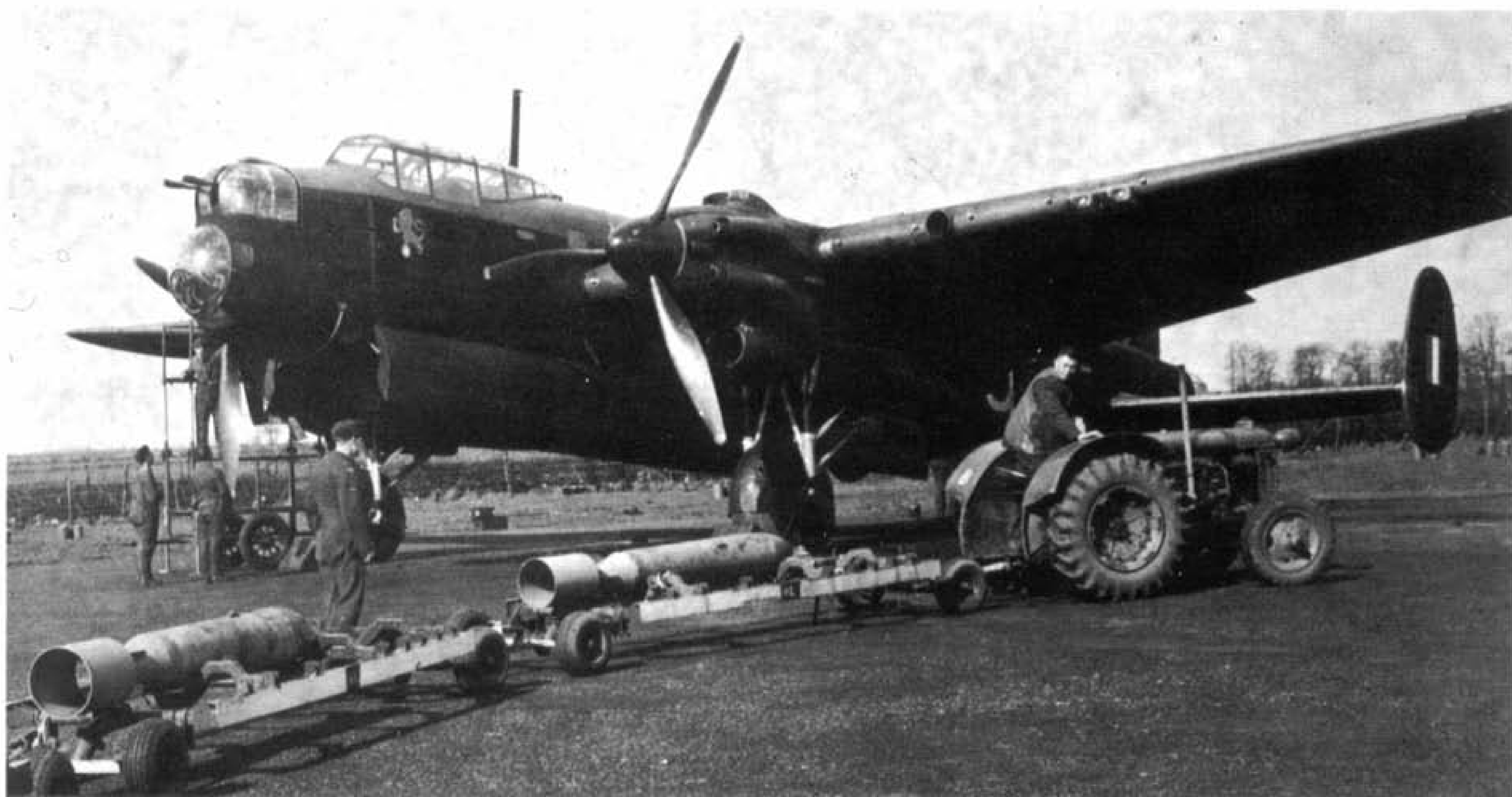


PROFILE Aircraft



Avro Manchester by Chaz Bowyer





Avro Manchester

by Chaz Bowyer

If sufficiently powerful engines had been available at the birth of the Avro Manchester, it is possible that the Lancaster¹ need never have been built and, equally, that the dismal 'legend' of the Manchester might now be an entirely different story.

Although 30 years have elapsed since the Manchester ended its first-line service, this twin-engined heavy bomber of the Royal Air Force still retains an almost evil reputation. Certainly, the Service shortcomings were formidable: Continual unserviceability, persistent trouble with the hydraulics, disastrous engine failures, together with a high loss rate and comparatively little success to show for its operational effort. While there is truth in all these facets, on the credit side the Manchester was basically a fine aircraft designed with great foresight and no little imagination.

That the Manchester was required to use the underdeveloped and controversial Rolls-Royce Vulture X-inline instead of a more reliable aero-engine was a circumstance of the period; and no fault of either the aircraft or its creators—as witness its immediate successor, the superb Lancaster. A common myth is that the Lancaster was hastily evolved after the Manchester's engine shortcomings in service became apparent. This was not the case because four-engine installations (Bristol

radials and R-R Merlin inlines) were committed to paper a year before the RAF accepted delivery of the first production Manchester. These first proposals of September 1939 were followed in April 1940 when the Merlin-version was mooted once again. EDITOR

Avro Type 679 to Spec. P.13/36

The Manchester bomber was first envisaged in response to the Air Ministry Specification P.13/36. This was issued in May 1936 as a requirement for an all-metal, twin-engined, medium (*sic*) bomber in monoplane configuration. The company designed their Avro Type 679 project and forwarded a tender in January 1937. Along with the Handley Page H.P.56, the new design was selected from various tenders and a contract² for two prototypes was awarded to Avro. In the event the H.P.56 venture was abandoned, its makers concentrating instead on the H.P.57 project which led the way to the Halifax³; thus leaving the Avro 679 as the only successful contender to the Specification.

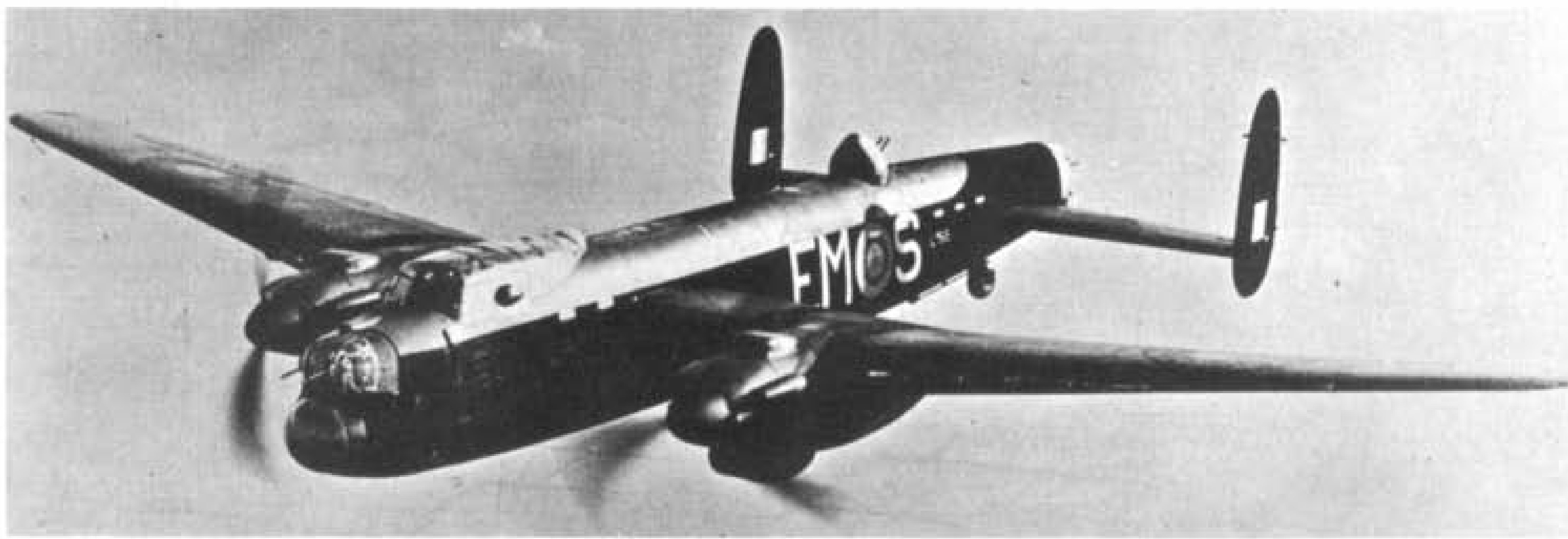
Written into the original official requirement were several new features for a bomber. Primarily these included the installation of two

Triple-fin Manchester Mk. I ready for bombing-up at a Scampton (Lincolnshire) dispersal in April 1942. Fuselage unit code letters are "OL" (No. 85 Squadron, RAF Bomber Command); "C-for-Charlie's" RAF serial number being L7385. The Manchester could carry up to six 2,000-lb bombs like those illustrated. Under the pilot's cockpit is "C-Charlie's" individual crest, "a lion rampant". Reference to the closing pages of this Profile will provide known individual histories of Manchesters by RAF serials. Thus, L7385 had a 16-month service career from April 1941 to August 1942 when it suffered an air collision. (Photo: Central Press, ref. 17.4.42)

¹See Profiles No. 65: Lancaster Mk. I; and No. 235: Lancaster Mk. II.

²Contract No. 624973/37/C4(c), dated April 30, 1937.

³See Profile No. 11: Halifax Mk. III, VI & VII.



Twin-fin Manchester Mk. IA (L7515) "S-for-Sugar" of No. 207 Squadron (code: "EM") flying from RAF Station Waddington (Lincs) in November 1941. This was the first Bomber Command squadron to be equipped with Manchesters. Before being struck-off-charge in November 1943, L7515 was successively reallocated to Nos. 49 and 106 Squadrons and No. 1656 Conversion Unit. (Photo: Hawker Siddeley Aviation, ref. A9/50)

Rolls-Royce Vulture engines—thereby sowing the seed of virtually all future troubles in Manchesters.

The Vulture was in effect an unhappy 'marriage' of two sets of cylinder blocks from Rolls-Royce Peregrine engines, mounted on a common crankcase with a 90° angle between the blocks and giving an 'X' cross-sectional appearance. The original Peregrine engine had a rating of 885 h.p., but the Vulture was rated (at least, on paper) at 1,710 h.p. and was calculated to give 1,845 h.p. at 5,000 feet. Its bore was five inches and its stroke, 5.5 inches. It was a new powerplant, still to be fully developed and therefore host to a continuing crop of teething problems which were to dog the Manchester throughout its career. Initial engine trials with Vultures soon convinced the Avro design team that alternative powerplants might be needed. Accordingly, other layout designs were considered, using two Bristol Hercules or Centaurus radial engines.

Other items required by the official specification included a bomb capacity of 8,000 lb. (although Avro's tender improved on this figure by offering load capacity up to 12,000 lb.—six 2,000 lb. bombs); accommodation for an alternative load of two torpedos; provision for power-operated machine-gun turrets (Nash & Thompson) in the nose and tail locations, and necessary stressing of the airframe to absorb the added strain of 'frictionless take-off'—a reference to the possibility of catapult-assisted take-off with a full war load. In preparing their original tender for Spec. P.13/36, Avro's draughtsmen produced various possible lay-outs for the Avro 679 project. All had several items in common. One major feature was the decision to accommodate all fuel storage in the wings, partly to eliminate the hazard of fumes in the crew cabin, but mainly to leave the fuselage 'free' for a maximum warload in a relatively large bomb-bay which stretched for nearly two-thirds of the under-fuselage.

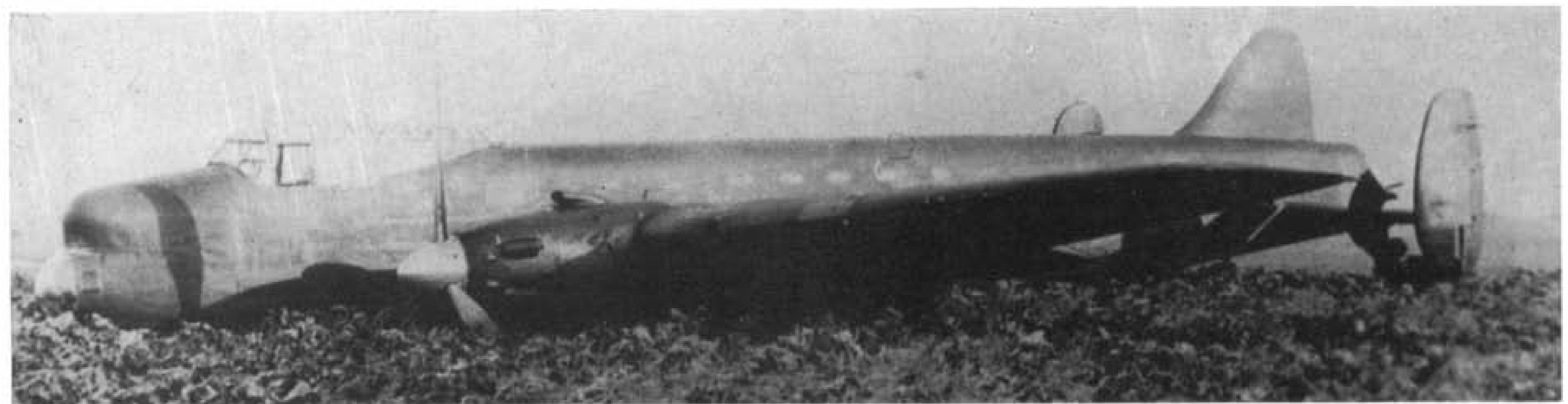
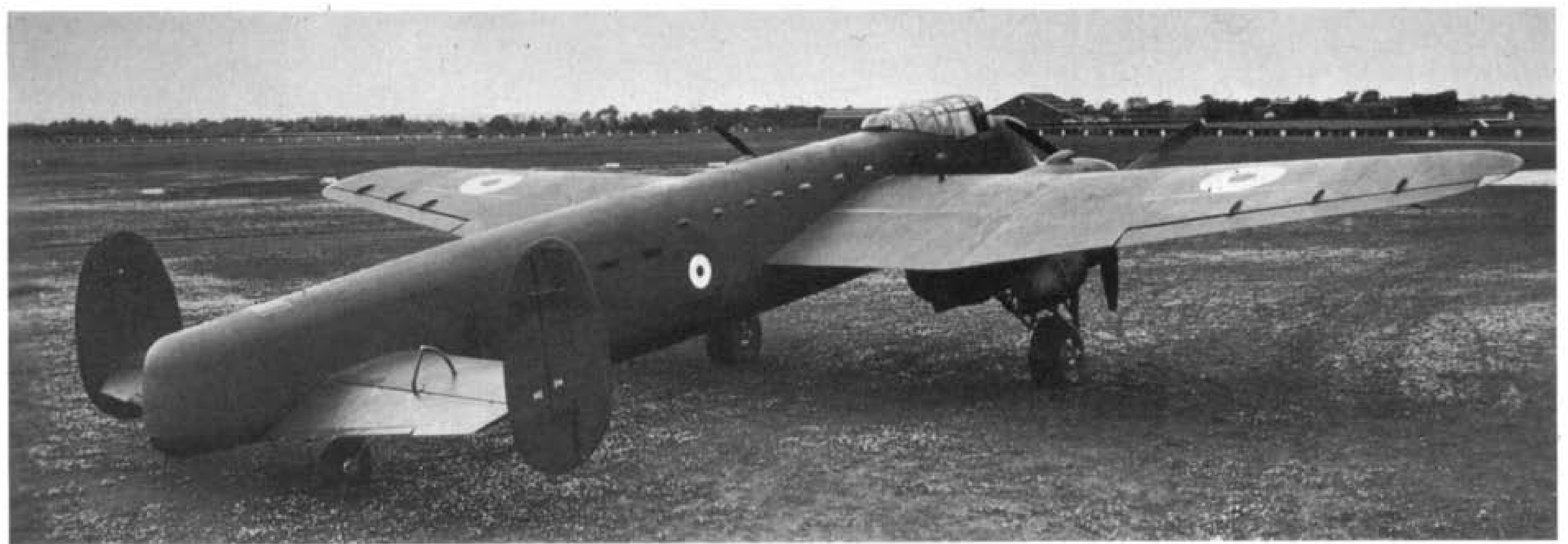
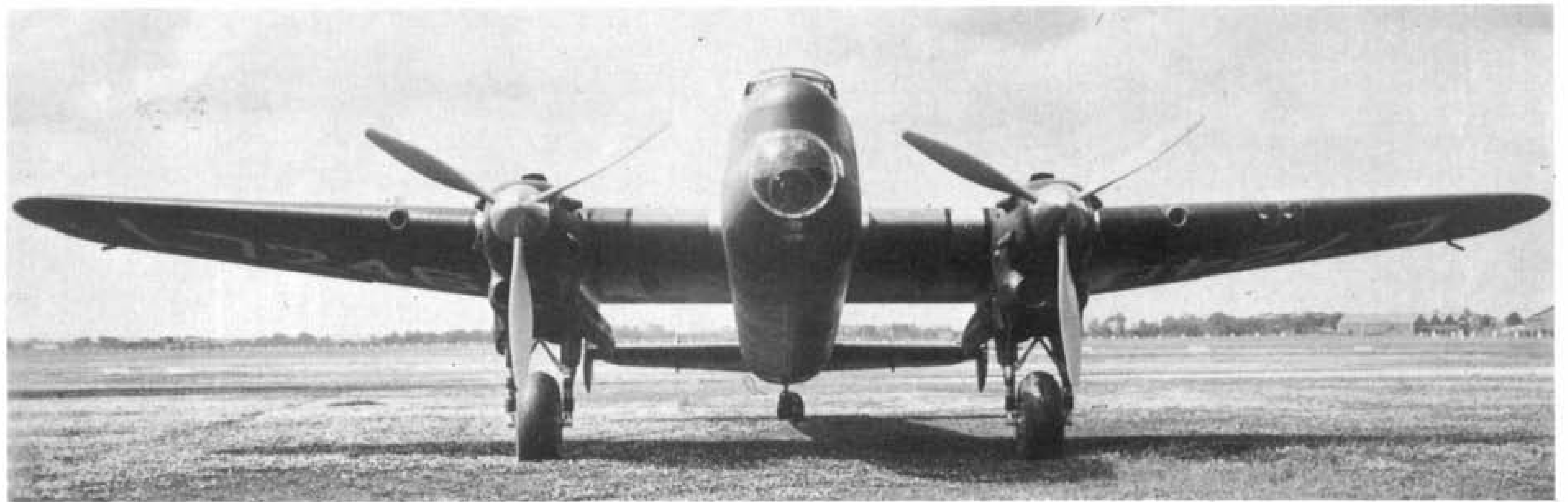
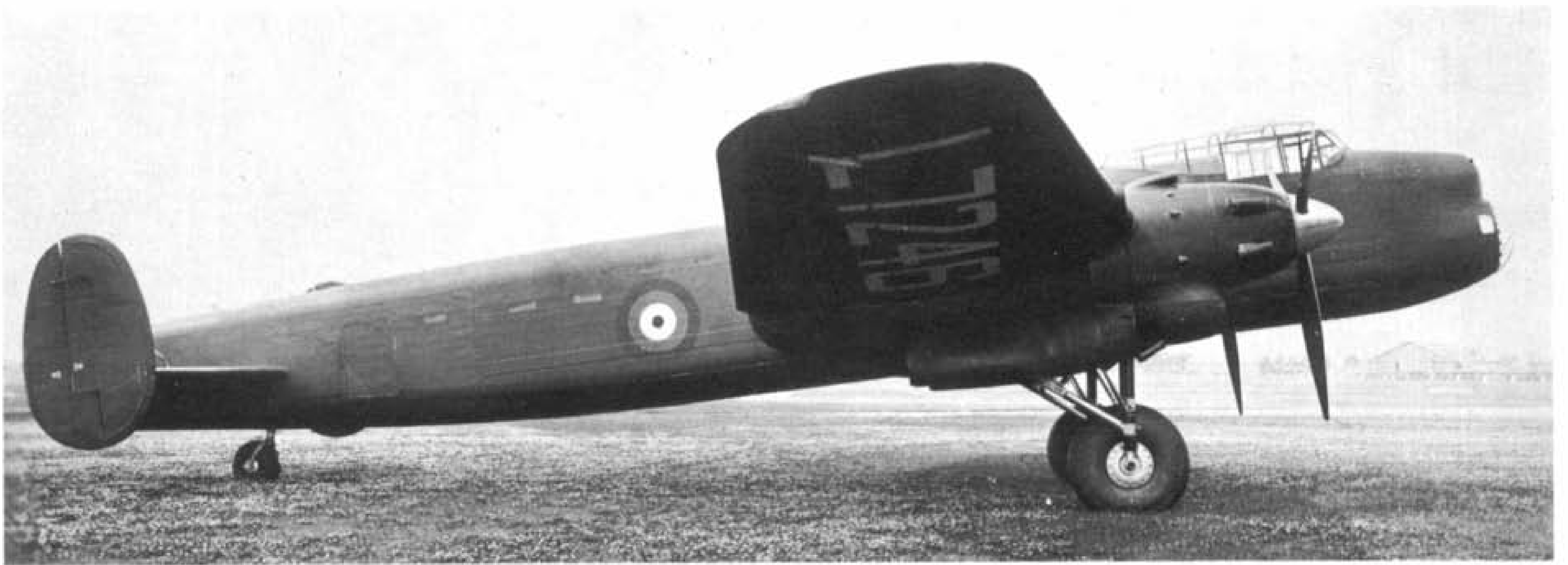
A great amount of attention was paid to the vital question of defensive armament. In addition to the minimum need for nose and tail gun turrets, Avro considered another arrangement whereby all defence was concentrated in either an upper or lower four-cannon turret. For this,

