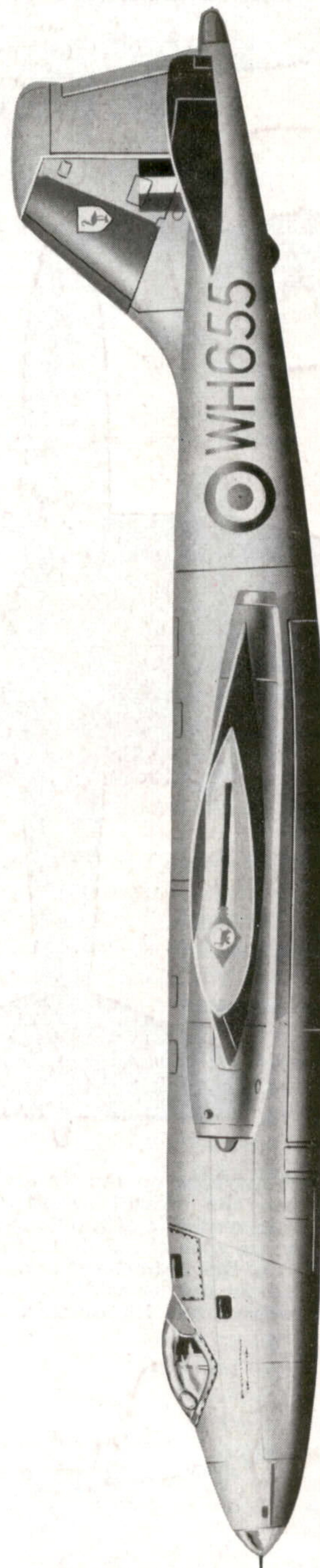


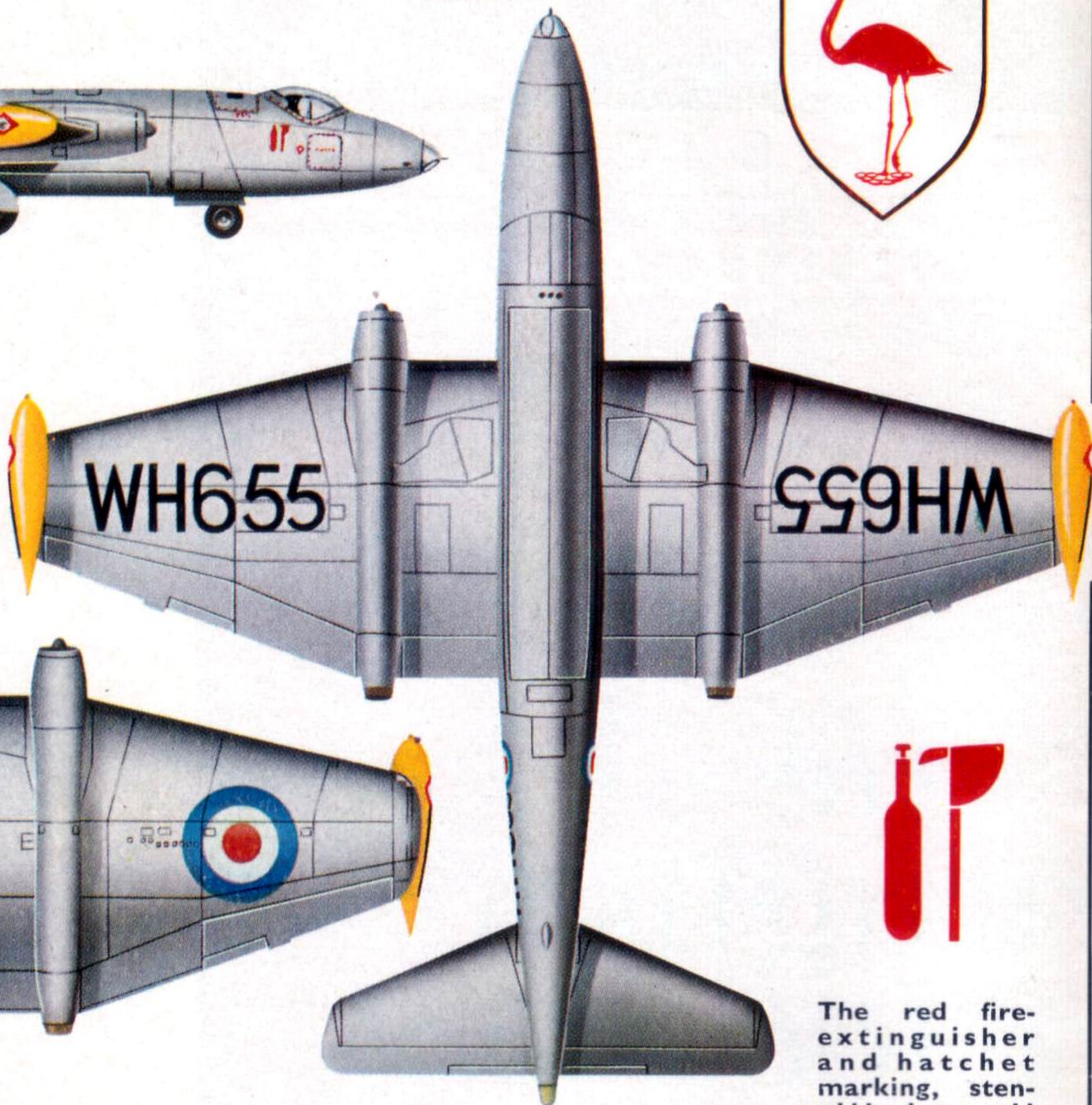
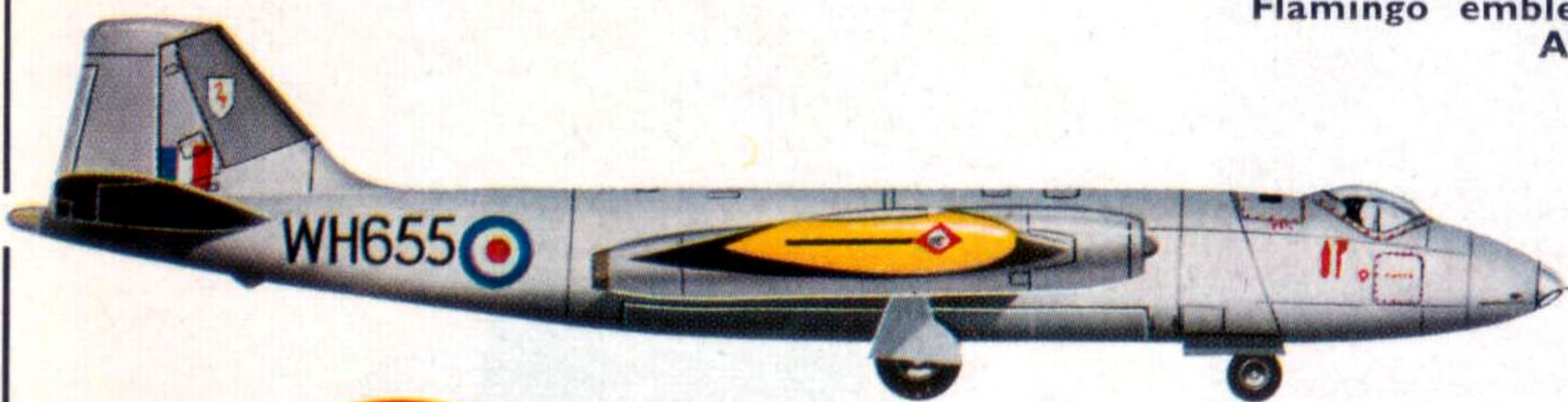
**PROFILE  
PUBLICATIONS**

The  
English  
Electric  
Canberra  
Mk.I & IV

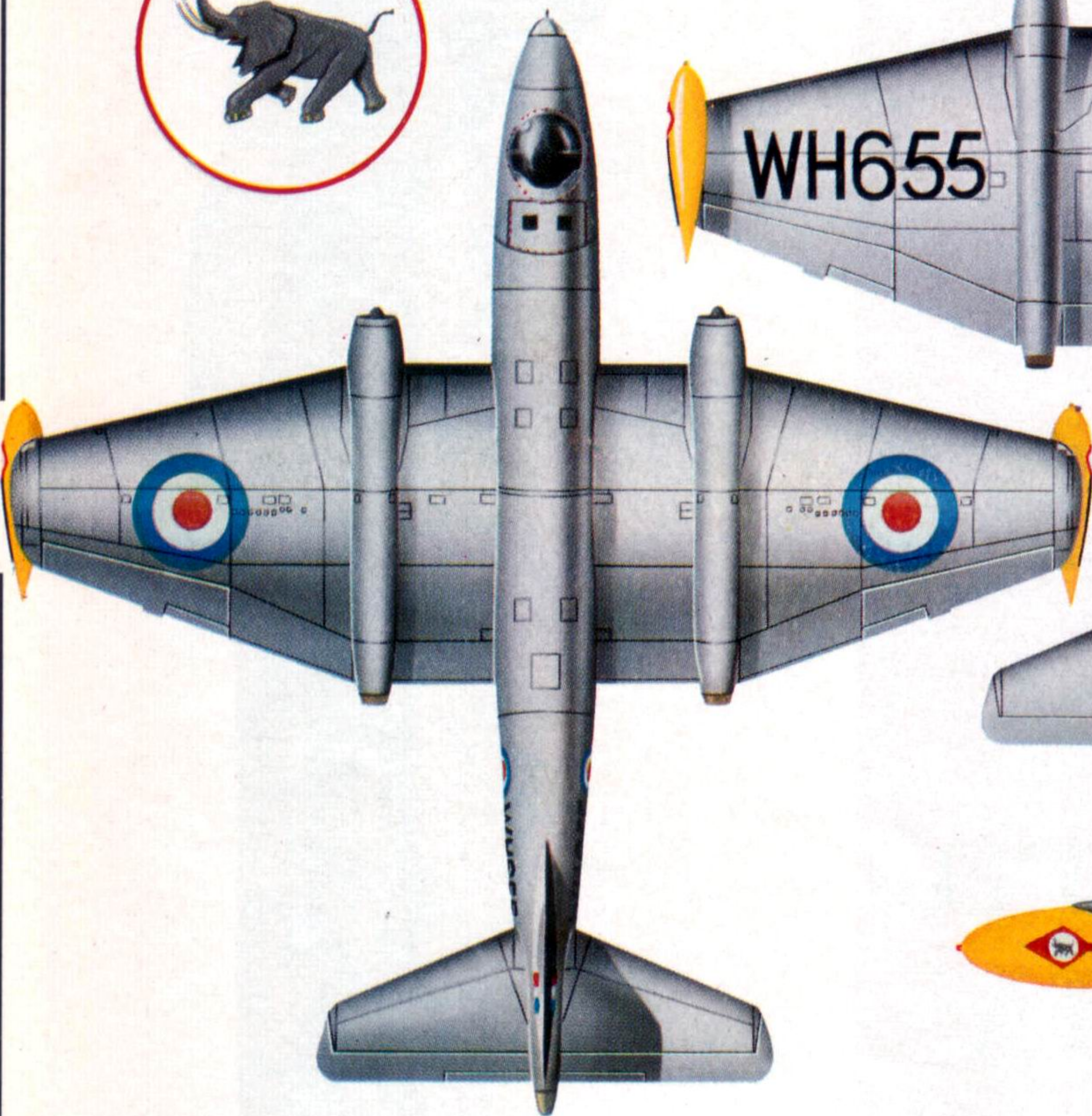
**NUMBER 54  
TWO SHILLINGS**



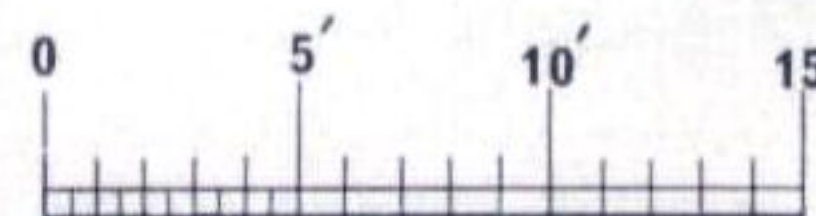
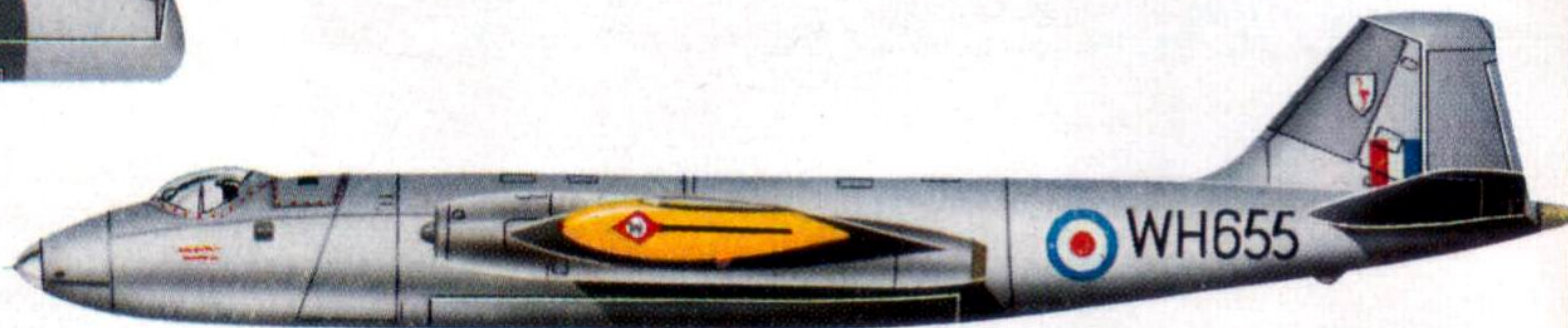
The badge on the fin is taken from the Flamingo emblem of R.A.F. station Akrotiri.



The red fire-extinguisher and hatchet marking, stencilled on all Canberra B. Mk. 2s, indicates the internal position of these items.

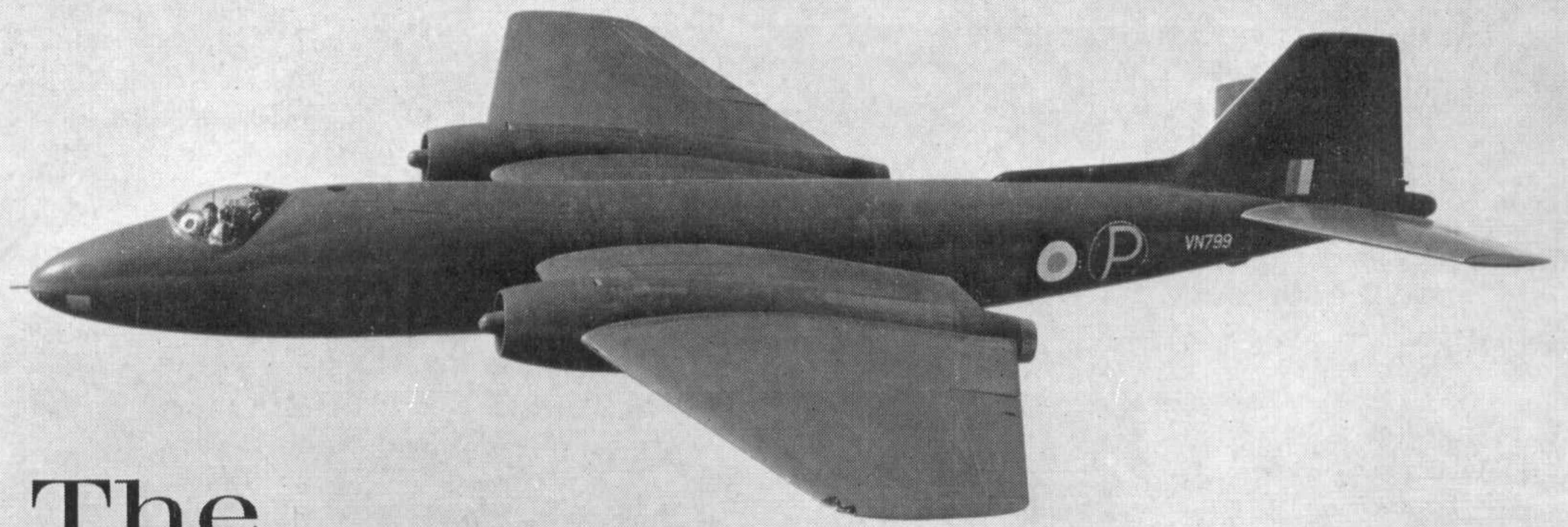


The elephant marking on the tip tank is taken from the official Squadron badge, which is symbolic of the Squadron's association with the Gold Coast. The residents of the Gold Coast adopted the Squadron during W.W.II and raised funds to buy its aircraft.



