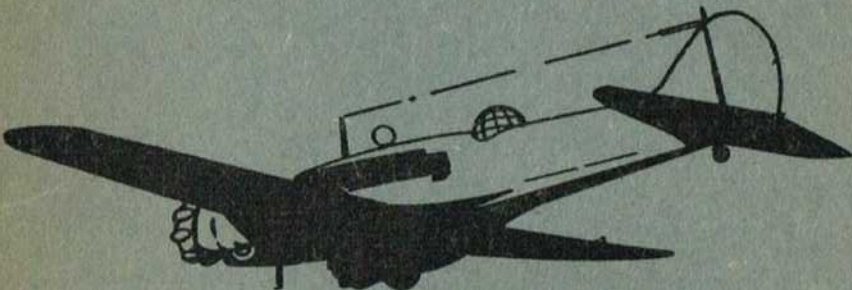
A.P. 1525A—P.N.

PILOT'S NOTES

FOR

ANSON I

TWO CHEETAH IX ENGINES



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AMENDMENTS

Amendment lists will be issued as necessary and will be gummed for affixing to the inside back cover of these notes.

Each amendment list will include all current amendments and will, where applicable, be accompanied by gummed slips for sticking in the appropriate places in the text.

Incorporation of an amendment list must be certified by inserting date of incorporation and initials below.

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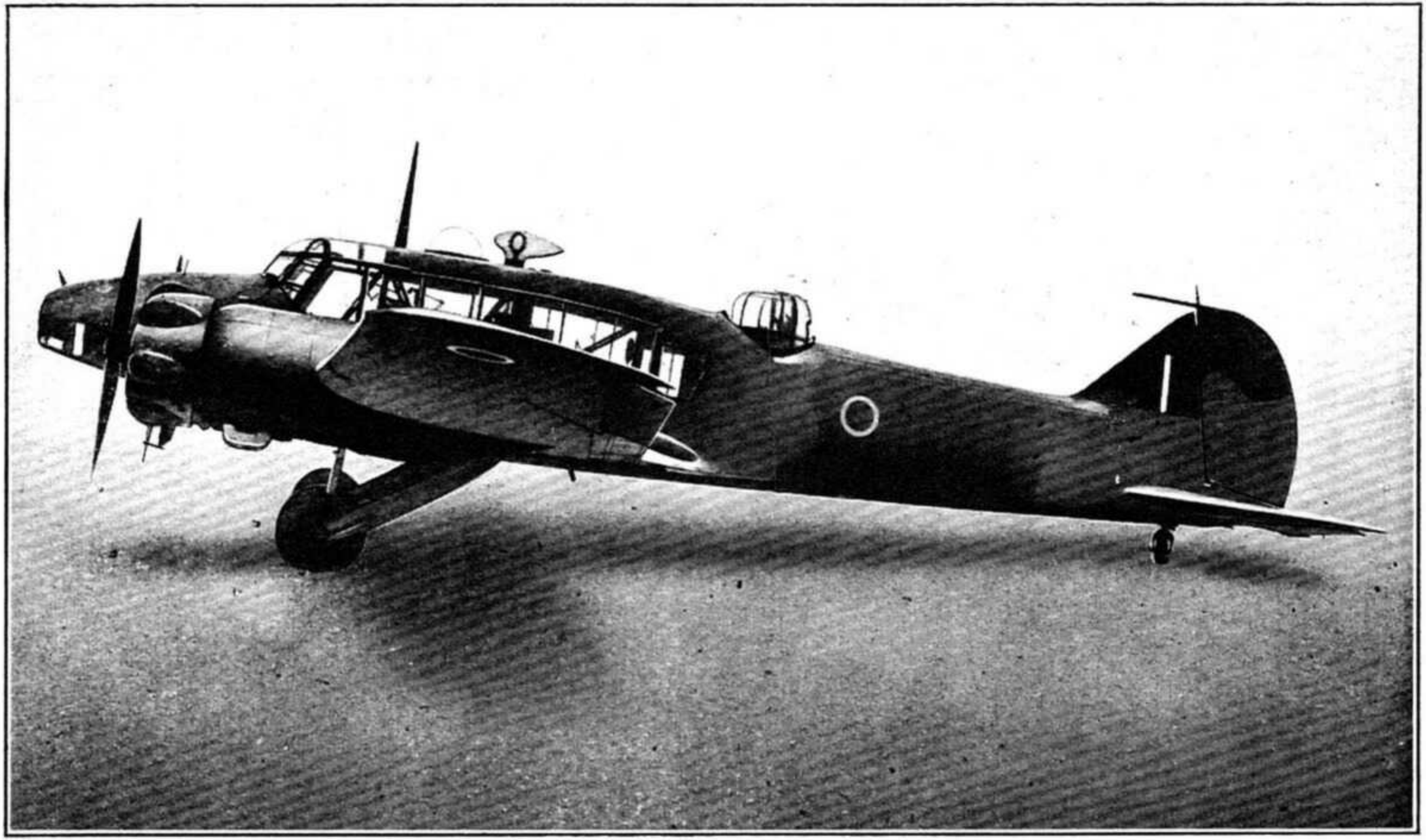

ANSON I

NOTES TO USERS

THIS publication is divided into five parts: Descriptive, Handling Instructions, Operating Data, Emergencies and Illustrations.

Part I gives only a brief description of the pilot's controls and of other controls with which the pilot, as captain, should be acquainted; for further information on controls and equipment see A.P. 1525A & D, Vol. I, Sections 1 and 3.

Other relevant information will be found in Pilot's Notes General, A.P. 2095.

Words in capital letters indicate the actual markings on the controls concerned.

Additional copies may be obtained from A.P.F.S., Fulham Road, S.W.3, by application on R.A.F. Form 294A, quoting the number of this publication in full — A.P. 1525A—P.N. Comments and suggestions should be forwarded through the usual channels to the Air Ministry (D.T.F.).

ANSON I PILOT'S NOTES

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PART I

DESCRIPTIVE

INTRODUCTION

1. The Anson 1 is a twin-engined aircraft used for air crew training and communication, and is fitted with two Cheetah IX engines and Fairey two-bladed fixed-pitch propellers. The normal crew is five.

MAIN SERVICES

2. *Fuel system.*—Two 35-gallon tanks are fitted in each wing outboard of the engine nacelle. (See Fuel system diagram Fig. 4). Each tank has a control cock, and these controls (35) are on a panel on the starboard side of the cockpit. The port and starboard fuel systems are separate and independent (each feeding its own engine-driven pump), but on most aircraft are connected by a cross-feed line and cock permitting the engine in one wing to be fed from the tanks in the opposite wing. Provision can be made on some aircraft for the installation of a long-range, 40-gallon tank in the navigator's compartment of the cabin, and this tank feeds through an ON-OFF cock into the cross-feed line, on the starboard side of the cross-feed cock.

3. *Oil system.*—Two oil tanks are fitted, one in each engine nacelle, each having an oil capacity of 7 gallons.

4. *Vacuum system.*—Vacuum pumps on each engine serve the instrument flying panel. One pump is used at a time and the change-over cock (2) is on the port window shelf.

5. *Electrical system.*—

(i) On early aircraft a 500-watt, 12-volt generator is mounted on the starboard engine, and feeds the following services through a 25-amp. hr., 12-volt accumulator:

Navigation lights
Landing lamps
Identification lights
Interior and instrument lights
Fuel gauges
Pressure head heater
Windscreen wipers (if fitted)
Bomb release gear
Wireless installation
Gunsight and camera gun

When the Marconi radio installation (Mod. No. 512) is installed, a separate 500-watt generator, driven by the port engine and charging a 40-amp. hr. accumulator, is fitted and works independently of the general services supply. However, an emergency switch is fitted on the starboard side of the navigator's cabin to allow the generator on the starboard engine to supply the Marconi radio installation in an emergency. A ground socket is also supplied and allows for testing the Marconi radio only, from an outside supply.