three types of turret were mooted—Boulton Paul, Bristol and Nash & Thompson. Such a turret necessitated a heavily-bulged midships section to the fuselage; the remainder of the fuselage being extremely well streamlined. Indeed, this fuselage in profile bore a striking resemblance to that of the Lancastrian civil transport of 1945. A second possibility was the addition of a third machine-gun turret in the ventral position, just to the rear of the bomb bay, for under-protection. This retractable, two-gun turret proved to be limited in physical manipulation, while its original periscopic form of sighting left much to be desired. Despite these limitations, such a turret was later fitted to the second prototype Manchester. Its shortcomings became plainly evident during early flying trials of the second prototype but because of the persistence of Air Ministry 'experts', a further Specification (P1.19/37, dated July 25, 1938, and issued for production Manchesters), clearly stated that 'a space 4 ft. X 4 ft. is to be provided behind the bomb-bay for a machine-gun mounting or turret if required at a later date to cover the blind area beneath the aircraft.' The vital need for some form of under-protection was obviously important and it remains something of a mystery that in spite of this early awareness of the basic design's most vulnerable area, later Manchesters and Lancasters flew to war without any such protection. German night-fighter pilots' accounts make it clear that the belly-shot was most favoured when engaging a Lancaster and this deficiency probably cost the Lancaster units more dearly than any other single factor.

Construction of the Manchester was aimed at great strength, high load capacity and an unusual amount of crew comfort and protection. The wing was built up on two main spars, formed of channel-section light alloy extruded booms top and bottom and joined by an Alclad plate web. The ribs were pressed in three sections, again in light alloy, and in addition to being flanged for stiffness, had vertical stiffeners. The skin covering the leading-edge had additional stringers for stiffness running spanwise. Other constructional details were normal for the period, including flush-riveted skin and a full range of hydraulics for operating the under-

The top three photographs show the first prototype (unarmed) Manchester (L7246) in August 1939 before the central vertical tail surface, had been added. No gun turrets fitted. Outermost ring of RAF roundel appears black instead of yellow, rendered thus by using orthochromatic film. (Photos: Crown Copyright Reserved, refs. 10214E, 'A & F')

First prototype (L7246) with second version of central fin fitted. Forced landing on December 12, 1939, while flying out of A&AEE, Boscombe Down (Hampshire). (Photo: via R.C.B. Ashworth)



carriage, flaps, bomb doors and radiator and air intake flaps. The Dowty-type undercarriage retracted completely, an ingenious catch on the leg near the hub hooking on the door as the whole mechanism rose into its nacelle and completing door closure. The wing flaps were of the split variety, while the 'tails' of the under-slung engine nacelles hinged down in harmony with the flaps which extended right into the fuselage.

Crew strength was originally five men: A pilot, a second pilot who also filled the roles of navigator, bomb aimer and front gunner, an air observer, a wireless operator and one air gunner for the rear turret. Provision for crew comfort included some novel ideas. In the leading edge of the wing, inboard of the engines, a duct passed air through a small coolant radiator inside the wing and delivered it under pressure into the cabin against a spreader baffle; resulting in a constant warm air atmosphere in the cabin. Also included was a 'rest room' (*sic*) situated just to the rear of the main cabin and capable of being sound-proofed. This was furnished with 'two couches or reclining chairs' for 'off-duty' crew members. Both pilots had back-armor protection, while just forward of the front spar, a swivel-mounted armour-plated bulkhead was installed.

Manchester prototypes

On July 1, 1937, a production contract¹ was placed with Avro for the production of 200 Manchesters, built to Air Ministry Spec. 19/37, as amended. Item 5 of this contract ordered a further 200 aircraft, dated September 20, 1939. Meanwhile the first prototype Manchester (serial L7246), was under construction at the Avro factory. Then, on July 25, 1939, the first flight was undertaken when Captain H. A. Brown; Avro's chief test pilot, made a brief 17-minute circuit of Ringway aerodrome, near Manchester.

In its original guise, this prototype had no armament installed, all gun-turret locations being faired over, while the 28-foot span tail-plane had twin inset fin and rudders. Wing span was 80 ft. 2 ins., and the elevators and ailerons were metal-covered.

The early flight trials of L7246 soon showed a certain amount of longitudinal instability, due mainly to insufficient wing area—a factor which was subsequently solved by adding nearly 10 feet to the wing span. Those tests also indicated the inadequacy of the Vulture engines in providing sufficient power for the new bomber—proof of the Avro design team's early doubts about them.

On November 28, 1939, L7246 was flown to

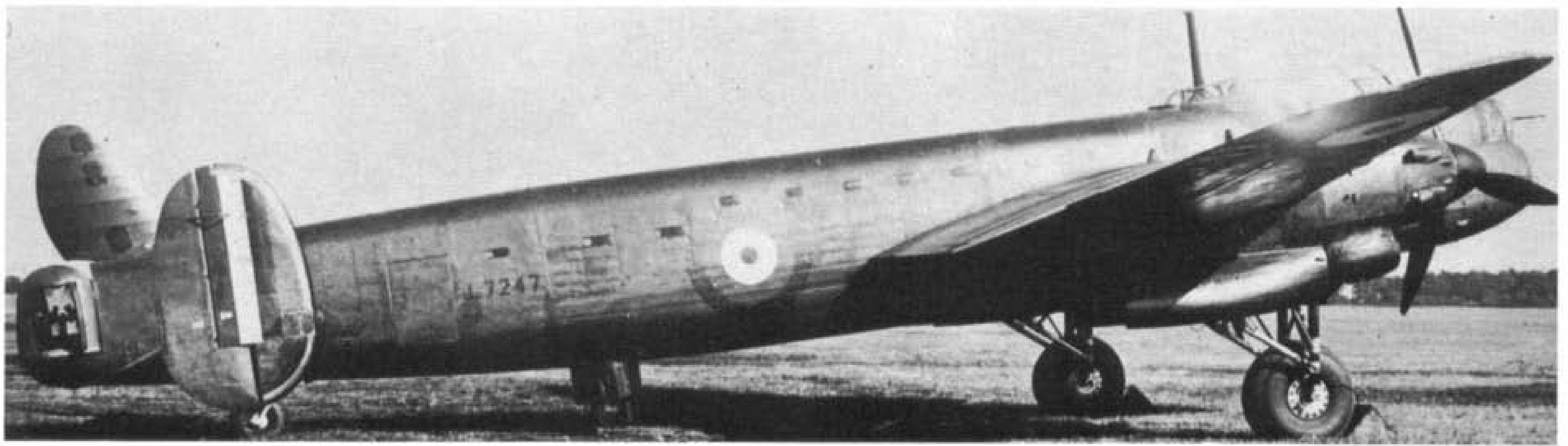
¹Contract No. 648770/37/C4(c).



Prototype (L7246) now fitted with nose and tail power-operated gun turrets and rigged for catapult-assisted take-off trials at RAE, Farnborough (Hampshire) where it became resident in August 1940. Behind the fuselage roundel is the obligatory yellow "P" (prototype) in a thin yellow circle. Fore and aft series of crosses were applied for photo-measuring purposes. (Photo: via R.C.B. Ashworth)

Number two prototype (L7247) shortly after its first flight on May 26, 1940. The FN21A ventral "dustbin" is shown in the fully extended position. Photo taken at A&AEE, otherwise RAF Boscombe Down. (Photo: Crown Copyright Reserved, ref. 10336A)





RAF Boscombe Down, Wiltshire, for Service appraisal and there a third fin was added to the rear fuselage to help improve directional stability. In its first form this fin had a distinctive 'shark-like' profile but within a few days was changed for a slightly larger and more pleasing shaped fin. On December 12, the Manchester prototype narrowly escaped disaster when it had to force-land in an acre of cabbages near to Boscombe Down airfield, but the damage proved to be superficial.

Eight months later, on August 24, 1940, L7246 was taken to the Royal Aircraft Establishment at Farnborough, Hampshire, for further extensive trials and experimental tests, not all of which related directly to Manchester progress. Included in the trial programme was practical investigation into catapulting a fully-loaded bomber for take-off—a surprising trial in light of the July 1938 amendments to the Manchester's production contract which specifically stated that production aircraft need have no provision made for catapult stressing.

The second prototype Manchester, L7247, made its first flight on May 26, 1940, at Ringway. It carried the third, 'shark'-fin and had full defensive armament fitted, comprising a two-gun Frazer-Nash FN5 nose turret, a four-gun FN20 turret in the tail and an FN21A two-gun 'dustbin' turret in the belly. Again, the 'shark'-fin was soon changed for the larger type (as on L7246).

Meanwhile, and virtually straight 'off the drawing board,' full production had started in July 1939 on the first 200-aircraft batch at Avro's Woodford factory. The first production Man-

chester (L7276), was delivered to Boscombe Down on August 5, 1940. A crop of minor problems, particularly the supply of certain minor components, temporarily delayed further production and it was not until October 25, 1940, that the second production aircraft, (L7277), came off the factory floor and was sent to Boscombe Down for Service acceptance trials. That same month, L7278 was delivered to No. 27 Maintenance Unit, (MU), Shawbury and earmarked specifically for eventual equipment of the reforming No. 207 Squadron—the first RAF unit scheduled to receive Manchesters for operational use.

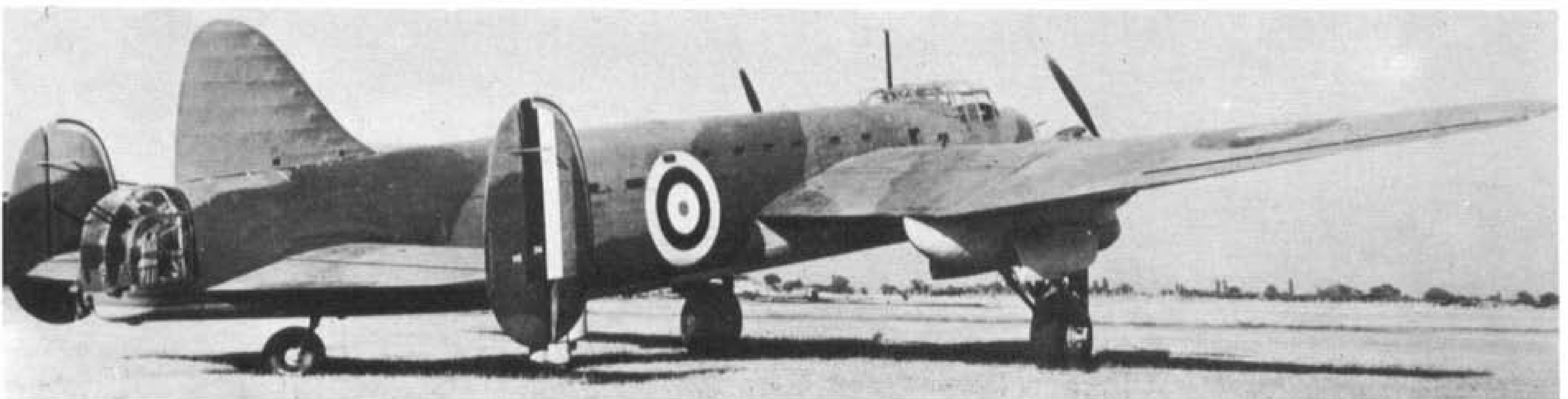
In 1939 a contract for a further 100 Manchesters was placed with Metropolitan Vickers of Trafford Park, Manchester. Metrovick (as the firm was usually referred to) had completed its first production Manchester (R5768) in time for it to have passed all acceptance tests by December 21, 1940. However, two nights later, a bombing force of 100 Luftwaffe *Kampfgruppen* aircraft (from K.G. 1 led by K.G. 100), raided the city of Manchester and R5768 and 12 others of these new, bombers (serials R5768 to R5780 inclusive) were destroyed or damaged beyond repair *in situ*. Production at Trafford Park soon resumed despite the loss of valuable jigs and special tools, while the destroyed batch's serial numbers were reallocated to other Manchesters later in the production line.

Into Service

It was decided, on August 29, 1940, to form the first operational Manchester unit at Lindholme but, by October 19, this venue was changed to

Second prototype again, showing "shark's fin" central vertical tail surface. The orthochromatic film again plays tricks with the yellow outer ring to fuselage roundel. Ventral turret just visible and rear turret faces away to reveal access doors in open position. (Photo: via R.C.B. Ashworth)

Now conventional panchromatic film offers truer rendering of colours when compared with photo above of the same aircraft, L7247; thus undersurfaces are yellow, not black. (Photo: via R.C.B. Ashworth)





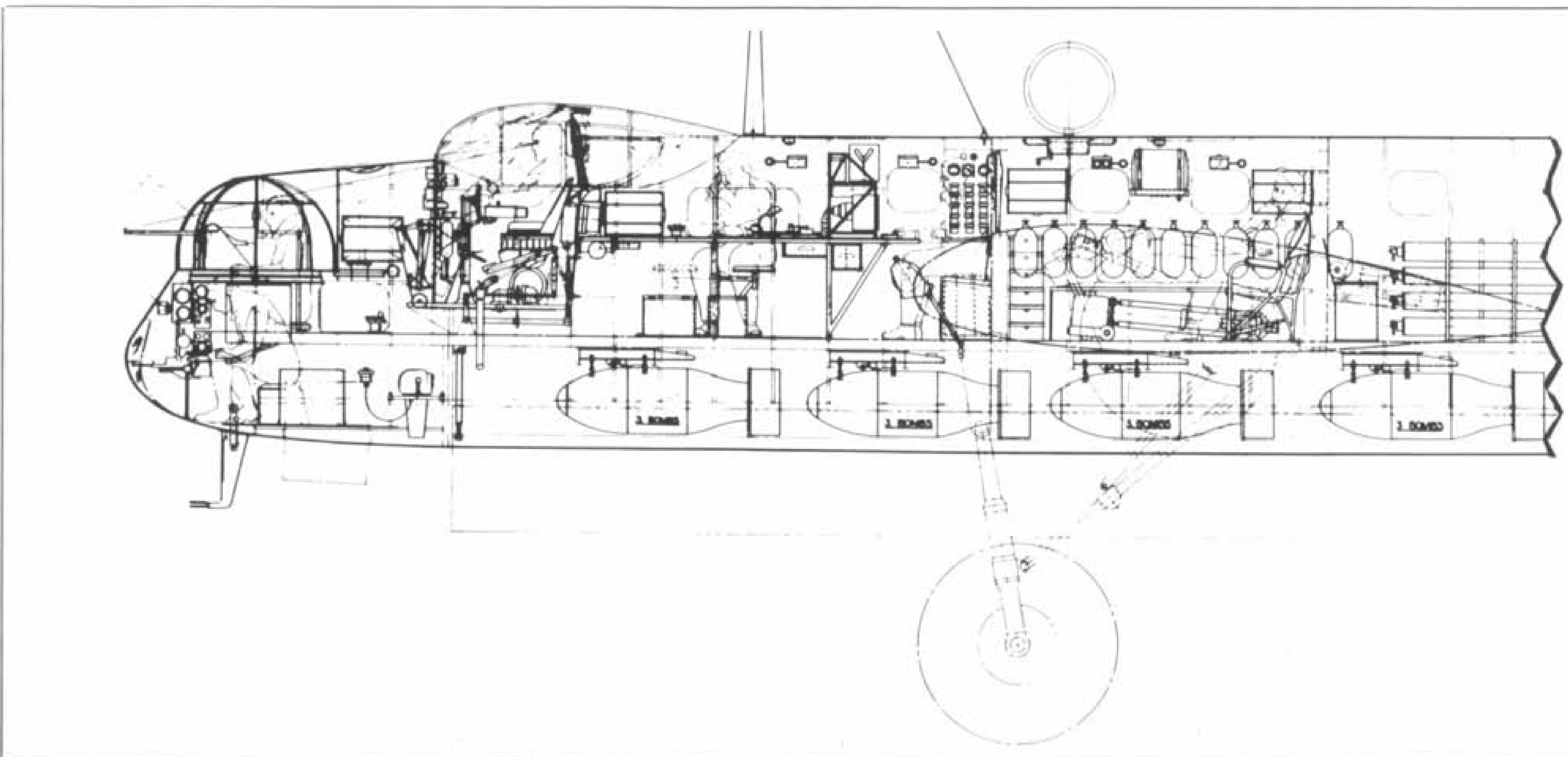
Waddington and it was there that, on November 1, 1940, No. 207 Squadron was reformed as a first-line unit for the specific purpose of introducing the Manchester to operational service. The unit's personnel actually arrived at Waddington on November 8 and its first Manchester (L7279), was delivered two days later from 6 MU, Brize Norton. This aircraft, like all the other early arrivals, was triple-finned, with the FN21A ventral turret used on the prototypes removed and a mid-upper, two-gun turret, the FN7, installed.