© JAMES GOULDING

Canberra B. Mk. 2 of No. 249 (Gold Coast) Squadron. This Canberra was based at Akrotiri, Cyprus, in 1958.



# The English Electric Canberra Mk.I & IV

by K. Munson

*The blue-painted first prototype English Electric A.1 (Canberra B. Mk. 1). Note roundels on fuselage only.*

The English Electric company, formed in 1918 by the amalgamation of five Midlands engineering firms, made a brief but scarcely spectacular appearance in the aeronautical arena between 1918 and 1926; after which it suspended its aviation activities until 1938, when it received a contract to build 75 Handley Page Hampdens for the R.A.F. By March 1942 it had completed 770 of these bombers, following with 2,145 Halifaxes between 1942-45 and 1,369 Vampire jet fighters from 1945-50.

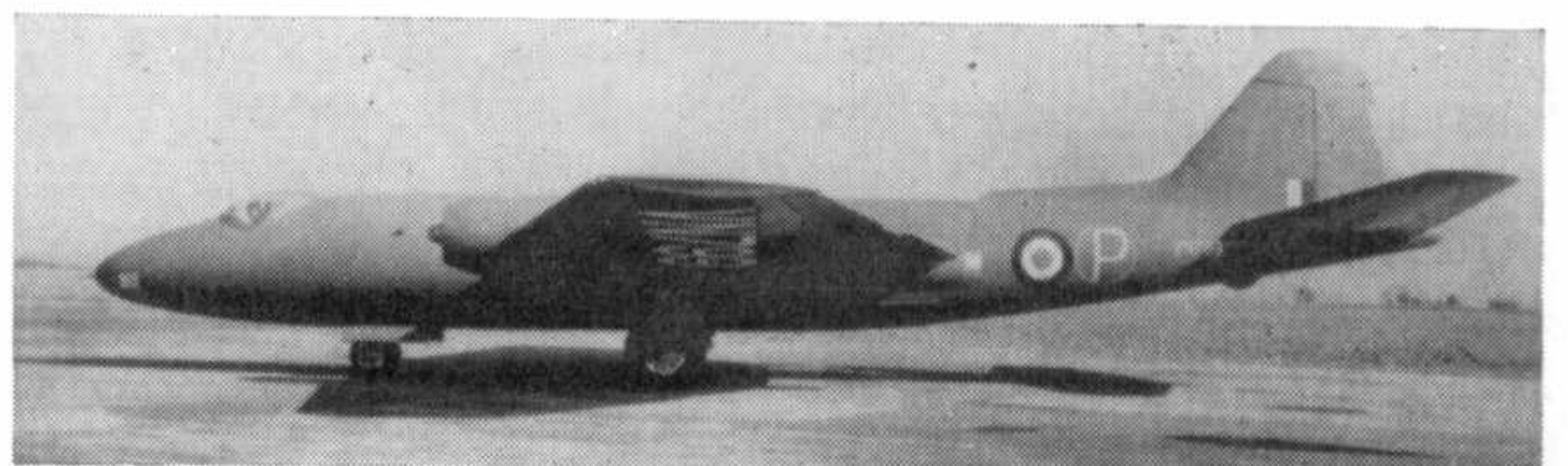
A liaison office had been set up at Preston in 1939, and it was here that W. E. W. Petter began to build the team that was eventually to produce Britain's first jet-propelled bomber. Although lacking adequate facilities (the first wooden mock-up of the Canberra was built in a converted garage basement), Petter and his staff began to evolve a design for a high speed, high altitude medium bomber to replace the Lincoln, which later became Air Ministry specification B.3/45. By June 1945 they had decided on a mid-wing layout with a single, large, turbojet engine. To have used two or even three of any existing type of engine would, at that time, have been prohibitive in terms of fuselage size and weight; and talks with Rolls-Royce had established the feasibility of an engine with a 5 ft. 6 in. diameter which could ultimately deliver 12,000 lb. of thrust. However, turbojet development was proceeding at such a pace that later Rolls-Royce engine designs indicated sufficient advantages to cause Petter to forsake his single-engined approach and re-shape the design round a pair of smaller engines buried in the wing roots. This would permit the fuel load to be accommodated within the fuselage, and extra fuel could, if needed, be installed in the wing leading edges. (Integral wing tanks were in fact introduced on the sole B. Mk. 5 and subsequent marks.) Swept-back wings were considered for a time, but the attendant aerodynamic problems were still largely unsolved, and this proposal was discarded. The twin-engined design had by now been even further improved internally, it weighed less, and it was smaller overall; and with the appearance of the first Rolls-Royce Avon, offering 6,000 lb. thrust, it became possible to place the engines out in each wing at about quarter-span and semi-

buried in the wing's thickness. A low aspect ratio (4.25) and low wing loading offered maximum fuel economy at optimum cruising altitude, combined with a degree of manoeuvrability that might have been envied by many a fighter then in service. The cabin contained ejection seats for the two-man crew (it was envisaged that the aircraft would bomb by radar: thus, the original design allowed for a pilot and navigator only, and had a one-piece metal nose with no visual bombing position). Twin nosewheels retracted rearwards, the single mainwheel units retracting inwards into the wings.

In the autumn of 1945, English Electric submitted their design, now bearing the company designation A.1. On 7th January 1946 a contract was placed for four prototypes with the proviso that, as the Avon engine had yet to prove itself, one machine should be powered by Nenes as a precautionary measure. At about this time, English Electric had acquired the disused U.S.A.F. airfield at Warton, but early construction work proceeded quietly at Preston for the next few years. Several months before the first aircraft was ready, however, its existence became an open secret—including references in less informed quarters to Britain's new "electric bomber"!

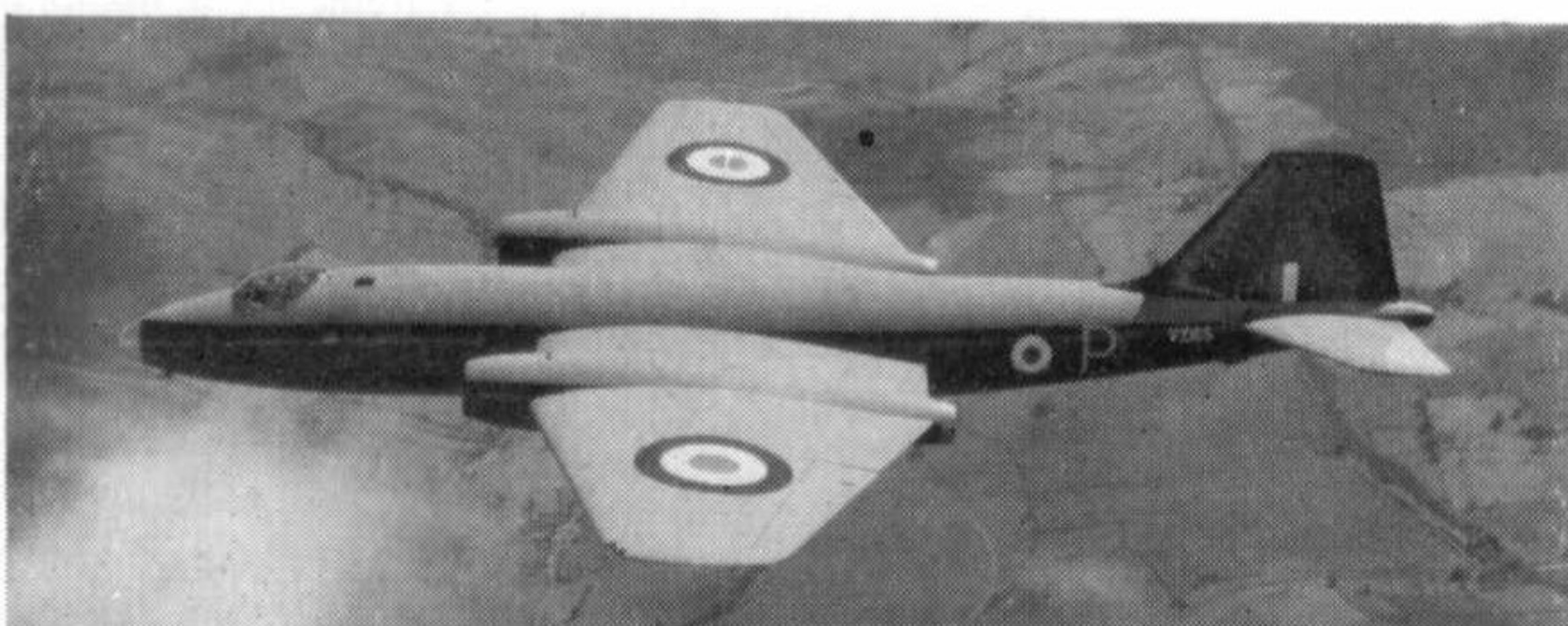
The first A.1, serialled *VN799*, began taxiing trials early in May 1949, making its maiden flight later that month powered by two 6,000 lb.s.t. Avon R.A.2s. English Electric's chief test pilot, Roland Beamont, took up the prototype on the morning of Friday 13th May for a successful 27-minute first flight, attended by John Squier in a Vampire 5 "chase-plane". The new bomber made its public debut at the S.B.A.C. Display in September 1949. Its clean, highly conventional

*The prototype Canberra as it first appeared with a rounded fin and rudder.*





Only four B. Mk. 1s were constructed, VN799, VN813, VN828 and VN850.



The first of two Canberra B.2 prototypes, VX165, in the grey and black Bomber Command finish used in 1950.

(Photo: English Electric)

appearance aroused little attention on the ground, but Beamont's flying of the aircraft during the week was one of the most exciting and convincing demonstrations of a new aeroplane ever seen at the display. On 9th November the second machine, VN813, was flown for the first time, also by Beamont. Apart from the installation of 5,000 lb.s.t. Nenes in place of the Avons, and (after the first flight of VN799) the squaring-off of the top of the rudder, it was outwardly similar to the first aircraft and was finished in the prevailing Bomber Command colours of grey top and black undersides. The third Mk. 1, VN828, flew with Avons on 22nd November. The fourth and last Mk. 1, VN850, flew on 20th December 1949 with Avon engines and wingtip fuel tanks, dispensing with the small dorsal strake that had characterised the first three machines. The Canberra was named at an official christening ceremony at Biggin Hill the following January by the Australian prime minister.

Progress of the Canberra had been so trouble-free that it had outpaced the development of the radar bombing equipment designed for it, and specification B.5/47 amended the original requirement in calling for the use of visual bombing techniques, thereby necessitating a transparent station in the nose. Two prototypes to this specification, designated B. Mk. 2, were ordered and the first of these (VX165) was flown for the first time on 23rd April 1950 with two 6,500 lb.s.t. Avon 101 (R.A.3) turbojets. The crew comprised pilot, navigator/plotter (navigating to the target) and observer/navigator (navigating and bomb aiming over the target); the radio was operated by the pilot. With the outbreak of war in Korea, additional impetus was now given to the Canberra construction programme: in addition to English Electric's initial contract for B. Mk. 2s, orders were placed with Handley Page Ltd., A. V. Roe and Short Bros. & Harland. The first Short-built Mk. 2 (WH853) flew on 30th October 1952, the

first from Avro (WJ971) on 25th November the same year, and Handley Page's first (WJ564) on 5th January 1953. Production of the Avon R.A.3, which had commenced in June 1950, was similarly stepped up by subcontracting to Bristol and Napier. Delivery of Warton's first Canberra B.2 to the R.A.F. was made in May 1951. Between 12th March 1953 and 4th May 1955, Handley Page delivered 74 Canberra B.2s (WJ622 being lost on a test flight), orders for a further 75 aircraft having meantime been cancelled. Avro orders were similarly cut back from 150 to 75 B.2s, these being delivered between 31st March 1953 and 7th March 1955.

## THE B.2 IN SERVICE

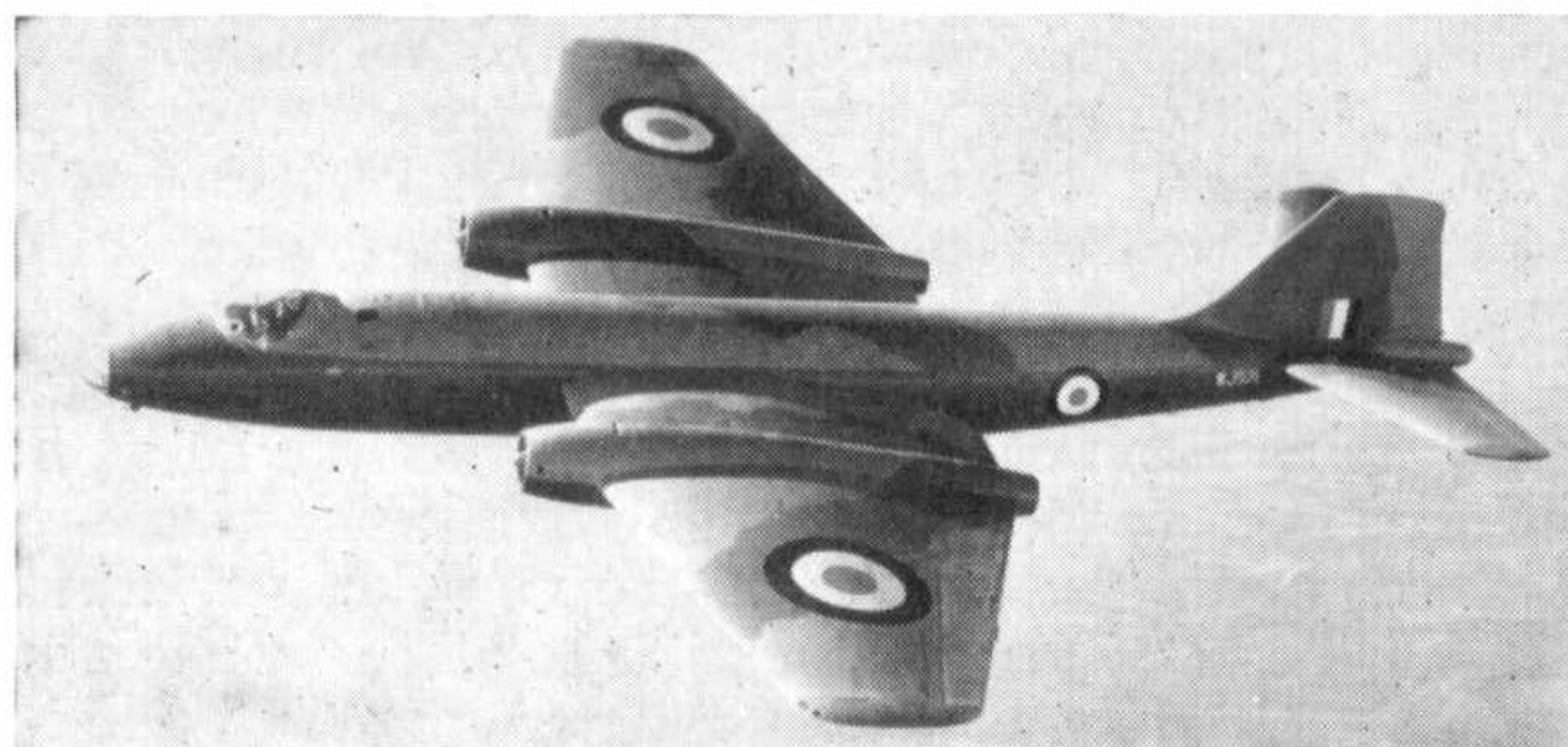
First delivery of a Canberra B.2 was made by Roland Beamont on 25th May 1951, when the type began to replace the Lincolns of No. 101 Squadron at Binbrook, Lincolnshire. Deliveries commenced with WD936. The second aircraft, WD938, which arrived on 28th June, had only a brief career before, on 5th July, both engines became starved of fuel during a familiarisation flight, the aircraft overshot and made a wheels-up landing. Between August and December the squadron was made up to strength with ten Canberras and a full complement of crews. Lincolns subsequently made way for Canberras in Nos. 9, 12, 50, 57, 61, 100, 199 and 617 Squadrons; they replaced the Washingtons of Nos. 15, 35, 44, 90, 115, 149 and 207; Mosquitos with Nos. 109 and 130; and Venoms in Nos. 6, 32, 45, 73, and 249. Newly-formed Canberra squadrons included Nos. 10, 18, 21, 27, 40, 59, 102, 103, and 104; and B.2s were also supplied to Nos. 51 and 98 Squadrons of Signals Command for calibration duties. The second Canberra squadron to form—No. 617, the "Dam Busters"—received its aircraft in January 1952. Altogether five squadrons received Canberras that year, ten in 1953, and eight more in 1954. From 1955, Valiants began to arrive in Bomber Command service, followed later by Vulcans, and after a suitable transition period many home-based Canberras became available for release to Middle East and Far East squadrons.