(ii) Later aircraft are fitted with two 750-watt, 12-volt generators, one on each engine, and supply all services, including the radio and the power-operated rear turret. The ground socket then becomes common to all services.

AIRCRAFT CONTROLS

6. *Trimming tabs.*—The elevator trimming tabs are controlled by a cranked handle (30) on the starboard side of the engine control pedestal and there is an indicator on the port side. The rudder trimming tab is operated from a small hand-wheel (41) under the roof on the port side of the cabin, and the setting is neutral when the ends of the chain, which passes around this hand-wheel, are level.

7. *Undercarriage control.*—The undercarriage is raised and lowered manually by operating the crank (47) in the pedestal beneath the pilot's seat, approximately 160 turns being necessary. When retracted, a small portion of each wheel is left protruding from the engine nacelle

to minimise damage to the aircraft if landed in an emergency with the wheels retracted. In the event of such a landing the wheels brakes are still effective. A hand locking-lever on the port side of cockpit is pulled up to withdraw the down-locks before undercarriage is raised. The lever is pushed down before lowering undercarriage so that locks engage when wheels are down. When lowering or raising the undercarriage, winding must be continued until the control handle slips.

8. *Undercarriage indicators.*—

(i) Twin green knobs (20) on the right side of the engine control box and normally hidden by spring-loaded covers, come into view when the undercarriage is fully extended.

(ii) A red warning lamp (9) on the pilot's instrument panel lights up if either undercarriage unit is not fully extended, and stays alight until the undercarriage is locked down.

9. *Undercarriage warning horn.*—An electrically-operated horn sounds when the undercarriage units are in any position other than the fully down and locked, and either of the throttle levers are pulled back to one third or less.

10. *Flaps control and indicators.*—The flaps can be raised or lowered hydraulically by a handpump (48) on the floor behind the pilot's seat. A control lever (24) with two positions marked FLAPS UP and FLAPS DOWN, is on the port side of the engine control pedestal and must be set in the appropriate position before operating the handpump. The maximum downward position of the flaps is 60° and the flaps position is shown by indicators (17) on the right side of the instrument panel. These indicators are controlled by a switch situated between them; a warning light, beside the indicators, lights up when the indicators are switched on, and serves as a reminder to the pilot that the indicators are on. Do not attempt to use an intermediate flap position for take-off, as the flaps are not interconnected and they may assume different angles.

11. *Wheel brakes.*—The wheel brakes are operated from an air bottle (which has to be inflated by external means as there is no engine-driven compressor) by a pawl and ratchet

lever (29) mounted on the engine control pedestal. (On later aircraft there are two air bottles.) Movement of the rudder pedals with the hand brake on will give differential braking. A triple pressure gauge (28) on the dash shows the pressure.

12. *Pressure head heater.*—The switch (4) for the pressure head heater is either on the left-hand side of the main instrument panel near the upper edge or on the port window shelf.

13. *Locking of flying controls.*—

(i) The pilot's control column may be locked by a strut fitted between the bracket at the top of the pilot's seat back and the special clip on the control column. The strut is secured by two quick-release pins attached to the locking strut by short chains. When not in use, the strut is stowed on two brackets on the inner edge of the shelf on the port side of the cockpit and is held in its stowage by its quick-release pins.

(ii) The aileron handwheel may be locked by leather straps which pass inside the rim of the handwheel, and through rings secured to the cockpit floor, on each side of the control column.

(iii) The rudder pedals may be locked by a device consisting of a wood base and a shaped swivelling top-piece which can be clamped together. To lock the pedals, set them in their neutral position, fit the clamp to the bottom ends of the pedal levers and with the top piece bedding transversely on the levers, tighten the clamp.

ENGINE CONTROLS

14. *Throttle and mixture controls.*—

(i) Two throttle levers (23) are fitted in the engine control pedestal, the three markings being SHUT (back), OPEN, and EMERGENCY (fully forward). There are two settings of the boost control now in service. Originally the higher setting was only allowed with 90 or higher octane fuel but it is now permitted also with 87 octane fuel. When the engine has been set at the higher boost setting no extra power is obtained by using the EMERGENCY position, as full power is obtained with the throttle lever at the gate (OPEN). When the engine has been set at the lower boost setting, the EMERGENCY position is sealed by light wire and is intended only to be used in emergency. But since the higher limitations are now permitted with 87 octane fuel, this EMERGENCY position may now be used for take-off, if the engine has not yet been adjusted to the higher setting.

(ii) The single mixture control lever (22) has three positions, WEAK (fully forward), normal (central position) and TAKE-OFF (fully back). The lever should be set to TAKE-OFF only for take-off and for emergency use. This enriches the mixture and also operates the boost over-riding device which raises the boost with the throttle at OPEN, and in the case of engines with the lower setting, gives maximum boost with the throttle at EMERGENCY. The WEAK position should be used for cruising when the boost is less than -1 lb./sq. in.

(iii) The throttles and mixture controls are inter-connected so that the mixture control will automatically return from the WEAK position to the normal (central) position when a boost pressure greater than that permitted for economical cruising is being used.

15. *Fuel cock controls.*—Four fuel cock control knobs (35) (one for each tank) are mounted on a panel on the starboard side of the pilot's cockpit. When the knobs are in the forward position the fuel control cocks are ON. The cross-feed cock (if fitted) is on the floor at the right of the pilot's seat, and when the long-range tank is fitted its ON-OFF cock is at the left of the navigator's table.

16. *Fuel contents gauge.*—An electrical fuel-contents gauge (12) is fitted either on the pilot's instrument panel or beside the main fuel cocks, with a 4-way switch (13) beside it by which the contents of each tank can be ascertained. The long-range tank, when fitted, has a mechanical indicator mounted on it.

17. *Fuel pressure gauges.*—The fuel pressure is indicated by a pressure gauge, mounted on the inboard side of the engine nacelle, forward of the fireproof bulkhead, where it can be seen from the pilot's cockpit.

18. *Fuel priming pumps and cocks.*—A cylinder priming pump together with a cock, is mounted on a panel aft of the fireproof bulkhead, on the port side of each engine nacelle. The priming cock must be turned to OFF after priming the engine.

19. *Ignition and starting switches.*—The four ignition switches (44) are in the roof of the cockpit and the starting magneto switches are on the panels on the port side of the nacelles, aft of the fireproof bulkheads. The starter magnetos are replaced (Mod. 472) by booster coils on later aircraft and the operating pushbuttons for these are on the extreme left-hand side of the main instrument panel.

20. *Hand starting.*—Two handles are supplied for coupling to the hand turning gear, and are stowed on the rear gunner's turret door when not in use.

21. *Slow-running cut-out control.*—This control (19) is operated by a pull-ring or a toggle at the right-hand bottom portion of the pilot's instrument panel.

22. *Oil dilution.*—The pushbuttons for operating the oil dilution valves are, on most aircraft, fitted on the respective engine bulkhead, but on later aircraft the buttons are in the pilot's cockpit.

OPERATIONAL EQUIPMENT

23. *Guns.*—The aircraft is equipped with one Browning gun with ring-and-bead gun sight, fixed on the port side of the nose and operated pneumatically by a pushbutton (27) on the pilot's control column and a Vickers G.O. gun mounted on a rotating turret, or two Browning guns in a power-operated turret in the rear end of the cabin.