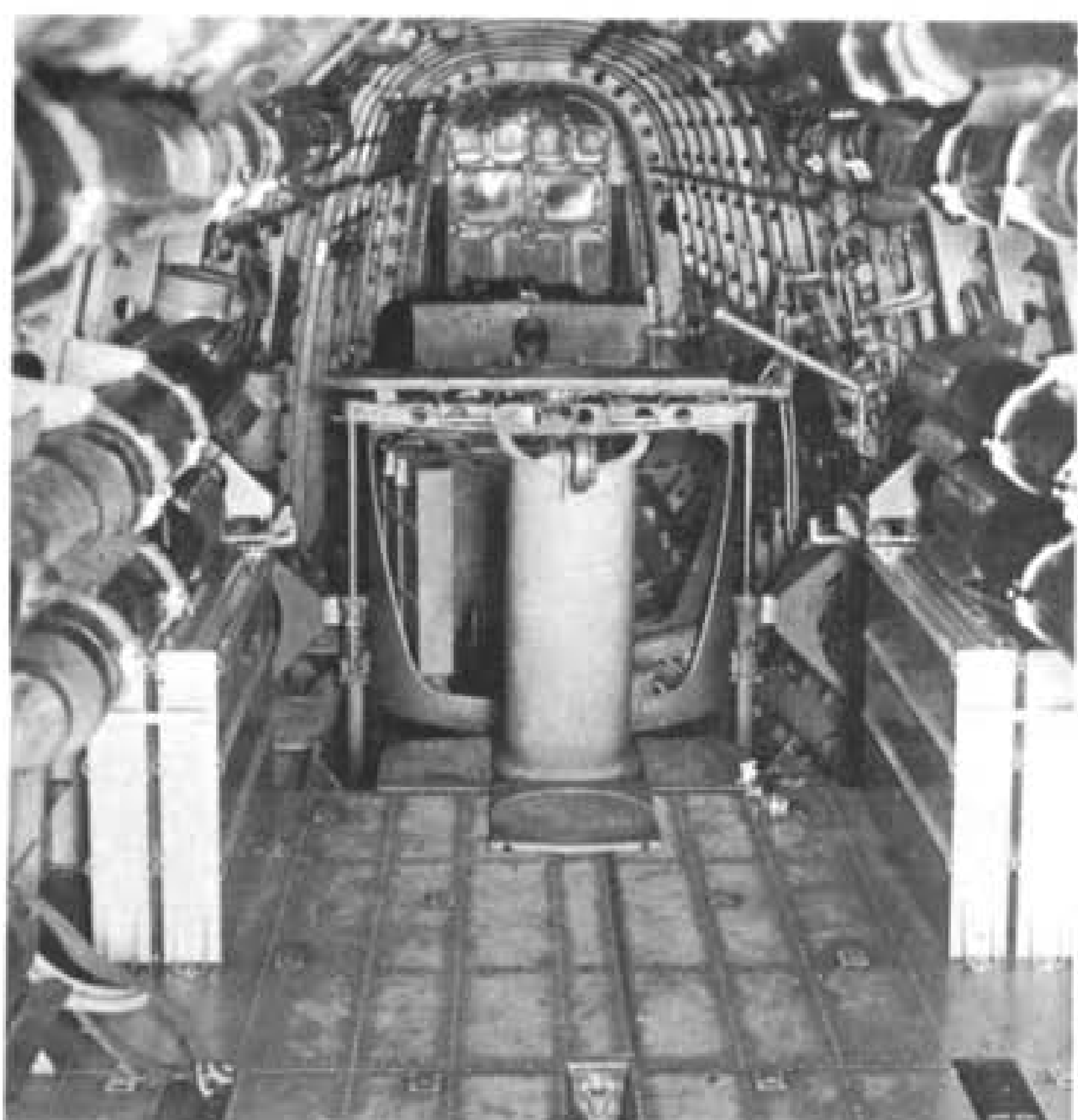
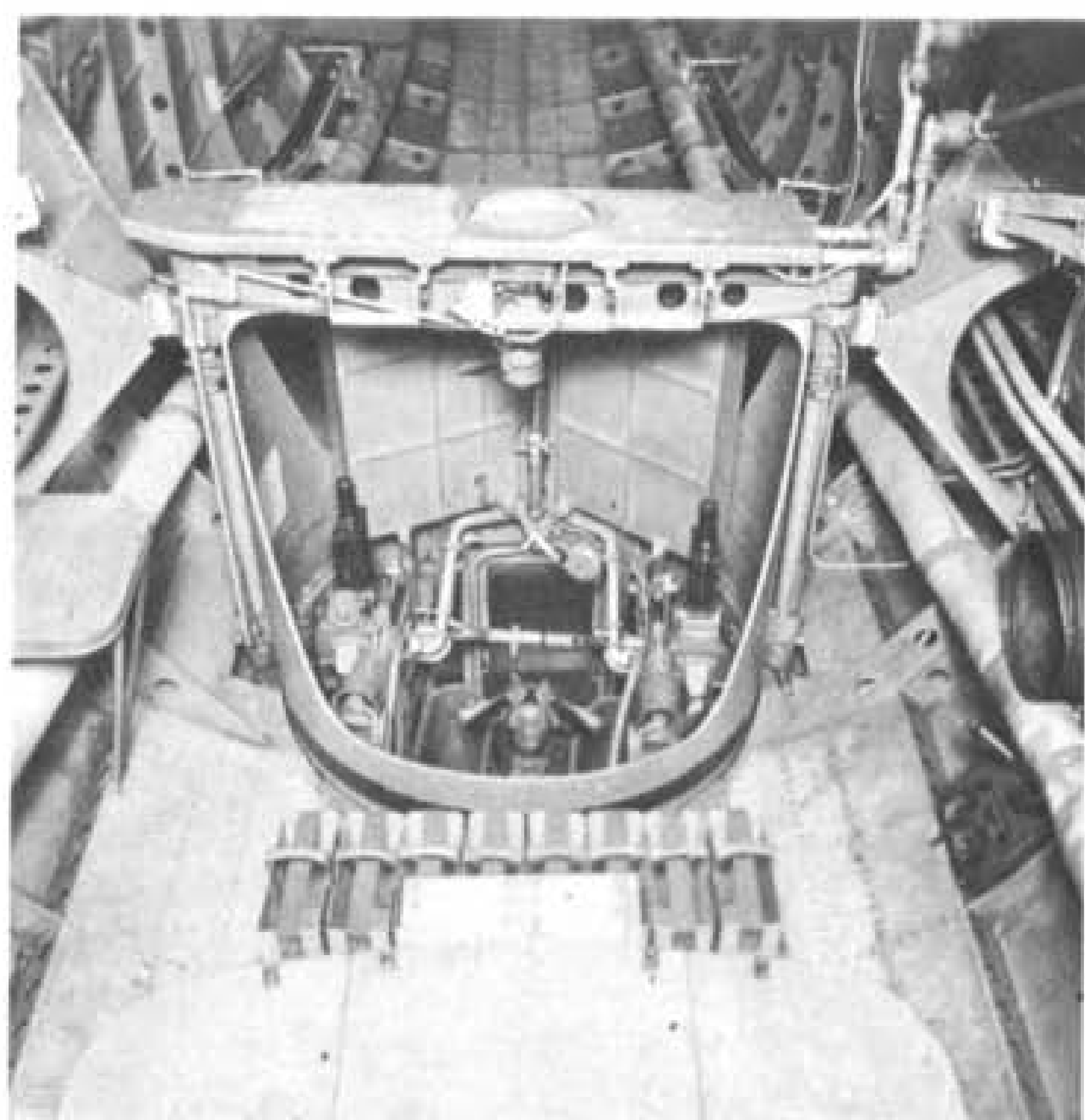
This gun turret—colloquially known as the 'Botha-type' because of its previous use in the ill-fated Blackburn Botha aircraft—had a shape resembling a badly constructed egg and was by no means popular with air gunners. Access from inside the fuselage was relatively difficult even for an 'average-sized' man; while any emergency abandonment through the external folding doors needed the agility of a Houdini, being in the words of one ex-gunner, 'a task best suited to an under-nourished dwarf.' In its first form the FN7 had proved to be too tall, protruding well into the slipstream and creating unnecessary problems of operation. Modification allowed for a neater, lower siting of the turret before being issued for operational aircraft. By this time a full Manchester crew consisted of seven men—pilot, second pilot, navigator, wireless operator and three air gunners.

Much of 207 Squadron's initial flying on Manchesters was an extension of test and trial programmes, intended to eliminate at least some of the snags inevitably associated with the introduction of any new aeroplane to Service use. By virtue of the early air-testing, a tendency for vibrational flutter in the third,

Good offices: The "Skipper" turns to the camera while one of his crew stares pensively (hangover remorse?) from the front gunner/bomb aimer's position. Second pilot's fold-down seat is likewise depressed (Photo: Imperial War Museum, ref. CH3880). Smaller photo shows "Sparks" the wireless operator/air gunner posed with the Navigator. Forward of them is the Skipper's office. (Photo: via Author; period, November 1941)

Self-explanatory drawing showing massive bomb-bay and crew positions.





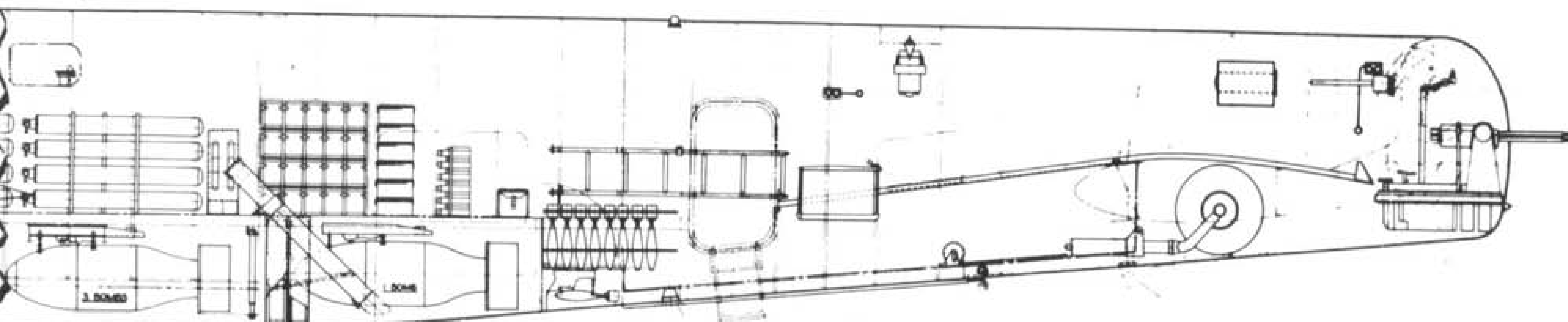
central fin was discovered, caused by normal operation of the dorsal FN7 gun turret disturbing airflow around the fin. Waddington's Station Commander, Air Commodore John Boothman, immediately reported this to the Air Ministry—though little appears to have been done for several months to rectify the situation.

By the end of 1940, 207 Squadron had at least eight Manchesters on strength and by February 24, 1941, could muster a total of 18 aircraft. On that date six of the unit's Manchesters were despatched on their first war sorties—a hastily-mounted raid against a reported Hipper-class cruiser in Brest harbour. All six managed to return, but one (L7284) crashed during landing at Waddington due to faulty hydraulics—the start of a long, dismal trail of similar defects during the following 16 months of the aircraft's operational career. Two nights later five Manchesters were sent on a bombing sortie, but one had to abort the mission early—another victim of leaking hydraulics.

Experience gained on the first sorties led navigators to complain that the standard Perspex nose panels were insufficient for positive checking of bombing results. Accordingly, an additional 'chin' clear-view panel was let into the under-nose. This refinement gave Manchester bomb aimers one of the best views offered by any RAF bomber of the period, and later Lancaster crews used virtually the same nose panels.

Inevitably it seemed, No. 207 Squadron soon suffered its first casualties from enemy action. On March 13, 1941, Manchester 'X-X-ray' (L7319), was only five miles from base at the start of a sortie to Germany when it was shot down by a Luftwaffe intruder fighter. Three weeks later, on April 8, 'R-Roger' (L7302) failed to return

Two amidships views showing the retracted ventral gun turret, the FN21A. (Photos: Crown Copyright Reserved, Apr. 1940, refs. 10307N & 'AD)



from a bombing raid. That same night saw the first operational trips by Manchesters of No. 97 Squadron—the second unit to be equipped. No. 97 was reformed from a nucleus of men supplied by 207 Squadron, received its first Manchester on February 12, 1941 and, on April 8, despatched four aircraft to bomb Kiel as the squadron's first contribution to the war.

On April 13, however, a Group order grounded all Manchesters due to the increasing number of faults occurring in engine bearings. The 'stand-down' also provided an opportunity to carry out modifications (Avro Mod. No. 262) to all bomb-bays to enable the Manchesters to lift a 4,000-lb. High Capacity (H.C.) bomb—a thin-cased blast bomb, known variously as the 'Cookie' or 'Dangerous Dustbin'. In the same month, L7379 of 207 Squadron made the Manchester's first satisfactory flight with a load including one 'Cookie'; while on May 3, L7377 and L7378 each dropped a 'Cookie' on Cologne. Despite this very thorough check on engine faults, the Vultures continued to give trouble and on June 16 all aircraft were again grounded for further modifications and overhauls.

Six days later a return to operations brought with it a particularly tragic loss when L7314, 'Y' of 207 Squadron was shot down by a Bristol Beaufighter¹ of No. 25 Squadron, mistakenly

vectored on to the bomber as a potential 'hostile'. A week later all Manchesters were grounded yet again, ostensibly for 'engine overhauls'. The growing menace of the recalcitrant Vultures was so serious by July 1941 that the unserviceability state had reduced units to a position where they were forced to use obsolete Hampdens to make up any required operational effort. By then, 207 Squadron had been reduced to just two Flights—A Flight being operational and B Flight concentrating on training and crew conversion duties.

Manchester Mk. IA

Operations restarted on August 7—only to run into more problems, this time with excessive tail flutter and dangerous vibration. This particular defect was solved by dispensing with the third, central fin and adopting a larger, 33 ft-span tail unit with twin, end-plate fin/rudders of larger size. This modification (Avro Alteration No. 108) was first carried out at the Woodford factory on June 5, 1941, based partly on the experience gained in January and February 1941 with initial trials of the Manchester Mk. III (the Lancaster prototype, BT308) and 207 Squadron received its first example thus modified (L7489) on September 20, 1941. The change of tailplane was indicated by a nomenclature of Mark IA for all Manchesters thus modified, although eventually other Mark Is were retrospectively modified.

To add to the saga of Vulture defects and hydraulic failures, evidence of faulty feathering controls for propellers began to take its toll—a defect which made the prospect of any one-engine performance decidedly uncomfortable. Although Avro's original tender had taken pains to emphasise the ability of any Manchester to cope completely with only one engine in use, in hard practice a Manchester usually took on the flying characteristics of a streamlined brick when presented with an engine failure.

One superb exception which deserves retelling was the occasion in August 1941 when Pilot Officer 'Kipper' Herring in L7432, 'Z', of 207 Squadron had one engine shot out of action over Berlin. Feathering the defaulting powerplant, Herring brought the bomber all the way back safely, despite a nightmare battle to maintain a precarious height below 1,000 feet and

Key to colour side views

1 L7284, allocated to No. 207 Squadron, RAF Bomber Command, in November 1940.

2 L7453, wearing the code letters of No. 49 Squadron in 1942.

3 R5833, "N-Nuts" of No. 83 Squadron, taken-on-charge April 1942. Individual "crests" on Manchester noses were rare; this one, by a Welsh litter, is aptly "AR HYD Y NOS" ("All through the night").

¹See Profile No. 137: Beaufighter Mk. I & II.



