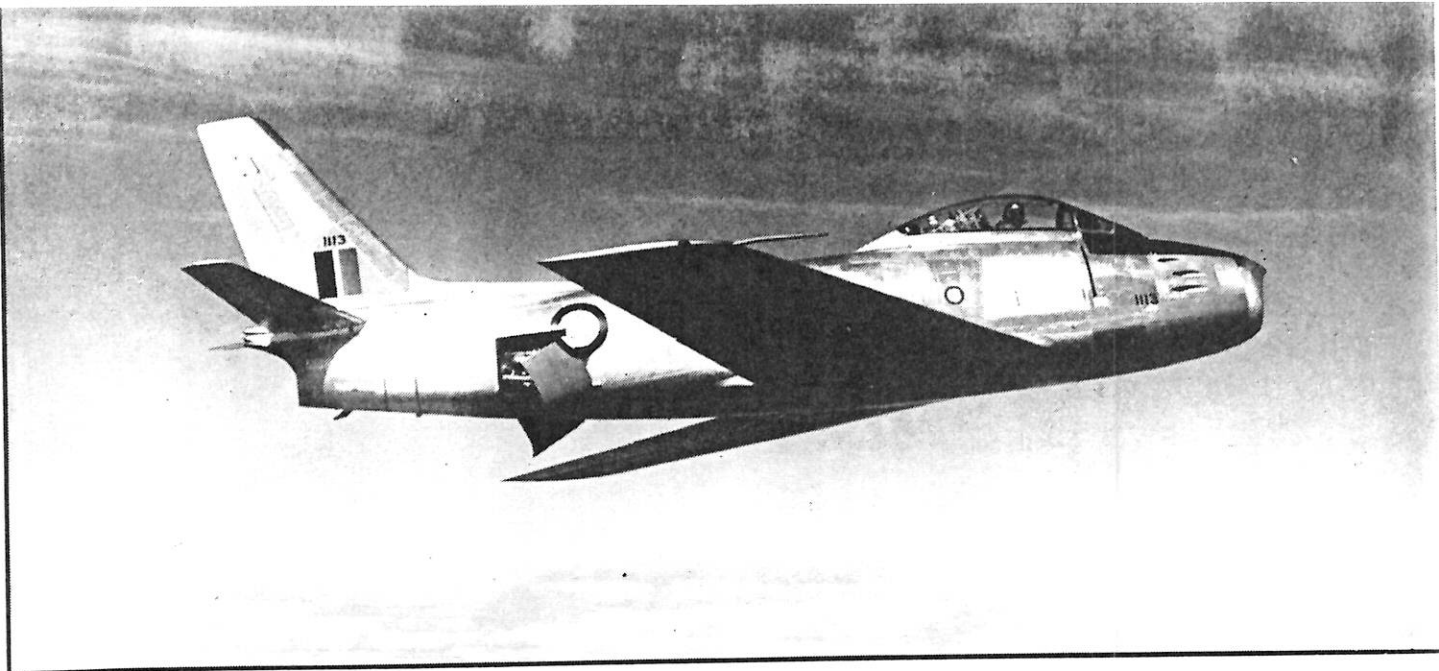
ment have crystallized sufficiently to permit the drawing up of a detailed specification. Rather, the real troubles are just beginning. Enemy developments, as they become known, must be countered by incorporating design improvements at whatever stage of design or development the aircraft happens to be. Then there is always the serious problem of trying to incorporate the improvements without delaying production so much that the airplane is obsolete by the time it gets into squadron service.

Expert Opinion: Addressing the Toronto branch of the Canadian Aeronautical Institute recently, Air Commodore F. S. Carpenter, Chief of Air Operations at AFHQ, summed up the headaches faced in ordering new aircraft to future requirements.

"Always," A/C Carpenter said, "the enemy appears to be getting something a little bit better, a little bit sooner. Always, we can get something a little better if we wait a little bit longer. The problem of compromise is important." The upshot was, he explained, that . . . "you can't have anything but an interim weapon to meet an interim requirement."

If an air force is only as good as the airplanes it flies, then how good is the RCAF? In the final analysis, the quality of a fighting machine





for a Modern Air Force

NO DAY FIGHTER IN NATO SERVICE SURPASSES THE ORENDA SABRE

must be measured by its success, or lack of success, against the general types of enemy airplanes it is intended to combat.