None was keener to show off the new aeroplane than



March 1953, and the first three Canberra B.2s off the Handley Page production line ready for delivery. The first H.P.-built machine, WJ564 (rear of photo) was delivered to No. 149 Squadron at Coningsby. (Photo: Handley Page)

First of the Avro-built Canberra B. Mk. 2s was WJ971. First flight took place on 25th November 1952. (Photo: A. V. Roe)





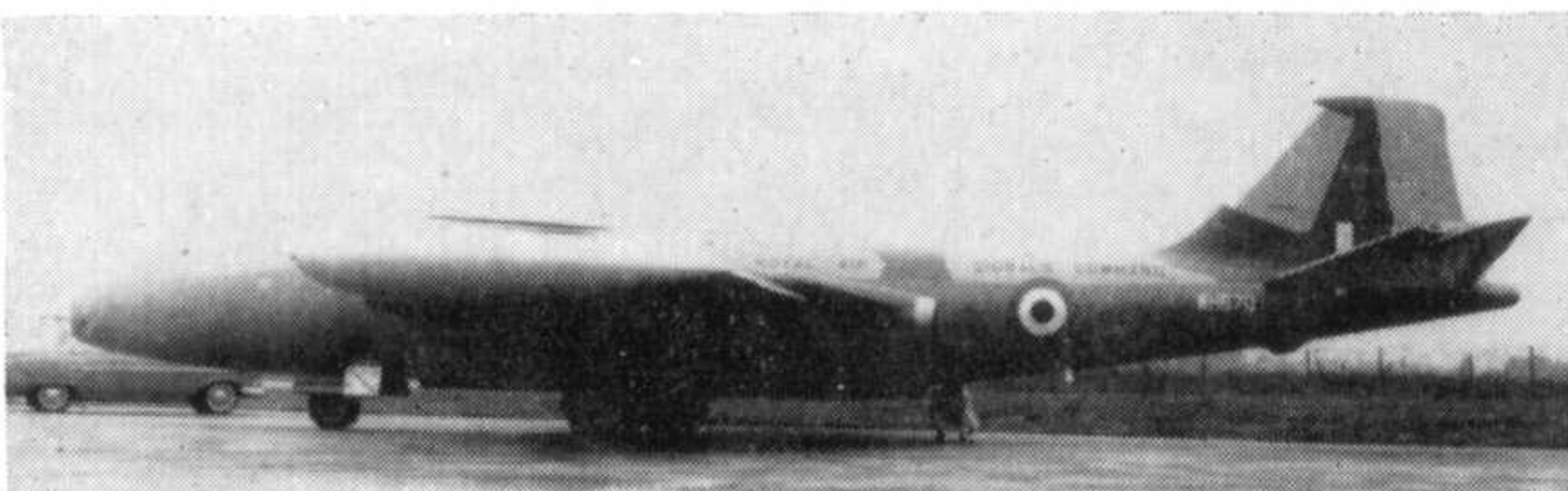
*The crews of No. 101 Squadron, first to operate Canberras, pose at Binbrook, Lincs, with their new aircraft. Line-up includes WD936, the R.A.F.'s first Canberra.*

*Canberra B.2s of No. 27 Squadron, Waddington, display the City of Lincoln coat of arms on their fins.*



the then A.O.C. No. 1 Group, Air Vice-Marshal D. A. Boyle. In October 1952 he led four Canberras of No. 12 Squadron (WD987, 990, 993 and 996) on what was to be the first of several goodwill visits by Canberras to overseas territories. Code-named "Operation Round Trip", the journey involved a 6½-week tour of the Caribbean and Latin American states totalling over 24,000 miles flown; more than thirty flying demonstrations were given in thirteen countries in the West Indies, Central and South America, and doubtless were responsible in no small measure for the Canberra's subsequent sales record in that part of the world. In the course of the exercise the Canberras made the first jet crossing, in both directions, of the South Atlantic. In the following summer, on 15th July, No. 12 took part in a strong Canberra representation at the Coronation review of the R.A.F. at Odiham, while on Coronation day itself (2nd June) three other Bomber Command B.2s, led by Wg. Cdr. W. N. Kenyon, made a transatlantic dash with film of the scenes in London which was shown to television audiences in Canada and the U.S.A. the same evening. Six Canberra B.2s of No. 57 Squadron toured the Middle East in November 1953; "Operation Med. Trip" by No. 27 Squadron in June 1954 took in Europe and the Mediterranean, and in 1955 the West Indies received another Canberra visit when No. 139

WH670 was one of several Canberra B.2s allocated to Signals Command for calibration duties. (Photo: Stephen Peltz)



(Jamaica) Squadron flew out on "Operation New World", attending the tercentenary celebrations in Jamaica and concluding with a visit to Canada before returning home.

The 2nd Tactical Air Force has seen more of the P.R. and interdicator Canberras than of the earlier marks, but three B.2 squadrons (Nos. 149, 102 and 103) were established in Germany with effect from August, October and November 1954 respectively. In March 1957 No. 73 Squadron, at Akrotiri (Cyprus), became the first M.E.A.F. unit to re-equip with the Canberra B.2, and eight months later, the first F.E.A.F. Canberra squadron, No. 45, was established at Tengah, Singapore.

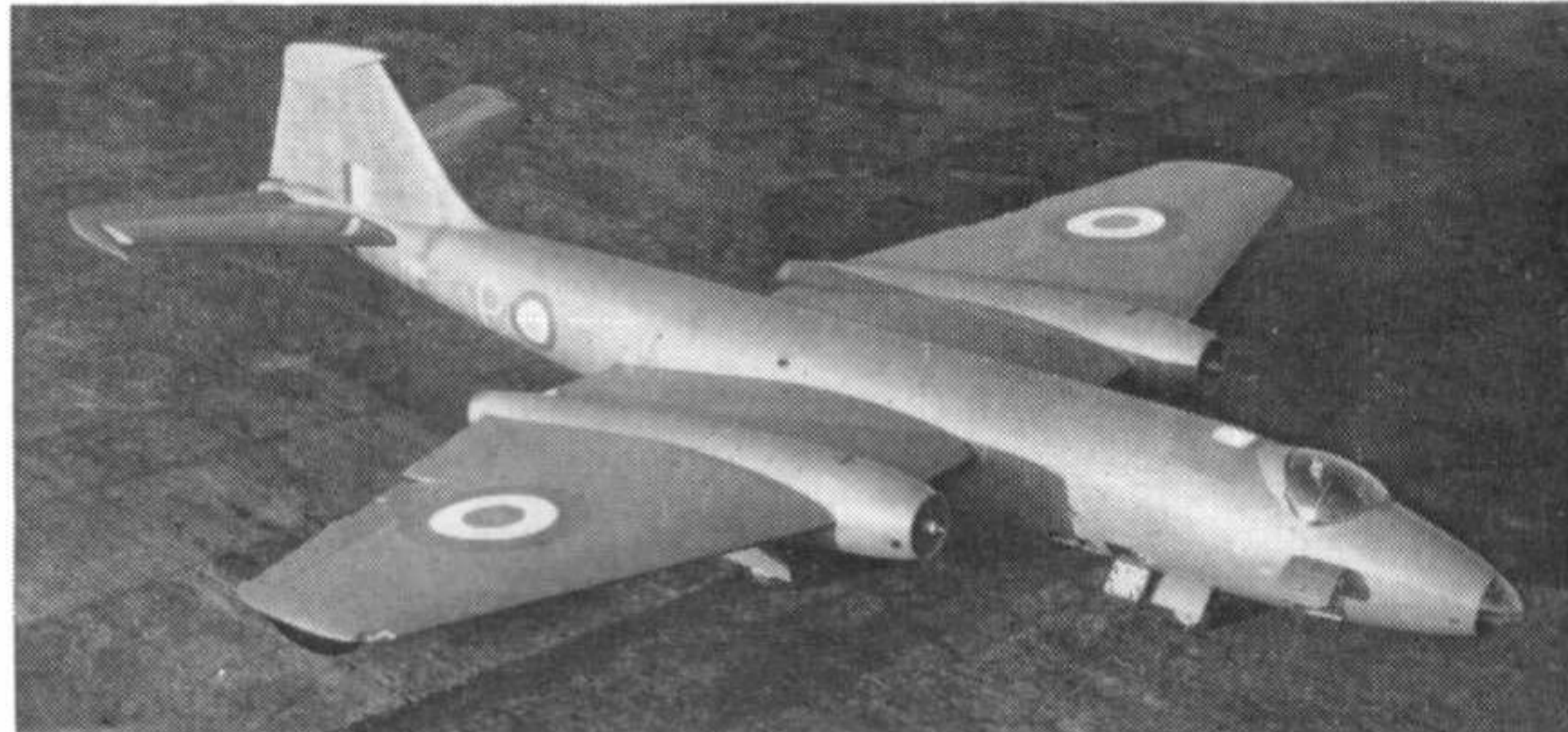
Curiously, although its production had been hastened because of the Korean war, the Canberra never participated in that conflict at all. However, in the late summer of 1956 a crisis was precipitated in the Middle East when the Egyptian president, Colonel Gamal Abd-El Nasser, seized the property and assets of the Suez Canal Company as a reprisal for the withdrawal of western financial support for the Aswan High Dam project. Anglo-French intervention to counteract this move and its implications included the transfer of a considerable air strength to the Mediterranean in a very short time, and brought Canberras in some force to the theatre. By the end of the year British bases in Malta and Cyprus were acting as temporary hosts to nearly a dozen Canberra squadrons from England. After a 12-hour ultimatum on 30th October had been ignored, military operations against Egypt began the following day with the aim of rendering the Egyptian Air Force ineffective from the outset. Targets included the air bases at Abu Sueir, Fayid and Kabrit, bases which the R.A.F. had itself quitted less than a year before under the terms of the 1954 Anglo-Egyptian Treaty. Now their occupants

were MiG-15s and Il-28s of the Egyptian Air Force, along with a number of British Meteor and Vampire trainers. The first bombs to fall on Egyptian soil during the campaign were delivered on the evening of 31st October by Canberras of No. 10 Squadron, flying from their temporary base at Nicosia. Originally unescorted, on later sorties the Canberras flew with Hunter fighter cover.

### THE P.R.3 AND T.4

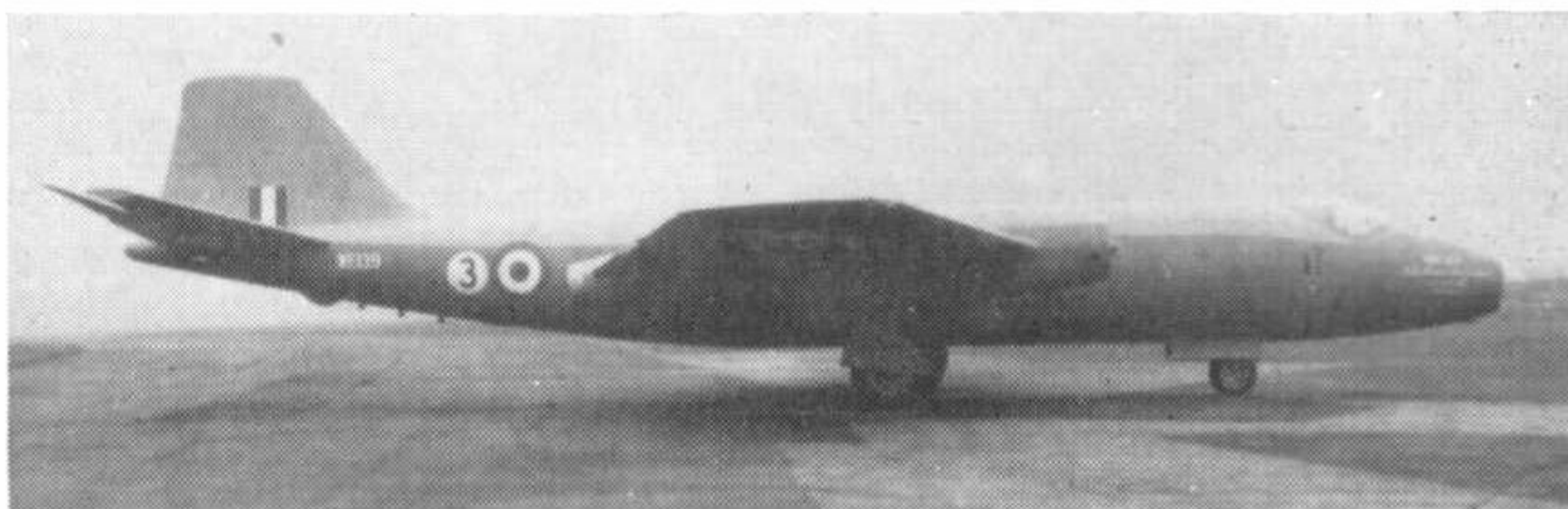
The R.A.F.'s reconnaissance squadrons were also in need of a faster, higher-flying replacement for the Mosquito P.R.34s which had served them steadfastly for six post-war years, and to meet this need a photographic version of the Canberra was developed to specification P.R.31/46. Among the changes made to the basic design were a 14-inch section built into the forward fuselage, to accommodate a battery of seven cameras for day or night photography; a smaller flare bay, in the forward part of which were stored photographic flares and other equipment, with additional fuel tankage to the rear; a photographic sight in place of the bombsight, and a crew of two instead of three. Thirty-seven P.R.3s, including two prototypes, were completed by the parent company, the first of the prototypes (*VX181*) making its maiden flight on 19th March 1950. The first production P.R.3 (*WE135*) followed on 31st July 1952, and the type entered service with No. 541 Squadron, Benson, early in 1953. Other home units to re-equip during 1953-54, as part of the U.K. Reconnaissance Force under Bomber Command's Central Reconnaissance Establishment, included Nos. 58, 82 and 542 Squadrons. No. 231 O.C.U. at Bassingbourn, and 31 and 69 Squadrons of the 2nd Tactical Air Force in Germany, were also among those to receive the P.R.3.

The London-New Zealand air race, held in October 1953, provided a golden chance for the Canberra to show its paces; and, apart from the prestige value involved, was of considerable training benefit to the participating crews. The Air Ministry, with £100,000 to spend, entered two Canberra P.R.3s and a P.R.7 in the speed section, the eight-man team (including a reserve crew) being led by Wg. Cdr. L. M. Hodges, D.S.O., A.F.C., and training at Wyton. Photographic equipment was replaced by additional fuel tankage, and standard 250-gallon jettisonable tanks were fitted; otherwise the aircraft were virtually standard service machines. Two Canberra B.20s were entered by the Royal Australian Air Force. A five-stage route (Heathrow-Shaibah-Negombo-Cocos Islands-Perth-Christchurch) of 12,270 statute miles was flown, during the course of which the Canberras set up several intermediate point-to-point records. The overall race winner was one of the P.R.3s, flown by Flt. Lts. R. L. E.



