

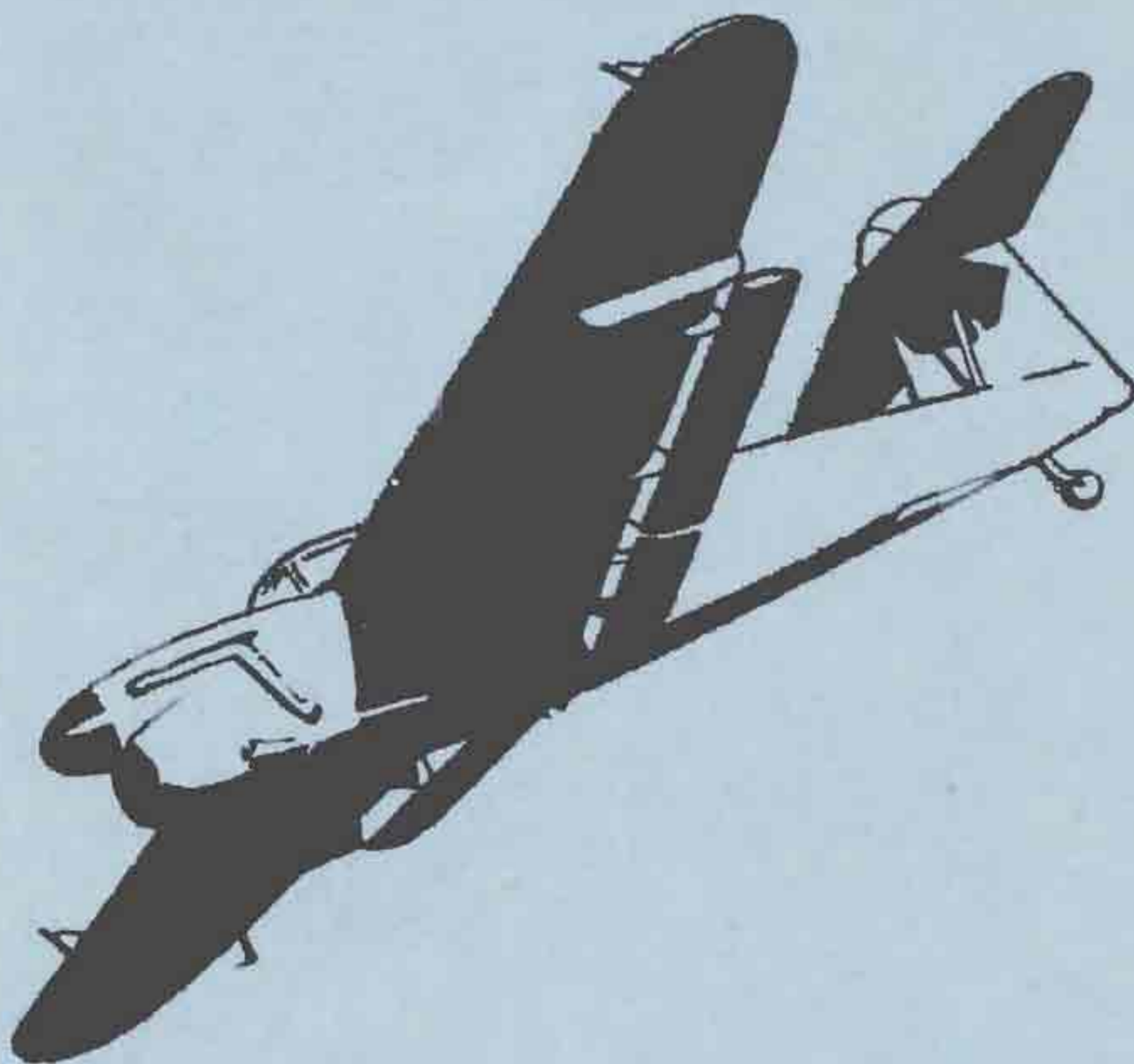
PILOT'S NOTES

FOR

BARRACUDA

MARK I—MERLIN 30 ENGINE

MARK II—MERLIN 32 ENGINE



PROMULGATED BY ORDER OF THE AIR COUNCIL

FOR OFFICIAL USE ONLY

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.

A.L. No.	INITIALS	DATE	A.L. No.	INITIALS	DATE
1			7		
2			8		
3			9		
4			10		
5			11		
6			12		

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. 2018A & B, Vol. I, Sections 1 and 3.

**A.L.1
NOTES
TO
USERS** These notes are complementary to A.P.2095 Pilot's Notes General and assume a thorough knowledge of its contents. All pilots should be in possession of a copy of A.P.2095 (see A.M.O. A93/43).

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

Additional copies may be obtained from S.N.S.O., 191A, Askew Road, Shepherd's Bush, London, W.12, by application on Royal Navy Forms S134D or D397 or on R.A.F. Form 294A, in duplicate, quoting the number of this publication in full—A.P.2018A & B—P.N.

Comments and suggestions should be forwarded through the usual channels to the Admiralty (D.A.E).



BARRACUDA

BARRACUDA PILOT'S NOTES

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PART I

DESCRIPTIVE

NOTE.—The numbers quoted in brackets after items in the text refer to the key numbers of the illustrations in Part V.

INTRODUCTION

1. The Barracuda I aircraft is a high-wing monoplane fitted with a Merlin 30 engine and Rotol 3-bladed propeller, and is designed for torpedo carrying, dive-bombing and reconnaissance duties with the Royal Navy. The aircraft can operate from the deck of an aircraft carrier, provision being made for an assisted take-off and for deck landing. The main planes can be folded for stowing the aircraft below deck. Accommodation is provided in two cockpits for a crew of three, the pilot occupying the forward cockpit, the navigator/gunner and the wireless operator/gunner occupying the rear cockpit.

A.L. 4
Part I
Paras.
1 & 2

Barracuda II and III aircraft are similar to the Barracuda I but fitted with a Merlin 32 engine and a Rotol 4-bladed propeller. All marks of aircraft are fitted with a power plant (A).

MAIN SERVICES

2. *Fuel System.*—(See Fig. 4 Part V). Two 90-gallon tanks are installed, one in each main plane, and on most aircraft these are supplemented by two 24-gallon tanks mounted outboard of, and flowing into, the main tanks, increasing the total capacity to 228 gallons. In addition an underslung auxiliary fuel tank of 116 gallons capacity may be fitted below the forward portion of the fuselage when a torpedo is not being carried. Fuel content gauges (13), one for each of the two main tanks are fitted, and are switched on by the undercarriage indicator switch (35). The pilot controls the fuel supply through a three-position cock (29), the position marked AUX being used to feed from the 116 gallon underslung tank. When changing over from MAIN to AUX it is possible that the engine may cut, but it will pick up immediately if MAIN is re-selected; a second attempt to change over should be satisfactory. With the tank selector at MAIN, the wing tanks do not necessarily empty evenly, and the fuel in one wing may drop to a low level before the fuel in the other wing flows fully. However, the engine running is satisfactory even in the extreme condition of one tank emptying completely before the other.

PART I—DESCRIPTIVE

- A.L.4 3. *Oil system.*—Two interconnected oil tanks with a total capacity of 18 gallons of oil, with 7.5 gallons air space, are mounted just aft of the firewall.

An oil dilution system is provided for ease of engine starting, the pushbutton (24) for operating it being on the pilot's panel.