24. *Bombs.*—Provision is made for carrying and releasing the following alternative bomb loads:—

(i) 2—100 lb, and 8—20 lb. bombs

(ii) 2—100 lb, and 8—smoke floats or reconnaissance flares.

The 100 lb. bombs are carried in a compartment aft of the rear spar, and the 20 lb. bombs or smoke floats are carried in a compartment between the front and rear spars. In addition, provision is made on some aircraft for carrying two extra 100 lb. or 250 lb. bombs on the underside of the fuselage between the main spars.

25. *Bomb doors.*—The doors of the 100 lb. bomb compartments are automatically opened by the weight of the released bombs, and are automatically closed by springs when the bombs have passed through them.

The doors of the 20 lb. bomb compartments are controlled by the bomb-aimer by means of a crank handle (38) on the starboard side of the pilot's cockpit.

26. *Bomb release controls.*—The bomb aimer has controls allowing him to select and release each or all of the 100 lb. and 20 lb. bombs (or smoke floats).

A bomb release panel (34) is mounted on the starboard side of the pilot's cockpit and a fixed firing switch (6) on the instrument panel. This arrangement enables the pilot to select and release the 20 lb. bombs (or smoke floats) and to jettison these and the 100 lb. bombs if required.

An additional firing switch is provided at the rear end of the fuselage, on the port shelf, immediately aft of the wireless operator's seat. This firing switch can be used in conjunction with the selector switches in the pilot's cockpit.

PART II

HANDLING INSTRUCTIONS

27. MANAGEMENT OF FUEL SYSTEM

(i) One tank only in each wing should be used at the same time, and when it is emptying its cock must be turned off and the cock of the other tank in the wing turned on simultaneously.

(ii) If 40 gallon long-range tank is fitted, its contents should not be used for take-off, but as soon as possible after take-off by turning it on, opening the cross-feed cock and closing the wing-tank cocks. When it is empty its cock must be turned off before opening wing-tank cocks. Close the cross-feed cock.

(iii) *Use of cross-feed cock.*—This cock should normally be kept closed, except when using long-range tank, as described in (ii), and when it is necessary to feed the engine in one wing from a tank in the opposite wing.

28. STARTING ENGINES AND WARMING UP

(i) Check:

Cross-feed cock (if fitted)	OFF
Fuel gauges	Check contents of tanks
Tank cocks	One tank in each wing ON (preferably the fuller tank)

(ii) Set engine controls as follows:—

Throttle	¾-inch open
Mixture	normal

(iii) The ground crew will turn on the priming cock and operate the fuel priming pump until the suction and delivery pipes are full; this may be judged by a sudden increase in resistance.

(iv) Leave the main magneto off; switch on starting magneto (or press booster-coil button) and have the engine cranked by hand. The ground crew works the priming pump vigorously, and when a large number of strokes are required the engine should be turned at intervals. The engine should start after the following number of strokes

Air temperature °C.	+30	+20	+10	0	−10
No. of strokes	1	2	3	6	14

(v) When the engine fires, switch on main magnetos, and switch off starting magneto (or release booster-coil button). The ground crew will screw down the priming pump and turn off the priming cock.

(vi) Open the engine up slowly to 1,000 r.p.m. and warm up at this speed.

29. TESTING ENGINES AND INSTALLATIONS

While warming up

(i) Check temperatures and pressures, and test operation of flaps with handpump.

After warming up

(ii) Move mixture control to TAKE-OFF, open up momentarily to the gate and check boost and r.p.m.

(iii) Return mixture control to normal, and check that boost falls to $+1\frac{1}{2}$ lb./sq. in. (On some engines boost control may still be set to the old 87 octane rating; in this case boost should fall to $+\frac{1}{2}$ lb./sq. in.) Throttle back to 1,600 r.p.m. and test each magneto in turn. The drop should not exceed 80 r.p.m.

30. TAXYING

(i) The rear gunner must move forward to the navigator's position for taxying and take-off.

(ii) *Check list before taxying*

Door	closed
Undercarriage	green knobs showing on mechanical indicator.
Pressure head heater ..	ON.

(iii) Steer as much as possible by use of the throttles so as to conserve the brake pressure.

31. CHECK LIST BEFORE TAKE-OFF

T—Trimming tabs ..	Elevator: Central Rudder: Central
M—Mixture control ..	TAKE-OFF
Fuel	Check fuel cocks are on the fuller tank in each wing.
Flaps	Up

32. TAKE-OFF

(i) There is a very slight tendency to swing to port. This is easily corrected and the aircraft can be kept straight by use of the throttles until rudder action is obtained.

(ii) Before climbing, increase speed to 90 m.p.h. I.A.S. (78 knots), which gives a good margin above the safety speed of 75 m.p.h. I.A.S. (65 knots).

(iii) At heavy loads, the undercarriage should be raised without delay, as this improves one-engine performance.

(iv) Change mixture control into the normal (central) position.

33. CLIMBING

The speed for maximum rate of climb initially is 100 m.p.h. I.A.S. (87 knots).

34. GENERAL FLYING

(i) *Change of trim:—*

Undercarriage down	Nose down
Flaps down ..	Nose up

(ii) *Stability.*—The aircraft is stable.

(iii) *Flying at low airspeeds.*—Flaps may be lowered 20° and speed reduced to 85 m.p.h. I.A.S. (74 knots) when flying in bad visibility.

35. STALLING

(i) The stalling speeds at light load are

Flaps and undercarriage up .. 57 m.p.h. I.A.S. (50 knots)
Flaps and undercarriage down .. 48 m.p.h. I.A.S. (41 knots)

(ii) If the pilot's A.S.I. is connected to the static vent (see para. 42) the stalling speed readings are as follows:—

Flaps and undercarriage up .. 66 m.p.h. I.A.S. (57 knots)
Flaps and undercarriage down .. 55 m.p.h. I.A.S. (48 knots)

(iii) *Characteristics at the stall.*—With flaps and undercarriage up there is no warning of the stall, and a wing drops gently if the control column is held back. With flaps and undercarriage down there is noticeable vibration, and the stall is straight, the nose dropping somewhat sharply.

36. DIVING

(i) The aircraft may be dived without altering the trim, but as speed increases the aircraft becomes tail-heavy. R.p.m. should be watched so that the maximum r.p.m. is not exceeded.

(ii) At maximum diving speed the rudder is effective but the ailerons stiffen up.

37. CHECK LIST BEFORE LANDING

(i) Rear gunner must move forward to Navigator's position for landing.

(ii) Reduce speed to 100 m.p.h. I.A.S. (87 knots), check brakes and carry out the drill of vital actions U. M. and flaps.

U —Undercarriage ..	DOWN. Check by mechanical indicator, and that red light is out.
M—Mixture	TAKE-OFF
Flaps	Switch on flaps indicatoi and pump flaps fully down.

(iii) Recommended approach speeds I.A.S. are:—

	Flaps		Flapless	
	m.p.h.	knots	m.p.h.	knots
Engine assisted	70	61	75	65
Glide	75	65	80	69

38. MISLANDING

(i) The pilot must be prepared to hold the nose down when opening the throttles.

(ii) At a safe height, raise the flaps in stages, by means of the flap selector only. It is not necessary to pump them up.

39. AFTER LANDING

(i) Retract the flaps before taxying, by pumping them up.

(ii) Let the engines idle for a minute, then pull out the slow-running cut-out and hold until the engines stop.