By this measure, then, one of the RCAF's two main weapons, the Sabre, is guaranteed to be effective, for the time being at least. The other one, the CF-100, since it has never been submitted to the ultimate test of a military airplane — mortal combat — is a relatively unknown quantity. However, all the intelligence available concerning the current potential enemy's capabilities, indicates that the CF-100 could anticipate a high degree of success. Let's take a closer look at the RCAF's CF-100 and, later on, the Sabre, in order to better understand the full capabilities of both of these fine aircraft.

all weather

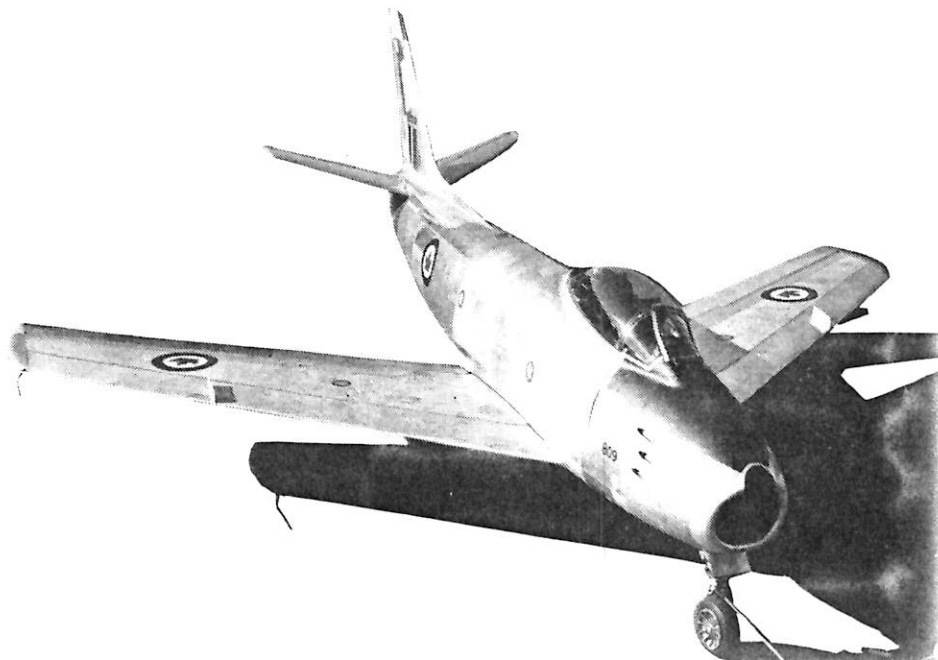
THE AVRO CANADA CF-100 represents Canada's first experience with the design and production of a military aircraft through all stages from original conception to operational service at the squadron level. In the most recent variant, the Mark 4, which is the current production version, the RCAF has what is believed to be the most heavily armed fighter aircraft in service anywhere in

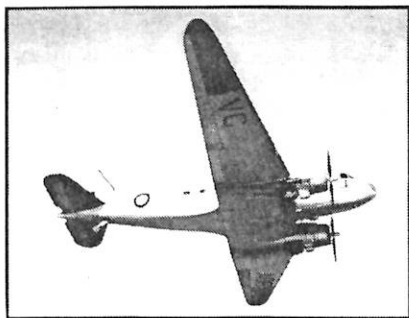
the Western World.

Its basic armament includes a ventral gun pack fitted with eight .50 in. calibre Browning machine guns, plus a ventral rocket pack which apparently holds an impressive 72 rockets. At the wingtips are rocket pods, each of which holds an additional 30 air-to-air unguided missiles. This gives a total rocket armament of 132 "Mighty Mouse" folding fin 2.75 in. diameter missiles. Some idea of the offensive power of the CF-100 can be gained from the information that each of these rockets has a striking force of a 73 mm. (nearly 3 in)

shell.

Further development work to boost even this powerful armament is in progress. Tests now being conducted, if successful, will result in the Mk. 4 being fitted with a heavier calibre gun than the .50 in. weapons now installed. Though the type of gun referred to has not been revealed, it could be the new British "Aden" 30 mm. cannon, which is standard armament on the new generation of British dayfighters now going into service with RAF squadrons. Probably four "Adens" would be substituted for the eight Brownings.





DAKOTAS for transport operations.



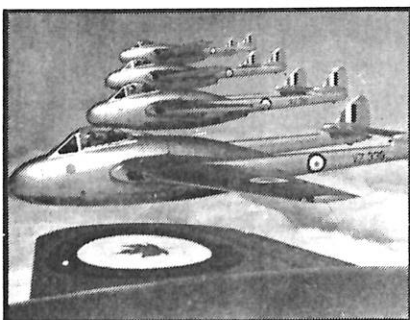
CANSOS for northern flying.



MUSTANGS for Auxiliary squadrons.



CHIPMUNKS for reserve training.



VAMPIRES the Auxiliaries.