4. *Hydraulic system.*—An engine-driven pump, fed from a header tank, supplies hydraulic pressure through accumulators to operate the following services:—

Undercarriage

Flaps

Folding trailing edge

Brakes

A hand pump provides an alternative method of operation. There are two hydraulic accumulators, a large one for supplying power to all services, and a small one reserved for brakes operation. Pressure in the brake accumulator is indicated by a gauge (57) in the pilot's cockpit.

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Part I
Para. 5

5. *Electrical System.*—An engine-driven generator type R.K. 24 volt 1,000 watt D.C.—80 volt 500 watt A.C., or alternatively a generator type U.K.N. 24 volt 1,500 watt D.C.—80 volt 1,200 watt A.C. charging two 12 volt 25 amp. hour accumulators provides the A.C. and D.C. supply for the following services:—

Usual lighting services

Landing lamp

Formation keeping lamps

Identification lamps

Undercarriage and deck hook indicator

Cartridge starter

Pressure-head heater

D.R. Compass

Graviner fire-extinguisher equipment

Radio equipment

Dinghy inflation

Camera and camera-gun operation

Bomb and torpedo equipment

Oil dilution system

All Mk. III aircraft are fitted with U.K.N. generators. The generator ON-OFF switch is in the rear cockpit on all marks.

PART I—DESCRIPTIVE
AIRCRAFT CONTROLS

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Part I
Para. 6

6. *Flying controls locking gear.*—Stay rods are provided for securing the control column and rudder bar against movement and when not in use are stowed in a bag on the back of the pilot's seat. They consist of three legs pivoted together to form a triangle. One rod is attached at one end to the control column by means of a quick release pin and at the other engages a peg on the starboard foot rest of the rudder bar. The other rods are taken from opposite ends of the first rod to an eyebolt below the undercarriage emergency gear handle where they are secured by the hook and spring sleeve of the upper rod.

7. *Trimming tabs.*—The elevator (61) and rudder (62) tab controls (on the left of the pilot's seat) operate in the natural sense, and each has an indicator geared to its hand-wheel spindle. The aileron tabs are set with the aircraft on the ground and are not adjustable in flight.

8. *Undercarriage control.*—The undercarriage lever (58) has two positions only, UP and DOWN, and should never be left in a mid-position. When in the DOWN position the lever engages in a slot on the gate, and must be pushed to the right before it can be moved upwards. A spring-loaded catch, on the port side of the fuselage and out of sight of the pilot, locks the lever in the DOWN position when the aircraft is on the ground with its weight on the undercarriage leg. The catch is automatically released when the aircraft takes off.

9. *Undercarriage indicator.*—The indicator (41) works as follows:

<i>Light showing</i>	<i>Position of undercarriage</i>
No lights	Undercarriage fully retracted
Red lights	Undercarriage retracting or lowering
Green lights	Undercarriage locked down

NOTE:—When the undercarriage is being raised, both red lights will show even if one leg remains down, but the green light for that leg will also be on at the same time.

The master switch (35) mounted below the indicator enables the indicator to be switched off, but the slide bar incorporated ensures that this may only be done after switching off the ignition, also that the indicator must be on before the ignition can be switched on.

PART I—DESCRIPTIVE

10. *Undercarriage warning horn*.—The horn sounds and a red light (2) shows, when the throttle lever is less than one-third open, if the undercarriage is not locked down.

The horn circuit can be tested by push switch (30).
A.L.4. The warning horn is not fitted on later aircraft

11. *Deck arrester gear*.—The deck arrester hook is released when the hook-shaped lever (60) is moved downwards. The lever is spring-loaded, and returns to its original position when released. When the hook has been lowered, it cannot be raised again from the cockpit but is re-engaged by the action of the deck wire or may be re-engaged by the snap gear by hand when the aircraft is on the ground.

12. *Deck hook indicator*.—On most aircraft the indicator is combined with the undercarriage indicator (41). On a few early aircraft it is independent and is on the sloping panel on the port side of the cockpit. In this case its switch is just below the indicator.

13. *Flaps control*.—The lever (59) moves in a gate giving four positions as follows :—

DIVE	Lever up	Flaps at negative incidence.
NORMAL	Lever central	Flaps normal.
NEUTRAL	Lever between NORMAL and LANDING	The NEUTRAL position is used to lock the flaps in the most efficient position for take-off. This is carried out by first moving the lever to the LANDING position, then returning it to the NEUTRAL position immediately the flaps have reached the required angle, as shown by the indicator (32).
LANDING	Lever down	Flaps at positive incidence.

A.L.1 NOTE.—When the flaps are in the normal position, the lever must be placed in the NORMAL position. The NEUTRAL position should only be used to obtain an intermediate flap setting, and when used, a watch must be kept on the flaps indicator as the flaps are inclined to creep with the lever in the NEUTRAL position.
PART I
Para. 13

14. *Flaps indicator*.—The flaps indicator (32) is switched on and off by the undercarriage indicator switch (35).

PART I—DESCRIPTIVE

15. *Folding trailing edge control.*—The folding and spreading of the trailing edge portions of each outer plane is carried out hydraulically by operating a lever, inside the rear cockpit above the port hinged window. An interlocking arrangement with the fuel cock (29) prevents the folding of the trailing edge unless the fuel cock is OFF. Care should be taken to ensure that the lever is always in the SPREAD position when the aircraft is in flight. If the lever is in the FOLD position the trailing edge will fold if the fuel cock is turned off. On later aircraft the selector lever is below the port stub plane and can only be reached when the aircraft is on the ground. The interlocking control is then unnecessary and is not fitted.
16. *Wheel brakes.*—The brake lever (27) on the spade grip of the control column is pulled to the right to apply the hydraulic brakes, and differential control is obtained by means of a relay valve operated by the rudder bar. The pressure gauge (57) is mounted on the sloping panel on the port side of the cockpit below the main instrument panel. For parking purposes the brakes may be locked on, by engaging the catch on the spade grip with the brake lever. To release the catch, the lever should be pulled to the right and the catch pivoted clear.

ENGINE CONTROLS

17. *Throttle and mixture controls.*—The throttle lever (53) is on the port side of the cockpit on a quadrant which also houses the propeller speed control lever. On Barracuda I a mixture control lever is fitted and is automatically returned to RICH (if in the WEAK position), when the throttle is closed. On Barracuda II there is no manual mixture control, an economical mixture strength being obtained by keeping at or below + 7 lb./sq. in. boost. A torpedo or bomb-firing pushbutton switch (52) is in the top of the throttle lever.
18. *Automatic boost control cut-out.*—The control knob (30) can be locked in the "out" position by a spring-loaded trigger just above the knob, and in this position re-sets the auto-boost control to a higher setting. On the Barracuda I +12½ lb./sq. in. boost is obtainable for take-off

PART I—DESCRIPTIVE

without use of the boost control cut-out, and advantage is therefore only obtainable at altitude. On the Barracuda II it is necessary to use the boost control cut-out to obtain +18 lb./sq. in. boost for take-off and also in operations.