The Rolls-Royce Vulture 24-cylinder X-inline engine was under developed when installed because of the necessities of war. The Vulture contributed much, though not everything, to the defects of the Manchester as a front-line bomber. (Photo: "Flight International," ref. M.36)

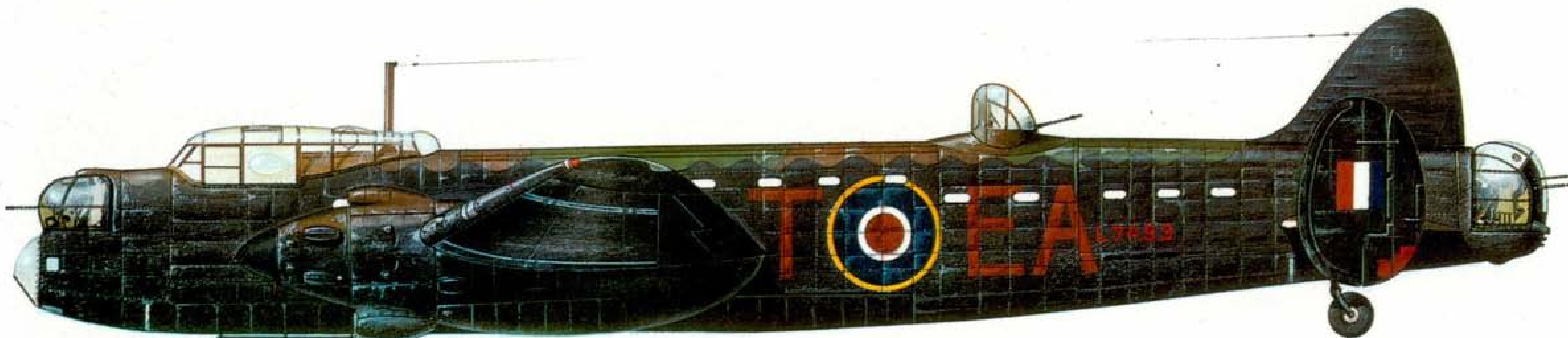
Metrovick of Manchester was bombed on December 23, 1940 and 13 production Manchesters were destroyed including this one (R5768), the first completed in the factory. Ultimately, its serial was reallocated to a later production aircraft. (Photo: Metropolitan Vickers)



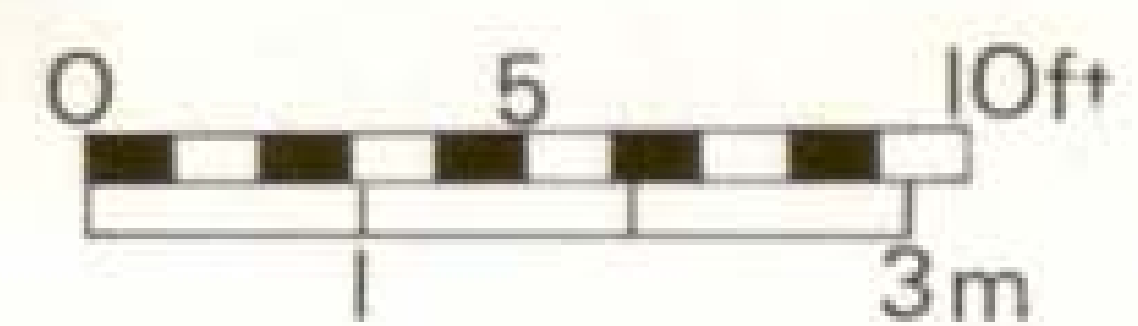
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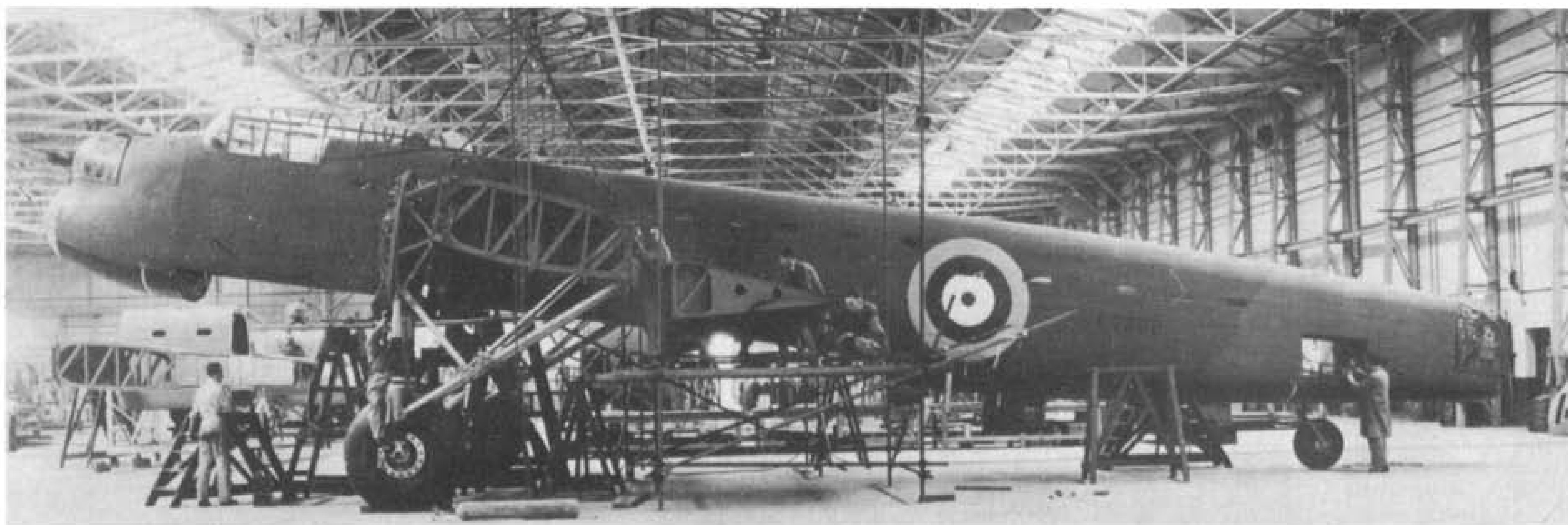


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Fifth production Manchester I (L7280) nearing completion at Woodford (Cheshire) prior to delivery at Ringway (Manchester) on October 19, 1940. (Photo: via G. A. Jenks)

having the crew almost strip the aircraft to its barest structure in the effort to reduce weight. His feat brought him an immediate gallantry award and such was the contemporary aircrew opinion of the Manchester that other 5 Group personnel were in unanimous agreement that an award was never more worthily earned!

By September 1941, Manchesters had returned to the operational scene, though only a mere handful were capable of sustaining any nightly routine. On September 7/8, RAF Bomber Command despatched 198 aircraft to Berlin but only four of these were Manchesters. A third squadron had, meantime, begun to operate the type. In June 1941, 61 Squadron at Hemswell, Lincolnshire, received a few examples and in the following month moved base to North Luffenham. For about three months never more than six Manchesters were on the unit's strength at any time and these few were used for occasional sorties until October 1941 when the squadron finally began full equipment with Manchesters. On the night of November 7, the full serviceable strength of Bomber Command was sent to bomb Berlin. The force comprised just over 400 aircraft, of which 15 were

Manchesters. And on December 17 about 100 bombers raided Brest, including nine Manchesters—two of the latter failing to return.

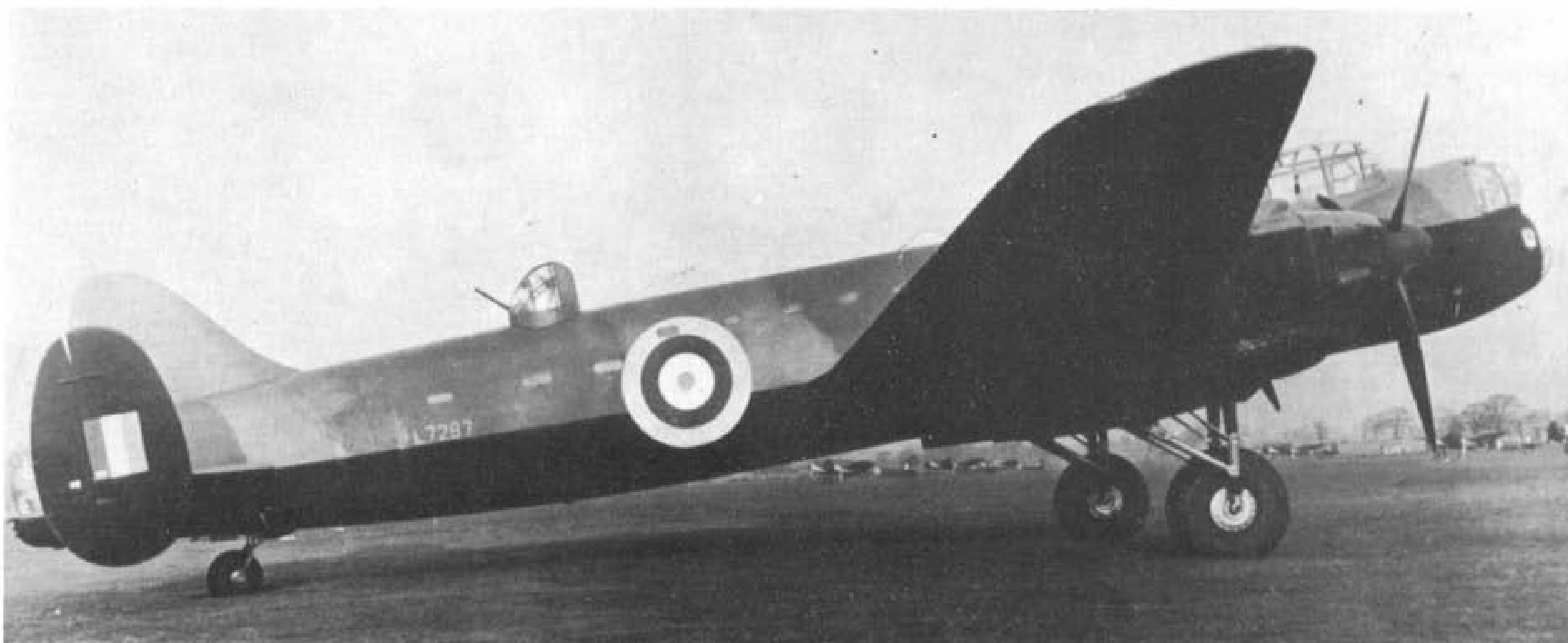
Peak—and Swan Song

Despite the obvious 'failure' of the Manchester on operations—mainly through the inability of its Vulture engines to deliver sufficient 'urge' for a respectable performance—RAF Bomber Command in late 1941 had almost no alternative but to continue using the type. Its successor, the Lancaster, was nowhere near full production status. Equally, of the other four-engined 'heavies' then being introduced, the Short Stirling¹ was already proving doubtful and the Handley Page Halifax had yet to equip more than a handful of units.

To have discontinued using the Manchester would have meant seriously undermining the numerical strength of Bomber Command's first-line effort. To have replaced Manchesters with obsolete Handley Page¹ Hampdens and Vickers-Armstrongs¹ Wellingtons would have

¹ See Profiles No. 142: Stirling; No. 58: Hampden and No. 125: Wellington I & II.

Brand-new Manchester I (L7287; 12th production) at Woodford shows retention of huge fuselage roundel and now excessive emphasis on non-reflective bomber-black surfaces, including the endplate fins and rudders but not central fin. (Photo: via G. A. Jenks)



been a retrograde step in maintaining the mounting air assault on Germany. Thus the Command had little choice but to continue employing Manchesters and even equipping fresh squadrons—at least until the Lancaster was available in sufficient numbers to take up the 'slack'.

In 1942, Manchesters were at their peak in sheer numbers on operational units, but an indication of the imminent demise of the design was the reception by No. 97 Squadron of its first Lancaster on January 14. Within four weeks this squadron had a total of 17 Lancasters on charge—the second unit to be thus equipped; the first being No. 44 Squadron. Nevertheless, re-equipment of other squadrons with Manchesters continued. No. 106 Squadron at Coningsby had begun to receive them as replacements for their out-moded Hampdens and flew its first operations with them on March 20. On the night of April 8, No. 50 Squadron at Skellingthorpe also flew its initial Manchester sorties.

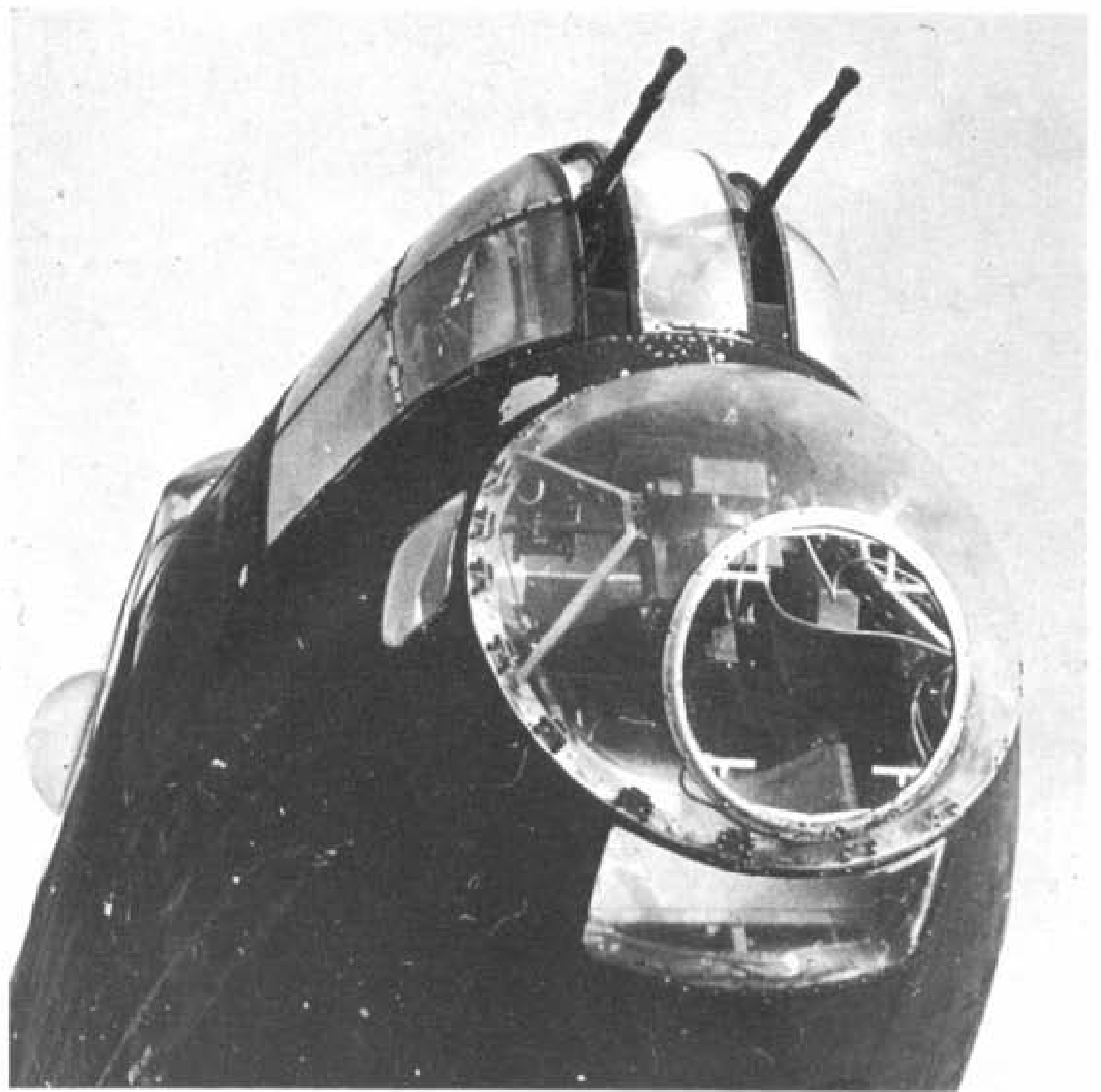
The faithful Hampdens of No. 83 Squadron at Scampton were gradually phased out by the end of 1941 and Manchesters were first used operationally when four aircraft were given an 'easy ride' to Boulogne on the night of January 28, 1942. On their return, L7423 was discovered to have shed the complete fabric covering of its third fin, leaving just a skeleton framework. Only days later, an A Flight aircraft calmly shed its port fin and rudder during a simple circuit of Scampton airfield—a hurried forced landing being made in nearby fields. Indeed, a standard quip of that period reflected most crews' feelings when it was said that they *had* to base Manchesters around Lincolnshire—it was the best forced-landing area available. . . . Another example of 'Manchester humour' was by the Warrant Officer in charge of one unit's maintenance who, in mock desperation, indented for 10 miles of 6-inch width elastic—'Propellers, Vulture, for the use of'. Fortunately, his immediate superior officer was in complete sympathy with the principle involved.

One ex-gunner's thoughts on the Manchester probably mirror most crews' experiences of operations in the 'Vulture test-bed':

'My own experience of Manchester single-engined performance', he reminisces, 'commenced when a starboard engine blew up on a local flying trip. The resulting descent was at a gliding angle approximating to a house-brick in free flight.

'Other diverting incidents included a complete shearing of all port propeller retaining bolts; a take-off with 2,800 r.p.m. port and 4,000 r.p.m. starboard and the time a constant speed unit (csu) gave up the ghost over Essen. The resulting howl must have terrified the ground defences—it certainly shook us.

'Later generations of aircrews never knew how interesting life could be, dodging the

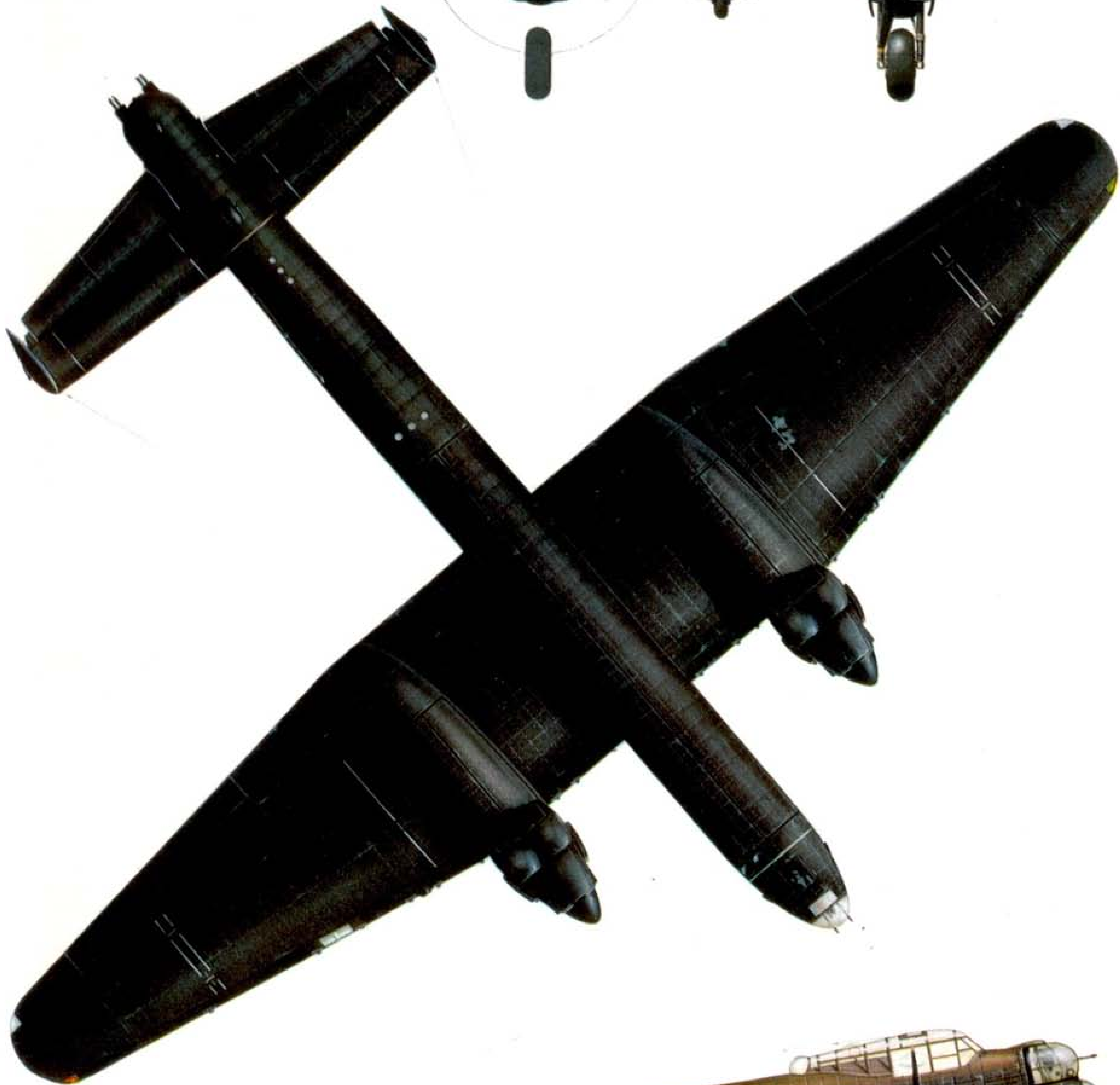


'Happy Valley' (Ruhr) flak at 8–9,000 feet and wondering what was going to fall off next.'