(iii) After engines have stopped, release the cut-out smartly to return it to the normal position; switch off ignition; turn off fuel, flaps indicator and pressure head heater.

(iv) *Oil dilution in cold weather.*—See A.P. 2095. The oil dilution period is 3 minutes.

PART III

OPERATING DATA

40. ENGINE DATA, CHEETAH IX

(i) *Fuel.*—87 octane or higher.

(ii) *Oil.*—See A.P. 1464/C.37.

(iii) *Engine limitations with 87 octane or higher fuel.*—

	R.P.M.	Boost lb./sq. in.	Temp. °C. Cylr.	Oil
MAX. TAKE-OFF TO 1,000 FEET	2,100	F.T.		
MAX. CLIMBING 1 HR. LIMIT	2,300	$+1\frac{1}{2}$	220	80
MAX. RICH CONTINUOUS	2,100	$-\frac{1}{4}$	220	80
MAX. WEAK CONTINUOUS	2,100	-1	180	80
MAX. ALL OUT 5 MINS. LIMIT	2,425	$+1\frac{1}{2}$	250	90

OIL PRESSURE:

NORMAL .. .. 70 lb./sq. in.

EMERGENCY (5 MINS.) .. .. .. 35 lb./sq. in.

MINM. OIL TEMP. FOR TAKE-OFF .. 25° C.

(iv) *Other limitations.*

Diving. Maximum boost .. .. $+1\frac{1}{2}$ lb./sq. in.

Maximum r.p.m. 2,910

2,425 r.p.m. may be exceeded only for 20 seconds, with throttle not less than one-third open.

(v) Fuel pressure .. .. .. 2–3 lb./sq. in.

41. FLYING LIMITATIONS

(i) The aircraft is designed for duties as a reconnaissance and training aircraft. Spinning and aerobatics are not permitted, and care must be taken not to impose heavy loads with the elevator in recovery from dives, or by rapid turns at high speed.

(ii) *Maximum Weights*

Take-off and straight flying .. .. .. 9,900 lb.

All forms of flying and landing .. .. 8,500 lb.

(iii) *The aircraft is designed for the following speeds, I.A.S.:—*

	m.p.h.	*Knots*
Diving	213	185
Undercarriage down	213	185
Flaps down	98	85

42. POSITION ERROR CORRECTION

(i) The corrections are as follows:

From .. To	70 88	88 108	108 135	135 m.p.h. I.A.S. 170 m.p.h. I.A.S.
Add ..	7	5	3	1 m.p.h.

(ii) When the pilot's A.S.I. is connected to the static vent in the port side of the fuselage, the position error at speeds above 100 m.p.h. (87 knots) is never more than approximately 1 m.p.h. (or 1 knot) and may be neglected. At low speeds, the correction is greater, but handling speeds are not affected except at the stall. (*See* para. 35.)

43. RECOMMENDED OPERATING SPEEDS

(i) *For maximum rate of climb*

100 m.p.h. I.A.S. (87 knots) up to 5,000 ft. Above 5,000 ft. reduce speed by 2 m.p.h. (or 2 knots) per 1,000 ft.

(ii) *For maximum range*

The recommended speed for maximum range is approximately 120 m.p.h. I.A.S (104 knots).

PART IV

EMERGENCIES

44. ENGINE FAILURE DURING TAKE-OFF

If engine failure occurs before the undercarraige is raised, it may be impossible to climb away. At 8,500 lb. with undercarriage up, it is possible to climb slowly at 75 m.p.h. I.A.S. (65 knots) with starboard engine failed, but with port engine failed, it is only possible to maintain height. Any attempt to increase speed will result in loss of height, and a decrease in speed may result in loss of control.

45. ENGINE FAILURE IN FLIGHT

(i) At 8,500 lb. it is possible to maintain height on one engine at 90 m.p.h. I.A.S. (78 knots) with the rudder trimmed so that no bank is necessary.

(ii) Lower undercarriage while there is still plenty of height in hand.

46. EMERGENCY EQUIPMENT AND CONTROLS

(i) *Fire extinguishers.*—Two hand fire extinguishers are carried in the cabin, one in a bracket on the starboard side beside the main window frame, the other on the starboard side above the front spar. Two additional extinguishers can be fitted, one in the bomb-aimer's position and the other in the gun turret.

(ii) *Parachute and emergency exits.*—(*a*) Parachute exits can be made via the cabin door on the starboard side.
(*b*) Three crash exits are provided in the roof of the cabin, each covered by a transparent panel which may be quickly released by means of a rip cord hand loop. On later aircraft one of these exits is replaced by the astrodome, which may be opened inwards. These exits must not be used as parachute exits.

(iii) *Dinghy.*—A type H dinghy is stowed in a valise on the floor of the wireless operator's compartment and is held against the starboard side of the cabin by two straps, each having a quick-release buckle. A No. 5 emergency dinghy pack is stowed immediately forward of the rear spar on the starboard side.

(iv) *Signal pistol.*—A signal pistol is provided and is either stowed in a leather holster secured to the fuselage frame, just forward of and below the pilot's seat, or is mounted in a fixed bracket in the roof vertically above the front spar. Along the back of the pilot's seat eight spring clips (49) are secured to carry the signal pistol cartridges.

(v) *Marine distress signals.*—A marine-distress signal is stowed in a compartment in the fin, behind the leading edge. Access to this compartment is provided by a rip cord hand loop which projects through a fabric strip doped on the port side of the fin. On the fabric above this compartment is stencilled "Distress signal stowage".

(vi) *First-aid outfit.*—On the starboard side in the gun turret bay is stowed two first-aid outfits, which are accessible from both inside and outside the fuselage. A rip cord for emergency use is provided on the outside of the fuselage, where the fabric covering the stowage is stencilled "First Aid".

(vii) *Crash axe.*—An axe is stowed on the forward face of the door in the cabin rear bulkhead leading to the air gunner's station.

(viii) *Destruction of equipment.*—When IFF set is fitted, the pilot has control of the emergency switches (7) which are on the port shelf at the extreme forward end.

PART V

ILLUSTRATIONS

Fig. 1

INSTRUMENT PANEL AND PORT SIDE OF COCKPIT

1. Suction gauge.
2. Vacuum system change-over cock.
3. Identification lights switch-box.
4. Pressure head heater switch (above instrument flying panel on some aircraft).
5. IFF master switch.
6. Pilot's bomb firing switch.
7. IFF emergency switches.
8. Engine speed indicator (twin).
9. Undercarriage warning light.
10. Instrument flying panel.
11. Fuel contents gauge selector switch. } Beside fuel cock controls on some aircraft.
12. Fuel contents gauge. } Beside fuel cock controls on some aircraft.
13. Boost gauges (two).
14. Landing lamps dipping control.
15. Oil pressure gauges (two).
16. Oil temperature gauges (two).
17. Flaps indicator.
18. Recognition lights switch.
19. Slow-running cut-out.
20. Undercarriage mechanical indicator.
21. Friction device for throttle and mixture levers.
22. Mixture lever.
23. Throttle levers (two).
24. Flaps control lever.
25. Landing lamps switch.
26. Compass.
27. Gun-firing push-button.
28. Brakes and supply pressure gauge.