19. *Propeller speed control.*—The propeller speed control lever (54) is on the inboard side of the engine control quadrant, and varies the governed r.p.m. from 1,800 to 3,000.
20. *Air intake heat control.*—When the handle (33) is pushed in, cold air is passed to the carburettor, and when pulled out, warm air is admitted from the engine nacelle.
21. *Radiator shutter control.*—The control (69) is mounted concentrically with the undercarriage emergency gear handle (85) and is turned clockwise to open the shutter, approximately $5\frac{1}{2}$ turns being required to move the shutter between shut and fully open. An indicator (70) is mounted just aft of the control.
22. *Slow-running cut-out.*—The control (28) is spring-loaded, and is pulled out and held, to stop the engine, before switching off the ignition.
23. *Priming pump.*—The cylinder priming pump (40) is under the control of the pilot, and must be screwed down when not in use. The cock (55) must be turned ON while priming, but must be returned to the OFF position when priming is completed.
24. *Engine starting controls.*—The ignition switches (3) are interlocked with the undercarriage indicator switch (*see* para. 9). The push switch (23) fires the starter cartridge and also operates the booster coil. A master switch (20), to the right of the push switch, must be ON before the push switch is operative.

A.L.4.

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25. *Starter reloading control.*—The reloading control knob (21) below the starting-master and push switches, must be pulled out hard and returned, to place the next cartridge in the starter breech, five cartridges being contained in the magazine. Spare cartridges are stowed in the rear cockpit. The type of cartridges used for engine starting are :
No. 1 Mk. II (Air temperature above 10° C.).
No. 2 Mk. II (Air temperature below 10° C.).

OTHER CONTROLS

26. *Cockpit heating and ventilation.*—Ventilation is controlled by a lever (42) at the top of the port side of the instrument panel, above the undercarriage indicator. Warm air from the radiator tunnel is admitted into the cockpit by operating the foot control (82), to the right of the control column base. The foot wheel should be pressed downwards and forwards with the heel for heat OFF, or rearwards for heat ON.
27. *Cockpit lighting.*—The two dashboard floodlamps are mounted above the decking, one on each side of the cockpit. The respective dimmer switches are mounted, one on the port side above the decking near the lamp and the other on the starboard side panel just aft of the undercarriage emergency gear handle. In addition, two cockpit lamps are fitted on the sloping part of the decking on the port and starboard sides approximately opposite the pilot's shoulder and the dimmer switches are mounted just aft of the lamps.
28. *Landing lamp.*—The landing lamp switch (31) is at the bottom of the port side of the instrument panel. The push-pull knob (34) to the top left above the switch, mechanically controls the dipping arrangement of the lamp. The knob is pulled out to raise the beam and pushed in to dip.
29. *Attitude Lights.*—Three attitude lights are fitted—one in each wing tip and the other below the rear fuselage. They are automatically switched on when the deck arrester hook is lowered.
30. *Signal pistol.*—The signal pistol is mounted on the starboard side near the floor, and is held in position by a bayonet-fitting at the top of the blast tube, through which it is fired. To release the pistol from its mounting the pistol-butt should be rotated outboard. If the pistol is not carried or is removed from its mounting, the blanking cap (81), stowed beside the pistol, must be fitted over the blast tube aperture, to prevent engine exhaust fumes from entering the cockpit. Eight cartridges are stowed in the side panel aft of the pistol.

PART I—DESCRIPTIVE

31. *Bomb gear.*—The nose and tail fuizing switches (68) and 16-point selector switchbox (72), together with a jettison switch (67) for small-bomb containers, are grouped on the

starboard side of the cockpit above the decking with the master bomb switch just below, while the automatic 16-point distributor (75) is mounted further aft. The selector switchbox incorporates a drum switch which may be set to SINGLE OR SALVO or DISTRIBUTOR.

32. *Torpedo gear.*—The torpedo director and contactor is mounted in the rear of the cockpit and is remotely controlled by the pilot. The controls are on the port side of the cockpit above the decking and consist of the avoiding action control (45) and the pilot's ship-speed control (46). The torpedo sight is of the mirror-and-travelling-lamp type, operating in conjunction with the torpedo director. The master switch (43), and dimmer (44) for the lamp, are on a panel on the sloping portion of the port decking.

and are labelled TRAVELLING LAMP. The master bomb-release switch is located on the starboard apron, and when placed in the on position the torpedo is released by the push switch (52) in the top of the engine throttle control lever. The push switch is also used for releasing the bombs or mine when carried as an alternative to the torpedo. The selector switchbox (72) has a mask fitted when a torpedo is carried, leaving two switches exposed, and these must be ON before the firing switch is operative.

PART II

HANDLING INSTRUCTIONS

33. PRELIMINARIES

- (i) Check trailing edge folding control is SPREAD.
- (ii) Check that generator switch in rear cockpit is ON.
- (iii) Check that undercarriage lever is at DOWN and flaps lever is at NORMAL.
- (iv) Switch on undercarriage indicator and check green lights.
- (v) Check operation of arrester hook (confirming with outside crew) and check attitude lights.
- (vi) Check cockpit hood for free movement and lock it in the open position.
- (vii) Switch on the D.R. compass setting switch, and when the compass stops "hunting," switch to NORMAL.

34. STARTING ENGINE AND WARMING UP

- (i) Set engine controls as follows :

Fuel cock	MAIN
Throttle	$\frac{1}{2}$ inch open
Boost control cut-out	Normal
Mixture control (if fitted)	RICH
Propeller speed control	Fully forward
Carburettor-air intake control	COLD AIR
Radiator shutter	OPEN

- (ii) Turn on priming cock and operate the priming pump until the fuel reaches the priming nozzles ; this may be judged by an increase in resistance. This resistance is sometimes hard to feel. Pump sharply rather than slowly, and the resistance should be felt after 3 or 4 strokes.

PART II—HANDLING INSTRUCTIONS

- (iii) Immediately before attempting to start, switch on ignition and starting-master switch, and give the following number of strokes if the engine is cold.

Air temperature °C	..	..	+30	+20	+10	0
No. of strokes	..	..	3	4	7	12

Leave the priming pump plunger out, and press the cartridge starter button. Keep the button pressed as it also controls the booster coil. As the cartridge is fired, give one sharp stroke of the priming pump. If the engine fails to start on one cartridge, no further priming should be given, except for one sharp stroke as each cartridge is fired.

- (iv) It will probably be necessary to continue priming after the engine has fired, and until it picks up on the carburettor.
- (v) When the engine is running evenly, switch off the booster coil by releasing the starter push-button, switch off the starting master switch, screw down the priming pump and turn off the priming cock.
- (vi) Open the engine up slowly to 1,200 r.p.m. and warm up at this speed.

35. TESTING ENGINE AND INSTALLATIONS

While warming up

- (i) Check temperatures and pressures, and test operation of hydraulic system by lowering and raising the flaps.

After warming up

- (ii) Open up to +4 lb./sq. in. boost and exercise and test operation of constant speed propeller.
- (iii) Open throttle fully (and on Barracuda II operate boost control cut-out) and check take-off boost and static r.p.m.
- (iv) Throttle back to +7 lb./sq. in. boost and test each magneto in turn. The drop should not exceed 150 r.p.m.

36. TAXYING

- (i) Switch on pressure head before taxiing.
- (ii) Brake pressure should be 2,500 lb./sq. in.