One particularly disquieting feature of the Vulture engines was their tendency to trail a constant stream of exhaust sparks no matter what countermeasures were tried to dampen out this manifestation. As one crew member has related, no German night fighter needed radar when Manchesters were in the vicinity—the exhaust trails pointed their presence only too clearly.

With all its faults, the Manchester continued to play its part in the bombing offensive. On the night of March 3, 1942, a force of about 200 bombers attacked the Renault factory near Paris; and 25 were Manchesters. Significantly, that same night saw the first operational sorties by Lancasters when four from No. 44 Squadron were given a 'soft' trip on a *Gardening* (sea mine-laying) sortie. Twenty-one Manchesters were part of the 211-strong main force which was sent to Essen on March 8; while on March 28 a pure incendiary raid on Lübeck was made by 234 aircraft, 20 of these being Manchesters. Lübeck was the first German city to be razed by a fire raid and RAF Bomber Command lost 13 aircraft, one being a Manchester. On May 1, 83 Squadron started gradual re-equipment with Lancasters; while two nights later eight Manchesters from 106 Squadron flew a *Gardening* trip—and lost two aircraft, the only bomber losses of the night. On May 9, 106's first Lancaster was received as the beginning of re-equipment.

"Sharp end" of the Manchester with the two 0.303-in. machine-guns installed in the FN5 front turret. The "chin" clear-view panel was introduced soon after the bomber became operational. (Photo: via Author)



Avro Manchester,
Lincolnshire,
eventually shot down
by the RAF's
Squadron.

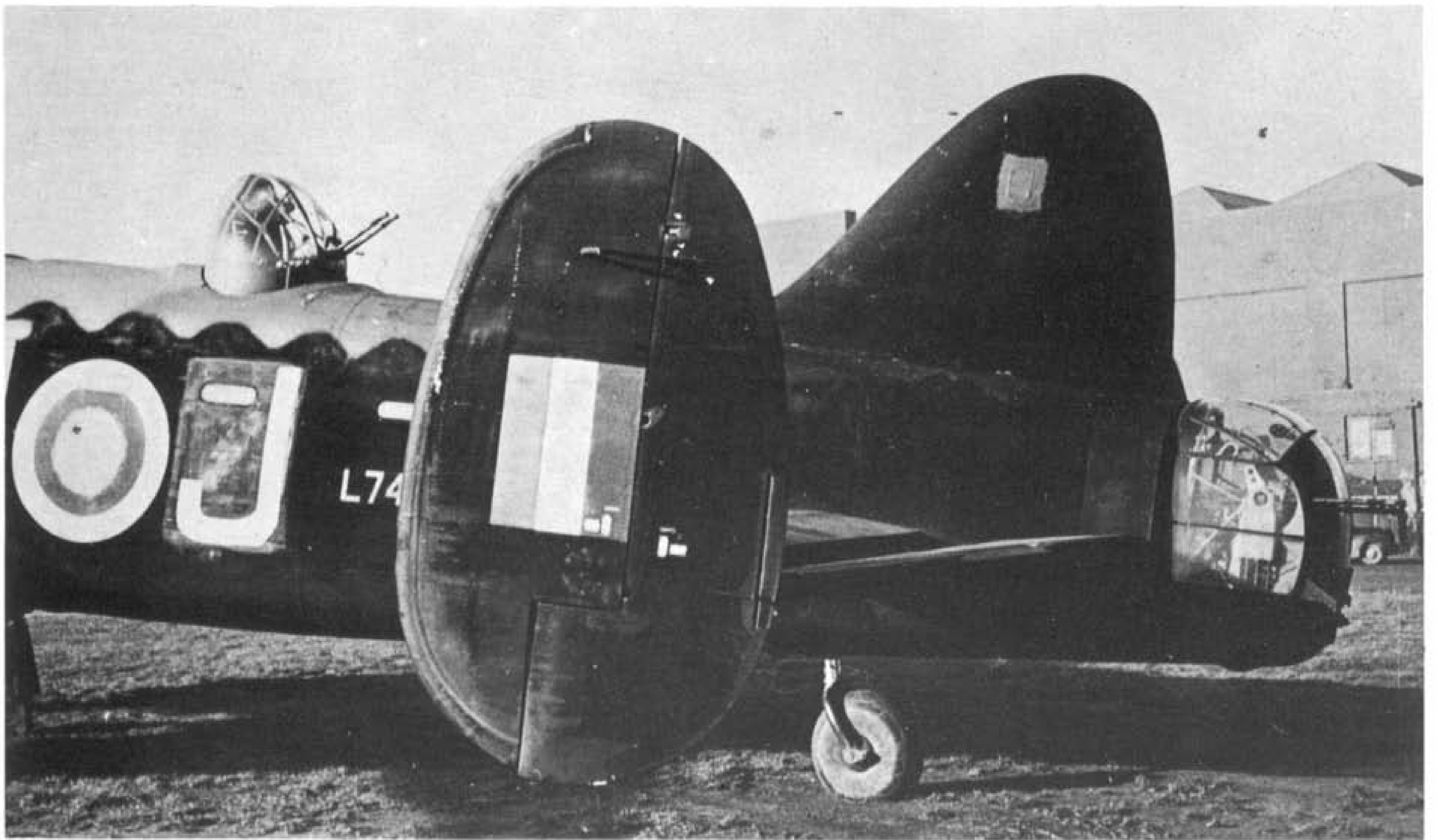
Tom Brittain © P...



Avro Manchester (L7319, "EM-S") of No. 207 Squadron, Royal Air Force, Waddington, Lincolnshire. Originally issued to No. 97 Squadron on March 6, 1941, L7319 was eventually shot down by a German intruder on March 13, 1942, while with No. 207 Squadron.

Tom Brittain © Profile Publications Ltd





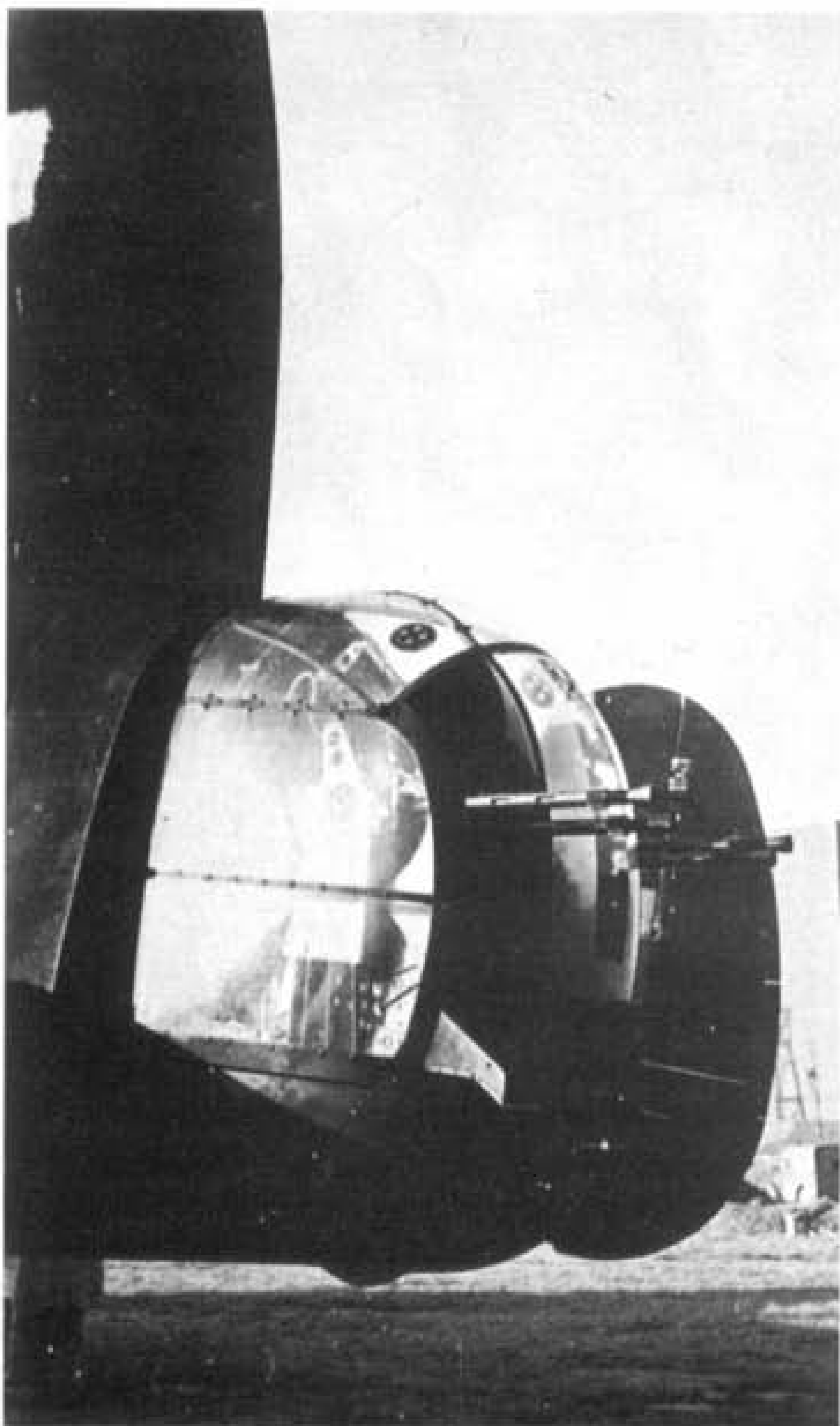
The Victoria Cross Manchester

The first of Air Marshal 'Bert' Harris's famous '1,000-bomber' raids took place on the night of May 30, 1942, when a total of 1,047 aircraft of every size and sort was despatched to destroy the cathedral city of Cologne. Of these, 35 Manchesters actually attacked the target and four failed to return. One of the 'missing' Manchesters was 'D-Dog' (L7301) of No. 50 Squadron, piloted by Flying Officer Leslie T. Manser, for whom Cologne was his 14th operational sortie.

'D-Dog' had been transferred to 50 Squadron from 106 Squadron two weeks before the Cologne raid and was not Manser's usual aircraft. Its general performance was not good and only the urgency of making up Harris's required '1,000 bombers' had forced its inclusion in the operation. Once airborne with a full bomb load, Manser found he could not coax the Manchester above 7,000 feet—a height which meant running the gauntlet of any flak defence over the target. Manser decided to continue the sortie.

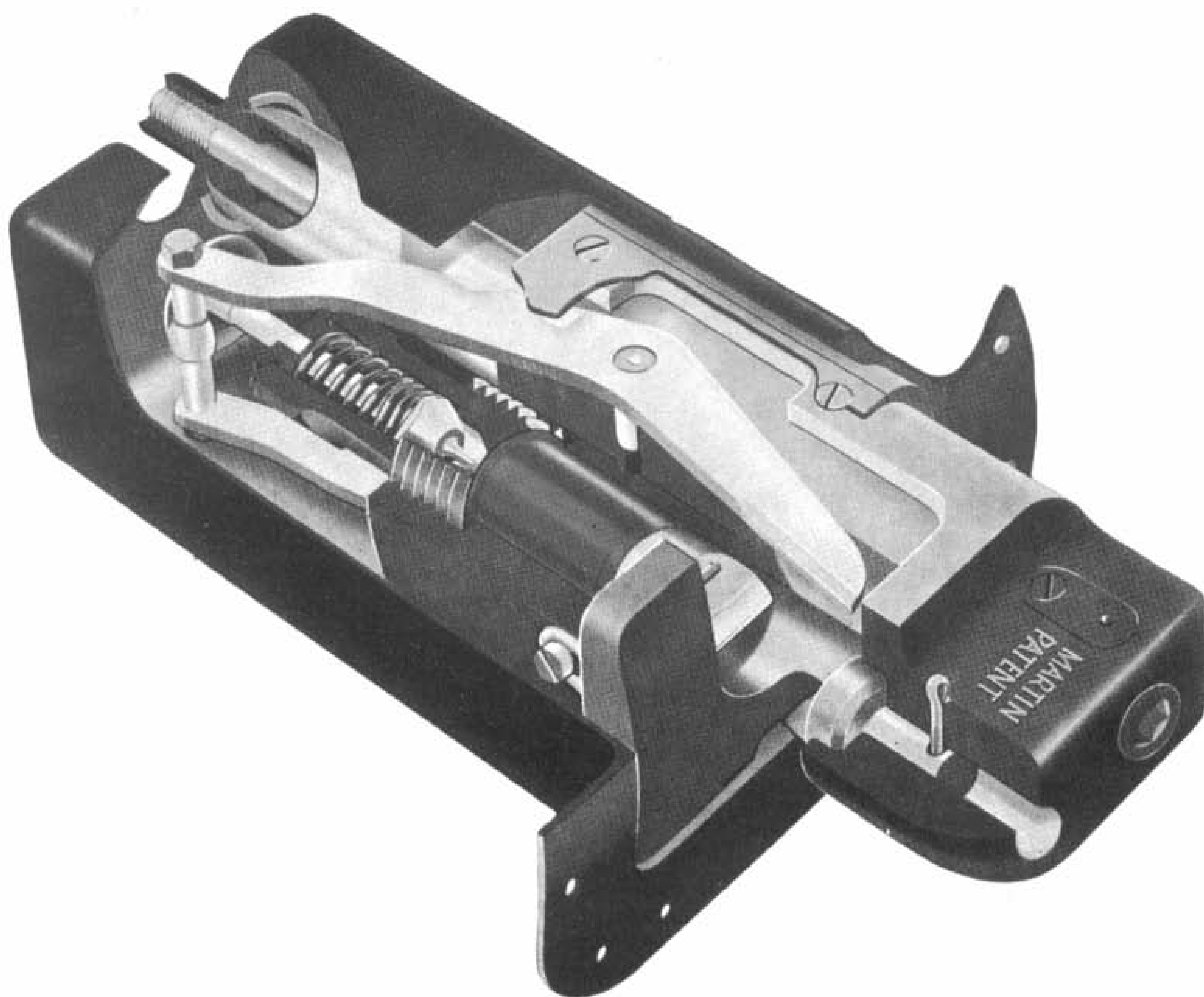
Over Cologne, he held the Manchester rock-steady as his bomb aimer released the load, only to have the controls torn from his hands immediately after when a direct hit from anti-aircraft fire punched the bomber from below. Diving, the Manchester flew through a hail of 20-millimetre fire from quick-firing defences and Manser finally managed to regain temporary control at about 800 feet. Behind him the Manchester was burning, while the rear of the bomb-bay doors had been sliced away.

Rear defences on "J-for-Johnny" (overpainted on "Z-Zebra") serving with No. 106 Squadron (code "ZN"). The two-gun (0.303-in.) turrets are respectively an FN7 mid-upper and an FN20 tail turret. De-icing "boot" wraps round endplate fin's leading-edge, but not central fin. (Photo: "Flight Int'l," ref. M.41)

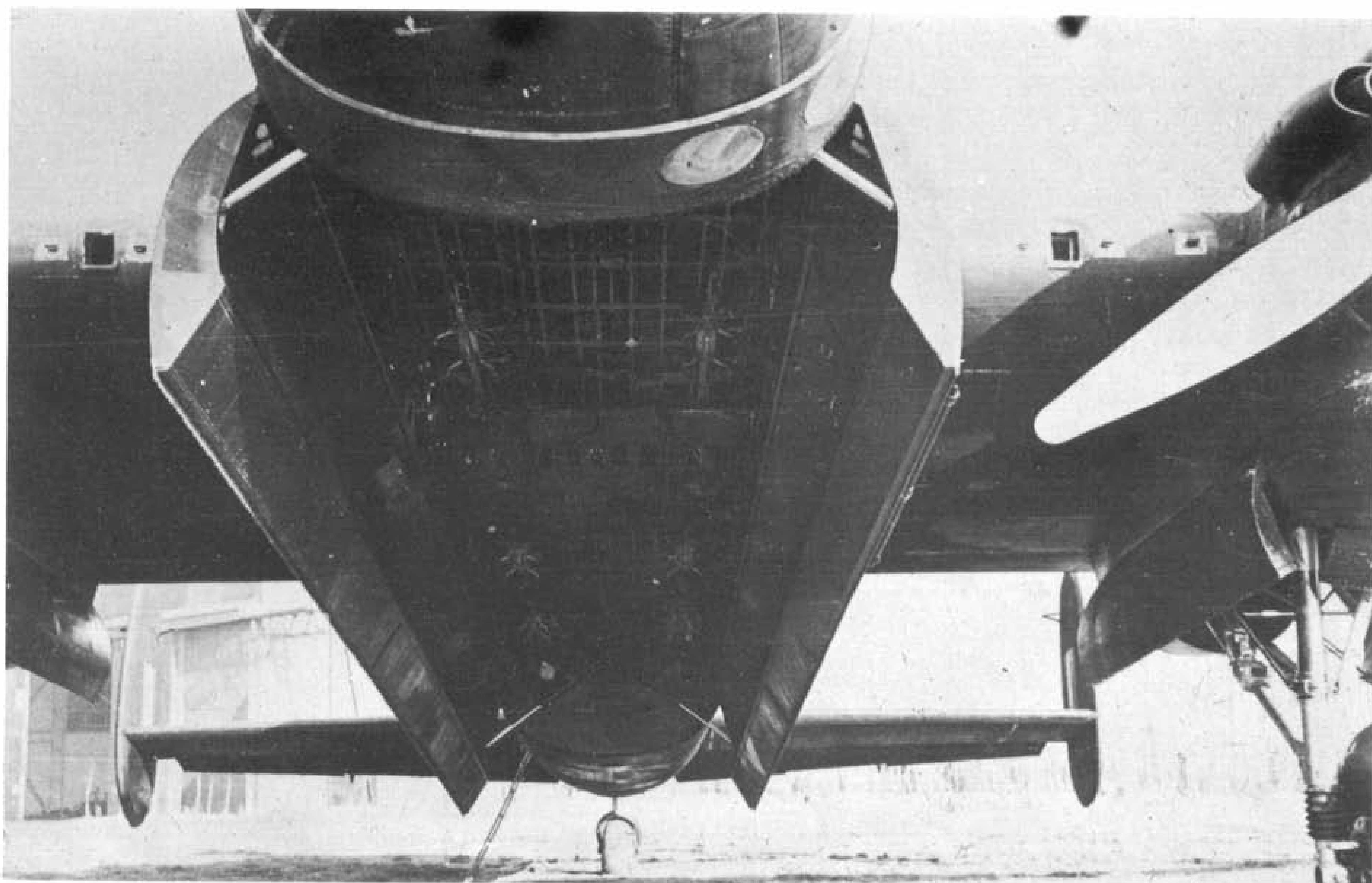


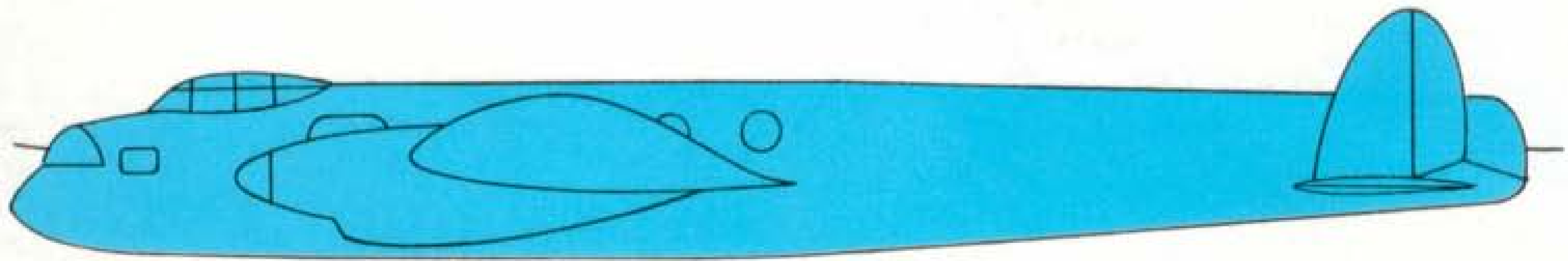
Four-gun FN20 power-operated rear turret on 106 Squadron's "J-Johnny". (Photo: "Flight Int'l," ref. M.42)

