

## Pinching the Sabre

A Canadian adaption of the so-called "area rule" was revealed recently by Canadair Ltd. The Montreal firm, working on behalf of the RCAF's Technical Services branch, has modified a Sabre to incorporate the "wasp waist" which is characteristic of aircraft designed to take advantage of the new drag-reducing principle.

This Canadian application of the area rule was developed for the RCAF by the National Aeronautical Establishment. After preliminary work by the NAE, Canadair was asked to carry out an experimental modification of a Sabre. Canadair's engineering division then took over the project and R. G. Raven was assigned as project engineer. Initial flight trials were carried out by W. S. (Bill) Longhurst, chief of Canadair's flight operations department. The wasp waist Sabre is now at Uplands, where it is being tested by the NAE and the RCAF. No details of the effect of the modification on the Sabre's performance have been released.

The photograph at top shows the modified Sabre, while the drawing below illustrates the difference in fuselage shapes of the standard Sabre and the modified version.

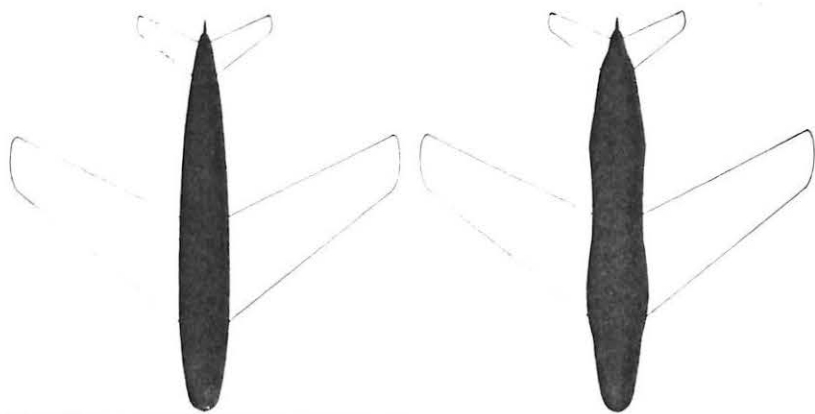
The area rule principle was originally conceived by Richard T. Whit-

comb, a young NACA scientist, who began working on the project in 1951. The new principle has already been applied to at least two U.S. production fighters, the Convair F-102A and the Grumman F11F-1 Tiger, and possibly a third, the F8U-1.

Various known as the "wasp waist", "pinch waist", "coke bottle", and "Marilyn Monroe", the area rule has been responsible for turning the F-102 from a failure to a success.

Very briefly, Whitcomb's principle is based on his discovery that drag rise is primarily a result of the combined cross-sectional area distributions of the fuselage and wing. By pinching in the fuselage where the wings are attached, the cross section area of the fuselage and wing together becomes the same as it would be for the streamlined fuselage only. This gives the least drag in the transonic range. In effect, the indented fuselage provides a convenient path for the air displaced by the wing to follow.

Where the basic design of an aircraft makes indenting the fuselage impracticable, the same end results can be obtained by adding a certain area to the fuselage, fore and aft of the wing, thus creating an artificial indentation. This is what has been done in the case of the Sabre.



The Aircraft Safety session included a paper on "Significant Problems in Air Safety", given by Jerome Lederer, who is managing director of the Flight Safety Foundation, as well as director of the Cornell-Guggenheim Aviation Safety Center; one by Group Captain Ralph C. Davis, RCAF Director of Flight Safety—"Aircraft Accident Investigation"; the third was "Recent Results of the NACA Crash-Fire Research with Jet Airplanes", given by I. Irving Pinkel, associate chief of the physics division at the NACA's Lewis Flight Propulsion Laboratory. The last paper was accompanied by a dramatic movie and still pictures which effectively dramatized the very important work that is being done by this American agency in the field of crash safety and fire prevention during crashes.

The Materials and Processes group of papers was led off by a presentation by E. H. Dix, Jr., assistant director of research for the Aluminum Co. of America . . . "Aluminum Alloys for Elevated Temperature Service." Following this paper, Canadair's chief materials & process engineer, J. J. Waller, described "Metal Bonding of Assemblies for Canadair CL-28 Maritime Reconnaissance Airplane". The session wound up with a paper titled "Materials and Fabrication Techniques for Structural Heat-Resistant Plastic Sandwiches", by Norman E. Wahl, head of the plastics section in the materials department of Cornell Aeronautical Laboratory.

During the afternoon of the final day of this second international joint meeting, the National Aeronautical Establishment Laboratories were open for inspection.

Guest speaker at the banquet Thursday evening was the Rt. Hon. C. D. Howe, Minister of Defence Production and of Trade & Commerce. Mr. Howe described the growth of the aviation business in Canada, mentioning that aircraft still had a big job to do in developing the Canadian north. He said that larger specialized aircraft were required for this job and urged that Canadian manufacturers should do something to meet this need. Mr. Howe also noted that there were some 700 aircraft now engaged in "bush operations," but that many of them were getting fairly ancient and would soon have to be replaced.