PART II—HANDLING INSTRUCTIONS

37. CHECK LIST BEFORE TAKE-OFF

T —Trimming tabs	..	Elevator control—Neutral
		Rudder control—Neutral
M—Mixture control	..	RICH
	(if fitted)	
Air-intake control	..	COLD AIR (normally)
Boost control cut-out	..	Barracuda I—IN
		Barracuda II—OUT
P —Propeller	.. .. .	Speed control fully forward
F —Fuel	.. .. .	Check contents and cock setting at MAIN
F —Flaps	.. .. .	10° to 20° down
NOTE.—For deck take-off, best flap setting is 10° to 15°.		
For an accelerated take-off, 20° flap should be used.		
Radiator	.. .. .	Shutter half open

A.L. I
part II
para. 37

38. TAKE-OFF

- (i) On Barracuda II do not use more than $\frac{1}{4}$ 12 lb./sq. in. boost unless necessary.
- (ii) There is a very slight tendency to swing to the left.
- (iii) Do not start to climb before a speed of 110 knots I.A.S. (125 m.p.h.) is attained.
- (iv) Do not raise the flaps at less than 115 knots I.A.S. (130 m.p.h.) nor below 300 feet.

39. CLIMBING

- (i) On Barracuda II, return boost-control cut-out to the " in " position before climbing.
- (ii) The initial speed for maximum rate of climb is 110 knots I.A.S. (125 m.p.h.).

40. GENERAL FLYING

- (i) *Stability*.—The aircraft is stable laterally and directionally. Fore and aft it is unstable on the climb, especially with the observer in the rear gunner's position, and is just neutrally stable at cruising speeds; stability improves as fuel is consumed.
- (ii) *Change of trim*

Undercarriage down	.. .. .	nose down
Flaps down	.. .. .	nose down
Flaps to DIVE position	.. .. .	nose up
Opening hood	.. .. .	nose down

A.L.3
PART II
Para. 40
(iii) to
(vi)
41 & 42
(i) (ii)

- (iii) During high speed turns no adjustment should be made to fore and aft trim and flaps should not be operated.
- (iv) If the aircraft appears to fly one-wing-down the pilot should check he is flying without sideslip before calling for adjustment of lateral trim. If readjustment is made the aircraft must be test-flown singly and the test must include manœuvres at high speed.
- (v) Application of top rudder when sideslipping appreciably in a banked condition during violent evasive action is to be avoided, and the aircraft should not be deliberately sideslipped when approaching to land.
- (vi) *Radiator shutter*.—With torpedo load this should normally be half open. For all other loads it gives the least drag when it is one quarter open. This is, of course, subject to the coolant temperature limitations not being exceeded. Under tropical conditions it will be necessary to open the radiator shutter fairly wide, in order to keep within the engine temperature limitations.

41. STALLING

- (i) With undercarriage and flaps up, some buffeting is felt before the stall. With the undercarriage down, and with the undercarriage down and flaps down to **LANDING**, the buffeting is more marked. Also, opening the hood increases the buffeting. When the stall occurs either wing may drop. Opening the throttle stops the buffeting.
- (ii) At an all-up weight of 12,000 lb. the stalling speeds are as follows:

Flaps and undercarriage UP	65 knots I.A.S. (75 m.p.h.)
" " " DOWN	60 knots I.A.S. (70 m.p.h.)
Undercarriage UP and flaps to	
DIVE position	85 knots I.A.S. (95 m.p.h.)

 Do not, therefore, use **DIVE** flaps below a speed of 90 knots.

42. DIVING

- (i) Before entering a steep dive, with or without flaps used as brakes, the propeller should be set to 2,000 r.p.m. and the throttle set one-third open, to avoid risk of over-speeding during the dive. The throttle must not be opened further until after pulling out of the dive, but may be closed to avoid gaining excessive speed when set in the dive.
- (ii) With flaps used as brakes, elevator trim should be wound forward two turns from the in-trim setting for level flight on entering the dive. The aircraft will then be nose-heavy up to about 200 knots and will then become tail-heavy, allowing a quick pull-out.

PART II—HANDLING INSTRUCTIONS

- A.L. 4
Part II
Para. 42
(iii) (iv)
and (v)
- (iii) The brake should be taken off when the speed has fallen below 220 knots, and as the brake comes off, the elevator trimmer should be wound back two turns to compensate for the consequent nose-heaviness which occurs during the later stages of the flap movement back to NORMAL: i.e. two or three seconds after the flaps control is operated.
 - (iv) The rudder trimmer should be set $2\frac{1}{2}$ to 3 divisions left before diving (about one turn of the handwheel from cruising setting) to counter the tendency of the aircraft to yaw to the right in the dive.
 - (v) If dived without the use of brakes, the aircraft should be trimmed into the dive. Recovery may be made without further use of the trimmer, but if it is used care is necessary to avoid imposing excessive loads.

43. CHECK LIST BEFORE LANDING

- (i) Lock cockpit hood open, check brake pressure and reduce speed to 110 knots I.A.S. (130 m.p.h.).
- (ii) On Barracuda II the boost control cut-out should be pulled out for landing.
- (iii) Set the rudder trimming tab control to neutral as a precaution in case of a mislanding.
- (iv) Drill is "U.M.P. and flaps."

U — Undercarriage	..	DOWN	(check green lights)
M — Mixture control	..	RICH	
		(if fitted)	
P — Propeller	.. ..	Speed control fully forward	
Flaps	.. ..	LANDING	

- A.L. 3
PART II
Para. 43
(v) and
(vi)
- (v) Recommended approach speeds (I.A.S.) are as follows:—
- | | | At 11,500 lb. | | At 13,000 lb. | |
|-----------------|-------|---------------|--------|---------------|--------|
| | | Kts. | m.p.h. | Kts. | m.p.h. |
| Engine assisted | .. .. | 75 | 90 | 80 | 95 |
| Glide | .. .. | 85 | 100 | 90 | 105 |
- (vi) Any tendency of the aircraft to swing after landing must be checked immediately by coarse use of rudder and brake if necessary.

44. DECK LANDING

- (i) Drill as for normal landing except that arrester hook should be lowered and indicator checked.
- (ii) Approach with ample engine power at 5 knots less than for the normal landing and do not close the throttle until just touching down.

PART II—HANDLING INSTRUCTIONS

45. MISLANDING

- (i) The Barracuda I will climb satisfactorily at loads below 13,000 lb., but the undercarriage should be raised immediately. Raise the flaps a little at a time. In very hot weather, or if rising ground or obstacles are encountered, it may be impossible at fairly heavy loads to go round again from a low height, so a decision should be made as early as possible.
- (ii) The Barracuda II has a much better performance than Barracuda I.

46. AFTER LANDING

- (i) Before taxiing, raise the flaps and open the radiator shutter.
- (ii) If the trailing edges are to be folded, move the flaps into the DIVE position and build up pressure in the accumulator before stopping the engine. On early aircraft it is not possible to fold the trailing edges until pilot's fuel cock has been turned OFF (see para. 15).
- (iii) Allow the engine to tick over for a minute and then stop it by pulling out the slow-running cut-out control.
- (iv) When the engine has stopped, switch off the ignition and all other electrical switches and turn off the fuel cock.
- (v) *Oil dilution.*—The dilution period is :—
 - 1 minute at atmospheric temperatures down to — 10°C.
 - 2 minutes at atmospheric temperatures below — 10°C.

PART III

OPERATING DATA

47. ENGINE DATA. MERLIN 30 (Barracuda I)

- (i) *Fuel*.—100 octane only.
- (ii) *Oil*.—See Relevant Admiralty Fleet Order.
- (iii) *Engine limitations with 100 octane fuel*.