*From Martin-Baker Aircraft came this patent Balloon Cable Cutter which fitted neatly into the mainplane leading-edge.
(Drawing: Martin-Baker Aircraft)*

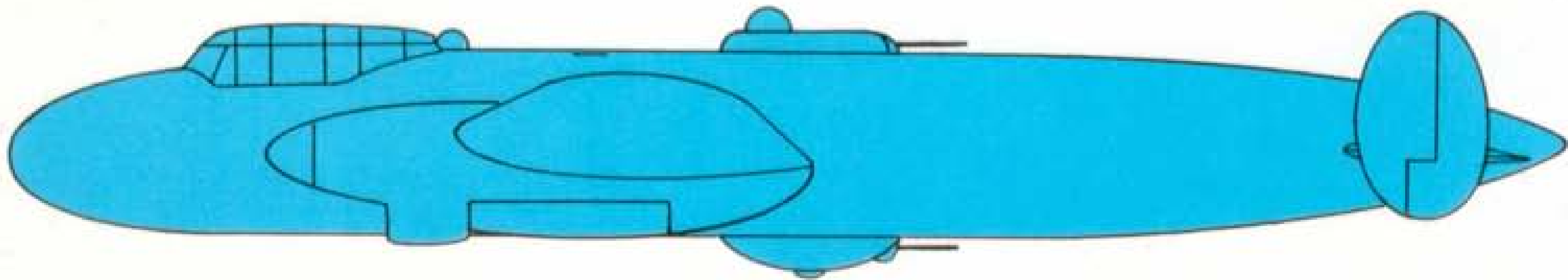


*The capacious bomb-bay. On the wing leading-edges can be seen the Martin cable cutters sandwiching the cabin heating air inlet "squares".
(Photo: "Flight Int'l," ref. W226/9)*

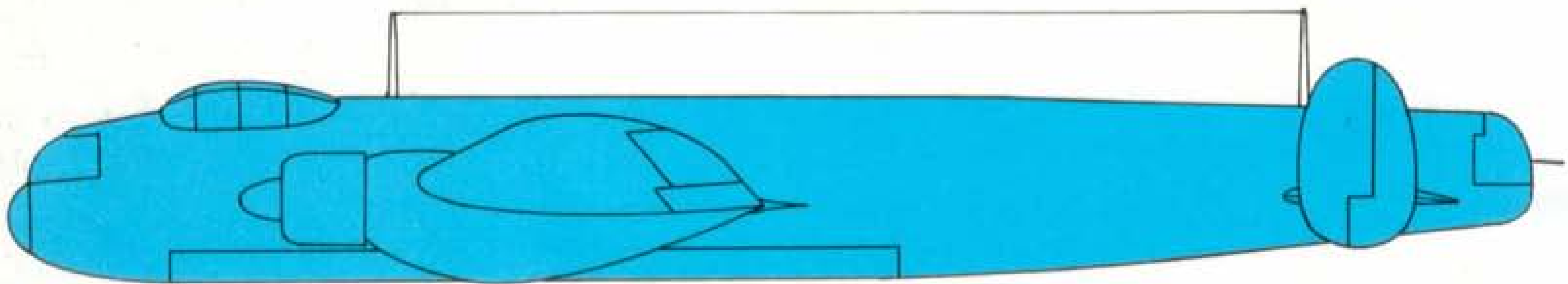




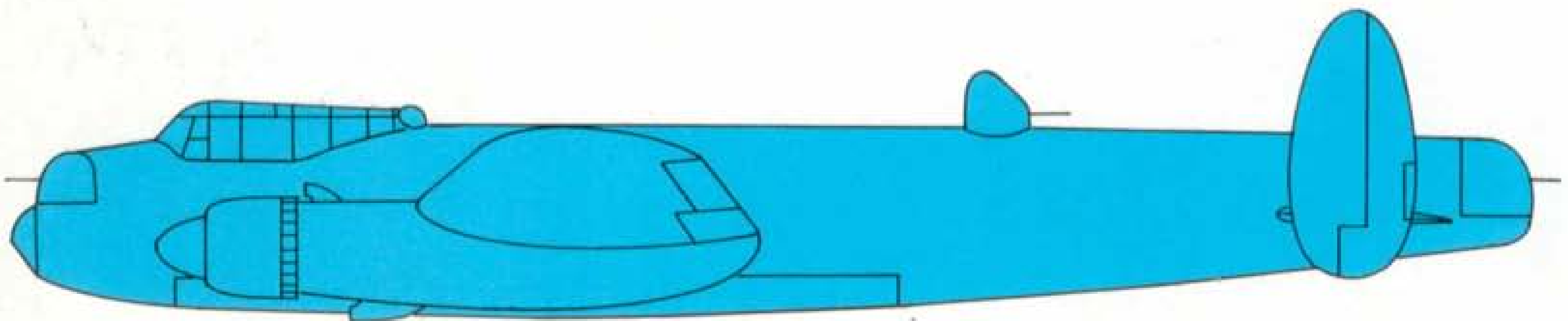
Original projected Manchester



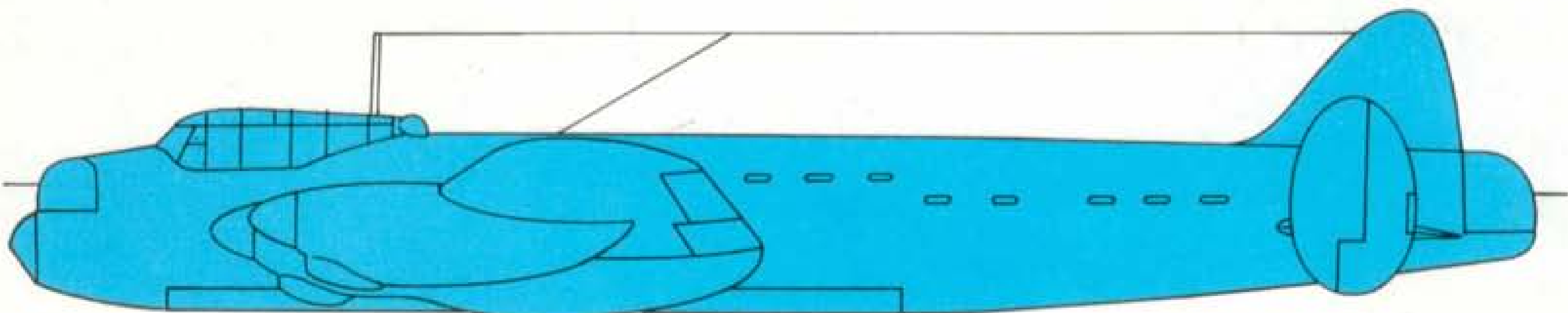
Manchester alternative armament – fitted with either mid-upper OR ventral 40mm cannon turret. Project dated August 1939



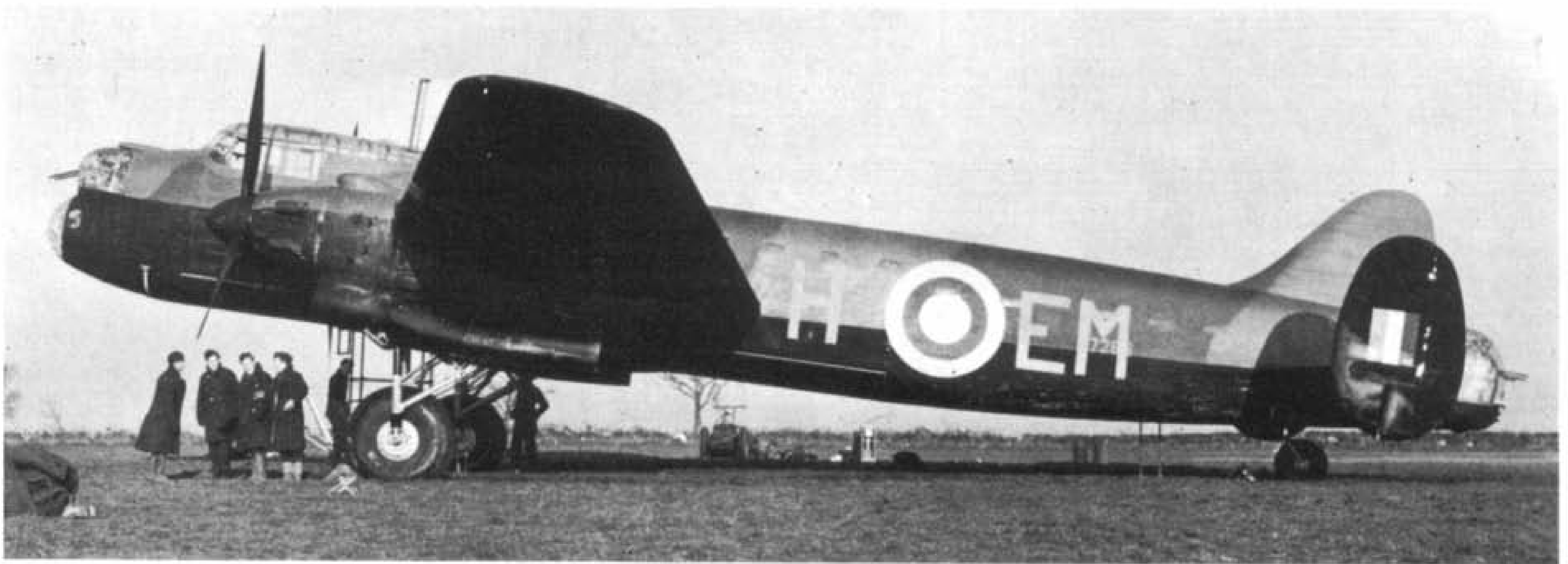
Hercules engine-variation proposed in late 1937



Another radial-engine project, fitted with Bristol Centaurus



Proposed four-Merlin 'Manchester III', dated August 1940



Struggling up to 2,000 feet, the aircraft wallowed dangerously—and then the port engine erupted in flames, the heat extending inexorably along the wing, threatening the fuel tanks. Manser coolly waited for the flames to die out—and, incredibly, they did. Heading for home, however, it soon became obvious that the Manchester would not make it and as the crippled bomber steadily lost height, the pilot had no alternative but to order his crew to bale out. The speed had by then dropped to near-stalling point and Manser could hardly hold the aircraft under control. As the last crew member was about to abandon the aircraft he tried to persuade Manser to take a parachute, but the pilot waved him away urgently—he could only hold the aircraft steady for a brief while. The crew man jumped—and immediately hit

the ground before his parachute had time to deploy. Seconds later the Manchester ploughed into the earth, near the Belgian village of Bree, a short distance from the Dutch border. On October 20, 1942, Leslie Manser was awarded a posthumous Victoria Cross for his selflessness.

More 1,000-bomber raids

The second '1,000-bomber' raid took place on June 1, an attack on Essen, when 27 Manchesters formed part of the 956-strong bomber force despatched. One Manchester failed to return. But the Manchesters' operational nights were almost over and during June 1942 they were quickly phased out.

The final war sorties were those flown on the night of June 25/26, when 15 Manchesters were one element of the 1,006 bombers sent to

"H-Ior-Harry", a Manchester Mk. I (L7288) of No. 207 Squadron (code "EM") at RAF Station Waddington (Lincolnshire). Later served with Nos. 61 and 97 Squadrons and finally as a trainer with No. 1654 Conversion Unit. (IWM, ref. CH17294)



"H-Harry" again; no cable cutters in evidence and no modified bomb aimer's "chin" panel. (Photo: via Author)



Unidentified crew of a No. 207 Squadron at Waddington in the spring of 1941 with a Mark I Manchester in the background. (Photo: via Author)



Manchester Mk. IA (R5833) of B Flight, No. 83 Squadron, RAF Station Scampton (Lincolnshire) on April 8, 1942. "N-Nuts" is the subject of one of the colour side views. Under the crescent-moon-and-stars "crest" is the motto supplied by the aircraft's Welsh-speaking corporal-fitter, "AR HYD Y NOS" or "All through the night". Crew (left to right): Sergeant J. Bushby; Pilot Officer Billings, RNZAF; Sergeants Dodsworth, Baines and Williams; and Warrant Officer Whitehead, DFM, captain of "N-Nuts". (Photo: via Author)



The morning after the RAF's first "Thousand Bomber Raid" sees Wing Commander Guy Gibson, DFC (later VC, DSO), left centre, with his men of No. 106 Squadron, grouped for the inevitable propaganda photograph designed to give civilian morale a boost. (Photo: via Author)

destroy the Focke-Wulf factories at Bremen—the third and last of Harris's '1,000' raids. One Manchester (L7289) of No. 50 Squadron, did not return. Significantly, 83 other bombers in that force were Lancasters—the Manchester's successors.

Despite its retirement from actual operations, each squadron retained temporarily four Manchesters for conversion training of crews onto the bigger, better Lancasters. With its fuselage and crew locations almost identical, the Manchester provided a semi-ideal instructional vehicle for the new crews. By October, 1942, however, properly constituted, separate Conversion Units were created within the command for that purpose and the remaining Manchesters were thankfully transferred to the new units.

Epilogue

In cold statistics the Manchester's operational effort could hardly be considered either successful or even particularly significant. Of the 202 Manchester aircraft actually built, nearly 40% were lost on operations, while a further 25% were written-off in crashes, accidents and unexplained technical failures. Even this tragic toll does not take into account the dispiriting saga of major and minor engine and airframe defects and failures which seemed a permanent adjunct to flying in a Manchester.

On operations a total of 1,269 individual sorties had been flown, almost equally by day and by night; during which 1,826 tons of high explosive bombs had been dropped on enemy targets, apart from 221 *Gardening* sorties and uncounted incendiary bombs.

Condemned by crews and latter-day historians alike, the Manchester has been vilified by all. Yet without its creation it is almost certain that the Lancaster—described by many as the outstanding bomber of World War Two—would never have been built.

When the other four-engined bombers, like



Almost a Lancaster: "S-for-Sugar" L7515 of No. 207 Squadron (code "EM") shows its paces in November 1941. (Photo: "Flight Int'l," ref. 182405)

This Manchester (L7468) was originally sent to No. 207 Squadron in September 1941 and then moved on to No. 50 Squadron as "P-Peter"; it was lost in a crash in March 1942. Observe how the "night black" is made to extend right over the top of the rear fuselage. (IWM, ref. CH3889)

"S-for-Sugar" (L7515) of No. 207 Squadron, November 1941, once again shows off its clean lines. (Photo: "Flight Int'l", ref. 18244S)



the Stirling and Halifax, were being progressed for the RAF and the imminent war of 1939, no official requirement or specification existed for the Lancaster. It was the Manchester Mk. III which gave direct parenthood to that unsurpassed aircraft. And it was the foresight, technical experience and sheer skill of the Manchester's designers that laid the foundation for the 'war-winning' Lancaster. Had it accomplished nothing else, the Avro Manchester would still deserve to rank among the RAF's most significant aircraft of the 1936-1942 period.

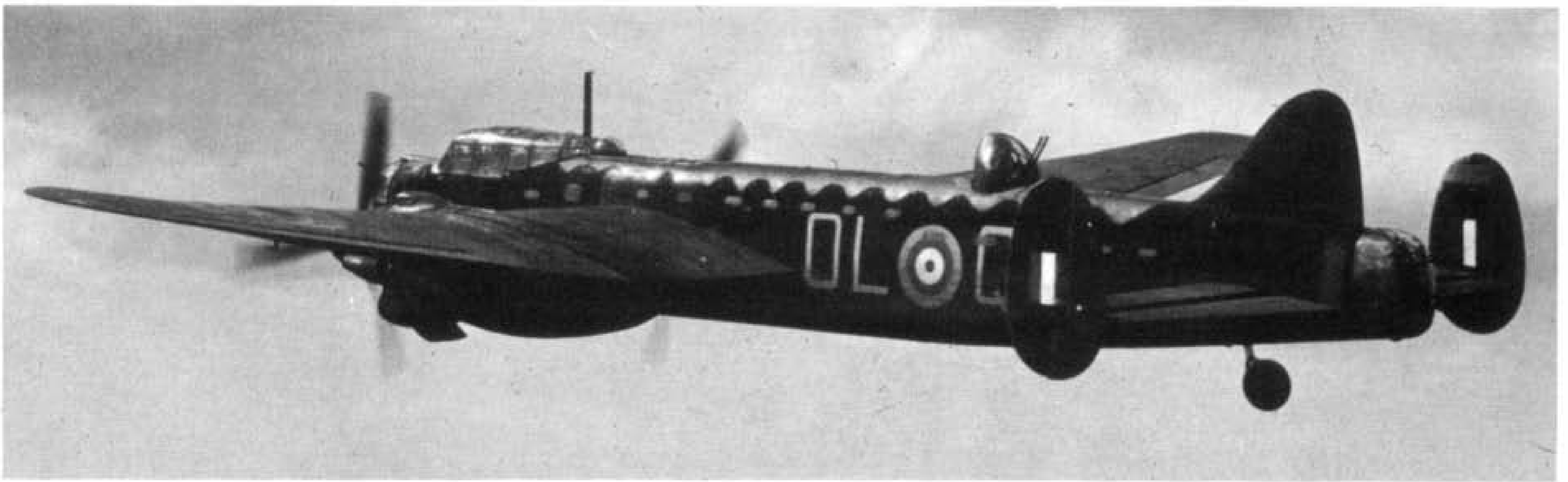
PROJECTS

To list every 'paper' design considered for AM.Spec.P13/36 is now impossible due to incomplete surviving records. Following are positively known but should not be regarded as a comprehensive listing.