First prototype Canberra P.R.3 was *VX181*.

(Photo: English Electric)

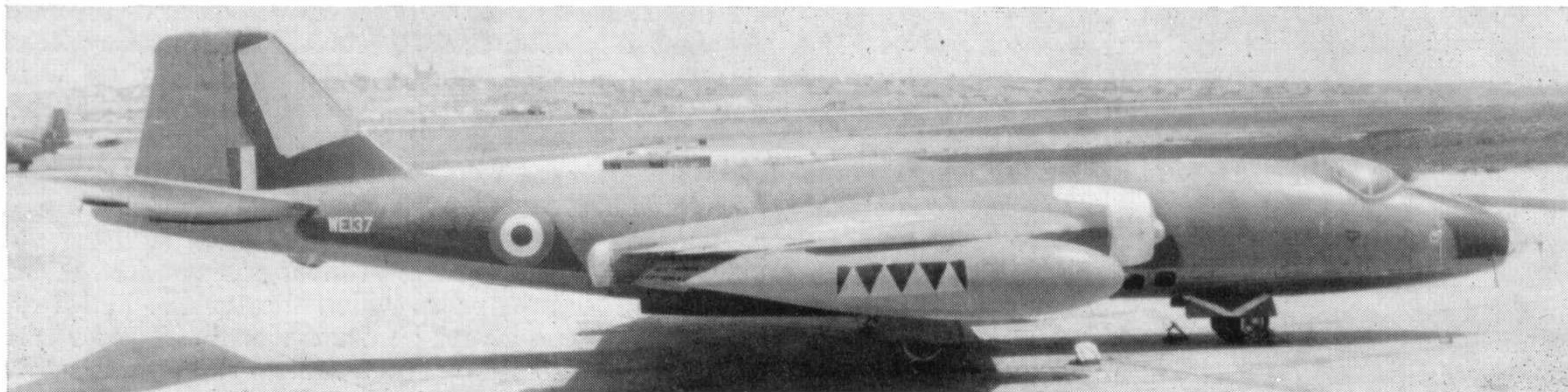


Photographed after winning the 1953 London-New Zealand air race, *WE139*, the fifth production Mk. 3, still bears its race number—3—alongside the roundel. (Photo: English Electric)

Burton, A.F.C. and D. H. Gannon, D.F.C. The time of this aircraft was 23 hr. 51 min. 7.2 sec., average speed 494.5 m.p.h.; but it is a tribute to the aircraft's consistent efficiency of operation that all five Canberras, in actual flying time, were separated by less than 15 minutes.

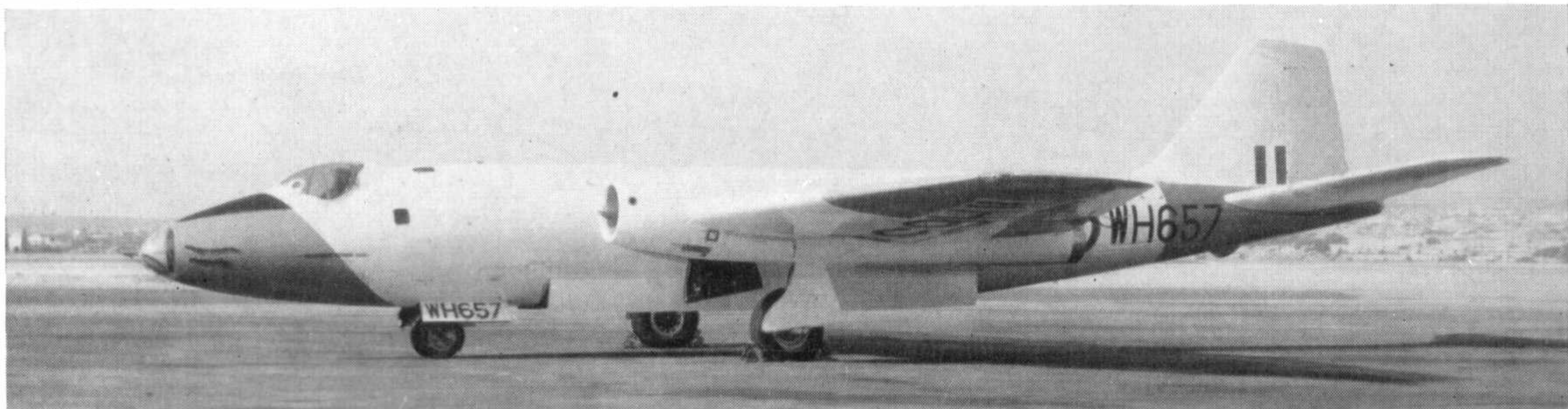
The Canberra entered service at a time when an increasing number of Bomber Command pilots were National Service men with comparatively little flying experience—and that, of course, on piston-engined aircraft. It was therefore doubly necessary to have a dual-control aircraft which would give the most comprehensive conversion training possible. For this purpose English Electric designed and produced the Canberra T. Mk. 4 to specification T.2/49. Pupil and instructor sat side by side in the two front seats, the pupil in the port seat with the navigator behind him. Externally, the T.4 was similar to the B.2 except that, being a pilot trainer only, the glazed bombing panel was replaced by a hinged one-piece, all-metal nose. The prototype T.4, *WN467*, was flown on 6th June 1952, being followed by 75 English Electric-built machines (commencing *WE188*), the first of which were delivered to No. 231 O.C.U. at Bassingbourn in 1954. The T.4 later equipped 230 O.C.U. at Scampton and 232 O.C.U. at Gaydon; each Canberra bomber squadron also had its own small complement of T.4s for on-the-spot training requirements. Several T.4s were sold abroad (see FOREIGN SALES), and a further undisclosed quantity was produced for the R.A.F. by converting B.2s which had been replaced

Note squadron markings on tip tanks of this Canberra P.R.3 (Serial *WE137*, code "A") of No. 39 Squadron, Ta Kali, Malta. August 1958.





Prototype T. Mk. 4 crew trainer, WN467. Note various markings indicating rescue kits under cockpit. (Photo: English Electric)



WH657 was one of a number of T.4s allocated to the Royal Navy for aircrew training. Colour scheme of this aircraft appears on page 11. (Photo: Stephen Peltz)

in service by later bomber models. All B.2/T.4 conversions were handled by Short Bros. & Harland.

### B.2 CONVERSIONS

The Canberra U. Mk. 10, whose existence was first disclosed in May 1958, was a conversion of the B.2 for unmanned, radio-controlled target drone duties at guided weapons trials units. Design development, conversion and flight testing of the U.10 was handled entirely by Short Bros. & Harland, and included the evolution of a completely self-contained approach and landing system. This operated via VHF radio link to a receiver in the aircraft, the signals passing through a selector filter to a relay receiving set which governed the required autopilot, speed, throttle or other control. The first B.2/U.10 conversion was carried out on an Avro-built B.2, WJ987, which made its first flight in the new configuration on 11th June 1957. The number of aircraft converted to U.10 is not available for publication, but this version has been used extensively at the Woomera weapons range in Australia, and by No. 728 Squadron of the Fleet Air Arm, operating from the Maltese base at Hal Far, on trials with the Seaslug ship-to-air missile.

The Canberra T. Mk. 11 was another variant procured by the conversion of former B.2 airframes.

One of the Canberra U.10s (WH921) in service with No. 728 Squadron, Fleet Air Arm, at Hal Far, Malta.

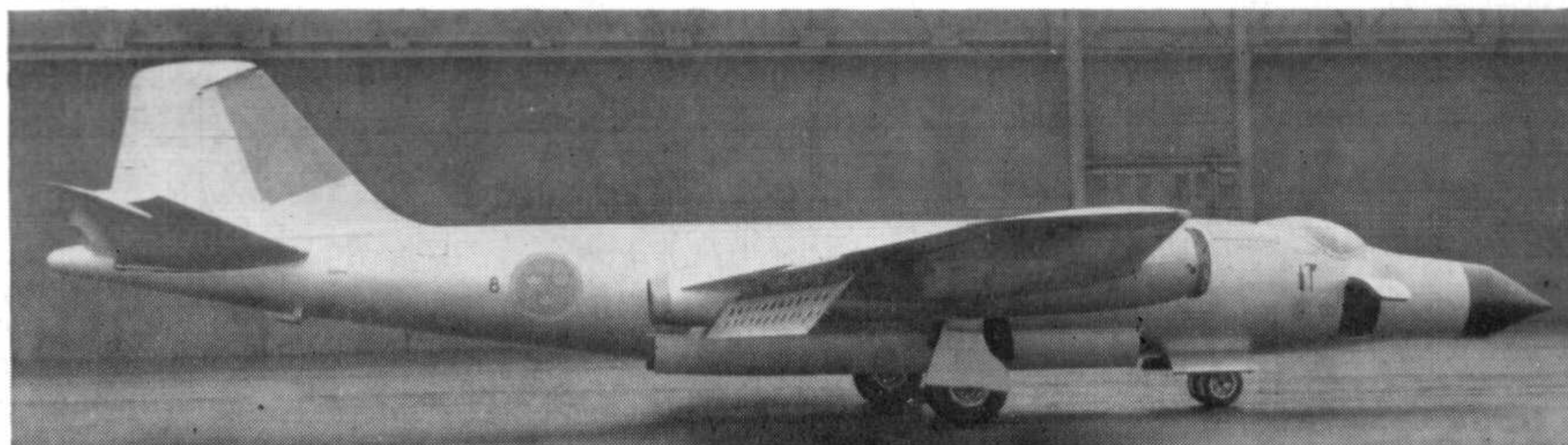
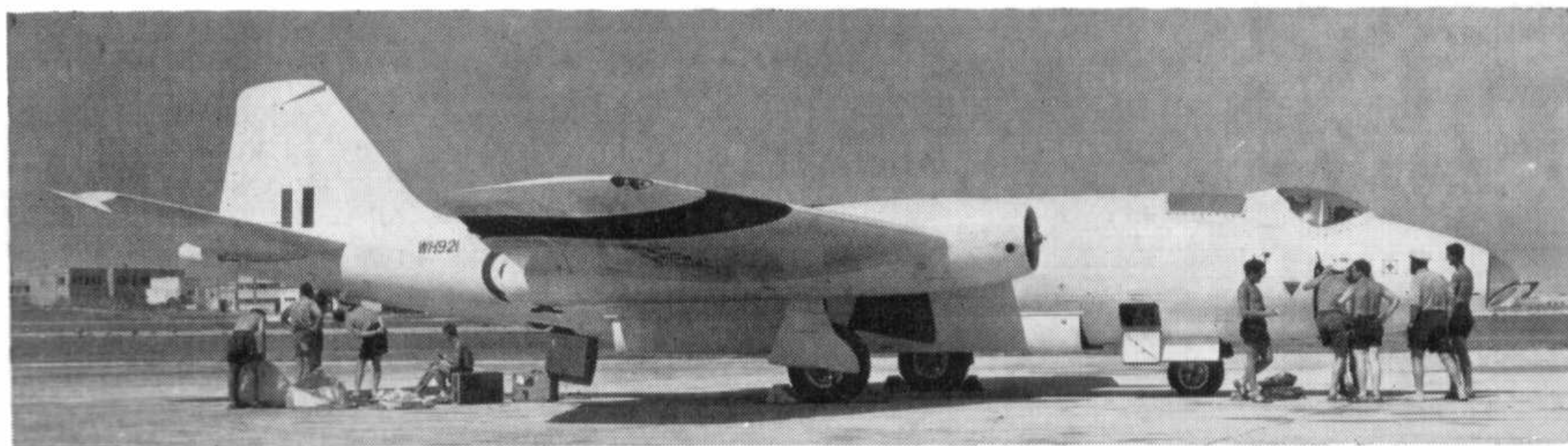
(Photo: Crown Copyright)

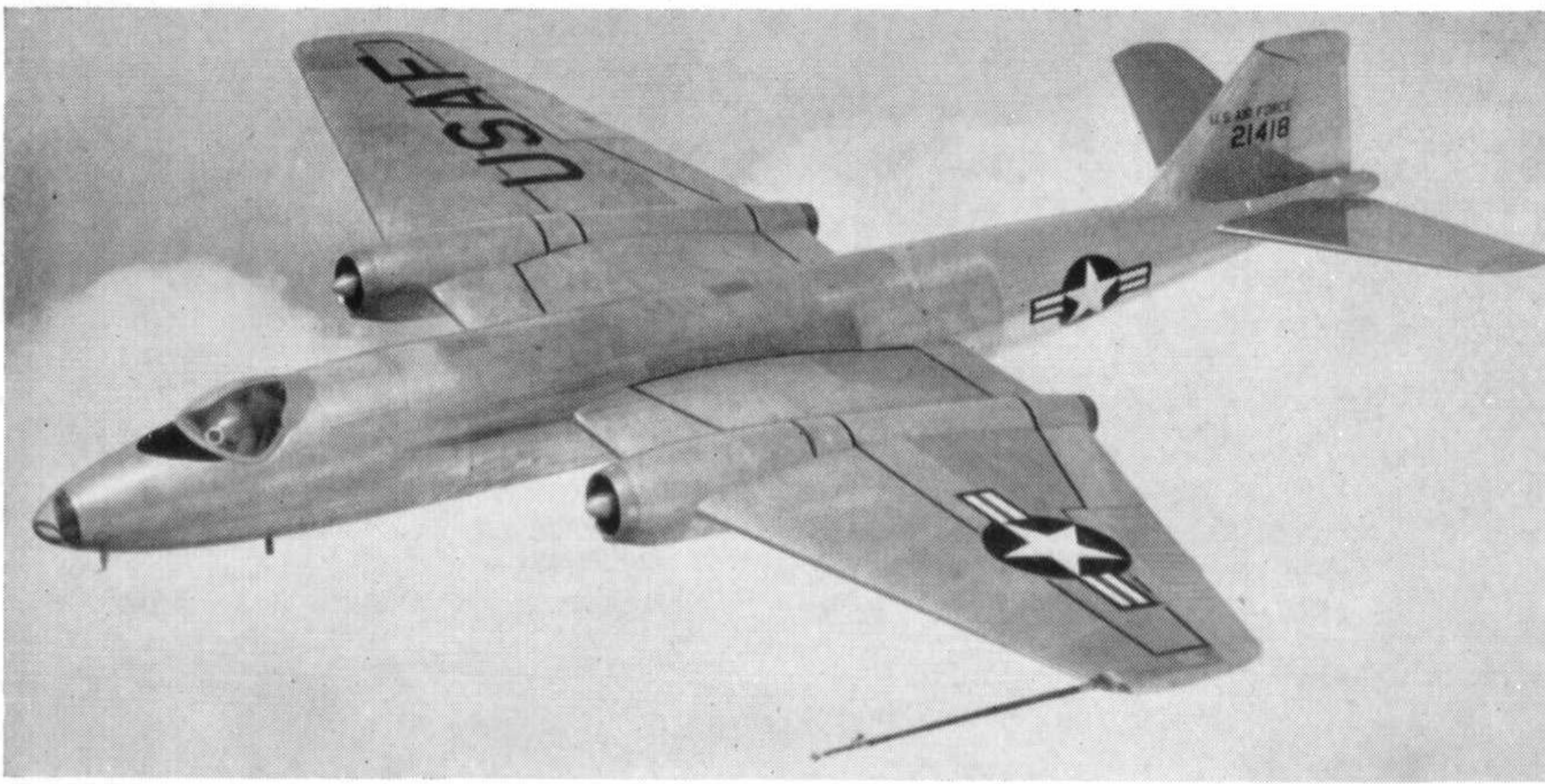
A Tp 52, just before delivery to the Swedish Air Force, displays elongated radar nose. Aircraft used for training all-weather fighter crews.

Produced to train Fighter Command pilots and navigators in the use of airborne interception radar before being assigned to all-weather fighter units, Boulton Paul assisted in the design, which was evolved on VN828, the third prototype B.1, which made its "first" flight as a T.11 on 29th March 1958. The A.I. radar unit is mounted in a lengthened nose of revised contours, with internal accommodation adjusted to seat four members—pilot and navigator instructors and pilot and navigator students. The T.11 first entered service with No. 228 O.C.U. at Leeming in 1959.