Falcon Missile: Mention has also been made of the Hughes F-98 Falcon air-to-air missile for possible use on the CF-100. Reports say that six of these will be mounted at each wing-tip. The Falcon is an air-to-air missile equipped with automatic tracking radar (which endows it with the ability to "home" on the target). It is powered by a solid propellant and extensive use is made of glass fibre-reinforced phenolic plastic in the manufacture of the main body, wings, and stabilizers. Besides being mooted as CF-100 armament, it is intended for use with the Convair F-102 supersonic interceptor.

At some point, the Canadian guided missile under development by the Defence Research Board will probably be used with the CF-100. However, it will likely be some time before this weapon will go into operational use. Little information has been released on the missile beyond the cautious statement from former Defence Minister Brooke Claxton last spring that "the guided missile development is progressing favourably and the results of the initial series of launchings have been encouraging."

So much for the armament, present and future.

The motive power of the CF-100 is also being increased. First production versions of the Mk. 4 have been flying with the Orenda 9's of 6,500 lbs. st. th., but those now coming off the line have the new Orenda 11. This engine is an improved model, lighter in weight than its predecessors, and featuring a two-stage turbine in place of the single-stage type. The Series 11 is rated at over 7,000 lbs. st. th. Thus, with a considerably improved power/weight ratio as a result of both a boost in power and a reduction in weight, the new engine should result in a material improvement in CF-100/4 performance, either in the form of greater weight carrying ability, or better take-off and climb altitude, and superior performance at altitude.

Fire Control: In the nose of the Mk. 4 is fitted the Hughes APG-40 radar for target spotting and fire control. Tied in with this automatic fire control system is the Minneapolis-Honeywell MH-11B automatic pilot, which takes over control of the aircraft once the radar operator "locks on" the target. It is understood that the attack

sequence is entirely automatic, from closing in on the "hostile" to firing when within range, followed by the break away.

The all-weather CF-100, though a bulky aircraft, has numerous times exceeded Mach 1.0 in dives, the first straight-wing operational aircraft to do so. All-up weight of the first prototypes was about 30,000 lbs., but this has grown to some 37,000 lbs. in the Mk. 4. It should be remembered in noting this weight increase that the prototypes carried no armament or radar equipment. Part of the greater weight is also due to the beefed up wing structure, which was found to be necessary after a strenuous RCAF flight test program on one of the first machines.

To assist in all-weather flight, the flying surfaces of the CF-100 are all fitted with NRC/Goodyear electro-thermal anti-icing pads. Engine intake anti-icing is provided by means of a simple freewheeling alcohol-spray boom arrangement. The boom is mounted on the engine nose fairing and windmills aerodynamically, spraying alcohol mixture from its tips into the intake.

day fighter

SECOND MEMBER of the RCAF's fighting team is the Canadair-built F-86E Sabre, a day fighter which is in service mainly as an "air superiority" interceptor with the Air Force's No. 1 Air Division in Europe.

A great number of these aircraft in several models have been manufactured at the Montreal plant of Canadair Limited. This number, in fact, is now approximately 1,300, though not all of these are in service with the RCAF. Some 370 were transferred from new production to the U.K. as a Canadian Mutual Aid Contribution (only the airframes were paid for by Canada, the U.S. covered the cost of the J-47 engines); an additional 120 machines were purchased outright by the U.S. Government and 60 of these saw service in Korea with the USAF, while the other 60 were sent to the U.K., bringing the total number of Canadair-built Sabres transferred to the RAF to 430. More recently, again as a contribution to Mutual Aid, Canada has supplied 164 Sabres to Turkey and

Greece (82 each). These latter were J-47-powered versions made surplus as the result of the re-equipment of the Air Division with Orenda-Sabres. Altogether, therefore, 594 Canadair Sabres have been sent to other nations.

More Powerful: In its latest version, the Sabre 6 represents a further improvement of the breed, having even greater motive power at its disposal than the Sabre 5, which is the first production version of the Orenda-powered Sabre. Because the latter is now in service in considerable numbers at squadron level, whereas the first of the Mk. 6's are just now coming off the production line, the Mk. 5 will be dealt with first.

The Mk. 5 version of the Canadair-built F-86E Sabre has been the subject of deliveries to the RCAF since early this year. It differs little in external appearance from earlier production versions the Mk. 2 and the Mk. 4, the main points of variance being found in the wing. This features the "6-3" hard leading edge, which in translation means that the leading edge of the wing has been extended 6 inches at the root tapering to 3 inches at the tip, while simultaneously the leading edge slats have been removed. An addition are small fences located at the leading edge at about two-thirds span positions.

The 6,500 lbs. st. th.-Orenda 10 powers this Sabre variant in place of the 5,200 lb.-General Electric J-47 turbojet with which all the previous F-86's were fitted. The 25% increase in thrust, together with the modifications to the wing, have resulted in material improvements to performance in the take-off and climb categories, as well as better performance at high altitudes.