Allocation of Mark numbers was an Avro 'internal' matter, the RAF using merely Mk. I and IA to differentiate between the early triple-fin, 28-ft. tailspan version and the later 33-ft. twin-fin assembly. The following list of Marks is quoted from contemporary notes, written circa November 1939:

MANCHESTER MARKS

| | | |
|-----|---------------|---|
| I | 2 × Vultures | 80-ft. wing, 28-ft. tail, (metal) skin as issued |
| IA | 2 × Vultures | 80-ft. wing, 33-ft. tail |
| IB | 2 × Vultures | As IA, with thin-gauge skin & formers |
| IC | 2 × Centaurus | Otherwise as IB |
| II | 2 × Vultures | 95-ft. wing, otherwise as IB |
| IIA | 2 × Centaurus | Otherwise as Mk. II |
| III | 4 × Merlins | This will probably be given another type name later |



Night-black scalloping of paintwork gives "Q-for Queenie" (L7427) of No. 83 (code "OL") a distinctive look. "Queenie" was eventually lost on its 15th sortie with Pilot Officer Morphett and his crew aboard while engaged on a Hamburg bombing during the night of April 8-9, 1942. (Photo: Central Press)



"S-Sugar" (L7515) moves up alongside the "photographic platform" Handley Page Hampden used by "Flight's" photographer in November 1941. (Photo: "Flight Int'l", ref. 18239S)

Proposals for alternative powerplants to Vulcures included:

- 2 × 2,100 h.p. Napier Sabres—did not reach test status
- 2 × 2,520 h.p. Bristol Centaurus—installed, never air-tested
- 2 × Bristol Hercules—did not proceed beyond drawing-board
- 4 × Bristol Pegasus—layout dated January 26, 1940
- 4 × Bristol Hercules—layout dated January 26, 1940
- 4 × Rolls-Royce Merlins—first dated September 1939

*Two further roles for the 'P.13/36 Project', detailed in the original Avro Tender were:

Military Transport—Accommodation for 16 troops & equipment.

Flight refueller (tanker & receiver)—A complete internal re-design in conjunction with Flight Refuelling Ltd, but (apparently) did not proceed beyond drawing board.

MANCHESTER III

The history of the Avro Lancaster Mk. I is given in *Profile* No. 65, but a brief resume of its origin as the Manchester III is relevant here. As explained in text, four-Merlin versions of the Manchester were considered almost from the start, but the first prototype Lancaster was constructed from a standard Manchester Mk. I airframe (serial BT308), fitted with extended wings of 100 ft. span (10 ft. greater span than Manchester) to accommodate four Rolls Royce Merlin X engines, each of 1,145 h.p. First flown at Woodford on January 9, 1941, it was delivered to Boscombe Down for Service evaluation on January 27, 1941. The original 'Manchester' triple-fin tail assembly was changed for the larger, twin-fin arrangement and, on September 16, 1941, it went to No. 44 Squadron—the first Lancaster unit of the RAF—for familiarization of crews. This squadron began to receive its operational aircraft on December 24, 1941 and flew the first Lancaster war sorties on March 3, 1942.

PRODUCTION CONTRACTS

Contract No. 624973/37/C4(c) dated April 30, 1937

To Avro for construction of two prototypes (L7246 & L7247); Avro Works Order No. 5667.

Contract No. 648770/37C4(c) dated July 1, 1937

To Avro for construction of 200 production Manchester Mk. Is; Avro Works Order No. 5723. Serial Batch: L7276 to L7584, inclusive.

Item 5 of this contract ordered further 200, dated September 20, 1939.

Air Ministry reduced this 400 total to 157 on May 29, 1941.

Subsequently reduced to 156 when L7517 burnt out before delivery.

From L7527, produced as Lancasters.

Contract No. B108750/40 dated 1939

To Metropolitan Vickers for construction of 100 Manchester Mk. Is; Works Order No. 8060. Serial Batch: R5768 to R5917, not inclusive.

R5768 to R5780 destroyed at factory, December 23, 1940—serials reallocated to other Manchesters later in production line.

Only R5768 to R5841 built as Manchesters; remainder Lancaster Is.

Avro received Contract B108750/40/C4(a) dated January 1941 for erection of 43 only as Manchesters.

CANCELLED PRODUCTION CONTRACTS

R4525 to R4744 (150) from Fairey Aviation, September 1939.

R5273 to R5477 (150) from Armstrong Whitworth, September 1939.

R5482 to R5763 (200) from A. V. Roe, September 1939. Built as Lancasters.

W1280 to W1498 (150) from Armstrong Whitworth Co. December 1939.

W4102 to W4700 (450) from A. V. Roe, January 1940. Built as Lancasters.

SERVICE USE

Squadrons: Nos. 9, 44, 49, 50, 57, 61, 83, 97, 106, 144, 207, 408 and 420.

Training Units:

25 Operational Training Unit, Finningley

No. 1485 Bombing & Gunnery School

No. 1654 Conversion Unit

No. 1656 Conversion Unit

No. 1660 Conversion Unit

No. 1661 Conversion Unit

Air Fighting Development Unit, Wittering

Torpedo Development Unit, Gosport

Air Observers School

Lancaster Finishing School

Aeroplane & Armament Experimental Establishment

No. 1 Air Gunnery School

No. 3 Air Gunnery School

No. 8 Air Gunnery School



MANCHESTER LOG

A & AEE—Aeroplane & Armament Experimental Establishment
 AFDU—Air Fighting Development Unit
 AGS—Air Gunnery School
 AM—Air Ministry
 AOS—Air Observers School
 CO—Commanding Officer
 CU—Conversion Unit
 Con Flt—Conversion Flight
 MU—Maintenance Unit
 OTU—Operational Training Unit
 SofTT—School of Technical Training
 SOC—Struck-off-charge
 TDU—Torpedo Development Unit
 trng. a/f—training airframe

Units named are in sequence of use of aircraft. Where an entry states 'Ringway' and a date as first entry, this indicates original delivery date from Woodford factory.

- L7246—First prototype. First flown, 25.7.39; A & AEE, Boscombe Down, 28.11.39; RAE, Farnborough, 24.8.40; became trng a/f 3422M
- L7247—Second prototype. First flown, 26.5.40; Boscombe Down; Woodford 21.2.41; By road to Chadderton, 1.1.42; became trng a/f 2738M
- L7276—A & AEE, 5.8.40; 61 Sqn; 25 OTU, Finningley; Woodford, 31.8.41; 39 MU Colerne, 9.7.42; TDU, Gosport, Dec. 42; wrecked 31.10.43
- L7277—Ringway, 25.10.40; A & AEE, 25.10.40; 6 MU; Woodford, 24.2.41; 1654 Con Flt, Swinderby, 1.6.42; crashed 2.3.43.
- L7278—27 MU, Shawbury, 10.11.40; 207 Sqn, 'EM-A'; burnt-out 21.3.41

- L7279—6 MU, 21.10.40; 61 Sqn, Hemswell; Woodford, 14.7.41; 207 Sqn, 6.11.40; RAE, Farnborough; 39 MU, 10.8.42; SOC 11.10.43
- L7280—Ringway, 19.10.40; 207 Sqn, Dec '40; 83 Sqn, Apr '42; 1654 CU; 1660 CU; SOC 15.8.43
- L7281—Ringway, 3.12.40; A & AEE, 7.12.40; Brize Norton; Woodford, 12.1.42; 1654 Con Flt, 22.5.42; 49 Sqn; 1661 CU; SOC 14.9.43
- L7282—Ringway, 3.11.40; 207 Sqn, Dec '40; 97 Con Flt, Feb '41; Woodford, 17.8.41; 39 MU, 10.8.42; 12 SofTT, Jan '43
- L7283—Ringway, 7.11.40; 207 Sqn; 25 OTU; 97 Sqn; 1660 CU; 10 AGS, June '43; became trng a/f 3743M
- L7284—Ringway, 8.11.40; 207 Sqn, 'D', Nov '40; 61 Sqn, Hemswell, Apr '41; Woodford, 14.7.41; 39 MU, 13.9.42; SOC 18.6.43
- L7285—37 MU, Burtonwood, 6.7.41; Woodford, 27.3.42; 83 Sqn, Scampton, 11.4.42; RAE; 39 MU; SOC Oct '42
- L7286—Ringway, 19.11.40; 61 Sqn Con Flt; 83 Sqn; 1660 CU; SOC Mar '43
- L7287—83 Sqn, 16.4.42; 49 Sqn; lost 6.6.42
- L7288—Ringway, 20.11.40; 207 Sqn, 'H'; 61 Sqn, Hemswell; Woodford, 24.7.41; 1654 Con Flt, Wigsley, 29.6.42
- L7289—37 MU, Burtonwood, 6.7.41; Woodford, 27.3.42; 83 Sqn, 11.4.42; 50 Sqn, June '42; lost, Bremen, 25/26.6.42
- L7290—Ringway, 20.11.40; 207 Sqn; 97 Sqn; Woodford, 11.6.41; 1654 Con Flt Swinderby, 24.5.42; 49 Sqn; lost, Cologne, 30/31.5.42
- L7291—Ringway, 21.11.40; 207 Sqn; 97 Sqn; Woodford, 11.6.41; 106 Sqn, 13.5.42; Woodford, 10.9.42; 50 Sqn; crashed, Wigsley, 4.4.43
- L7292—Ringway, 22.11.41; 207 Sqn; Woodford, 24.11.41; 61 Sqn; 97 Sqn; 39 MU, 25.7.42; TDU, Gosport, Dec '42; SOC 6.11.43
- L7293—37 MU, 14.7.41; Woodford, 2.4.42; 83 Sqn, 18.4.42; 39 MU, 25.7.42; 61 Sqn; 207 Sqn; 1660 CU; became trng a/f 3773M
- L7294—Ringway, 25.11.40; 207 Sqn; 97 Sqn; 61 Sqn; Woodford, 24.7.41; 1654 CU, Swinderby, 11.6.42; burnt-out, Wigsley, 15.4.43
- L7295—Ringway, 4.12.40; Rolls-Royce, Hucknall; Woodford, 21.2.41; R-R, Hucknall, 10.3.41; undershot, crashed, Ternhill, 26.5.41
- L7296—Ringway, 10.12.40; 6 MU; Woodford, 28.2.41; 49 Sqn, Scampton, 'Y', 25.6.42; 97 Sqn; 1661 CU, Benson; SOC 18.4.43
- L7297—37 MU, Burtonwood, 15.7.41; Woodford, 17.4.42; 83 Sqn, 28.4.42; 1661 CU, overshoot, Winthorpe, 19.5.43.
- L7298—Ringway, 10.12.40; 207 Sqn; 97 Sqn; Woodford, 24.7.41; 1654 CU, Wigsley, 29.6.42; undershot, crashed, Wigsley, 1.9.42
- L7299—207 Sqn, Jan '41; 97 Sqn, Feb '41; Woodford, 9.7.41; 39 MU, 11.7.42; SOC 31.10.43
- L7300—6 MU, Brize Norton, 29.12.40; 207 Sqn, 'S', crashed 23.11.41
- L7301—27 MU, Shawbury, 4.1.41; Woodford, 18.3.41; Ringway, 23.4.41; 106 Sqn, Coningsby, 28.4.42; 50 Sqn, 'D', in which Fg Off L. T. Manser (VC) lost, Cologne, 30/31.5.42
- L7302—207 Sqn, 15.2.41, 'R', lost (Sqn CO), 8.4.41
- L7303—207 Sqn, 15.2.41, 'P'; AFDU, Wittering, Mar '41; shot down 27.3.41
- L7304—207 Sqn, 15.2.41; 61 Sqn, Apr '41, lost 26.6.41
- L7305—25 OTU, 22.1.42; 106 Sqn; 3 SofTT, Sep '43 as trng a/f 4279M
- L7306—27 MU, 25.2.41; 97 Sqn, burnt-out (crash), 13.9.41
- L7307—46 MU, Lossiemouth, 26.2.41; 61 Sqn; 97 Sqn; 25 OTU; 1654 CU; 1660 CU; 1668 CU; became trng a/f 4118M
- L7308—97 Sqn, Coningsby, 19.3.41; 49 Sqn; 1656 CU & crashed May '43
- L7309—97 Sqn, 6.3.41; 207 Sqn, 'O', 'J', 'S'—lost 15.1.42
- L7310—207 Sqn, 22.2.41, 'H'
- L7311—207 Sqn, 22.2.41, 'F', lost 16.8.41
- L7312—207 Sqn, 22.2.41, 'L', lost 13.11.41
- L7313—207 Sqn, 22.2.41, burnt-out 13.3.41
- L7314—207 Sqn, 'Y' shot down by Beaufighter, 25 Sqn, 21.6.41
- L7315—46 MU, Lossiemouth, 26.2.41; 97 Sqn; 61 Sqn, burnt out 29.6.41
- L7316—27 MU, 25.2.41; 207 Sqn, 13.4.41, 'U', lost Essen, 31.8.41
- L7317—6 MU, 25.2.41; 207 Sqn; 106 Sqn, forced down, 14.4.42
- L7318—97 Sqn, 6.3.41; 207 Sqn, 'K', burnt-out Sep '41
- L7319—97 Sqn, 6.3.41; 207 Sqn, 'X', shot down by enemy intruder, 13.3.42

Photographed from one Manchester to another, outward bound for a German target in 1941-42. As Shakespeare penned of other times, other places: "Gentlemen of the shade, minions of the moon"—Henry IV, Part 1. (Photo: via Author)

MANCHESTER SPECIFICATION (Two Rolls-Royce Vultures)

| | Tender to Spec. 13/36 | Prototype L7246 | Production to Spec. 19/37 |
|-------------------------------------|---------------------------------------|-----------------|---------------------------|
| Span (ft. in.) | 72 0 | 80 2 | 90 1 |
| Length (ft. in.) | 69 0 | 68 4½ | 69 4½ |
| Height (ft. in.) | 16 6 | 16 6 | 19 6 |
| Tail span (ft. in.) | 28 0 | 28 0 | 33 ¹ |
| Wing area (sq. ft.) | 930 | 1,057.5 | 1,131 |
| Wheel track (ft. in.) | 21 9 | 21 9 | 23 9 |
| Weight, gross (lb.) | 37,777 | 45,000 | 56,000 |
| Weight, empty (lb.) | 17,270 | 25,959 | 29,432 |
| Engines (b.h.p.) | 1,710 | 1,760 | 1,845 |
| Max. speed (m.p.h. @ ft.) | 330 @ 15,000 | 265 @ 17,000 | 265 @ 17,000 |
| Cruising (m.p.h. @ ft.) | 294 @ 15,000 | 185 @ 15,000 | 185 @ 15,000 |
| Range (miles for lb. load) | 1,000 for 12,000 | 1630 | 1630 for 8,000 |
| Max. Bomb load (lb.) | 12,000 | 8,000 | 10,350 |
| Service Ceiling (ft.) | 24,250 | — | 19,200 |
| Turret Armament ² (tail) | 4 × 0.303 ² | FN20 | FN20 |
| Turret Armament ² (nose) | 2 × 0.303 ² | FN5 | FN5 |
| Turret Armament (VT/DT) | 2 × 0.303 ² (VT: optional) | FN21A (VT) | FN7 (DT) |

¹First 20 had tail assembly span of 28 ft. 0 in.

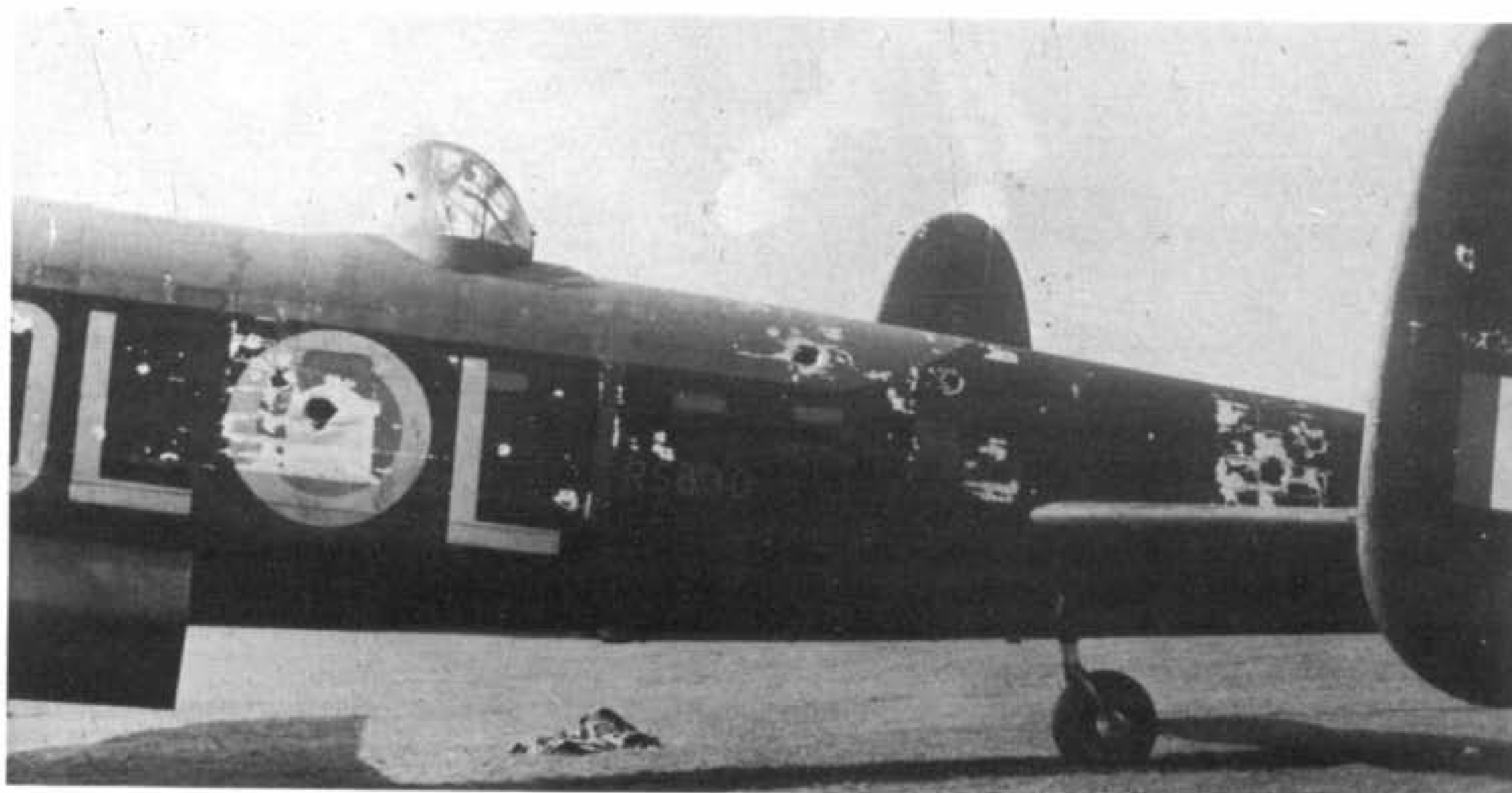
²1,000 rounds per gun carried in spare boxes; (VT/DT) = Ventral or Dorsal Turret.



