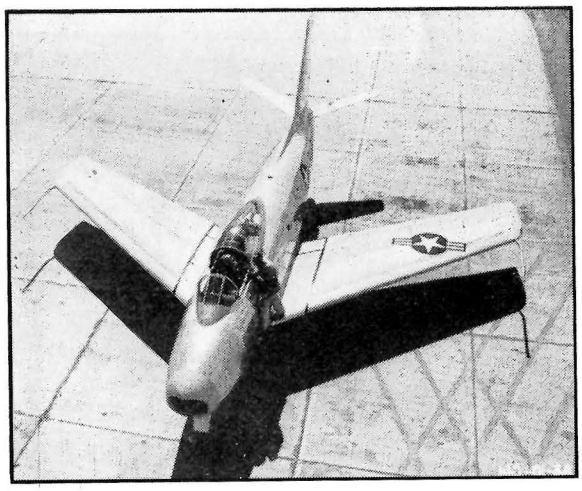
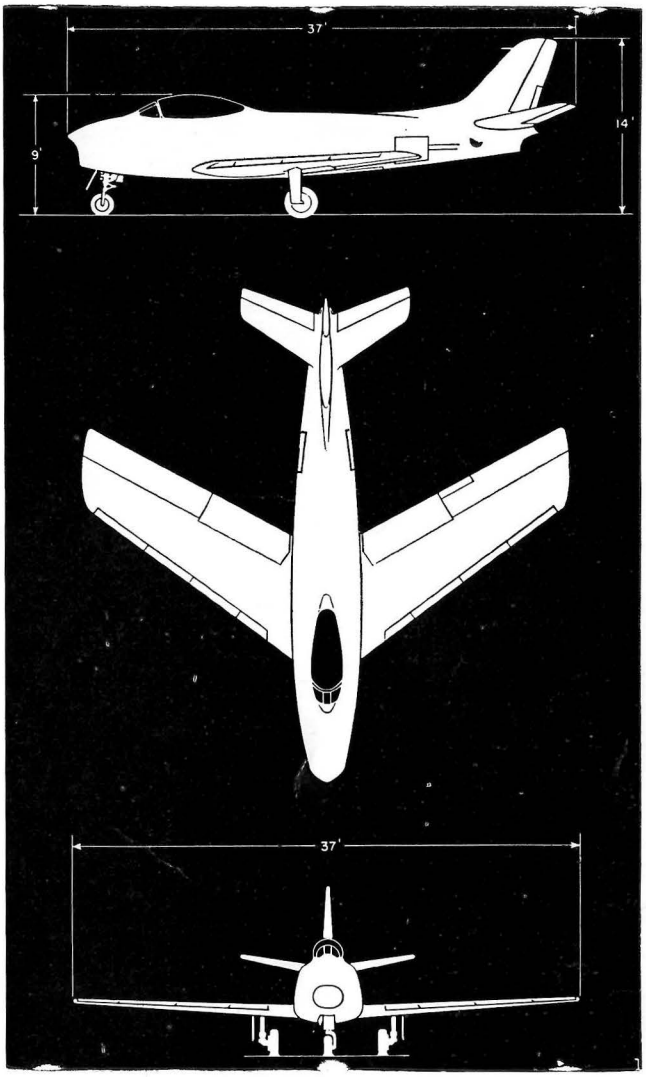