### FOREIGN SALES AND LICENCES

Over £50 million in export revenue for the British aircraft industry has been achieved by sales of British-built Canberras or licences to manufacture the type in Australia and the U.S.A. A visiting U.S. mission had seen Beamont fly the Canberra at Warton in September 1950, and on 21st February 1951 a standard B.2,



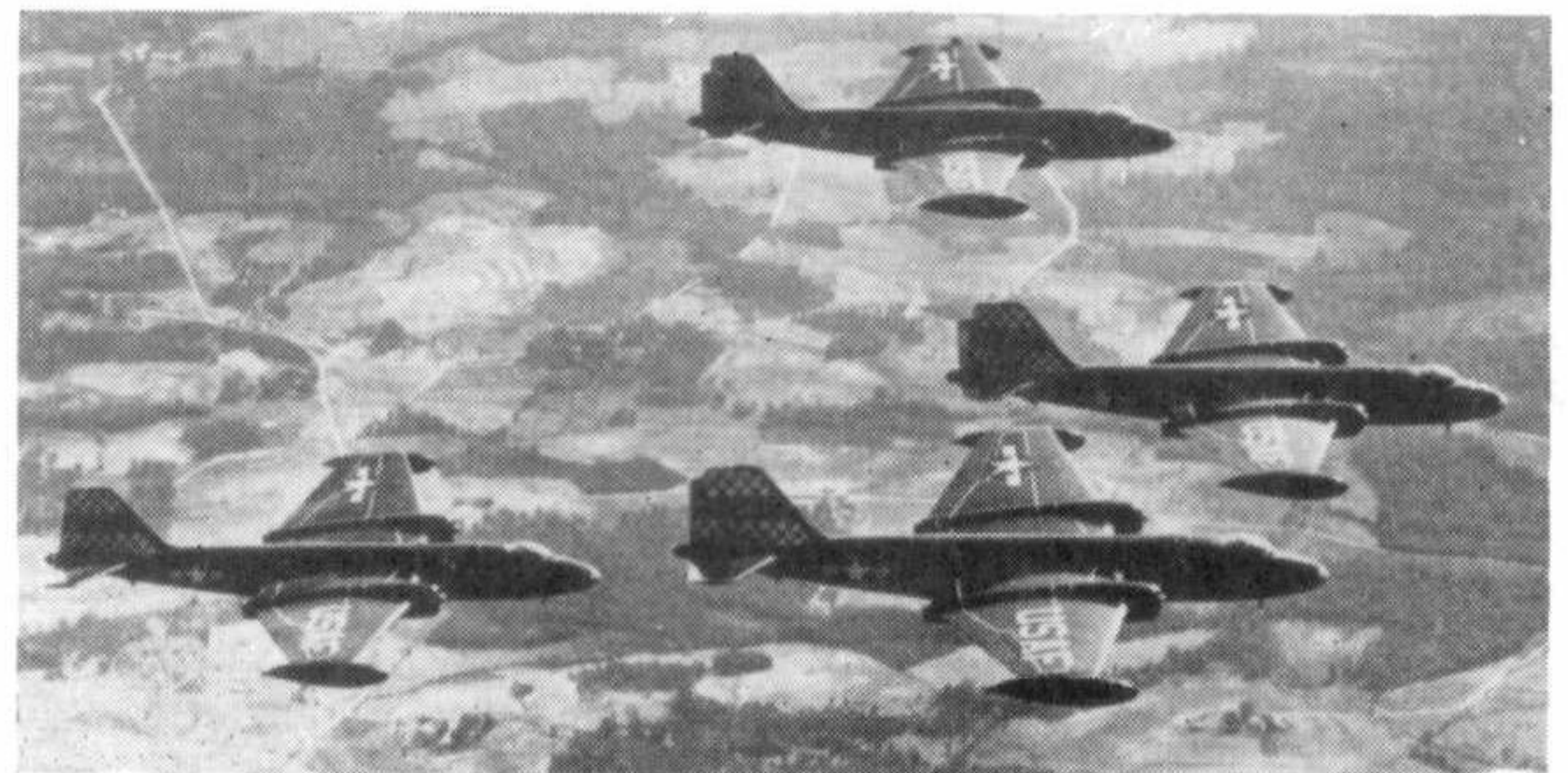


Prototype Martin B-57A, basically a Canberra built under licence.

Standard production RB-57A (52-1470) in black and red finish.

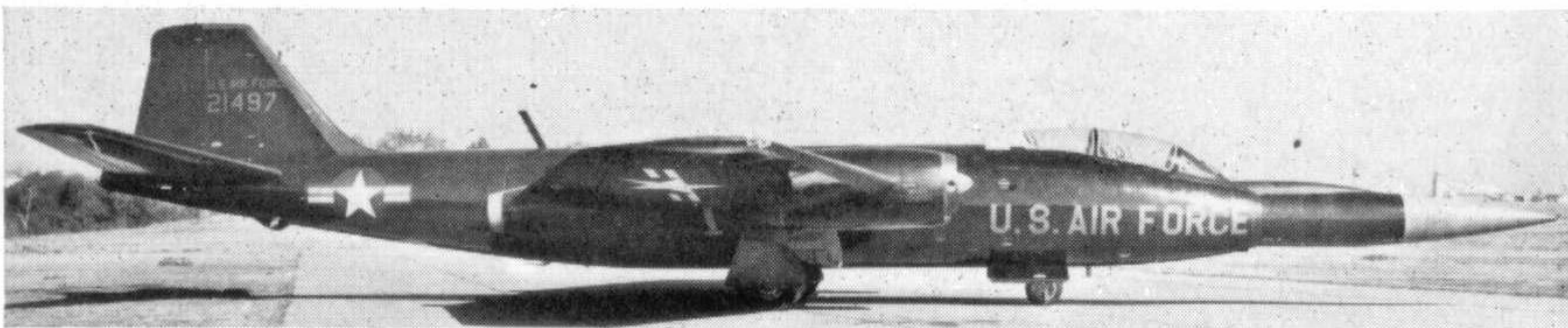
WD932, was flown to the U.S.A. by an R.A.F. crew—making, incidentally, the first non-stop jet crossing of the Atlantic without refuelling. Beamont again demonstrated the aircraft to U.S.A.F. officials at Washington and Baltimore, and negotiations were concluded in April for Martin to build the B.2 under licence as the Model 272 or B-57. The Canberra thus became the first British warplane to be built under licence in the U.S.A. since the D.H.4, nearly forty years earlier. In August 1951 WD940 was flown to Baltimore as a pattern aircraft (receiving the U.S.A.F. serial 51-17352), and production soon began of an evaluation batch of eight B-57A night intruders, powered by Wright J-65 engines, the American-built version of the Armstrong Siddeley Sapphire. The first B-57A (52-1418) flew on 20th July 1953. A second U.S.A.F. contract, in October 1952, called for 67 RB-57A reconnaissance-bombers, the first of this type being delivered to No. 363 Tactical Reconnaissance Wing of T.A.C. in March 1954, where they replaced Douglas B-26 Invaders. The RB-57As saw service in Europe, deployment beginning late in 1957. At the time of writing (August 1965) only one B-57A was still flying (as a “weather ship” with the F.A.A.) and most of the RB-57As had been transferred to A.N.G. units. (Subsequent American development of the B-57 has so radically altered the original Canberra design that it falls outside the scope of this *Profile*.)

The first foreign bid for British-built Canberras also came from across the Atlantic, when the *Fuerzas Aereas Venezolanas* ordered six B.2s in October 1952; these were delivered during the following year. In

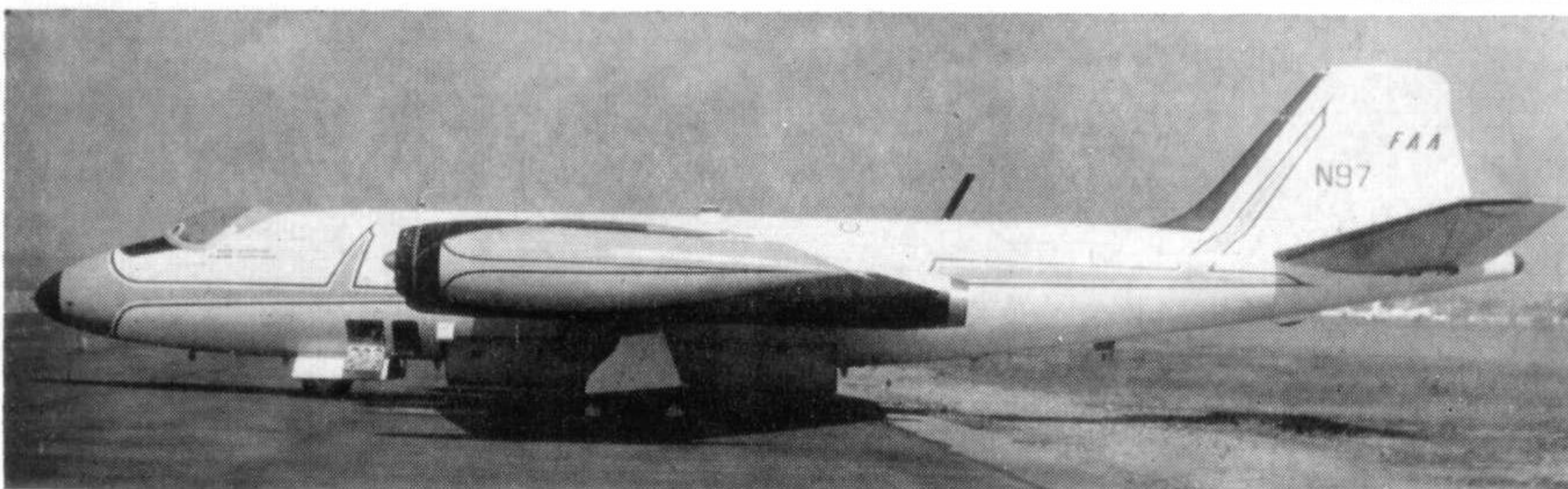


A “box” of RB-57As of Tactical Air Command, with distinctive fin and rudder markings. (Photo: U.S.A.F.)

March 1957, a second Venezuelan order for Canberras included two T.4s, one serialled 2E39. The majority of early exports, however, were to countries within the Commonwealth. Australia, like Britain, wanted a

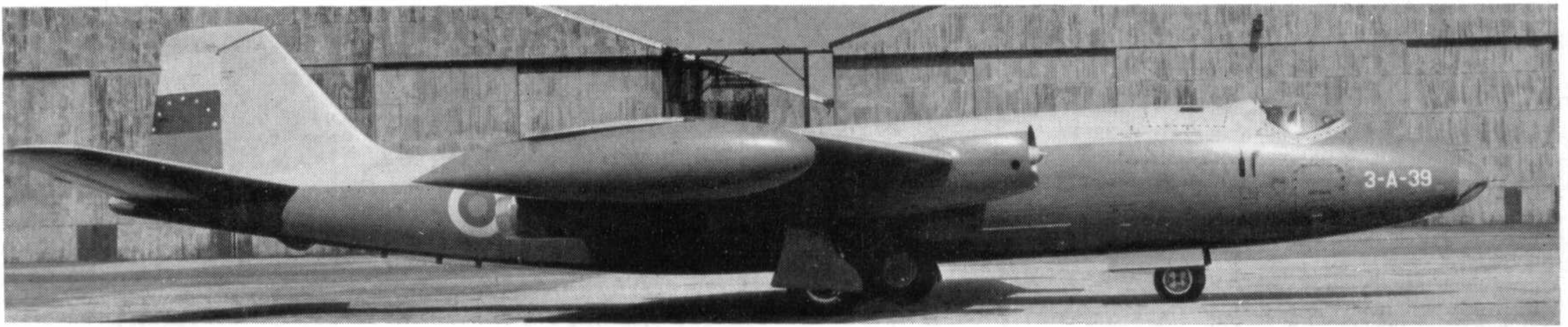


Martin B-57 used for development of electronics and nose cone of Boeing Bomarc pilotless interceptor.



Bearing the U.S. civil registration N97, this RB-57A was used for research with the F.A.A.'s High Altitude Flight Inspection programme. (Photo: Stephen Peltz)





One of six B. Mk. 2 Canberras (3-A-39) delivered to the Venezuelan Air Force in the late '50s.

(Photo: English Electric)

Lincoln replacement, and the R.A.A.F. expressed an early interest in the Canberra, one being flown out by an R.A.A.F. crew in August 1951. Licence agreements were concluded for the B.2 to be built at the Government Aircraft Factory at Fisherman's Bend, Melbourne, and five British machines were offset from R.A.F. orders as patterns for the Australian version. Formerly *WD935*, *WD942*, *WH710*, *WD983* and *WD939*, the last two were renumbered *A84-125* and *-307*. The Australian version, known as the B.20, differed in detail only from the British design and in having integral wing tanks; the first 28 production aircraft, like their British counterparts, were powered by the 6,500 lb.s.t. Avon 101 (R.A.3), but the remaining 20 benefited from the 7,500 lb.s.t. Avon 109 (R.A.7), licence-built by the Commonwealth Aircraft Corporation. The G.A.F. completed 48 B.20s, the first (*A84-201*) making its maiden flight on 29th May 1953. Deliveries were made, starting in July 1953, to Nos. 1, 2 and 6 Squadrons, R.A.A.F., and the last B.20 was delivered in December 1958. Two B.20s took part in the 1953 London–New Zealand air race, and five represented Australia at the U.S. Armed Forces Day display in Washington in May 1956; Canberras of No. 2 Squadron saw service in Malaysia from 1958. For crew training, *A84-125* and *-307*, and five G.A.F.-built machines, were converted between 1958 and 1960 to dual controls and designated T.21. New Zealand was not long in following her neighbour's example. Initially, five B.2s (*WF915*, *WH645*, *WH666*, *WH739* and *WJ988*) were hired from U.K., equipping No. 75 Squadron, R.N.Z.A.F., in Singapore from mid-1958 in support of the operations in Malaysia; when the squadron went home in January 1962, these aircraft were returned to the R.A.F. Meanwhile, in February 1958 the New Zealand government had ordered eleven B(I).12s (similar to the Mk. 8) and two T.13s (similar to the Mk. 4). Due to some delay in delivery of the T.13s (*NZ6151* and *6152*), two British T.4s were loaned to the R.N.Z.A.F., these being returned when the T.13s arrived in 1961. The T.13s currently serve (June 1965) with the Strike Support Unit at Ohakea, New Zealand.

