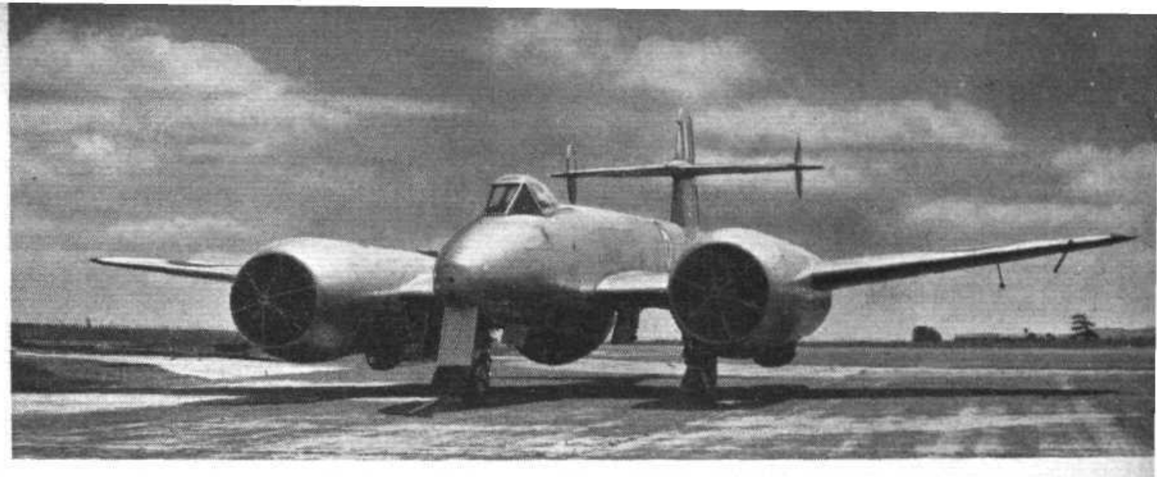

***FIRST WITH DEFLECTION:** Westland-converted to M.o.S. order, this experimental Meteor is the first British machine to employ jet deflection. It flew nearly a year ago, with S/L. L. de Vigne at the controls. The turbojets are R-R Nenes, and the deflected jet-pipes, just visible under the nacelles, exhaust beneath the cs. of g. (Another photograph appears on page 214.)*

Jet-deflector Meteor

IT may now be revealed that a jet-deflection aircraft has been flying in this country for ten months past; the machine concerned is an experimental Meteor fitted with Rolls-Royce Nene turbojets. The work of conversion and installation of the deflection units was carried out by Westland Aircraft, Ltd., under a Ministry of Supply contract, and it was a Westland pilot, S/L. Leo de Vigne, D.S.O., D.F.C., A.F.C., who first flew the aircraft at Boscombe Down last May and subsequently completed ten hours' testing.

The deflection boxes themselves were designed and constructed at the National Gas Turbine Establishment at Farnborough, whither the aircraft has now returned. The R.A.E. will continue with the experimental flying and development work. In the accompanying photograph it can be seen that the deflector jet-pipe protrudes from beneath the engine nacelle at approximately the mid-way point. This is to enable the thrust to act through the centre of gravity. The normal engine jet-pipe is also, of course, retained.

Some readers may recognize this particular Meteor, serial RA490, as a much-converted Beryl flying test-bed. The tail is now, however, that of a Mk 8, to which has been added small extra fin surfaces reminiscent of the Wyvern and the Trent-Meteor in earlier days.

In the course of his experimental flights, S/L. de Vigne has discovered that the deflection of the jet stream considerably reduces the stalling speed of the aircraft and, for example, with 60 per cent of full thrust deflected on the approach, the safe speed can be reduced by as much as 20 per cent. The pilot has a selector switch, on the port side of the cockpit, for operation of the deflector mechanism under hydraulic power.

Advantages to be gained from jet deflection have been listed as follows: (1) an aircraft can take off and land using shorter runways than hitherto; (2) the speed range can be substantially improved; (3) it is possible to produce an aircraft of smaller dimensions for a given all-up weight (saving structure weight, cost and raw materials); (4) for the pilot, it is easier to carry out an approach without changes of airspeed or attitude; (5) rate of descent can be quickly checked, or converted to climb, with little tendency to increase forward speed.

No Monopoly in Trouble

ALTHOUGH the proverbial blacks do not make a white, it is worthy of note that two of *America's* finest and most important new military aircraft have both been in trouble recently. One is the Boeing B-52A strategic heavy bomber, which is in production at Seattle and will be produced at Wichita. The chairman of the Senate Armed Services Committee, Mr. Richard Russell, testified on February 10th that the B-52 had "developed faults which have slowed down its delivery to the U.S.A.F."