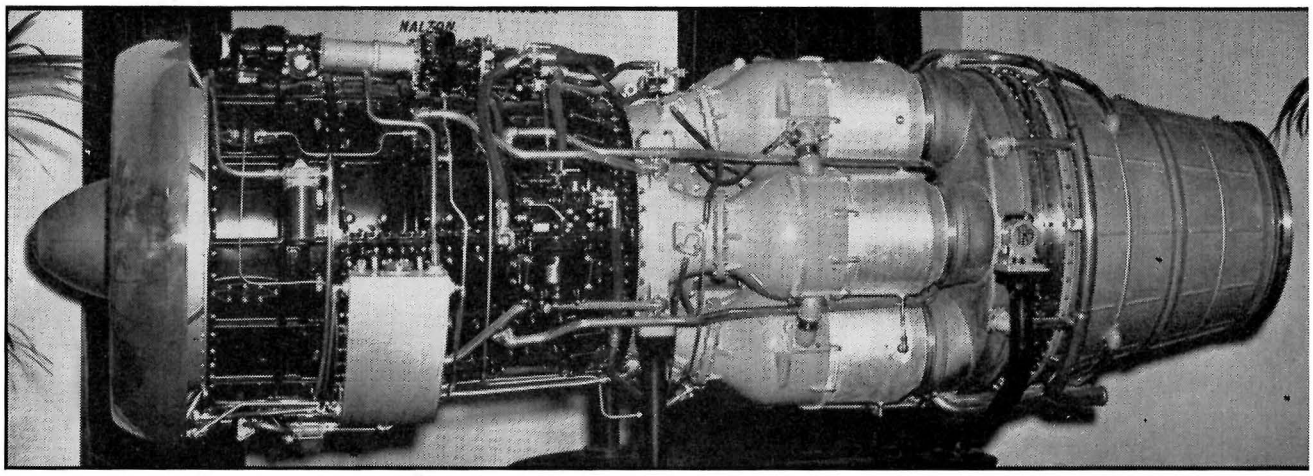


A CANADAIR PROJECT

Building the Sabre

In August of this year the first of 100 Canadair built North American F86 Sabres is scheduled to roll off the end of Canadair Limited's assembly line at the plant in Montreal. Initial stages of production are now well advanced, but the production program will not get into full swing until Canadair has completed the new addition that is being built to its main plant.

The manufacture of the F-86 by Canadair will involve several processes which are unique to the aircraft industry in Canada. Chief among these is the use of sandwich type construction in the wings, in which the structural material is laminated between inner and outer tapered skins. According to "The Iron Age" magazine, tapered sheets are a relatively recent development. Aluminum alloy wing and fuselage skins, spar webs, and other structural members



AVRO ORENDA

can be machined in a variety of shapes with thick edges, straight tapers or islands. The ease and speed of fabrication and assembly of tapered metal sheets compare favorably with conventional assemblies of multiple thickness skins and splices.

Weight Saving: The amount of weight that can be removed by tapering is the important factor. Any sheet of aluminum alloy 48 in. by 114 in. that is tapered in thickness by .005 in. will be 1.7 lb. lighter than a corresponding sheet of uniform thickness. When the thickness is tapered by .05 in., the reduction in weight will be 17 lb.

Each F-86 wing has six skins and these are tapered in both chordwise and spanwise directions. Naturally the cost of this work is high. This is because it requires special equipment consisting of a planer-type milling machine, a high-cycle milling head, and a workpiece hold-down mechanism that clamps the sheet around the edges and holds it in position by evacuating the air from under it. However, as compared with conventional assemblies considerable time is saved, so that labor cost per skin is only $7.50. Consequently the overall cost per wing is quite comparable with one in which conventional construction methods are used.

Shape Setting: Canadair is also making extensive use of stretch wrap forming for forming skins and other sheet parts. This method utilizes a Hufford Stretch Wrap forming machine and is superior to the older and better known stretch wrap forming in that parts are shaped much more accurately and waste is reduced materially. The sheet to be formed is first put under tension and then wrapped over the die, which is made to the exact dimensions of the part being formed, rather than to such a size as to allow for spring-back. After the sheet has been wrapped over the die, it is jerked sharply. This has the effect of "setting" it in the shape of the die.

Among the other interesting operations which are being employed in the construction of the Canadair F-86s are coin dimpling of rivetted joints, copper fillet brazing, and the wide use of explosive rivets. The coin dimpling is much superior to the radius type because it allows the rivets to be recessed more cleanly into the skin, resulting in the smoother surface finish which is so essential for modern high speed aircraft.