A.L.I PART III Para. 47		R.p.m.	Boost lb./sq. in.	Temp. °C. Coolant Oil	
	MAX. TAKE-OFF TO 1,000 FT. ..	3,000	+ 12½		
	MAX. CLIMBING 1 HR. LIMIT ..	2,850	+ 9½	125	90
	MAX. RICH CONTINUOUS ..	2,650	+ 7½	105	90
	MAX. WEAK CONTINUOUS ..	2,650	+ 4	105	90
	COMBAT 5 MINS. LIMIT ..	3,000	+ 9½	135	105
OIL PRESSURE:					
	NORMAL .. ..	..	..	..	60/80 lb./sq. in.
	MINIMUM .. ..	..	..	..	45 lb./sq. in.
MINM. TEMP. FOR TAKE-OFF:					
	OIL .. ..	..	..	..	15°C
	COOLANT .. ..	..	..	..	60°C

- (iv.) *Combat concession*.— +12 lb./sq. in. emergency boost (fully effective up to 6,000 ft.) can be obtained by operating the boost control cut-out with the throttle opened as far as the gate. Use of this concession must be reported and an entry made in the engine log book.

PART III—OPERATING DATA

48. ENGINE DATA—MERLIN 32. (Barracuda II)

- (i) *Fuel*.—100 octane only.
- (ii) *Oil*.—See Relevant Admiralty Fleet Order.
- (iii) *Engine limitations with 100 octane fuel*.—

		<i>R.P.M.</i>	<i>Boost lb./sq. in.</i>	<i>Temp. °C. Coolant</i>	<i>Oil</i>
MAX. TAKE-OFF TO 1,000 FT.	..	3,000	+18*		
MAX. CLIMBING 1 HR. LIMIT	..	2,850	+12	125	90
MAXIMUM CONTINUOUS	..	2,650	+7	115	90
MAX. ALL OUT 5 MINS. LIMIT	..	3,000	+18*	135	105

* Obtainable by use of boost control cut-out.
- deleted -

OIL PRESSURE : NORMAL : 60/80 lb./sq. in.
MINM. : 45 lb./sq. in.

MINM. TEMP. FOR TAKE-OFF : OIL : 15°C.
COOLANT : 60°C.

49. FLYING LIMITATIONS

- (i) The aircraft is designed for manœuvres appropriate to a torpedo and dive-bomber, and 'spinning and aerobatics are not permitted.
- (ii) *The aircraft is designed for the following maximum I.A.S.—*

	<i>Knots</i>	<i>m.p.h.</i>
Diving (with flaps NORMAL) ..	315	360
Diving (with flaps in DIVE position)	260	300
Moving flaps to or from DIVE position	190	220
Undercarriage DOWN	150	170
Flaps in LANDING position ..	130	150

PART III—OPERATING DATA

A.L. 4
Part III
Para. 49
(iii) and
(iv)

(iii) *Maximum permissible weights*

		Mk. I	Mk. II	Mk. III
Take-off	.. ..	13,200 lb.	14,250 lb.	14,250 lb.
Landing	.. ..	13,000 lb.	14,250 lb.	14,250 lb.

(iv) *Typical maximum loads*

		Mk. I	Mk. II
Reconnaissance	.. ..	12,064 lb.	12,456 lb.
Bomber	.. ..	13,074 lb.	14,007 lb.
Torpedo	.. ..	13,177 lb.	14,110 lb.

50. CORRECTION FOR POSITION ERROR

From	.. ..	96	130	165	200	knots I.A.S.
To	.. ..	130	165	200	226	" "
Add	.. ..	2	0	—	—	knots
Subtract	.. ..	—	—	2	4	knots

At all normal cruising speeds, the position error can be ignored.

51. MAXIMUM PERFORMANCE

A.L.2
Part III
Para. 51

The speed for maximum rate of climb is 105 knots I.A.S. (120 m.p.h.) up to 10,000 feet. Above this height reduce speed by 2 knots or m.p.h. per 1,000 feet.

52. MAXIMUM RANGE

A.L.3
PART III
Para. 52
(i) and
(ii)

(i) The recommended speeds are as follows:

With torpedo	.. ..	125 knots I.A.S.
With bombs	.. ..	130 " "
No bombs or torpedo	.. ..	135 " "

(ii) Fly in weak mixture at maximum obtainable boost, not exceeding +7 lb./sq.in. and adjust r.p.m. as necessary between 1,800 and 2,650 to maintain the recommended speed. At low r.p.m. check that generator is charging.

53. FUEL CONSUMPTIONS

(i) Approximate fuel consumptions on Barracuda I and II at 5,000 feet in WEAK mixture are as follows:

<i>Boost lb./sq.in.</i>	<i>R.P.M.</i>						
	2650	2500	2400	2300	2200	2100	2000
+7*	67	62	59	55	49	45	43
+4	53	51	49	46	44	43	42
+2	48	46	43	41	40	39	39
0	42	39	38	36	35	34	34

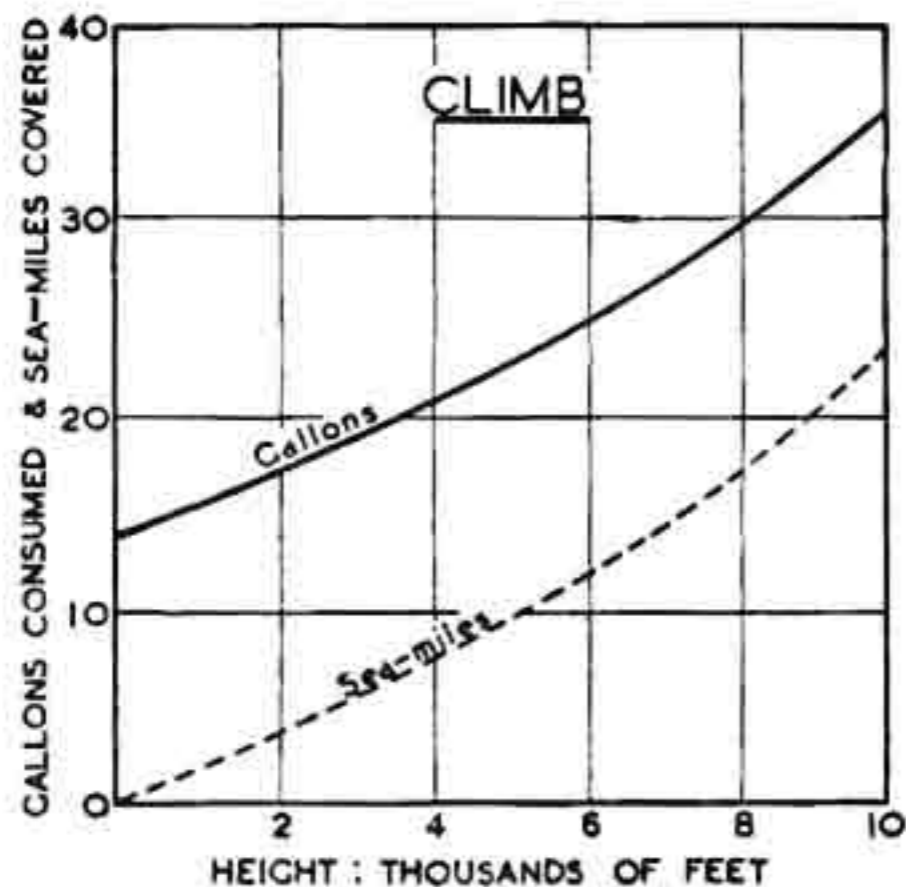
*Barracuda II only.