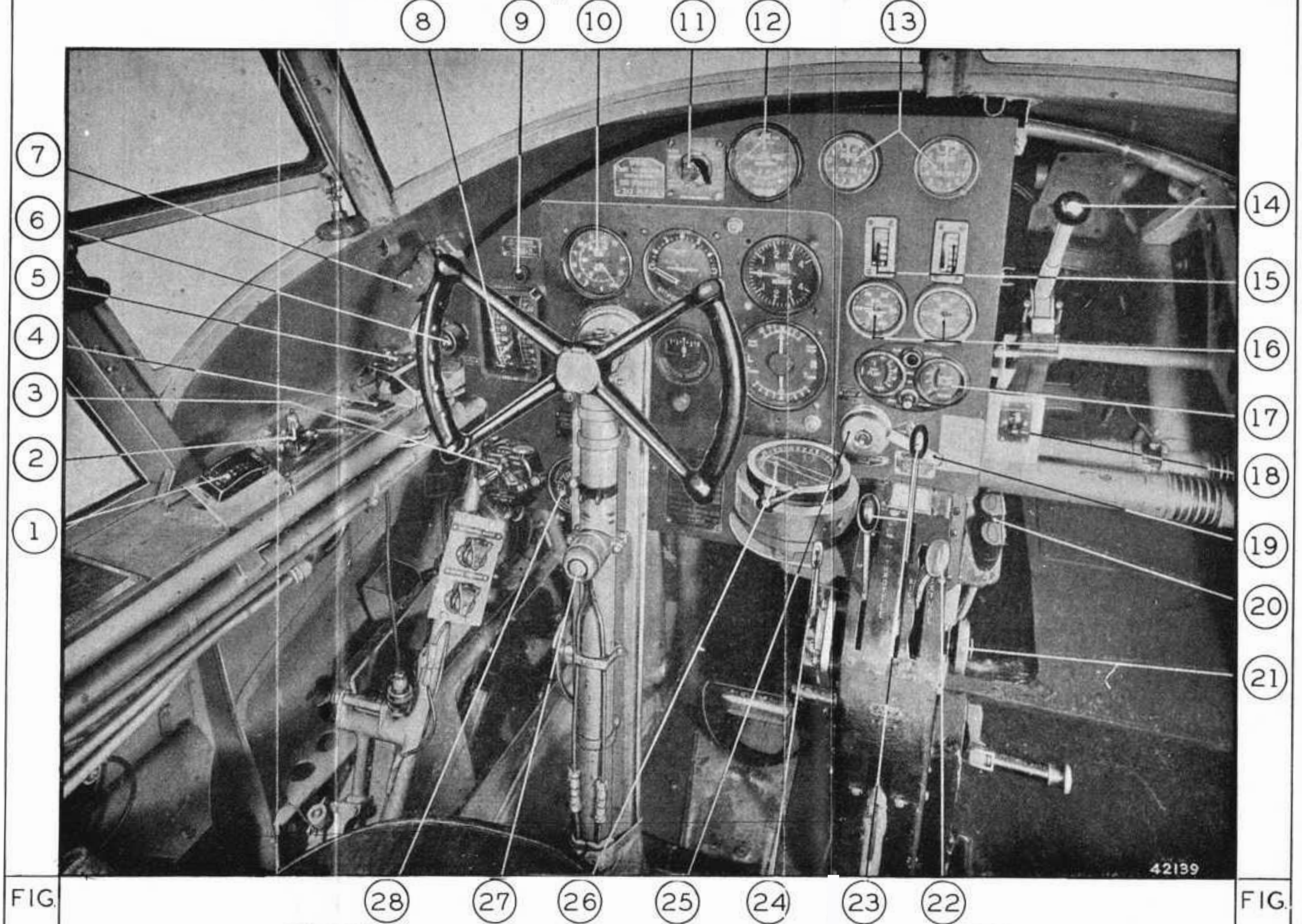


FIG. 1 INSTRUMENT PANEL AND PORT SIDE OF COCKPIT. FIG. 1

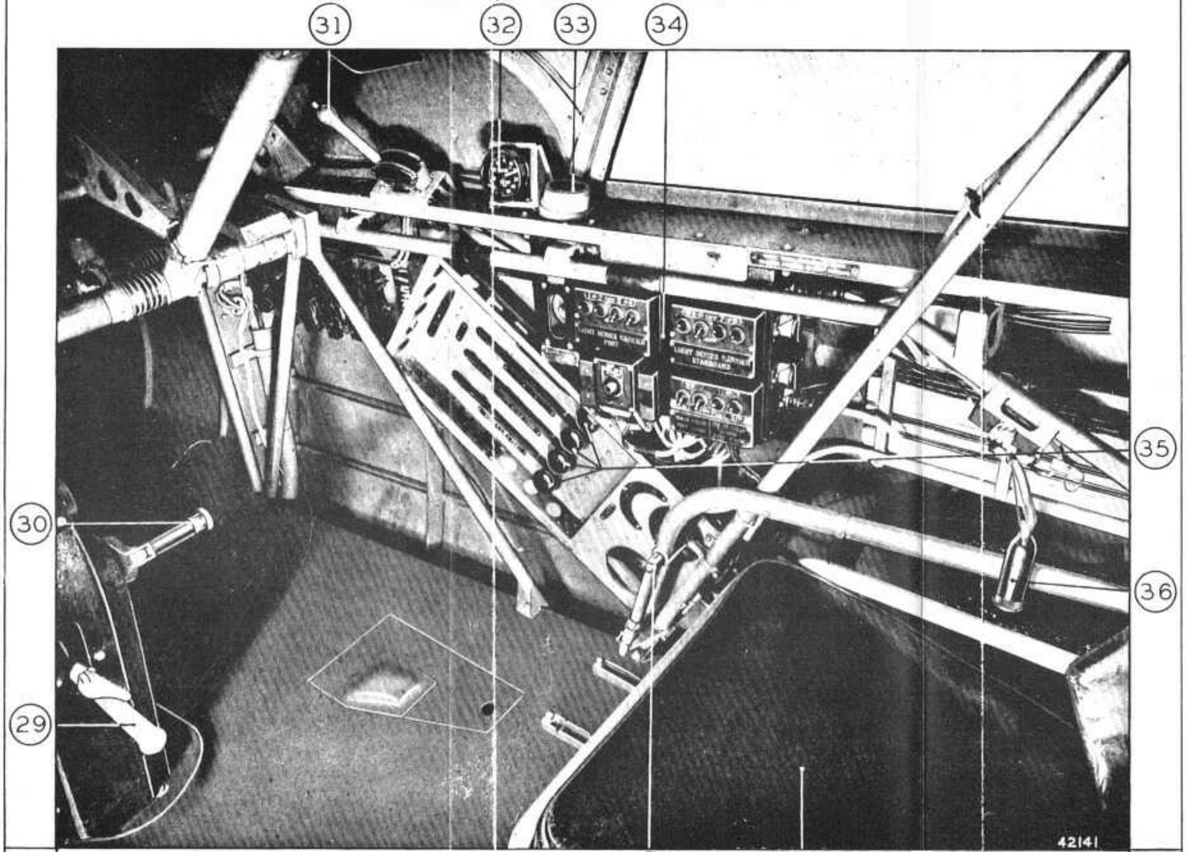


FIG. 2 COCKPIT — STARBOARD SIDE FIG. 2

Fig. 2

COCKPIT — STARBOARD SIDE

29. Wheel brakes control.
30. Elevator trimming tabs control.
31. Bomb fuzing control lever.
32. Air temperature gauge.
33. Watch-holder.
34. Bomb control panel.
35. Fuel cock controls (four).
36. 2nd pilot's intercommunication socket.
37. 2nd pilot's seat.
38. Bomb door crank control.