Best in Service: The Sabre 5 is generally recognized as being the best dayfighter in squadron service anywhere in the free world and is certainly capable of meeting on equal terms anything the Soviets can send into the air in squadron strength at the moment.

The successor in production to the Sabre 5, is the Mk. 6, already mentioned. This model, so far as is known, differs from the 5 only in that it is powered by the Orenda 14, which is understood to be identical to the Orenda 11 now going into CF-100/4's,

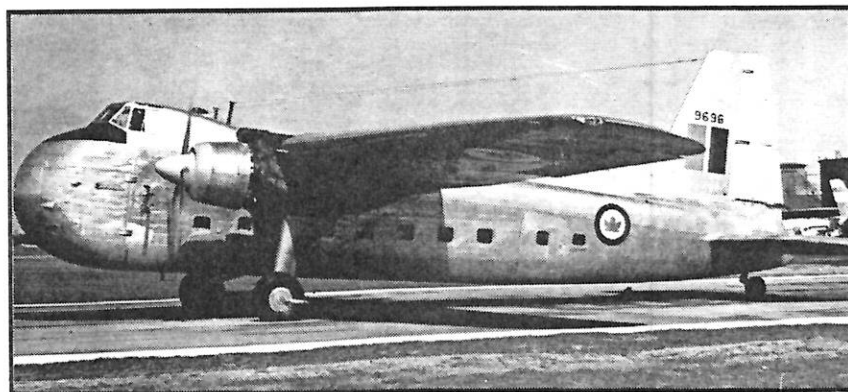
(Continued on page 110)



CANADAIR C-5, only animal of its kind in the world, is basically a North Star re-engineered to take Pratt & Whitney Wasps. It is used for VIP transport.



NORTH STAR, long distance workhorse for Air Transport Command, is the RCAF's principal heavy transport. It gave sterling service on Pacific Airlift.



BRISTOL FREIGHTER, three of which are in service with the RCAF overseas. Attached to 30 AMB, they support operations on Continent of 1 Air Div.



DE HAVILLAND COMET, at present grounded pending outcome of inquiry in the U.K., is one of two used for VIP transport and simulated bomber attacks.

MODERN WEAPONS

(Continued from page 69)

except that it has been adapted for installation in the Sabre. The Orenda 14, therefore, has a thrust of "over 7,000 lbs.", representing a further increase in power for the Sabre of 500 lbs. This should be sufficient to give the Sabre 6 a slight edge over even the Sabre 5, and, of course, a marked advantage over other comparable fighter types.

Things to Come: What of the future? What replacements are com-

ing along to succeed the CF-100 and the Sabre? Officially, no replacement has yet been chosen to succeed the Sabre, but favor seems to have weathercocked in the direction of the North American F-100 Super Sabre, a powerful interceptor that is truly supersonic in the sense that it can and has frequently exceeded Mach 1.0 in level flight. When a Sabre successor has been chosen, it will undoubtedly be built by Canadair.

The CF-100, on the other hand, is to be followed by the CF-105, which will utilize the delta wing plan. Air-

craft design speed is reported to be some 1,200 mph with a range of 1,500 miles. Weight is expected to be quite formidable — over 60,000 lbs. The new delta interceptor will be powered by two turbojets, either the new engine now under development by Avro Canada's Gas Turbine Division, or a comparable British or American type.

CANADA'S NAVY

(Continued from page 87)

five thousand landings have been carried out without an accident.

Reflections on Landings An invention which promises to help make carrier landings even more successful is the stabilized landing mirror. This consists of a large curved mirror on a gyro stabilized mounting. A number of coloured lights are mounted on arms on each side of the mirror. Shining into the mirror is a row of lights which, due to the curvature of the mirror, are reflected as a single white light. On the approach the pilot keeps the white light centered between the coloured lights both vertically and horizontally, right down to the touch down point. The result is a near perfect landing.

Another recent development which will be incorporated in Bonaventure is the steam catapult. The old hydraulic ram and purchase system has reached its ultimate in development and is still inadequate.

The steam catapult employs a unique slotted cylinder, the piston of which is powered by steam from the ship's boilers. The cylinder is not limited in size or length and the catapult is, therefore, capable of launching the latest and heaviest types of aircraft.

HMCS Bonaventure, equipped with all three of these latest British developments, will be as modern in this respect as any carrier afloat.

CANADA'S AIR FORCE

(Continued from page 43)

vision and maintenance of the twelve-squadron Air Division in Europe. All components of the Division had arrived in Europe by this time last year, several months ahead of schedule. Now being re-equipped with new air-

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