The other is the North American F-100A Super Sabre. Last autumn a number of F-100s were completely destroyed, one such occurrence resulting in the death of A. Cdre. G. D. Stephenson, Commandant of the R.A.F. Central Fighter Establishment, and another killing George Welch, the test pilot principally responsible for the F-100. It was possibly the latter accident which provided the key to the problem: the machine concerned had dived from 40,000ft to 23,000ft (near Los Angeles) when it disintegrated in the air.

Early in November an order was issued grounding all F-100As in U.S.A.F. service, while weeks were spent collecting and examining fragments of the stricken machine and its instrumentation. Only when a slightly-damaged oscillograph film record was recovered was the solution exposed: the F-100 had experienced what Mr. Ray H. Rice, North American's engineering vice-president, described as "a high, nose-dive yaw" to an unprecedented angle, resulting in accelerations of at least 7g at a true airspeed of over 800 m.p.h. This condition, described by Mr. Rice as due to "aerodynamic phenomena never before experienced by man" exceeded the design limit of the aircraft.

North American have now designed a number of important modifications, which are being retrospectively made to the 100-plus machines already built. Early this month the grounding order was lifted and, following the alterations, the F-100A is claimed to be "on the brink of new high performance".

Even the well-tried Martin B-57 (Canberra) has just been grounded—by the makers—following two recent accidents.

REPORT OF THE COMET INQUIRY

THE report of the Public Inquiry into the accidents to Comets G-ALYP and G-ALYY was published* last Saturday, February 12th. Both accidents occurred over the Mediterranean, G-ALYP being lost on January 10th, 1954, and G-ALYY on April 8th, 1954. Simultaneous public inquiries into the accidents were held in London between October 19th and November 24th, with Lord Cohen as Commissioner and Sir William Farren, Professor W. J. Duncan and A. Cdre. A. H. Wheeler as assessors. Lord Cohen's report was submitted to the Minister of Transport and Civil Aviation on February 1st, 1955; it bore the signatures of all three assessors, indicating their agreement with its contents.

The major findings of the Court were that the cause of the accident to G-ALYP was structural failure of the pressure cabin, brought about by fatigue; that the cause of the accident to G-ALYY could not be definitely established, but that the explanation offered for the first accident appeared to be applicable to the second; and that neither accident was due to wrongful act, default or negligence.

The greater part of the report deals with the accident to G-ALYP, which, while operating a scheduled B.O.A.C. service from Rome to London, descended into the Mediterranean off Elba with the loss of all 35 persons on board.

Dealing first with the history of the Comet project, the report notes that in order to provide the aircraft with an economically satisfactory payload and range it was essential that its cruising height should be upwards of 35,000ft—double that of airliners then current—and that the weight of the structure and equipment should be as low as possible. The manufacturers gave special attention to the structural integrity of the pressure cabin, since the difference (8¼ lb/sq in) was about 50 per cent greater than that in general use. For the design of the basic cabin structure they adopted a multiple of the working pressure difference—referred to in the report as P—in excess of current requirements in any country. British and international airworthiness requirements called for a proof pressure of 1⅓P (under which the cabin must show no signs of permanent deformation) and a design pressure of 2P (at which the material might reach its ultimate strength), whereas de Havillands used a design pressure of 2½P and tested the cabin to 2P. They did so because they believed that a cabin which would survive undamaged a test to double its working pressure would not fail as a result of pressure fatigue, and also to ensure a larger margin of safety against the possible failure of windows, door and hatches.

Two test sections of the cabin were built. The front part, 26ft in length, was pressurized to between P and 2P some 30 times and "rather over P" 2,000 times—not to test the fatigue-resisting properties of the structure, but rather to provide assurance that it would be satisfactory as a pressure vessel. Simultaneously with this design and testing, all other parts of the structure received treatment based on the same outlook—"design to at least the current requirements, coupled with exhaustive tests".

Until about the middle of 1952, the report states, the likelihood that the fatigue-resistance properties of the pressure cabin demanded further precautions than were provided by the current static-test requirements had not been realized. In June 1953 the A.R.B. issued a paper calling for repeated applications of load (15,000 times 1¼P) in addition to the static tests; the paper also suggested that such parts as door and window frames might have to be designed to 3P. In July 1953 de Havillands undertook repeated loading tests of the test section previously referred to, which extended from the nose nearly to the front spar of the wing; the working pressure P was applied about 16,000 times. The tests were ended by a failure of the skin due to fatigue in a corner of a window, originating in a small defect in the skin.

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