Fig. 3

GENERAL VIEW OF CABIN

39. Navigator's table.
40. Stowage for computor, etc.
41. Rudder trimming tab control.
42. Port direct vision window.
43. Ring sight for Browning gun.
44. Main magneto switches.
45. Starboard direct vision window.
46. 2nd pilot's seat (folded).
47. Undercarriage control.
48. Flaps hydraulic hand-pump control.
49. Signal pistol cartridges stowage.

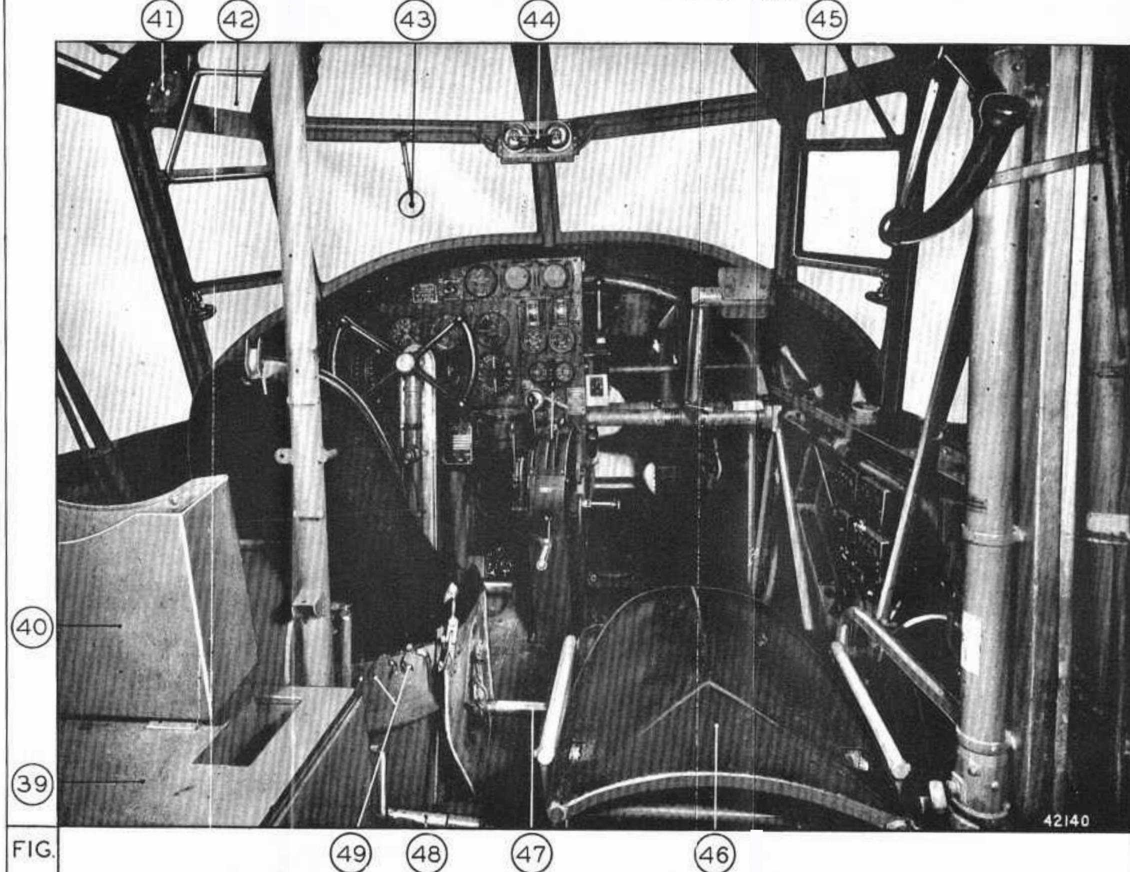


FIG. 3 GENERAL VIEW OF CABIN. FIG 3

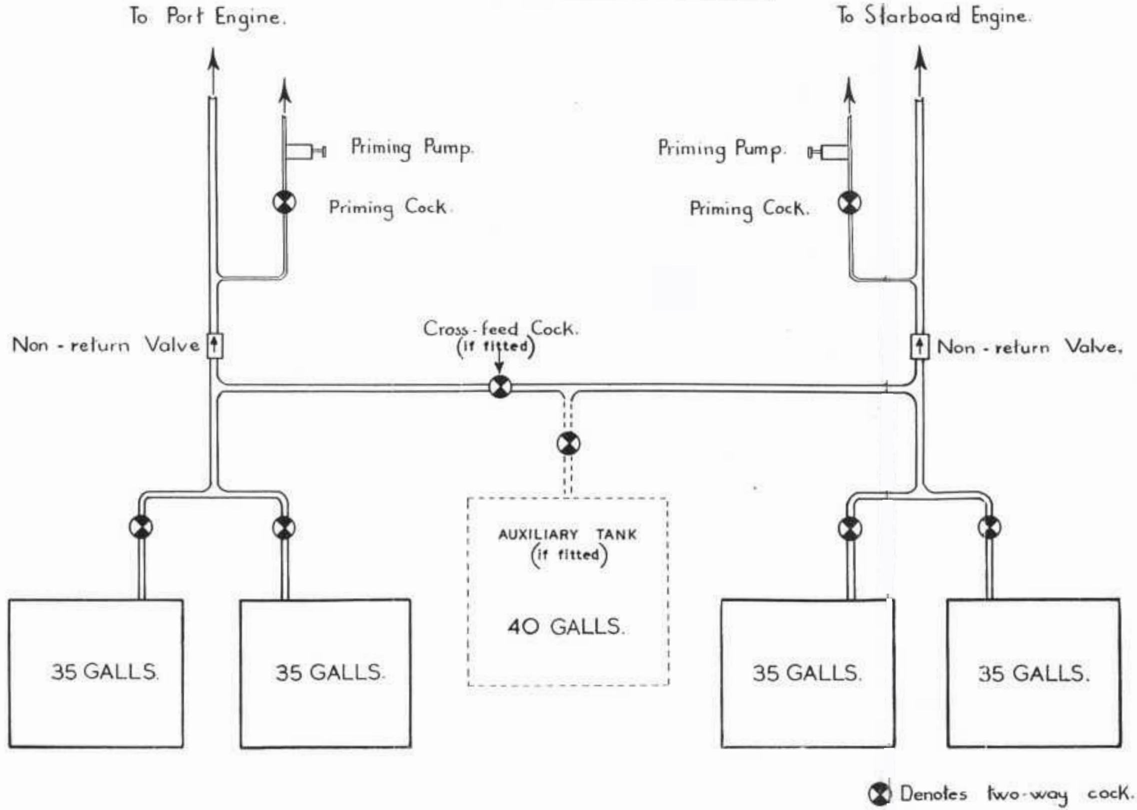


FIG. 4

SIMPLIFIED FUEL SYSTEM DIAGRAM

FIG. 4

F
VX
N4877

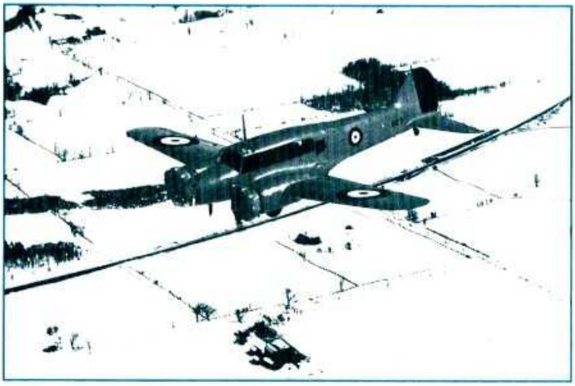
Faithful Annie

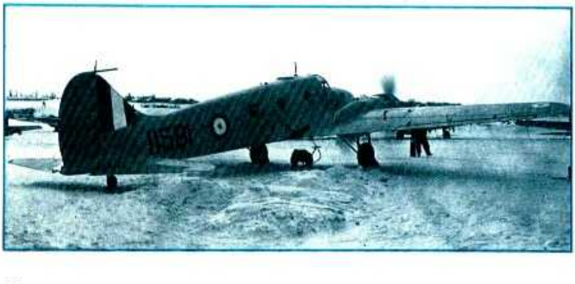
The dependable and versatile Anson served in many combat and training roles