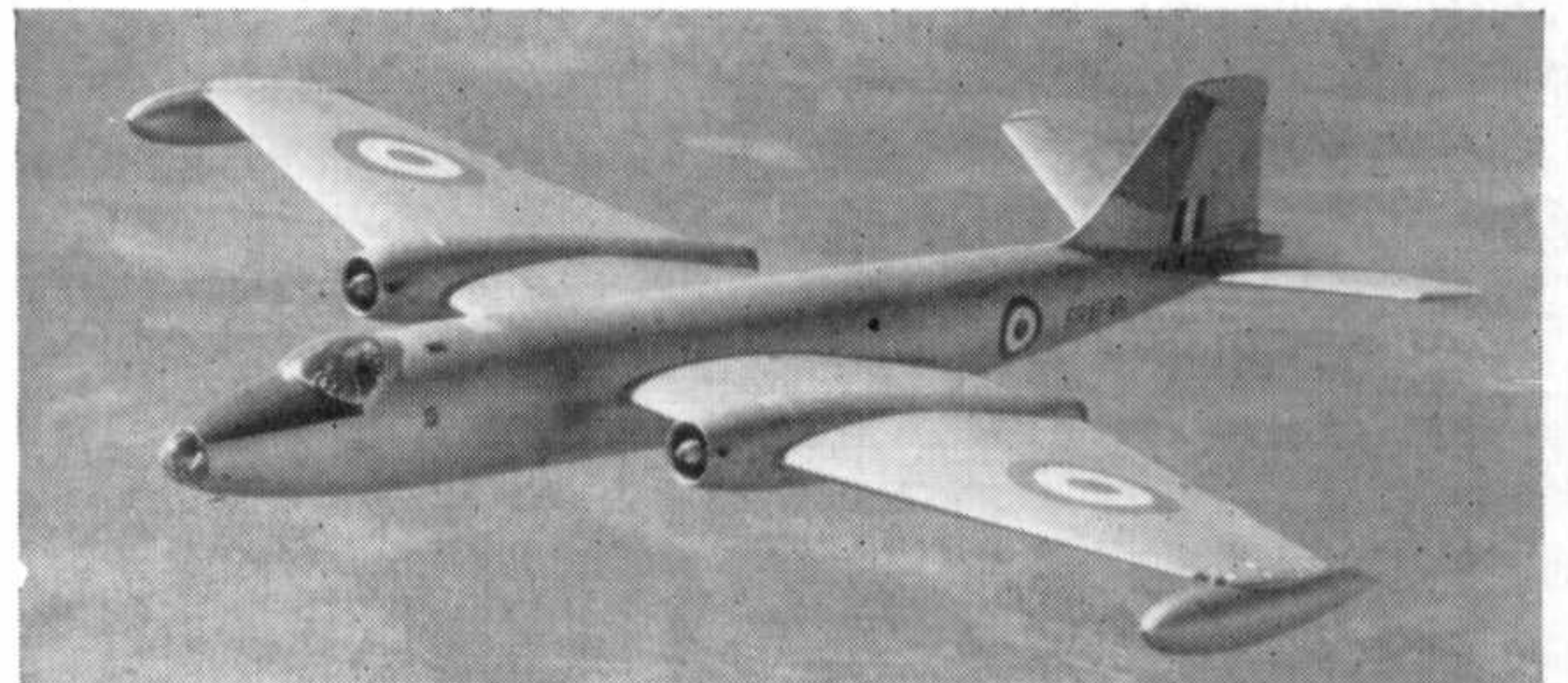
Eighteen ex-R.A.F. machines (fifteen B.2s and three T.4s) were ordered by the Royal Rhodesian Air Force towards the end of 1957, the B.2s being delivered between March and June 1959. Formerly *WH867*, *653*, *662*, *672*, *707*, *855*, *871* and *883*, *WJ571*, *572*, *578* and *606*, *WK198*, *WJ612* and *WH644*, they initially received serials *RRAF159–173* respectively, later being re-numbered *RRAF200–214*, on allocation to Nos. 5 and 6 Squadrons. They are currently operated by the former squadron only, No. 6 having disbanded when the Federation of Rhodesia and Nyasaland was dissolved. The T.4s (converted B.2s, formerly *WH658*, *WH674* and *WJ613*: RRAF serials originally *174–176*, later *215–217*) were delivered in March 1961.

The South African Air Force has three T.4s as crew trainers for the B(I).12 intruders of No. 12 Squadron, S.A.A.F. India's Canberras are mostly of the later marks, but her £20 million order placed in January 1957 included seven T.4 trainers. The most recent Canberra customer has been Sweden, who in



One of two T.13s delivered to the Royal New Zealand Air Force in 1961.

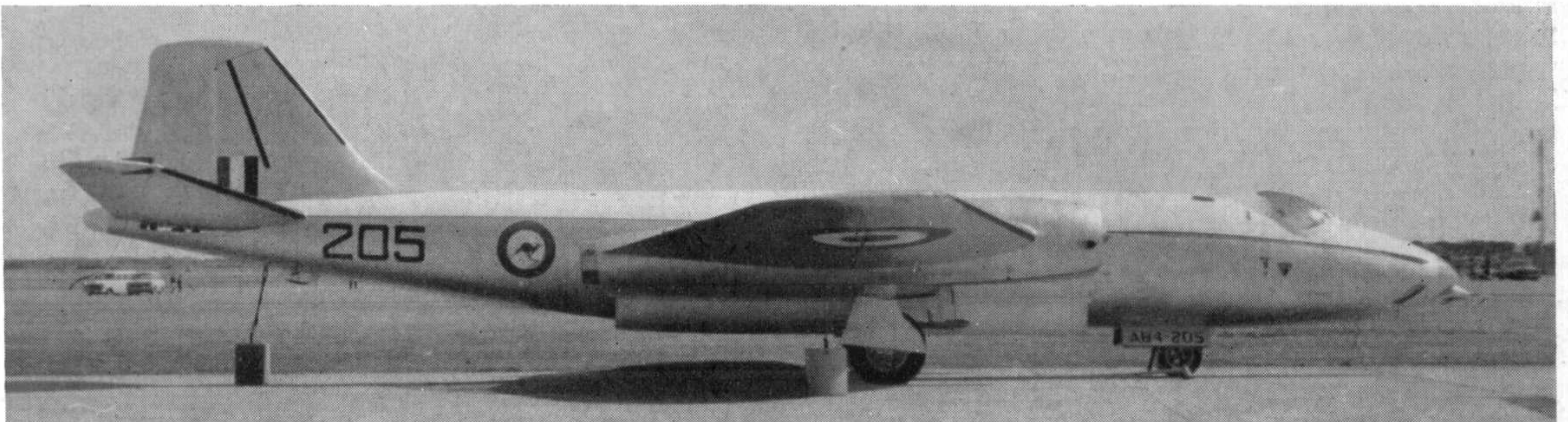
(Photo: Stephen Peltz)



Formerly *WH662* of No. 12 Squadron, this B.2 is now with No. 5 Squadron of the Royal Rhodesian Air Force; it was serialled *RRAF161*, later *RRAF202*.

The fifth G.A.F.-built Canberra B.20, *A84-205*, of the Royal Australian Air Force.

(Photo: Stephen Peltz)



1960 acquired two former B.2s converted, in similar fashion to the British T.11, for radar crew training; these aircraft have the *Flygvapnet* designation Tp 52.

## CANBERRA TESTBEDS

The Canberra's straightforward layout and proven performance have made it an ideal choice for experimental work of many kinds, not least of which has been its invaluable record as a flying testbed for an extensive range of British turbojet and rocket engines during the 1950s. Brief details of the more important testbeds appear below.

**VN799.** First B.1, used by R.A.E. July–August 1953 for automatic approach experiments with Smiths Mk. 10 autopilot.

**VN813.** Second B.1, used by Rolls-Royce November 1950 to September 1951 for development of the Nene R.Ne.2. To T.R.E. Great Malvern until August 1952; to de Havilland June 1953; converted by Folland 1956 to become first aircraft flown in Great Britain with a fully-controllable rocket motor (D.H. Spectre). First airborne firing of the Spectre 18th December 1956.

**VN828.** Third B.1, converted by Boulton Paul 1955 with Mk. 8-type canopy for trials at R.R.E. Defford of the Canberra T.11 radar installation.

**VN850.** Fourth B.1, used by Rolls-Royce from October 1950 to 13th June 1951 (crashed) for further development of Avon R.A.2.

**WD930.** B.2, used by Rolls-Royce as Avon R.A.26 (from August 1951) and R.A.29 (from 1956) testbed. Cut up for scrap August 1960.

**WD933.** B.2, fitted April 1952 with two 8,300 lb.s.t. Sapphire Sa.6; these replaced 1954 by 10,200 lb.s.t. (later 11,000 lb.s.t.) Sapphire Sa.7, with which it first flew at Bitteswell on 13th August 1954. Crashed 1955 and replaced by WK141 (see below).

**WD943.** B.2, used by Rolls-Royce October 1951 to July 1957 as testbed for re-heat system for Avon R.A.7R and R.A.14R.

**WD952.** B.2, flown 5th August 1952 with 8,000 lb.s.t. Bristol Olympus 99s. On 4th May 1953, flown by Wg. Cdr. W. F. Gibb, established a world aeroplane altitude record of 63,668 ft. Subsequently re-engined with 11,000 lb.s.t. Olympus 101s and, on 29th August 1955, re-engined with 12,000 lb.s.t. Olympus 102s, and again flown by Gibb, it raised this record to 65,890 ft. Olympus programme completed March 1956.

**WD953.** B.2, used by Ferranti from 1961 for research and development of airborne electronic equipment; still so employed (June 1965).

**WD959.** B.2, used by Rolls-Royce December 1953 to December 1959 as testbed for re-heat systems for the Avon R.A.7R, R.A.14R and R.A.24R.

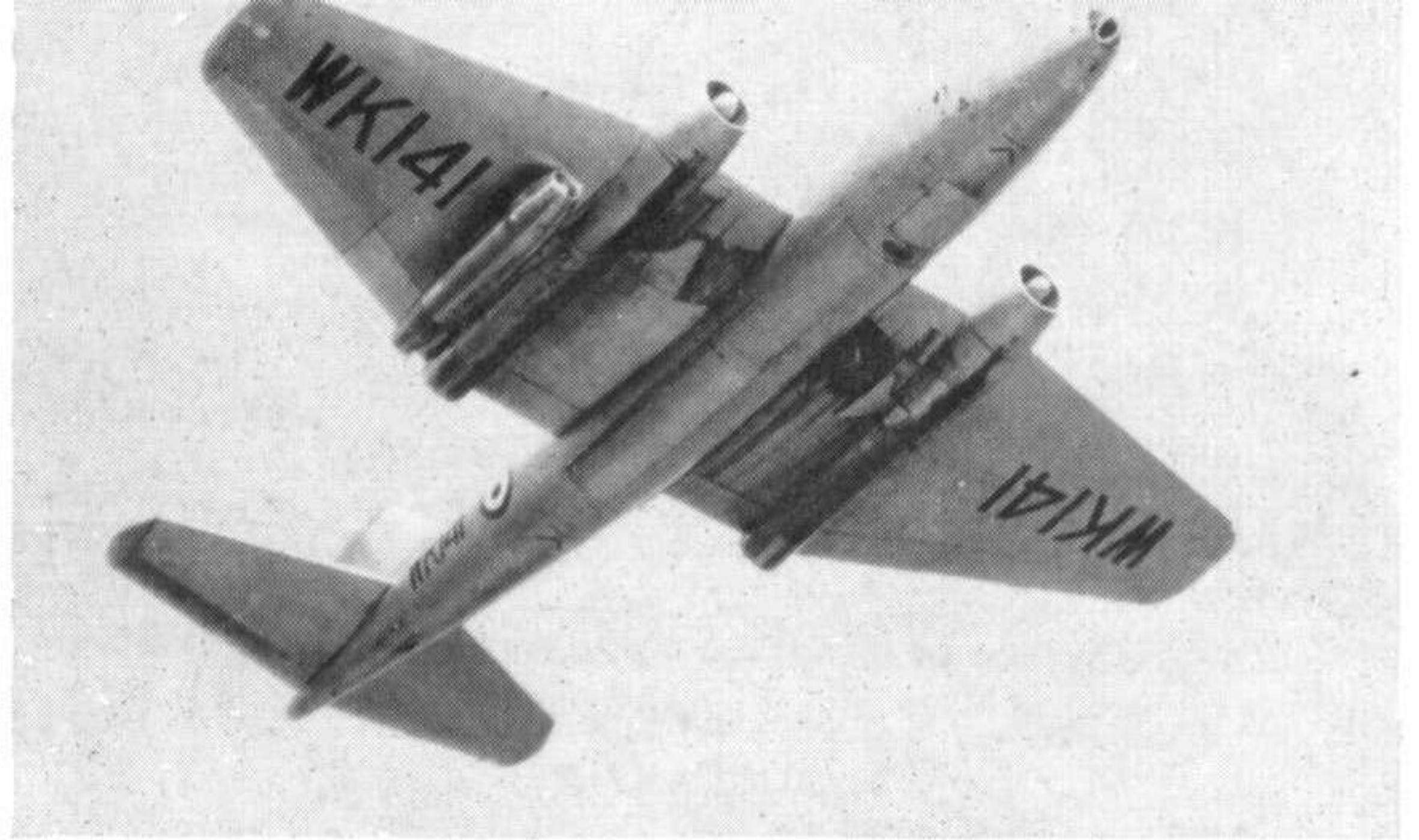
**WE189.** T.4, used for Autoland experiments at B.L.E.U. from April 1955 to September 1956.

**WF909.** B.2, used by Rolls-Royce from July 1952 for surge tests and general Avon development. To de Havilland Propellers December 1955 for conversion as testbed for 7,000 lb.s.t. Gyron Junior DGJ.1, with which it first flew (one DGJ.1, in port nacelle) on 28th May 1957.

**WH661.** B.2, used by Aircraft Torpedo Development Unit, R.N.A.S. Gosport, from July 1953 to March 1955 for parachuted aircraft mine trials; then to R.A.E. Farnborough.

**WH671.** B.2, used by Rolls-Royce (ex-Boulton Paul) from June 1954 for general development of Avon R.A.24 and R.A.28. Cut up for scrap November 1961.

**WH699.** B.2, used by R.A.F. Flying College, Manby, from 1953 as *Aries IV*, for navigational research.



*Flight testing the Viper turbojet in a starboard underwing pod of WK141. Bristol Siddeley have also used this aircraft to continue the development programme of the Sapphire Sa.7.*

Numerous trans-Polar flights including, 14th October 1954, the first flight by a British jet aircraft over the North Geographic Pole. Replaced by P.R.7 *Aries V* (WT528) on 14th June 1956.

**WH734 and WK143.** B.2s used by Flight Refuelling for trials with probe and drogue and "buddy" systems.

**WH854.** B.2, used by Rolls-Royce for re-lighting tests with the Avon series.

**WH912.** B.2, used by R.A.E. Farnborough from 1958 as testbed for Airpass radar and fire-control system.

**WJ576.** One of six B.2s from Cyprus engaged, 1959–60, in "Operation Swifter" trials in the Middle East (El Adem) to study high-speed, low-level turbulence problems for R.A.E. and the I.A.M.

**WJ627.** B.2, formerly with 149 Squadron, used by Ferranti from 1959 to 1963 for research and development of airborne electronic equipment.

**WJ643.** B.2, used by Ferranti from 1955 for research and development of airborne electronic equipment; still so employed, now Mk. 8 standard, in June 1965.

**WJ644.** B.2, used by the Ministry of Supply for high altitude firing trials at Aberporth of the de Havilland Firestreak. Weapons launched from underwing pylons,

*(Continued on page 12)*

## CANBERRA PRODUCTION

### B. Mk. 1

4 built by E.E.C.—VN799, VN813, VN828 and VN850.

### B. Mk. 2

205 built by E.E.C.—VX165 and VX169 (prototypes); WD929–966 (38 aircraft); WD980–999 (20); WE111–122 (12); WF886–892 (7); WF906–917 (12); WH637–674 (38); WH695–742 (48); WJ712–733 (22); WJ751–753 (3); and WP514–516 (3). Known conversions include WD944, WH637, WH657 to T.4; WH733 to U.10.

75 built by A. V. Roe—WJ971–995 (25); WK102–146 (45); WK161–165 (5). Known conversions include WJ992 to T.4; WJ987 to U.10; WJ975 to T.11. Further 75 aircraft cancelled—WK166–190 (25) and WT140–189 (50).

75 built by Handley Page—WJ564–582 (19); WJ603–649 (47, of which WJ622 crashed before delivery); WJ674–682 (9). Known conversions include WJ568 and WJ617 to T.4; WJ610 to T.11. Further 75 aircraft cancelled—WJ683–707 (25), WS960–999 (40) and WT113–122 (10).

75 built by Short Bros. & Harland—WH853–887 (35); WH902–925 (24); WH944 (1) + 15. Known conversions include WH854 to T.4; WH903 and WH904 to T.11.

### P.R. Mk. 3

37 built by E.E.C.—VX181 and WH772 (prototypes); WE135–151 (17); WE166–175 (10); WF922–929 (8).

### T. Mk. 4

75 built as T.4 by E.E.C.—WN467 (prototype); WE188–195 (8); WH839–850 (12); WJ857–881 (25); WT475–492 (18); XH583–584 (2) + 10 others.