- L7389—61 Sqn, 24.4.41; 207 Sqn; 83 Sqn, Dec '41; 49 Sqn; 106 Sqn; 1660 CU; 1 SofTT, Halton as trng a/f 3763M
- L7390—Ringway, 24.4.41; Woodford, 21.12.41; 97 Sqn, 9.1.42; 106 Sqn, lost in Holland, 25.3.42
- L7391—Ringway, 25.4.41; 207 Sqn, 17.1.42; 106 Sqn; 1485 Con Flt, crashed 11.2.43
- L7392—Ringway, 25.4.41; A & AEE, Boscombe Down; 39 MU Colerne, Sep '42; SOC Oct '43
- L7393—207 Sqn, 27.4.41, 'V', crashed Aug '41; became trng a/f 2600M
- L7394—83 Sqn, 27.2.42; 106 Sqn, lost mining 29.3.42
- L7395—61 Sqn, North Luffenham, 13.2.42, abandoned over Wittering 13.3.42 after returning from a raid
- L7396—Delivered to RAF, 6.5.41; 61 Sqn, 22.1.42, lost 31.1.42
- L7397—83 Sqn, 28.4.42; 49 Sqn; 207 Sqn; 1660 CU; became 3762M
- L7398—97 Sqn, 9.1.42; 106 Sqn; 49 Sqn; 97 Sqn; 1661 CU; 1660 CU; scrapped 30.4.43
- L7399—Rolleston Aviation Co., Tollerton, 14.5.41; 106 Sqn, lost mining 3/4.5.42
- L7400—Rolleston Aviation Co., Tollerton, 15.5.41; RAE; 1654 CU; scrapped May '43
- L7401—Rolleston Aviation Co., Tollerton, 17.5.41; 408 Sqn; 1654 CU; 1661 CU; wrecked 15.10.43
- L7402—Rolleston Aviation Co., Tollerton, 18.5.41; 420 Con Flt; 1661 CU; SOC Mar '43
- L7415—Rolleston Aviation Co., Tollerton, 21.5.41; 50 Sqn; 61 Sqn; 408 Sqn; 1654 CU; 1660 CU; SOC Oct '43
- L7416—Rolleston Aviation Co., Tollerton, 21.5.41; 1654 CU, crashed 30.8.42
- L7417—61 Sqn, 13.3.42; 106 Sqn, lost 19.5.42
- L7418—Delivered to RAF, 20.5.41; 83 Sqn, 26.2.42; 106 Sqn, lost 20.5.42
- L7419—Ringway, 22.5.41; 207 Sqn, 1.7.41, 'H'; 50 Sqn; 408 Sqn; 1654 CU, 'UG-B'; 4 AGS; became trng a/f 3748M
- L7420—25 OTU, 7.6.41; 49 Sqn; 1660 CU; 1661 CU; dumped, 1956
- L7421—25 OTU, 11.6.41; 49 Sqn; 97 Sqn; 1660 CU, wrecked 16.11.43
- L7422—207 Sqn, 26.5.41, 'V', crashed 1.9.41
- L7423—97 Sqn, 12.6.41, 'S'; 83 Sqn, Jan '42, lost 13.3.42
- L7424—97 Sqn, 1.6.41, lost 12.8.41
- L7425—97 Sqn, 26.5.41; 207 Sqn; 50 Sqn; 408 Sqn; 9 Sqn; 1661 CU; 8 AGS; became trng a/f 3741M
- L7426—61 Sqn, Hemswell, 26.6.41; 83 Sqn, Dec '41, lost 9.3.42
- L7427—97 Sqn; 83 Sqn, 'J' & 'Q', lost Hamburg, 8.4.42
- L7428—25 OTU, 1.7.41, crashed 18.11.41
- L7429—25 OTU, 2.7.41; 97 Sqn; 49 Sqn, lost Cologne, 30/31.5.42
- L7430—25 OTU, 2.7.41; 44 Con Flt; 1661 CU; 1654 CU; SOC Sep '43
- L7431—25 OTU, 4.7.41; 1654 CU; became trng a/f 3772M
- L7432—207 Sqn, 4.7.41, 'Z'; 50 Sqn, lost Bremen, 3/4.6.42
- L7433—6 MU, Brize Norton, 6.7.41; 61 Sqn, Dec '41, lost 16.2.42
- L7434—6 MU, 6.7.41; 25 OTU; 106 Sqn; 1656 CU; 39 MU; became trng a/f 4221M
- L7453—97 Sqn, 26.9.41, 'X'; 83 Sqn, Feb '42, 'K'; 49 Sqn, 'T'; 44 Sqn; 1661 CU; wrecked 1.5.43
- L7454—207 Sqn, 10.9.41, 'M'; 61 Sqn, Feb '42, lost 29.3.42
- L7455—207 Sqn, 10.9.41, 'G'; 50 Sqn; 9 Sqn; 1661 CU; 8 AGS; became trng a/f 3742M
- L7456—Ringway, 23.7.41; 6 MU, 26.11.41; 25 OTU; 50 Sqn; 106 Sqn, lost 30/31.5.42, Cologne
- L7457—207 Sqn, 13.9.41; 97 Sqn, 'Y'; 1654 CU, crashed 24. 1. 43
- L7458—83 Sqn, 10.12.41; 61 Sqn, 'E'; 1660 CU; 3 SofTT as 4280M
- L7459—97 Sqn, 27.9.41, crashed 8.1.42
- L7460—97 Sqn; 83 Sqn, 10.12.41; 50 Sqn; 97 Sqn, 'J'; 57 Sqn; 1656 CU, Oct '42; SOC July '43

Battle-damaged L7477 of No. 61 Squadron shows what flak could do. This Manchester arrived at the unit on October 12, 1941 and flew the squadron's last Manchester sortie on the night of June 25-26, 1942 with Bremen as the target. (Photo: Fox Photos via "Flight Int'l." Library archives)

- L7320—Boscombe Down, 23.3.41; crashed 12.12.41
- L7321—97 Sqn, 17.3.41; 207 Sqn, 'D', lost Nuremburg, 14.10.41
- L7322—207 Sqn, 17.3.41, 'B', 'Q', lost Brest, 8.1.42
- L7323—97 Sqn, 4.4.41, lost 12.8.41
- L7324—97 Sqn, 4.4.41, lost 16.5.41
- L7325—97 Sqn, 6.4.41; 25 OTU; 9 Sqn; 12 SofTT as trng a/f 3751M
- L7373—A & AEE, 13.4.41; 207 Sqn, 'T' Aug '41, lost 14.10.41
- L7374—97 Sqn, 17.4.41, lost 27.6.41
- L7375—97 Sqn, 'B', crashed 28.9.41
- L7376—25 OTU, 24.12.41; 106 Sqn; 1654 CU; 3 AGS; became trng a/f 3747M
- L7377—97 Sqn, 13.4.41; 207 Sqn, 'G', lost 13.8.41
- L7378—97 Sqn, 13.4.41; 106 Sqn; 207 Sqn, 'A'; 106 Sqn; 50 Sqn; 1654 CU; 12 SofTT, Jun '43 as trng a/f 3752M
- L7379—207 Sqn, 9.4.41, 'T' missing 23.5.41
- L7380—61 Sqn, 13.4.41; 207 Sqn, 'W', lost 8.9.41
- L7381—207 Sqn, 15.4.41, 'R', lost 13.8.41
- L7382—97 Sqn, 23.4.41, 'D'; 83 Sqn, Dec '41; 44 Sqn; 83 Sqn; 6 AGS; became trng a/f 3753M
- L7383—97 Sqn, 23.4.41; 61 Sqn, lost 2.9.41
- L7384—97 Sqn, 23.4.41; Woodford, 25.5.41; 97 Sqn, 1.6.41, lost 14/15.8.41
- L7385—Ringway, 24.4.41; Woodford, 12.12.41; 83 Sqn, 9.1.42, 'C'; 207 Sqn; 44 Sqn; air collision, 6.8.42
- L7386—25 OTU, 24.12.41; 49 Sqn; 9 Sqn; 57 Sqn, crashed on fire, Oct '42
- L7387—61 Sqn, 24.4.41; 97 Sqn; 83 Sqn, 'A'; 49 Sqn, crashed 21.6.42
- L7388—61 Sqn, 24.4.41, lost 2.9.41



RAF roundel serves as another kind of target on Manchester R5830 of No. 83 Squadron (code "OL"). The Manchester took part in a raid on the night of March 29, 1942 but it survived another 20 months before being struck-off-charge. (Photo: via Author)

L7461—97 Sqn, 19.9.41; 106 Sqn; 1661 CU; 1654 CU; 1660 CU; 3 SofTT as 4278M
 L7462—97 Sqn, 26.9.41, lost Hamburg, 26.10.41
 L7463—97 Sqn, 26.9.41; 106 Sqn, Jan '42, 'L', lost 23/24.4.42
 L7464—61 Sqn; 50 Sqn; 97 Sqn, 9.1.42; 83 Sqn, Feb '42; became 3642M
 L7465—83 Sqn, 24.12.41, 'H', lost 25/26.3.42
 L7466—97 Sqn, 26.9.41, 'N', lost 8.11.41
 L7467—25 OTU, 10.10.41; 97 Con Flt; 1661 CU, wrecked 25.9.43
 L7468—207 Sqn, 9.11.41; 50 Sqn; 9 Sqn; 1660 CU; 12 SofTT as 3732M
 L7469—25 OTU, 10.10.41; 49 Sqn, lost Emden, 6.6.42
 L7470—61 Sqn, 11.10.41, lost 8.4.42
 L7471—61 Sqn, 9.11.41, 'V'; 50 Sqn, lost Emden, 6/7.6.42
 L7472—61 Sqn, 11.10.41, lost 31.1.42, Brest
 L7473—97 Sqn, 'H'; 61 Sqn; 1485 B/G Flt, crashed 6.10.42
 L7474—97 Sqn, 28.10.41; 106 Sqn, abandoned 12.3.42
 L7475—97 Sqn, 28.10.41; 61 Sqn; 50 Sqn, Apr '42; burnt-out, 16.8.42
 L7476—97 Sqn, 27.9.41, 'K'; 207 Sqn; 50 Sqn; 1654 CU; SOC Apr '43
 L7477—61 Sqn, 12.10.41; 1661 CU; 1654 CU; SOC 1943
 L7478—38 MU; 25 OTU, Dec '42; wrecked 16.1.43
 L7479—25 OTU, 25.11.41; lost Cologne 30/31.5.42
 L7480—207 Sqn, 9.11.41; 61 Sqn; 50 Sqn; 44 Sqn; 1661 CU; scrapped 30.4.43
 L7481—46 MU, Lossiemouth, 2.11.41; 25 OTU; 44 Con Flt; 1661 CU; SOC Sep '43.
 L7482—25 OTU, 25.11.41; 97 Con Flt; 1660 CU; abandoned 2.1.43
 L7483—207 Sqn, 10.9.41, 'H', 'O'; 10 AGS; 12 SofTT as 3749M
 L7484—207 Sqn, 10.9.41; 83 Sqn, Apr '42; 49 Sqn; 408 Sqn; 9 Sqn; 1458 Con Flt; 1 AGS; became trng. a/f 3776M
 L7485—207 Sqn, 12.9.41, 'D', 'G'; 106 Sqn, Mar '42, lost 16/17.4.42
 L7486—207 Sqn, 12.9.41, 'P'; 50 Sqn, crashed Skellingthorpe 25.3.42
 L7487—207 Sqn, 12.9.41, 'N', lost in sea, 21.10.41
 L7488—97 Sqn, 15.10.41; 207 Sqn, 'Q'; 106 Sqn; 50 Sqn; 1654 CU; 12 SofTT, Jun '43 as 3750M
 L7489—97 Sqn, 19.9.41, 'T'; 50 Sqn, lost 9.5.42
 L7490—25 OTU; 97 Sqn, 24.9.41, 'U', wrecked 18.12.41
 L7491—25 OTU, 27.9.41; 97 Sqn; 1654 CU, crashed on take-off, 17.5.43
 L7492—25 OTU, 30.9.41; 97 Sqn; 61 Sqn; 50 Sqn; 1485 Con Flt; 1654 CU; 4 AOS; became trng. a/f 3985M
 L7493—25 OTU, 30.9.41; 49 Sqn, Aug '42; 1661 CU; SOC Oct '43
 L7494—61 Sqn, 4.10.41, lost 7/8.12.41 Boulogne
 L7495—61 Sqn, 20.10.41, abandoned 16.1.42
 L7496—61 Sqn, 4.10.41; 1654 CU, crashed, burnt-out 5.7.42
 L7497—61 Sqn, 10.10.41, lost 27.3.42
 L7515—207 Sqn, 10.10.41, 'S'; 106 Sqn; 49 Sqn; 1656 CU; SOC Nov '43
 L7516—61 Sqn, 10.10.41; 50 Sqn, Apr '42, lost 29/30.4.42
 L7517—Burnt-out before delivery to RAF—AM cancelled
 L7518—61 Sqn, 15.10.41, lost Bergen-am-Zee, 25.3.42
 L7519—61 Sqn, 19.10.41; 50 Sqn, burnt-out 13.5.42
 L7520—61 Sqn, 21.10.41, crashed 2.11.41
 L7521—61 Sqn, 25.10.41; 50 Sqn, crashed 5.9.42
 L7522—61 Sqn, 25.10.41; 97 Sqn, 'V'; 83 Sqn, Jan '42, lost 22.4.42, Stavanger, 'N'
 L7523—207 Sqn, 'M' crashed 14.1.42
 L7524—46 MU, Lossiemouth, 2.11.41; 25 OTU; 49 Sqn; 1485 Con Flt; 1661 CU; 1668 CU; SOC Oct '43
 L7525—38 MU, Llandow, 15.11.41; 97 Sqn, 'D'; 106 Sqn; 50 Sqn; 83 Sqn, 'O'; 1485 Flt; 1661 CU; SOC Aug '43
 L7526—25 OTU, 26.11.41; 49 Sqn; 207 Sqn; 1656 CU, Oct '42; SOC July '43

R5768—83 Sqn, 18.4.42; 1660 CU, 'TV-A'; SOC Nov '43

R5769—25 OTU, 27.3.42; 106 Sqn; 50 Sqn; 98 Sqn; 1661 CU; SOC Dec '43
 R5770—25 OTU, 8.3.42; 106 Sqn, Wg. Cdr. G. P. Gibson's a/c; 1660 CU, crashed 4.7.43
 R5771—25 OTU, 27.3.42; 49 Sqn; 420 Sqn; 57 Sqn; 1654 CU; 2 AGS; became trng. a/f 3746M
 R5772—49 Sqn; 25 OTU, 2.4.42; 1654 CU, crashed 26.1.43
 R5773—RAE, Farnborough, 24.3.42; TDU, Gosport, May '42; became 3892M
 R5774—TDU, Gosport, 27.4.42; 11 SofTT as 3890M
 R5775—49 Sqn; 83 Sqn; 408 Con Flt, 27.5.42; 1654 CU; 1660 CU; 3 SofTT as 4281M
 R5776—1654 CU, Swinderby, 1.6.42; became trng. a/f 3745M
 R5777—1654 CU, 22.6.42; 39 MU; 1654 CU; SOC Oct '43
 R5778—207 Sqn, 17.1.42; 50 Sqn, 25.1.42, lost 9.5.42
 R5779—83 Sqn, 24.12.41, 'G', lost 9.3.42
 R5780—83 Sqn, 27.12.41, 'D'; 106 Sqn; 49 Sqn; 57 Sqn; 1656 CU, Lichfield, crashed 19.10.42
 R5781—83 Sqn, 9.1.42, lost 28/29.3.42
 R5782—207 Sqn, 19.9.41; 50 Sqn, Mar '42, lost Hamburg 17/18.4.42
 R5783—97 Sqn, 23.9.41, 'V', crashed 21.10.41
 R5784—61 Sqn, 4.10.41; 50 Sqn; 9 Sqn; 57 Sqn; 1485 Flt; 1660 CU; became trng. a/f 3984M
 R5785—61 Sqn, 12.10.41, lost 11.4.42
 R5786—61 Sqn, 10.10.41; 50 Sqn, Apr '42; 1654 CU; SOC 28.1.43
 R5787—61 Sqn, 20.10.41, lost Brest 31.1.42
 R5788—61 Sqn, 31.10.41; 83 Sqn, Dec '41, 'E'; 49 Sqn; 1660 CU; became trng. a/f 3983M
 R5789—61 Sqn, 20.10.41, crashed 9.1.42
 R5790—207 Sqn, 22.10.41; 83 Sqn, Dec '41, 'F'; 49 Sqn; 44 Sqn; 1661 CU became trng. a/f 3774M
 R5791—207 Sqn, 29.10.41, 'V'; 1457 Flt; 1485 Flt; 1654 CU; became 4001M
 R5792—97 Sqn, 29.10.41, burnt-out 24.11.41
 R5793—25 OTU, 16.11.41; 49 Sqn, Sep '42; 83 Con Flt; 1656 CU; 39 MU; SOC May '43
 R5794—25 OTU, 16.11.41; 49 Sqn, lost Essen 2.6.42
 R5795—97 Sqn, 22.11.41, lost Brest 18.12.41
 R5796—61 Sqn, 18.11.41; 106 Sqn; 207 Sqn, 'W'; 57 Sqn; 50 Sqn; 1654 CU; 1660 CU; SOC Nov '43
 R5797—Ringway, 22.4.42; became trng. a/f 3778M
 R5829—25 OTU, 17.12.41; 1654 Flt; 3 AGS; SOC Jly '43
 R5830—A&AEE, Boscombe Down, 11.1.42; 83 Sqn, Feb '42; 1656 CU; SOC Nov '43
 R5831—83 Sqn, 9.1.42, 'I', lost 25/26.3.42
 R5832—61 Sqn, 28.1.42; 1660 CU, Oct '42; became trng. a/f 3744M
 R5833—207 Sqn, 6.2.42; 83 Sqn, Apr '42, 'N'; 50 Sqn, lost mining 5.6.42
 R5834—61 Sqn, 28.1.42; SOC May '42
 R5835—207 Sqn, 6.2.42; 83 Sqn; 49 Sqn; 408 Sqn; 1654 CU; 1661 CU; SOC Oct '43
 R5836—83 Sqn, 13.2.42, 'T', wrecked landing 1.12.42
 R5837—83 Sqn, 13.2.42, 'R', lost 8/9.10.42
 R5838—83 Sqn, 13.2.42, 'S'; 9 Sqn; 1661 CU, crashed 12.3.42
 R5839—61 Sqn, 28.2.42; 106 Sqn, Mar '42; 1661 CU; SOC Oct '43
 R5840—61 Sqn, 28.2.42; 106 Sqn, lost mining 3/4.5.42
 R5841—61 Sqn, 10.3.42; 106 Sqn; 1660 CU, crashed on fire 11.1.43

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One of the original Avro Manchesters, the Type 533 of 1918, powered by two 320 h.p. ABC Dragonfly engines. Because of the Armistice only two of these power variants were completed, F3493 illustrated and F3494. The first, however, was a Puma-powered prototype, F3492. (Photo: Avro via Author)

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