'Faithful Annie' was the nickname bestowed upon the Avro Anson, and, as all who knew the aeroplane would agree, it was highly appropriate. Not only was 'Annie' utterly reliable, but she also outlived her great ancestor the Avro 504 of 1913 and was even more widely used. This 'lady-of-all-work' was in continuous production for seventeen years and nearly 11,000 were built. Her rather quaint figure underwent changes from time to time, but never to such an extent that she was not immediately recognisable. She always had the stamp of a thoroughbred, and her pilots and aircrew held her in high esteem despite such little snags, on some models, as fuel cock controls that were rather tricky in an emergency and manual undercarriage retraction that seemed like winding-up a pail of water from an 80-foot well.

Nice to handle pilots said 'She flies herself' 'Annie' gave long and unfailing service in peace and war, being used for such diverse tasks as coastal reconnaissance, crew training, passenger transport, survey, crop dusting, freight carrying and ambulance duties. The RAF used her for no less than thirty-two years (1936 1968) and during World War II she was one of the mainstays of the vast British Commonwealth Air Training Plan in Canada,

Below: the Anson was one of the most important aeroplanes supplied to Canada under the British Commonwealth Air Training Plan (a Mk I is shown).
Bottom: the Canadians built their own versions of the Anson, including the Mk V pictured





Australia and New Zealand. Pilots in almost every branch of civil and military flying came to know her, but today 'Annie' is well-nigh extinct. However, as befits a truly classic aeroplane, a few examples have somehow been spared the unworthy fate of the breaker's yard and are thus still with us, albeit, in most cases, as non-flying relics.

The Anson was designed by Roy Chadwick (who later designed the Lancaster) and his team and was derived from the Avro Type 652 six-passenger civil transport, two of which were delivered to Imperial Airways in March 1935 and used for several years on the long Croydon-Brindisi route. Work on the Type 652A, as the Anson was designated, began a year earlier, on 7 May 1934, when the Air Ministry notified Avro that it wished to consider possible designs for a twin-engined landplane for coastal reconnaissance duties. The required disposable load matched that of the Type 652 as then designed almost exactly and, furthermore, the invitation to tender asked for 'details of the extent to which any of your existing types can be adapted to meet the requirements'. On 19 May the Avro 652A design was offered and in the following September the Air Ministry chose it and a conversion of the de Havilland DH89 Dragon Rapide from fifteen competitive designs submitted by the aircraft industry and ordered one prototype of each. Avro was given just six months to design and build the 652A at a time when the first 652 (G-ACRM *Avalon*) was itself far from complete.

Coastal reconnaissance

Nevertheless, on 7 January 1935 flight trials began with this new civil transport the first low-wing monoplane

Avro had ever built and its first to have a retractable undercarriage and on 24 March the 652A prototype (K4771) followed it into the air, piloted by S. A. 'Bill' Thorn. Official RAF trials at the Aeroplane and Armament Experimental Establishment at Martlesham Heath, Suffolk, quickly followed and, after necessary modifications had been made to the 652A's horizontal tail surfaces, it went, together with the DH89M, for evaluation trials at the Coast Defence Development Unit at Gosport, Hants.

Soon after the Gosport trials, the 652A was able to demonstrate its superiority in range and endurance over its biplane rival during a fleet exercise off the East Coast and on 24 May 1935 the Air Ministry decided to order it in quantity. Specification 18/35 was written round K4771 in August, listing 38 special requirements for the production aircraft – which was duly named Anson, after Admiral George Anson, the famous British seaman of the eighteenth century.

The first production Anson I (K6152) made its first flight on 31 December 1935 piloted by Geoffrey Tyson. It had more powerful engines than K4771 (two 350hp Armstrong Siddeley Cheetah IXs instead of 295hp Cheetah VIs) and the most noticeable external difference was the higher, continuous line of cabin windows giving almost uninterrupted all-round vision. A crew of three was normally carried (pilot, navigator/bomb aimer, and wireless operator/air gunner), their seats being so placed that a free passage was left down the starboard side of the fuselage for movement from one part of the aircraft to another. The bomb sight was in the extreme nose and,

Although primarily a training aeroplane, the Anson was also used as a taxi aircraft for ferry pilots

with the bomb release, was operated by the navigator/bomb aimer from a prone position, although the pilot also had a bomb release. The bomb load totalled 164kg (360lb), usually made up of two 45kg (100lb) anti-submarine bombs and several smaller bombs, smoke floats, or flares, and was stowed in the centre-section. When not bomb aiming, the navigator sat at a chart table midway between the pilot and the big parrot-cage-style Armstrong Whitworth dorsal turret. There was also a spare seat alongside the pilot which he could use.

On 6 March 1936 the Anson began to enter service with No. 48 Squadron at Manston, Kent, thereby becoming the first monoplane to reach the squadrons under the RAF Expansion Scheme and also the first to have a retractable undercarriage. That same year Avro announced in one of its foreign sales brochures that, in addition to the initial RAF order for 174 Ansons, they had received orders from Australia, Egypt, Finland, Greece and Eire.

From an early stage in the Anson's history, an advanced trainer version was envisaged and several aircraft, both with and without dual controls and turrets, were supplied to various flying training units in 1937–38. The first orders for Mk I trainers were placed in 1937 and deliveries of these purpose-built aircraft began early in 1939 to Service Flying Training Schools, Elementary and Reserve Flying Training Schools and many other specialist training units. Several bomber squadrons formed under the RAF Expansion Scheme received Ansons as interim equipment, pending the availability of modern monoplane bombers such as the Handley Page Hampden and Armstrong Whitworth Whitley, and during World War II some Anson Is were fitted with Bristol power-operated gun turrets for use by Air Gunnery Schools.

Commonwealth air training

On 18 December 1939 the British Commonwealth Air Training Plan was launched and the Anson was chosen as one of its mainstays. This resulted in huge quantities of Ansons being ordered, many of which were destined to be built at Avro's new underground shadow factory at Yeadon, near Leeds. It also resulted in the Anson becoming known to tens of thousands of pilots in the United Kingdom, the Dominions and the Colonies, including men from the Allied nations. A steady increase in production took place until in 1943–44 the output reached a peak of 130 aircraft a month.

Several new versions of the Anson appeared as the war progressed, many of them converted from British-built airframes or entirely constructed in Canada. The versions evolved in Canada were the Mks III and IV with Avro-built airframes and American Jacobs or Wright engines respectively (the Mk III being eventually modified to incorporate an hydraulically-operated undercarriage and flaps); the Canadian-built and Jacobs-powered Anson II first flown in August 1941 (later modified to incorporate a moulded plywood nose, together with hydraulic undercarriage and flaps operation, and adopted by the US Army Air Corps as a crew trainer designated AT-20); and, finally, the Canadian-built Mks V and VI with American Pratt & Whitney engines, used respectively for navigational training (no turret) and armament training (Bristol power-operated turret). In order to conserve strategic materials, the fuselages of these last two marks were constructed entirely of moulded plywood.