### B. Mk. 20

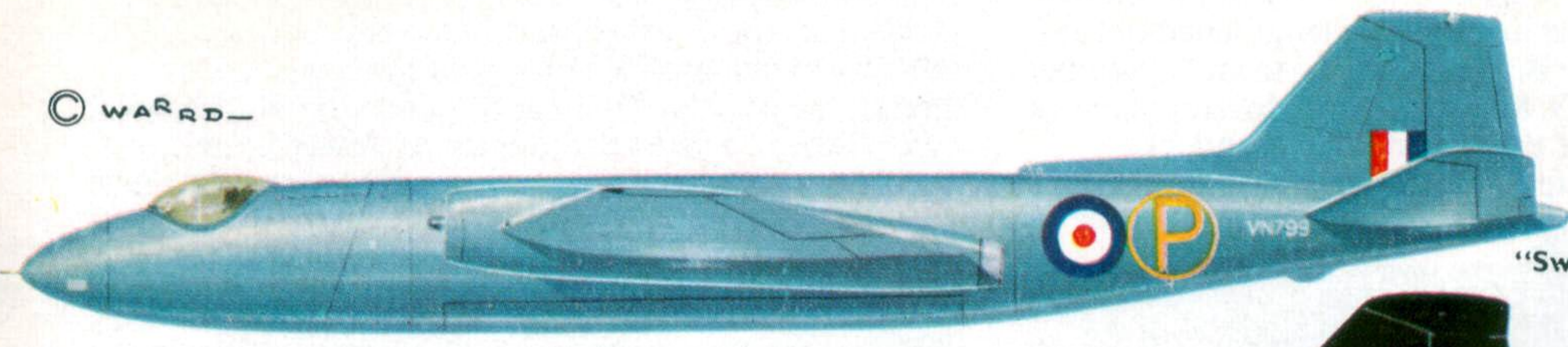
48 built by G.A.F.—A84-201–248; of these, A84-201, -203, -204, -205 and -206, and two ex-R.A.F. machines (see text) were converted to T. Mk. 21.

### B-57A

8 built by Martin—52-1418–1425.

### RB-57A

67 built by Martin, commencing 52-1426.



Canberra prototype.



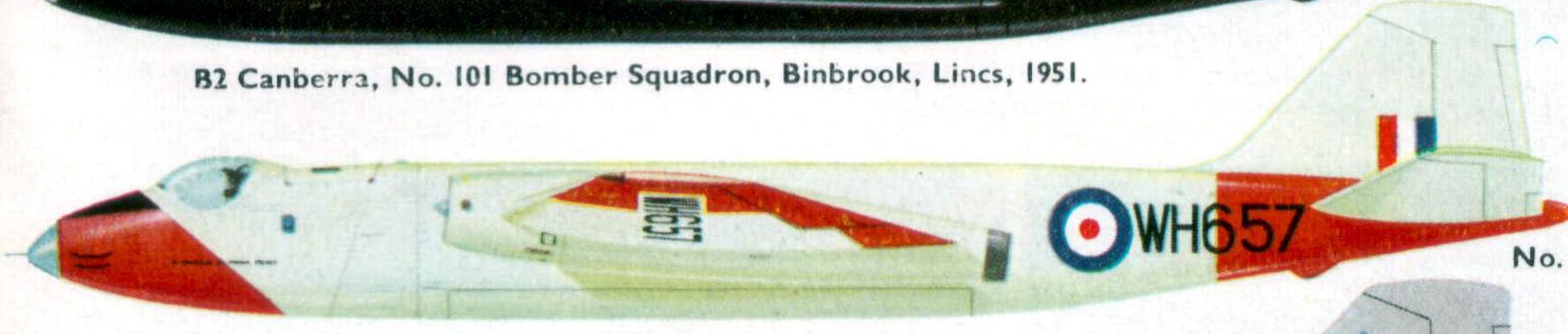
"Swifter" insignia.



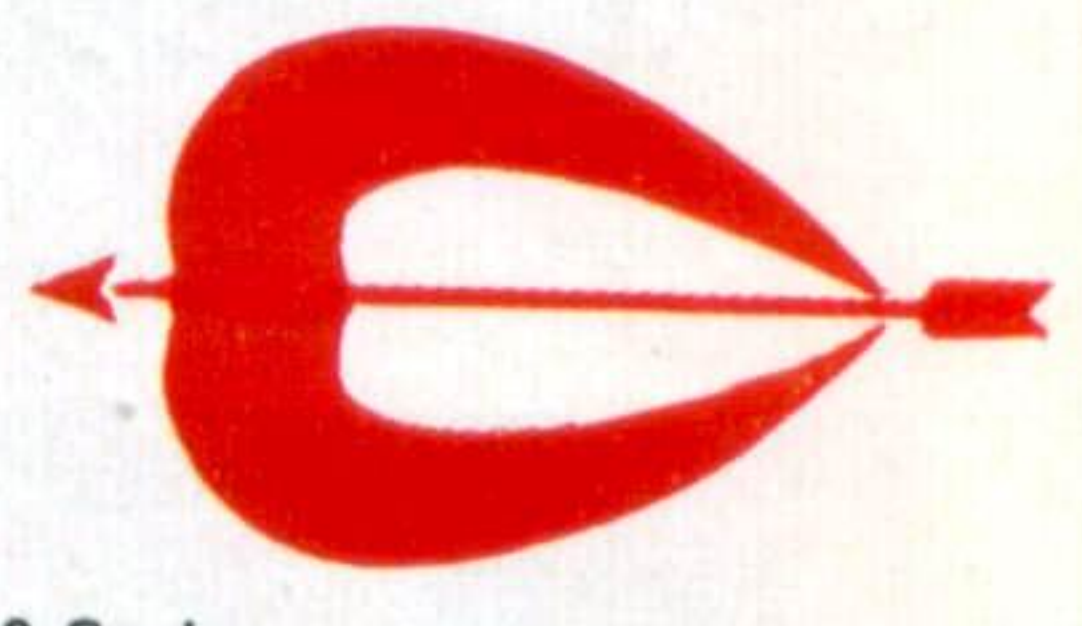
B2 Canberra, No. 101 Bomber Squadron, Binbrook, Lincs, 1951.



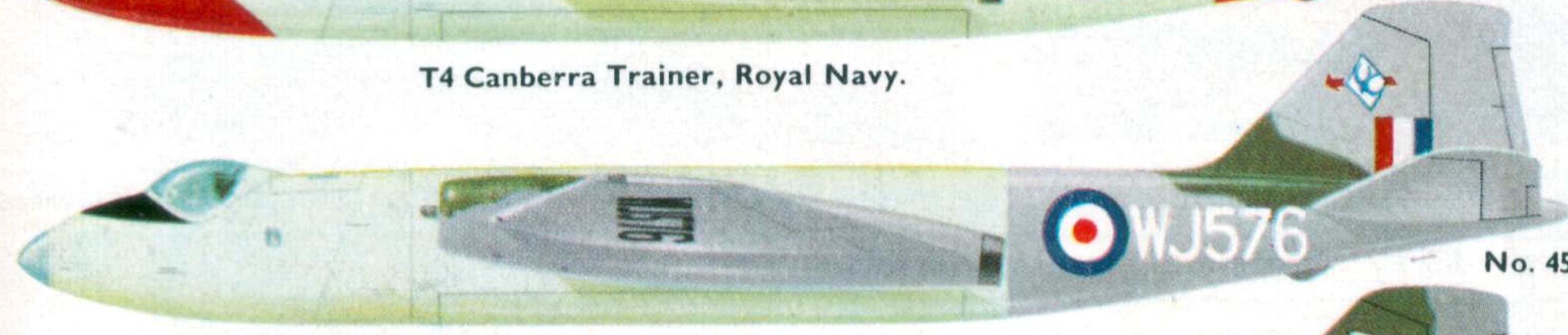
Honington Wing.



T4 Canberra Trainer, Royal Navy.



No. 10 Sqn.



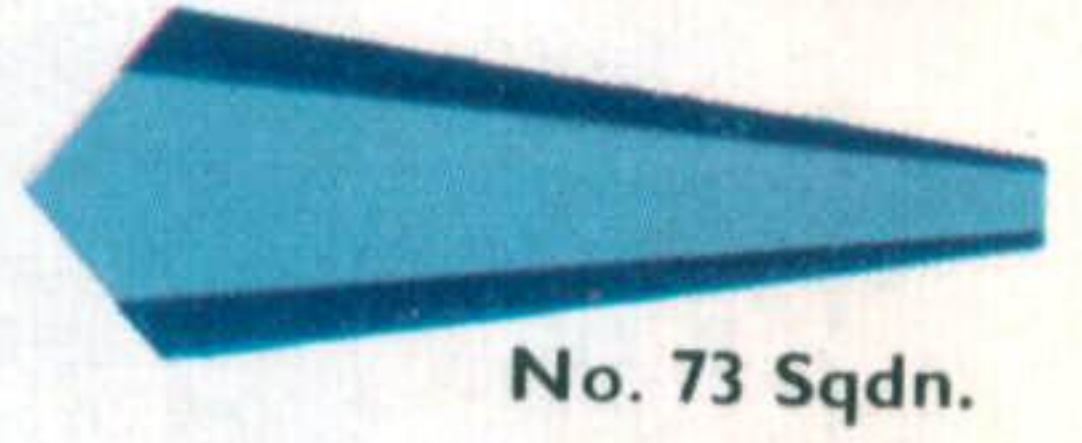
B2 Canberra, Operation "Swifter", specially modified aircraft to investigate effects of high-speed, low-level turbulence on a/c structures and aircrew. El Adem, Libya, 1960.



No. 45 Sqn.



B2 Canberra, No. 10 Bomber Squadron, Nicosia, Cyprus, Suez Crisis 1956. Home base Honington, Suffolk, U.K.

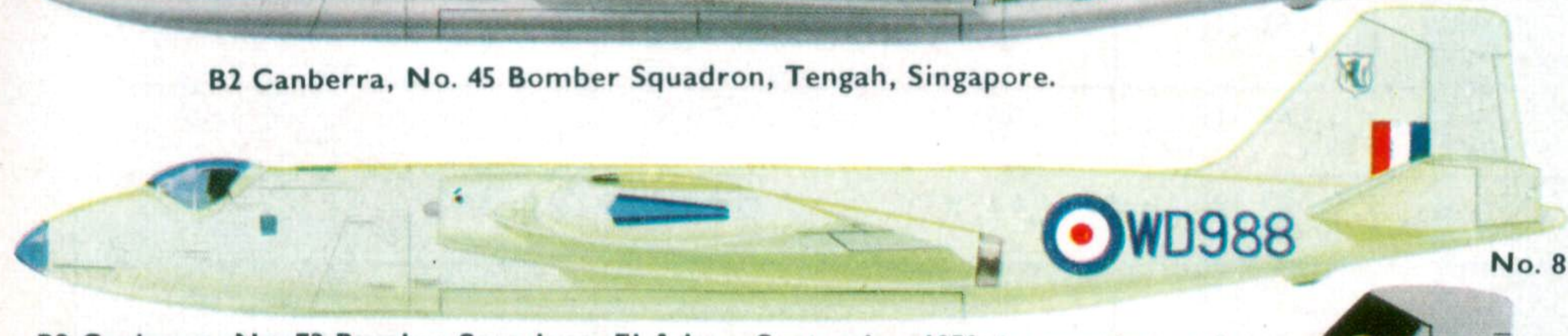


No. 73 Sqn.



No. 73 Sqn.

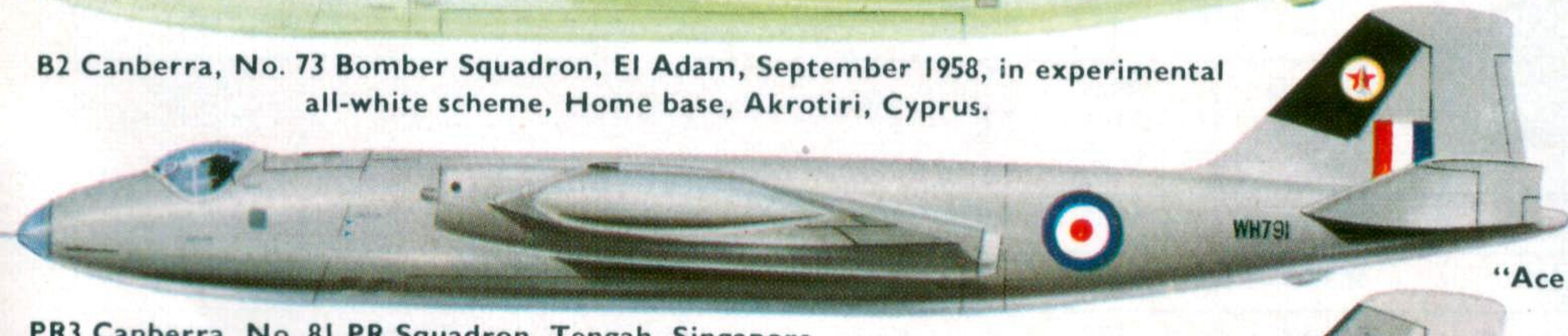
B2 Canberra, No. 45 Bomber Squadron, Tengah, Singapore.



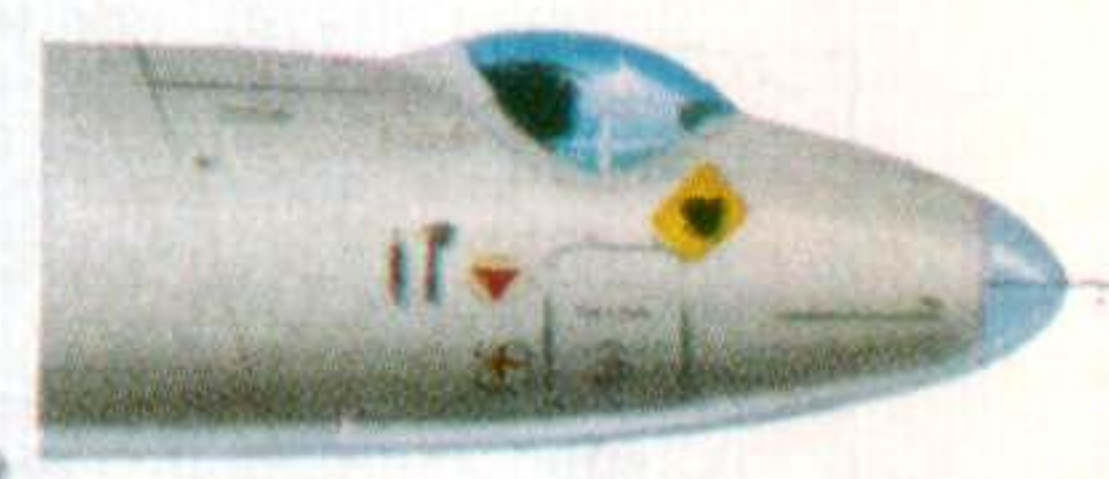
B2 Canberra, No. 73 Bomber Squadron, El Adam, September 1958, in experimental all-white scheme, Home base, Akrotiri, Cyprus.



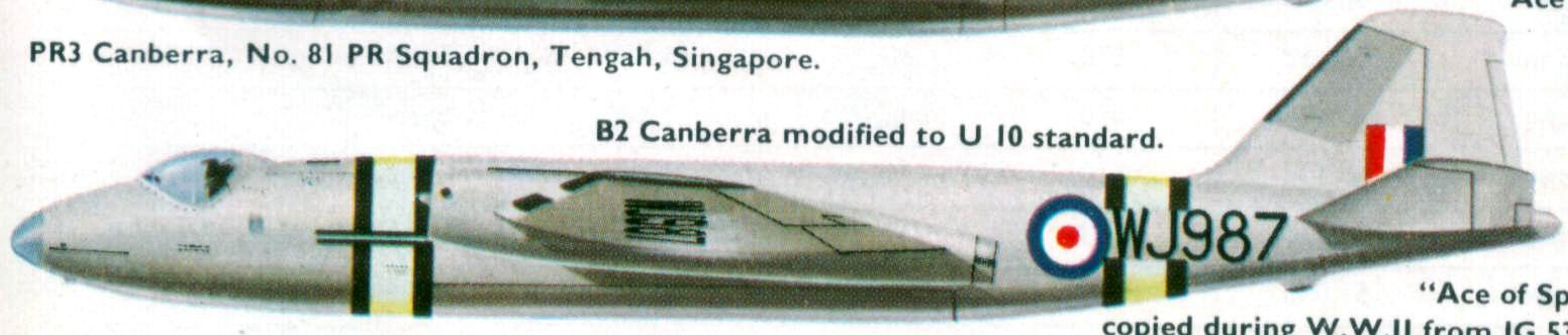
No. 81 Sqn.