(ii) Approximate fuel consumptions on Barracuda I in RICH mixture are as follows:—

<i>R.p.m.</i>	<i>Boost lb./sq. in.</i>	<i>Height ft.</i>	<i>Consumption gals./hr.</i>
3,000	+12	6,000	130
3,000	+9 $\frac{3}{4}$	10,000	110
2,850	+9 $\frac{3}{4}$	10,000	105
2,650	+7 $\frac{3}{4}$	10,000	90

(iii) Approximate fuel consumptions on Barracuda II are as follows:—

<i>R.p.m.</i>	<i>Boost lb./sq. in.</i>	<i>Height</i>	<i>Consumption gals./hr.</i>
3,000	+18	sea level	145
2,850	+12	sea level	105
2,650	+ 7	sea level	70



CONSUMPTION CURVES

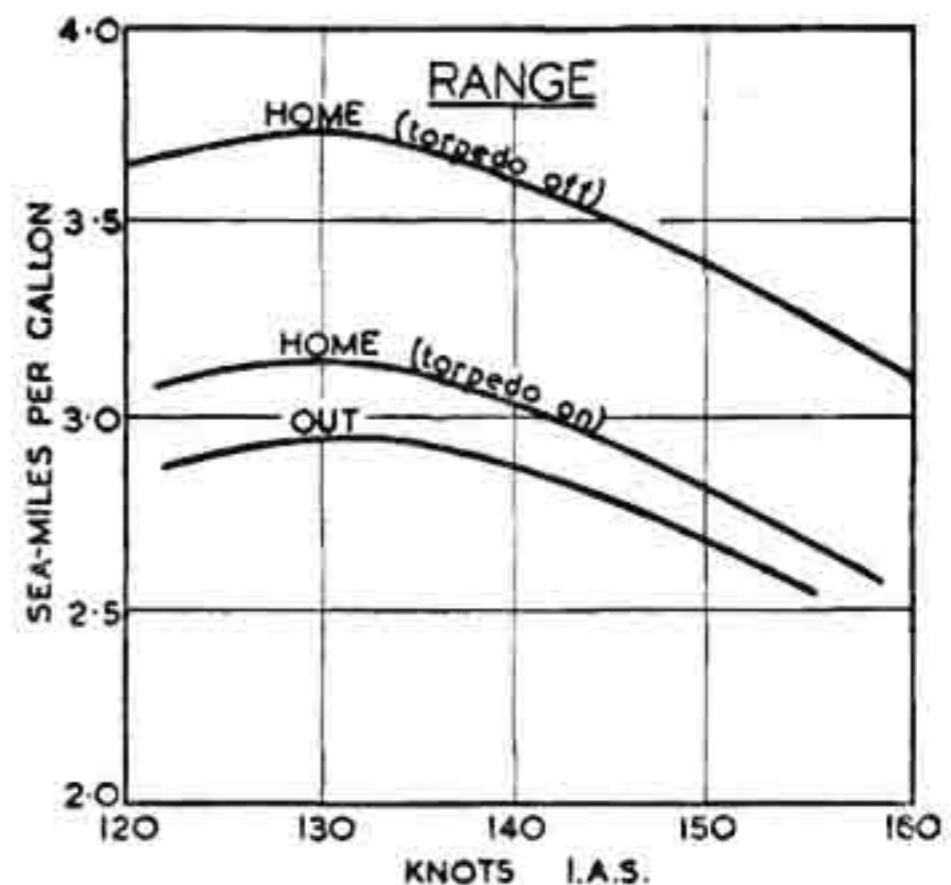
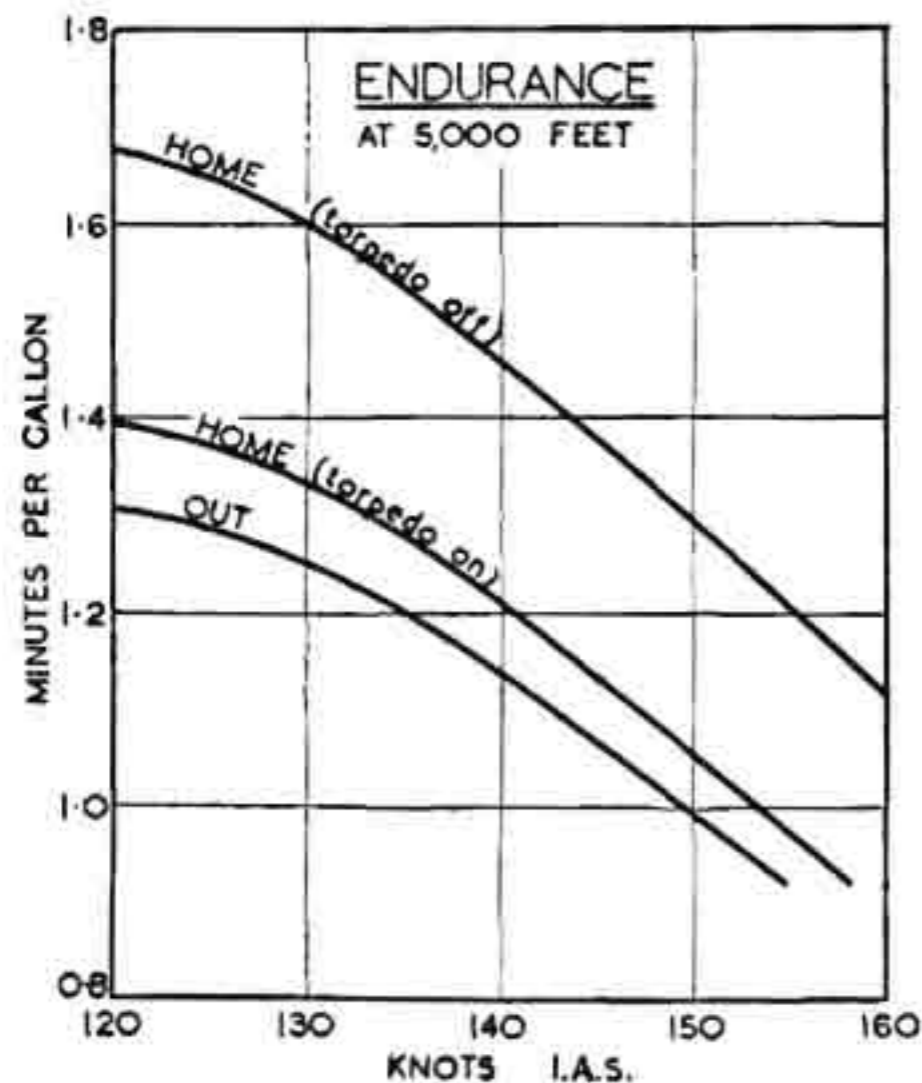
TORPEDO CASE