RCN AVENGERS

An undisclosed number of Grumman Avengers have been purchased from the U.S. Government for use as anti-submarine aircraft by the RCN. They will be used in that capacity by 825 and 826 Squadrons, which are now equipped with Firefly Vs.

Prior to being placed in service, the Avengers are to be fitted with additional anti-submarine equipment at Canadian aircraft plants.

Used as a wartime torpedo-bomber by the USN, the Avenger has since been adopted by that service as a standard anti-submarine weapon. It carries a crew of three and is armed with rockets, bombs and depth charges.

No. 826 Squadron will receive the machines first and will work up to carrier standards. No. 825 Squadron will make the switch later.

Keg Lining: Certain parts of the F-86 which are not under stress are made of fiberglass laminates. These include the nose section, the dorsal fin, the fin tip, etc. These laminates are molded of polyvinyl alcohol sheet and fiberglass and are cured at 350°F. The resultant parts are treated for protection against dust and rain erosion with a plastic material which was originally developed in the U.S. for the somewhat obscure and unglamorous job of lining metal beer kegs.

Though it was originally announced that the model of the North American designed fighter to be built in Canada was the F-86A, there is now some speculation that a more advanced model might be turned out by Canadair. This seems doubtful however, as the only other variant is the F-86D, which is classed as an all-weather fighter. Since Canada will have an all-weather fighter in the CF-100, it does not seem likely that the necessary features for this type will be incorporated in the Canadair-built Sabres, too. Another development of the F-86 is the XF-93, recently test flown for the first time.

Afterburning: The F-86D differs from the "A" in that the nose has been redesigned and the fuselage is some three feet longer to allow for the installation of an afterburner on the General Electric J-47 powerplant. The redesign of the nose involved lowering the nose inlet duct about a foot. A pointed cowling above the duct houses the radar installation, the result being that the F-86D has the appearance of an open-mouthed shark.

The XF-93 differs from both the F-86A and D in appearance in that it has flush type air inlets on either side of the nose, which is sharply pointed.

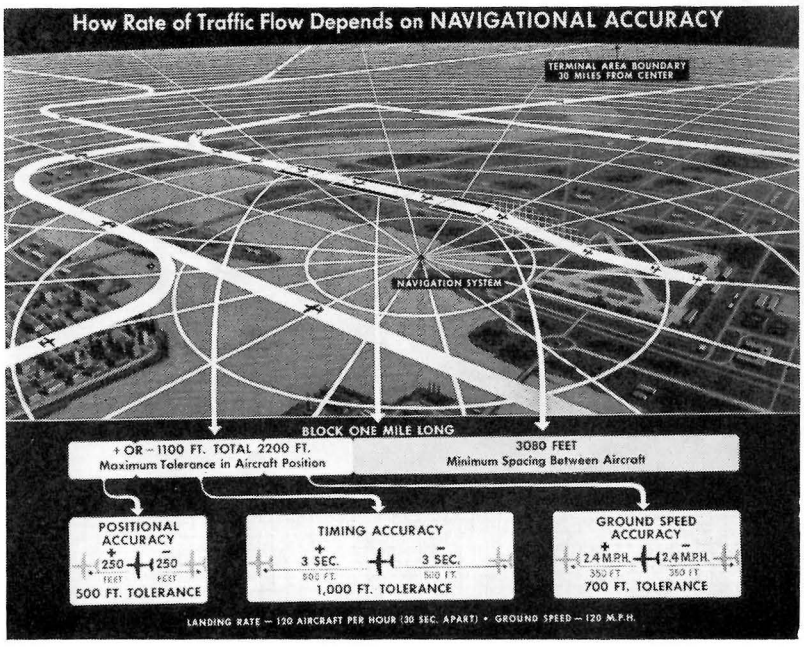
Power is by the Pratt & Whitney J-48 Turbo-Wasp P & W version of the Rolls-Royce Tay with a basic dry rating of 6,250 pounds static thrust at sea level. It is equipped with afterburner and water injection.