Meanwhile, in England the Anson X appeared, with no turret and a strengthened floor, for passenger and freight carrying. The Anson, in this and other forms, was the principal taxi aircraft of the Air Transport Auxiliary,

Avro Anson MK1
500 Squadron, 1940

Dimensions
Span 17·23m (56ft 6in)
Length 12·77m (42ft 3in)
Height 3·99m (13ft 1in)
Wing Area 38·08sq m (410sq ft)

Engines
Two Armstrong-Siddeley Cheetah IX air-cooled radial engines of 350hp

Performance
Maximum speed 300km/h (188mph) at 2100m (7,000ft)
Cruising speed 250km/h (158mph) at 1800m (6,000ft)
Service ceiling 5900m (19,500ft)

Armament
One fixed, forward-firing Browning 0·303 m/g and one Vickers K 0·303 m/g in a manually operated turret

the civilian organisation which took over the task of ferrying RAF and Royal Navy aircraft from the manufacturers to the services during World War II. Ansons logged nearly 16 million kilometres (ten million miles) in ATA service, with only eight fatalities, an accident rate so low as to be comparable with well-organised commercial airline operation. One ATA pilot described the Anson as being 'the easiest aircraft to fly that you could wish for' and another recalled that at least once in 1940 he flew in an Anson with thirteen other ferry pilots and their parachutes.

In September 1944 ATA Ansons began the dangerous task of delivering urgently needed supplies, ranging from radio transmitters and receivers to mortar bombs and blood plasma, to the Second Army in Belgium. The stores were packed mostly in wooden boxes which were stowed under the cabin floor between the main wing spars, and sometimes there were so many of them that the pilot was forced to get to his seat via the port side sliding cockpit window.

Further development of the Anson led to the Marks XI and XII, both of which featured a deeper cabin with revised glazing and hydraulically operated undercarriage and flaps (the last two items had also been incorporated in the Mk X Series II). Both marks began to replace some of the ageing Mk Is on communications duties during 1944; some were fitted out as ambulances, while others were furnished for use by various Air Attachés throughout the world. Early 1945 saw the appearance of the Mk XIX civil feeder line/Service communications Anson with a completely redesigned interior and windows. It was built in two main versions, with either wooden or metal wings and tailplane. Most of the latter version joined the RAF where some remained in use until as late as June 1968, when they became the last RAF Ansons to be withdrawn.

Final Anson variants were the Mks XVIII and XVIIIC, which were respectively general-purpose aircraft for the Royal Afghan Air Force and civil aircrew trainers for the Indian Government; the Mk XX bombing and navigational trainer for RAF use in Southern Rhodesia; and the Mks XXI and XXII, respectively navigational and radio trainers for RAF use at home.

Altogether, 10,996 Ansons were built (not 11,020 as is sometimes stated), 8,113 by Avro and 2,882 in Canada by Federal Aircraft Limited, a company formed specially for the manufacture of the type. The last Anson to be built was a Mk XXI serialled WJ561; it was officially handed over to the RAF at Avro's Woodford, Cheshire, factory on 27 May 1952.

Testing airborne radar

In 1937 an Anson was used for flight trials of the first British airborne radar to incorporate its own transmitter: a small experimental set working on a wavelength of 240 megacycles, built by Dr Edward Bowen and his team in their laboratory at Bawdsey Manor in Suffolk. The trials began in July and it was not long before large ships were being detected at ranges of up to 8km (5 miles). On 3 September Bowen managed to locate the battleship *Rodney*, the aircraft carrier *Courageous* and the cruiser *Southampton*, which he had known when he took off to be exercising somewhere off the Suffolk coast. Next day he again took off in the Anson, bent on repeating the performance. But this time the weather began to deteriorate and the Coastal Command aircraft in the exercise were recalled by radio. Bowen's radar-equipped Anson did not pick up the recall signal, however, and continued its reconnaissance under the murkiest circumstances, finally locating some of the warships on its radar screen at a range of about 14km (nine miles). In order to confirm the identity of the warships, the pilot closed in to within visual range and *Courageous*, believing an attack to be imminent, despatched some of her fighters to intercept. As they took off, these too duly appeared as 'blips' on the Anson's radar screen. On the return flight, through solid cloud cover up to 3650m (12,000ft), Bowen used the radar to help the pilot make an accurate landfall and it is recorded how that evening a surprised Duty Air Staff Officer, who had been led to believe that all flying had been cancelled, received an accurate plot of the fleet's position.

By the outbreak of World War II the Anson was already obsolescent as a combat aircraft and a much more effective weapon, in the shape of the American Lockheed Hudson, had begun to replace it in Coastal Command. Even so, all but one of the eleven general reconnaissance landplane squadrons in existence were still flying Ansons and they were immediately employed on reconnaissance over the North Sea and the Channel, convoy escort duties and anti-submarine patrols.

Despite their obsolescence, Ansons could, and did, give a good account of themselves in aerial combat. On 8 November 1939, for instance, an Anson fought two Dornier Do 18 flying boats, forcing one into the sea. Another Anson on patrol encountered an enemy aircraft, fired the moment the pilot saw the black crosses on its

Opposite: an Anson fitted with a Bristol Type I Mk IV turret, which was used as a gunnery trainer. Few are preserved, but in the United Kingdom some examples are preserved ... Ansons of this type

wings, and with the first burst sent it straight into the sea, where it broke up and sank before its type could be identified.

Combat experience

Standard defensive armament of the Anson I was a single moveable machine-gun in the dorsal turret and a fixed forward firing machine-gun in the port side of the nose. However, as a result of combat experience, Anson squadrons beefed-up this fire power by improvising machine-gun mountings in the cabin, with the guns firing through the windows to cover the blind spots on either side. The commanding officer of No. 500 Squadron, based at Detling, Kent, went one better than this. At the time of the Dunkirk evacuation his Anson also sported a 20 mm Hispano cannon–poking out of a hole specially cut in the rear fuselage floor on what had formerly been the site of the Elsan chemical lavatory. Apparently this 'secret weapon' achieved considerable success against unsuspecting German E-boats, and eventually several more of 500 Squadron's Ansons were similarly armed.

One particularly memorable incident in the annals of the Anson was an action which took place at low level over the Channel in June 1940. Three Ansons were attacked by nine Messerschmitt Bf 109s and not only did they successfully defend themselves, but also succeeded in shooting down two of the enemy and damaging a third. Two of the Anson crew members were wounded.

During that fateful summer there were other operational incidents scarcely less remarkable. In July 1940, for example, a Coastal Command Anson on reconnaissance shot down a Messerschmitt Bf 110 twin-engined fighter. Though 242 km/h (150 mph) or so slower than the Bf 110, the audacious 'Annie' intervened when its pilot discovered four of the German fighters machine-gunning British trawlers off the south coast. The ill-fated Bf 110 left the trawlers and came in for a beam attack, but the Anson's turret gunner kept his nerve and held his fire until he could be sure of a hit. In the same month another Anson displayed similar temerity by intervening in a melée and accounting for a Heinkel He 115 twin-engined seaplane and an He 111 bomber.

By the end of 1941, the Anson had been almost completely replaced in operational service with Coastal Command, but, thanks to its wonderful reliability, it was adopted at this time for another maritime duty–air/sea rescue–to undertake searches for ditched aircrew. It performed this valuable task for some two years until replaced by such types as the Vickers Warwick and Supermarine Spitfire.

Top: Anson Mk 21 WJ561, a navigation trainer, was the last Anson to come off the production line. Above: an Anson of RAF Air Support Command in the 1960s. The Anson ended its days with the RAF as a communications aircraft