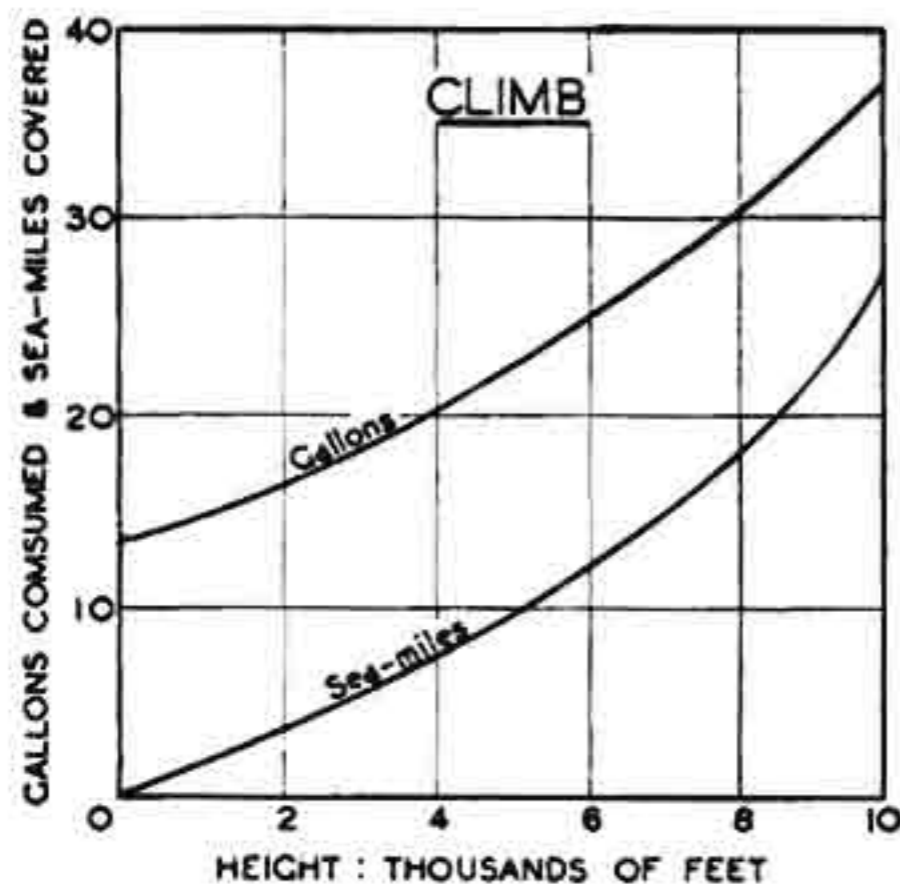
All up weight at take-off with torpedo and 230 gals. fuel.....13,900 lb.

Mean weight carried on outward journey..13,450 lb.

" " " homeward (torpedo dropped)..10,920 lb.

" " " " (torpedo carried)...12,600 lb.





CONSUMPTION CURVES

BOMBER CASE

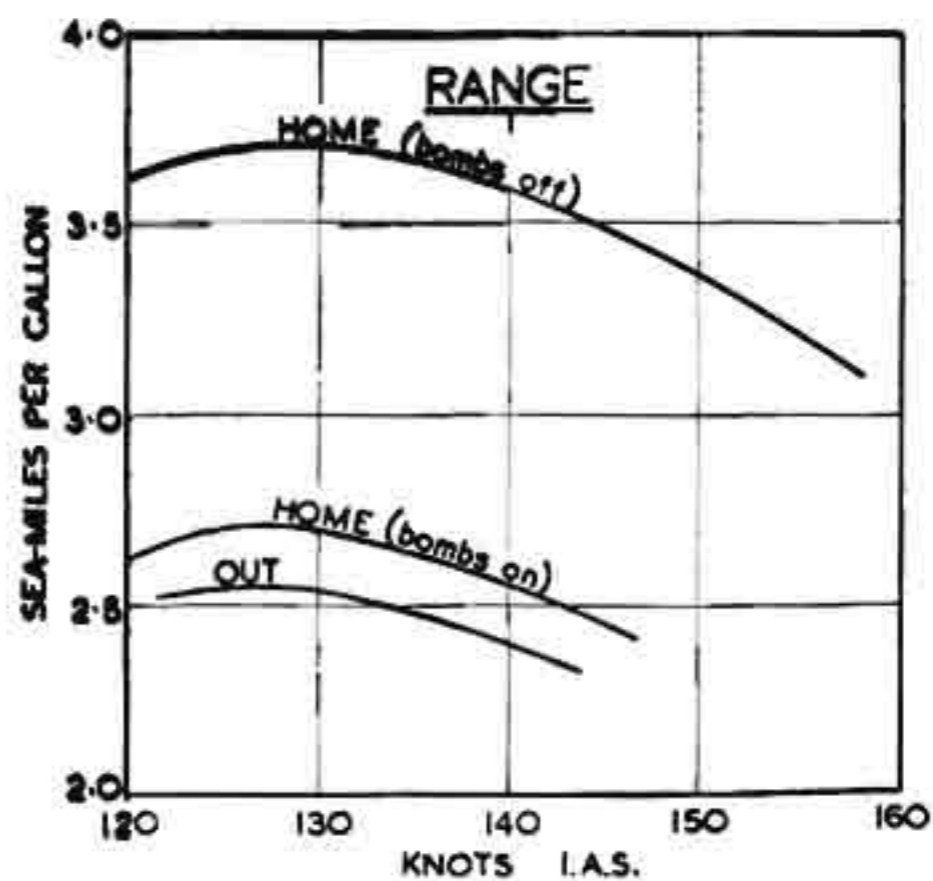
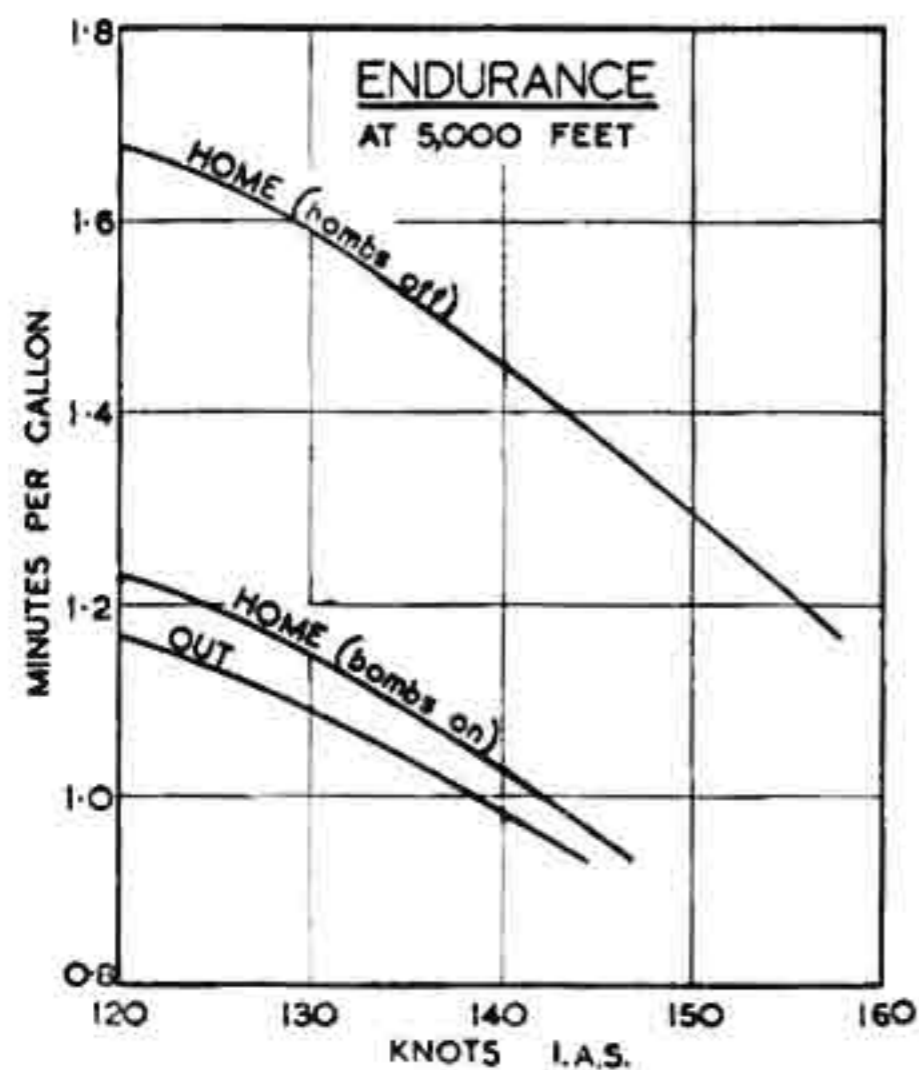
All up weight at take-off with 8 X 250 lb.