Orenda Testing: As can be seen from the foregoing descriptions, it is not probable that the Canadair Sabre will be anything but the F-86A incorporating all the latest modifications. Of course, there will also be the variant powered by the Avro Canada Orenda, but it is not known if this type will be given a new designation. Just how many of the Sabres are to be powered by Orendas is not yet known and will likely depend on how soon the engine successfully completes its airborne trials. Even now a Lancaster has been fitted with two Orendas at Avro Canada's Malton plant and it is expected that this machine will fly very soon.

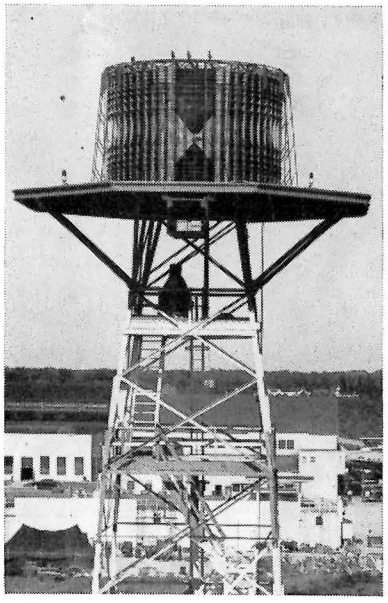
The North American built F-86 has a tactical radius of 500 miles and a service ceiling of over 40,000 feet. Its gross weight is 13,715 pounds. As is well known, this is the type of machine in which USAF Major Richard L. Johnson set the world speed record of 670.981 mph. It has also unofficially averaged 710 mph. on a flight between Dayton, Ohio, and Washington, D.C. This flight was made early in 1949.

Pilot Ejecting: The wings are fitted with automatic leading edge slats. Dive brakes open from the sides of the rear section of the fuselage, being pushed out against the slipstream by hydraulic arms. Another interesting feature is the "split" fuselage which is made so that it comes apart just about at the trailing edge root. The rear section is held on by only four bolts. This makes it possible to remove the rear fuselage entirely to work on the engine, or even to change the engine in one hour (with trained crews). The aircraft has a pressurized cabin and a pilot ejection seat.

Plans at Canadair call for fabrication of parts for the F-86s to be carried out at the extension to Plant 1, which is now nearing completion and which will provide an extra 200,000 square feet of floor space. Sub assembly and final assembly operations for the jet fighters will be located in Canadair Plant 2, also located at Cartierville (the old Noorduyn plant).



SPERRY ELECTRONIC LIGHTHOUSE



Accuracy of air navigation is one of the fundamental factors which determines the rate at which air traffic can flow in an airport terminal area. Recently two radio engineers, George B. Litchford and Joseph Lyman of the Sperry Gyroscope Company, revealed the development of a new precision navigation aid which they described as a "precision omni-directional radio range for the terminal area". The precision range, designed to facilitate movement of air traffic within an airport control zone of 30-mile radius, measures the direction of bearing from aircraft to the range station.

To show the importance of navigational accuracy as a factor which can limit the movement of air traffic, the two engineers used as an example a system in which a landing rate of 120 aircraft per hour is desired. To achieve a system with this traffic capacity they show (top cut) that the position of all aircraft in the terminal area must be determined with a bearing accuracy of at least one-tenth degree.

This accuracy is obtained with the new device, which transmits extremely short radio waves (microwaves) having a frequency of approximately 5,000 megacycles. The antenna (lower cut) is a circular lens which resembles a Fresnel lighthouse lens and performs a simi lar function. High precision is derived from microwave techniques which reduce ground reflections. A basic improvement in accuracy is gained by using a heart shaped beam to which eleven or more lobes or scallops have been added.