PR3 Canberra, No. 81 PR Squadron, Tengah, Singapore.



Stbd. nose detail showing "Ace of Spades".



B2 Canberra modified to U 10 standard.



"Ace of Spades" copied during W.W.II from JG 53 "Pik As".

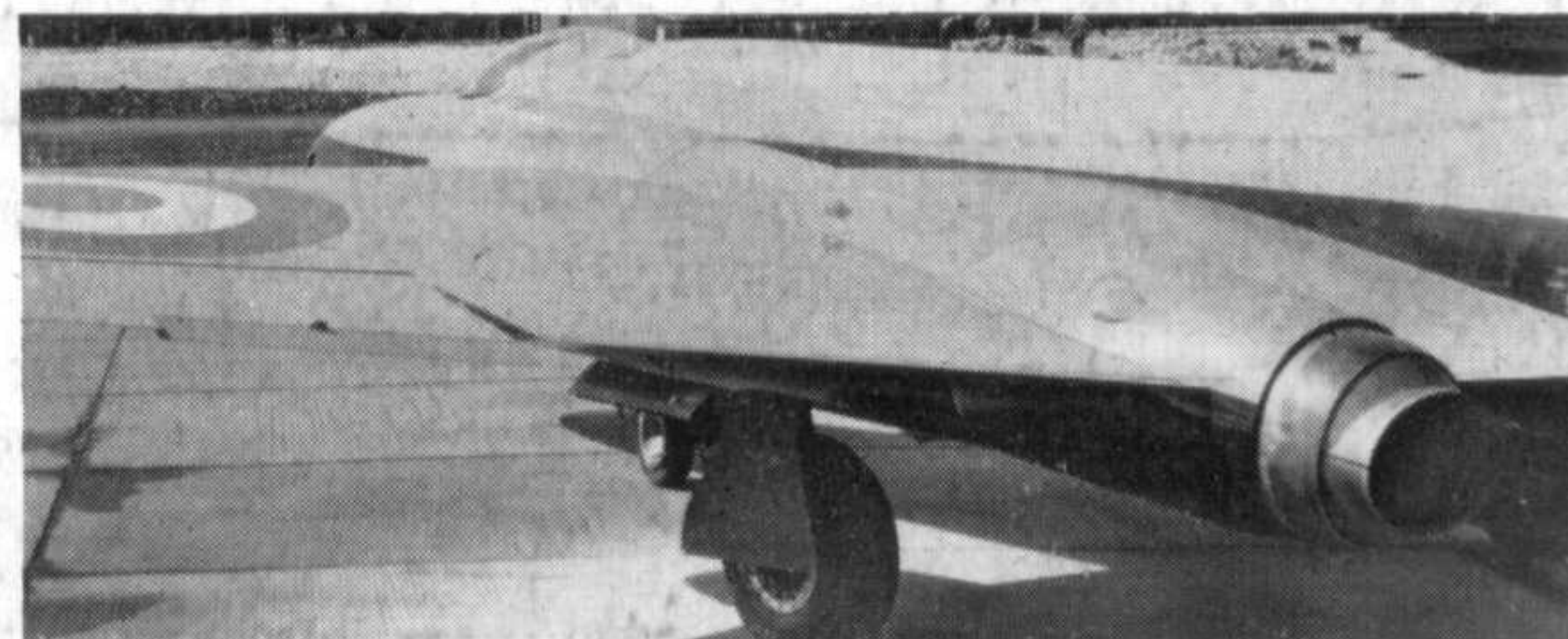
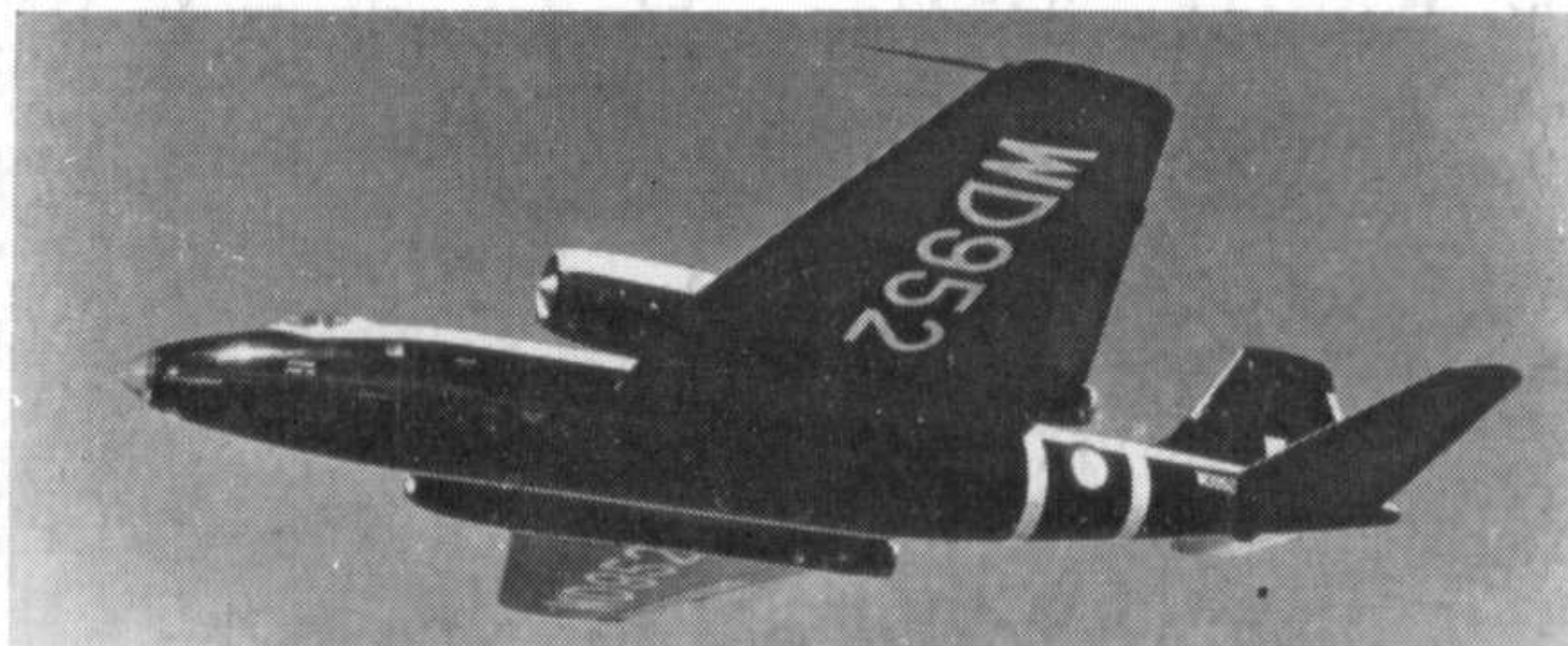
with guidance mechanism and a tracking camera installed in a modified and slightly lengthened nose.

**WK141.** B.2, used by Bristol Siddeley from September 1959 to March 1963 for continued development of Sapphire Sa.7 and of the Viper Mk. 8 and 11.

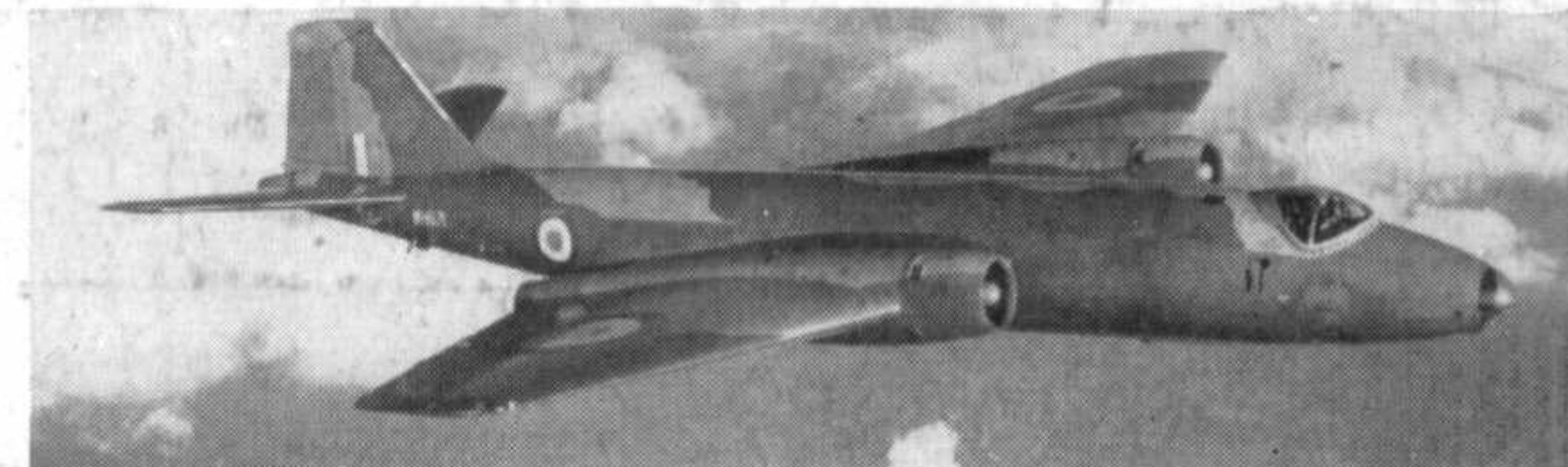
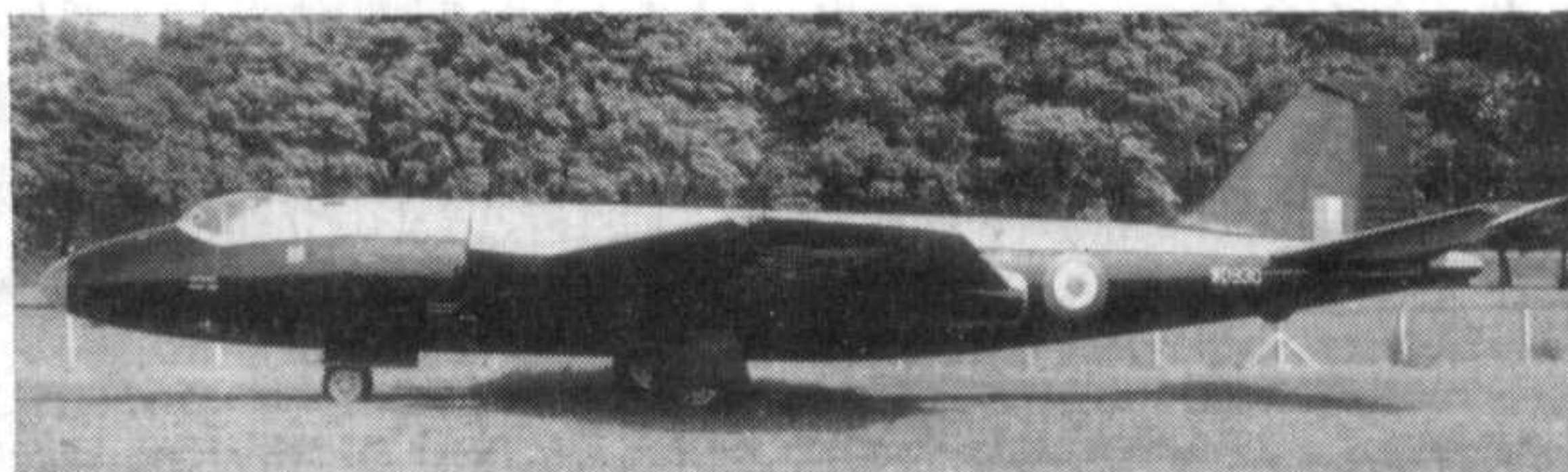
**WK163.** B.2, converted by Napier (Luton) to take a Double Scorpion N.Sc.D.1-2 liquid rocket motor in

the bomb bay and first flown in this form on 20th May 1956. The third world aeroplane altitude record to fall to Canberras (70,310 ft.) was established by this aircraft, piloted by Michael Randrup, on 28th August 1957. Later to Bristol Siddeley as testbed for short- and long-life Viper 3 (in starboard underwing pod).

© Kenneth Munson, 1965



Left: Two world altitude records fell to the Olympus-Canberra WD952 in 1953 and 1955, seen here in original form with 8,000 lb.s.t. Olympus 99s. Right: Re-heat systems for various Avons were tested in Canberras. WD943 was responsible for the R.A.7 and R.A.14 systems. (Photos: Bristol Siddeley and Rolls-Royce)



Left: One of several Rolls-Royce testbeds, WD930 was used for development work on the Avon R.A.26 and R.A.29. Right: WH671, also an Avon testbed until scrapped in 1961, reveals an unusual partial camouflage finish. (Photos: Rolls-Royce)

### SPECIFICATIONS

| Mark No.   | Powerplant  | Span<br>ft. in. | Length<br>ft. in. | Height<br>ft. in. | Wing Area<br>sq. ft. | Basic Empty Weight<br>lb. |
|------------|---|-----------------|-------------------|-------------------|----------------------|---------------------------|
| B. Mk. 1   | 6,000 lb. s.t. Avon R.A.2 or 5,000 lb. s.t. Nene R.Ne.2 | 63 11½          | 65 6              | 15 8              | 960                  | n.a.                      |
| B. Mk. 2   | 6,500 lb. s.t. Avon 101 (R.A.3)                         | 63 11½          | 65 6              | 15 8              | 960                  | 22,200                    |
| P.R. Mk. 3 | 6,500 lb. s.t. Avon 101                                 | 63 11½          | 66 8              | 15 8              | 960                  | 22,780                    |
| T. Mk. 4   | 6,500 lb. s.t. Avon 101                                 | 63 11½          | 65 6              | 15 8              | 960                  | 21,800                    |
| U. Mk. 10  | 6,500 lb. s.t. Avon 101                                 | 63 11½          | 65 6              | 15 8              | 960                  | n.a.                      |
| T. Mk. 11  | 6,500 lb. s.t. Avon 101                                 | 63 11½          | 69 9              | 15 8              | 960                  | n.a.                      |
| B. Mk. 20  | 7,500 lb. s.t. Avon 109 (R.A.7)                         | 63 11½          | 65 6              | 15 8              | 960                  | 24,700                    |
| RB-57A     | 7,220 lb. s.t. Wright J65-W-5                           | 63 11½          | 65 6              | 15 8              | 960                  | n.a.                      |

| Mark No.   | Bomb Load<br>lb. | Max. T/O Weight<br>lb. | Max. Speed<br>m.p.h. | At Height<br>ft. | Initial Climb Rate<br>ft./min. | Operational Ceiling<br>ft. | Range (Int. Fuel)<br>miles |
|------------|------------------|------------------------|----------------------|------------------|--------------------------------|----------------------------|----------------------------|
| B. Mk. 1   | none             | 44,500                 | 550                  | 40,000           | 3,500                          | 48,000                     | 2,660                      |
| B. Mk. 2   | 6,000            | 46,000                 | 570                  | 40,000           | 3,800                          | 48,000                     | 2,656                      |
| P.R. Mk. 3 | none             | 44,150                 | 570                  | 40,000           | 3,800                          | 48,000                     | 3,585                      |
| T. Mk. 4   | none             | 37,660                 | 570                  | 40,000           | 3,800                          | 48,000                     | 2,656                      |
| U. Mk. 10  | none             | 40,500                 | 570                  | 36,000           | 3,800                          | 48,000                     | n.a.                       |
| T. Mk. 11  | none             | 38,000                 | 570                  | 40,000           | 4,300                          | 48,000                     | 3,110                      |
| B. Mk. 20  | 6,000            | 51,000                 | 580                  | 40,000           | 3,800                          | 48,000                     | 2,600                      |
| RB-57A     | 6,000            | 51,000                 | 582                  | 40,000           | 3,500                          | 48,000                     | 2,300                      |