'B' bombs and 230 gallons fuel ---- 13,900 lbs.

Mean weight outward..... 13,450 lbs.

" " homeward (bombs dropped) -- 11,090 lbs.

" " " (" carried) -- 12,600 lbs.



PART IV

EMERGENCIES

54. EMERGENCY APPROACHES

If, for any reason, it is not possible to move the flaps from the NORMAL or DIVE positions to the LANDING position, the following speeds for the approach are recommended :—

(a) With flaps NORMAL at 11,500 lb. :

Engine-assisted	..	..	..	85 knots
Glide	..	..	..	95 ..

(b) With flaps at DIVE position at 11,500 lb. :

Engine assisted	100 knots
-----------------	----	----	----	-----------

If approaching with the flaps in the DIVE position much more power than usual is required and as difficulty will be found in going round again, the approach must be made with care and accuracy.

55. HYDRAULIC HANDPUMP AND EMERGENCY FLAPS OPERATION

The operations which can be performed by the hand pump, mounted on the floor on the port side of the cockpit, depend on whether the undercarriage mechanical lowering handle is stowed or unstowed and ready for use.

- (i) *With the mechanical undercarriage lowering handle stowed*, the handpump supplies power via the main accumulator to the three selector valves, i.e., flaps, undercarriage and trailing edge; even if the accumulator is discharged it will not absorb the earlier delivery of the pump which will therefore operate the services at once.
- (ii) *With the mechanical undercarriage lowering handle unstowed*, the handpump supplies power to the flaps circuit only.

**56. UNDERCARRIAGE EMERGENCY
OPERATION**

- A.L.I**
PART
IV
Para.
56
- Should the undercarriage fail to lower under hydraulic pressure, the handpump, which is located at the left side of the seat, should be used, or alternatively the mechanical gear may be actuated. The operation of the mechanical gear is as follows:
- (i) Move the selector lever (58) to the DOWN position if not already in that position.
 - (ii) Wait 5 seconds and then withdraw the handgrip of the emergency gear operating handle (85) from the clip under the instrument panel and place it in the winding position.
 - (iii) Rotate the handle in a counter-clockwise direction, approximately 28 turns, until the green lights appear on the undercarriage indicator.

The mechanical gear does not operate to raise the undercarriage, but if this course is desired whilst the aircraft is still airborne and the hydraulic system is again operative, the emergency gear must first be wound fully back (28 turns in a clockwise direction until solid) and the handle stowed in its clip before the selector lever is moved from the DOWN to the UP position.

57. BOMB AND TORPEDO JETTISONING

The bombs or the torpedo may be jettisoned, by the jettison bar incorporated in the selector switchbox on the port side above the decking. When small-bomb containers are carried, they may be jettisoned by means of the SMALL-BOMB CONTAINER JETTISON switch, also on the port side above the decking. The jettison of small-bomb containers should be carried out before the selector switch jettison bar is operated.

58. PILOT'S EMERGENCY EXIT

The pilot's hood is arranged to slide aft to open, but in case it cannot be opened in an emergency, a break-out panel is incorporated in the hood above the pilot's head. On some early aircraft, this break-out panel may be knocked out after pulling the release cable at the front edge of the hood, but on most aircraft the panel is held by safety pins which are all connected to a single cable,

PART IV—EMERGENCIES

passing round a pulley at the front of the hood. By pulling on the pulley handle, all the quick-release safety pins are withdrawn and the emergency panel may then be knocked out.

59. FIRE EXTINGUISHER SYSTEM

- A.L.4 Two push-switches (4) are on the instrument panel and are labelled PORT WING, STARBOARD WING.

A hand extinguisher is installed on the starboard side of the cockpit and there is also a hand extinguisher in the rear cockpit. The engine fire-extinguisher is deleted by Mod.252

60. DINGHY AND DITCHING

- (i) The dinghy, type M, contained in the rear fuselage, is automatically inflated and launched on alighting in the sea. A manual release cable is attached along the port side of the fuselage and terminates in a handle which is secured to the fuselage skin by a doped fabric patch. The handle is on the port side of the fuselage approximately below the leading edge of the fin. Each member of the crew is also provided with a K-type dinghy. A first-aid outfit, marine distress signals, smoke floats and emergency rations are included in the dinghy pack which is attached by a cord to the dinghy.
- (ii) It should be possible to ditch the the Barracuda successfully, though the landing will probably be unpleasant, as the latter half of the ditching will be made with the forward part of the aircraft covered with green water and heavy spray.
- (iii) All cockpit hoods should be opened and the aircraft should be landed on the sea as slowly as possible, using about 20° flaps. At high speeds the aircraft will tend to porpoise.
- (iv) The deceleration of the aircraft, when ditched, will be similar to that experienced when the aircraft is deck-arrested on the wires.

PART V—ILLUSTRATIONS

Fig 1—INSTRUMENT PANEL

1. Pilot's speaking tube.
2. Undercarriage warning light.
3. Ignition switches.
4. Fire extinguisher pushbuttons (three).
5. Instrument flying panel.
6. Pressure head heater switches.
7. Pilot's windscreen de-icing pump
8. Boost gauge.
9. Engine speed indicator.
10. Identification and recognition lamps switchbox.
11. Radiator temperature gauge.
12. Oil pressure gauge.
13. Fuel contents gauges.
14. Oil temperature gauge.
15. Baulking lever for lowering undercarriage control lever before using emergency system. Deleted by Mod. 158
16. Downward Recognition lights colour selecting switch.
17. Formation lights switch.
18. Navigation lights switches.
19. Resin lights switch.
20. Engine starter master switch.
21. Starter re-loading control.
22. Fuel pressure warning light.
23. Starter pushbutton switch.
24. Oil dilution pushbutton.
25. D.R. compass.
26. D.R. compass switches.
27. Brakes lever.
28. Slow-running cut-out control.
29. Fuel cock control.
30. Boost control cut-out.
31. Landing lamp switch.
32. Flaps position indicator.
33. Air intake heat control.
34. Landing lamp dipping lever.
35. Undercarriage indicator switch.
36. I.F.F. destruction switches.
37. I.F.F. master switch.
38. Air temperature gauge.
39. Undercarriage warning horn test switch.
40. Cylinder priming pump.
41. Undercarriage and deck hook indicator.
42. Ventilator control.

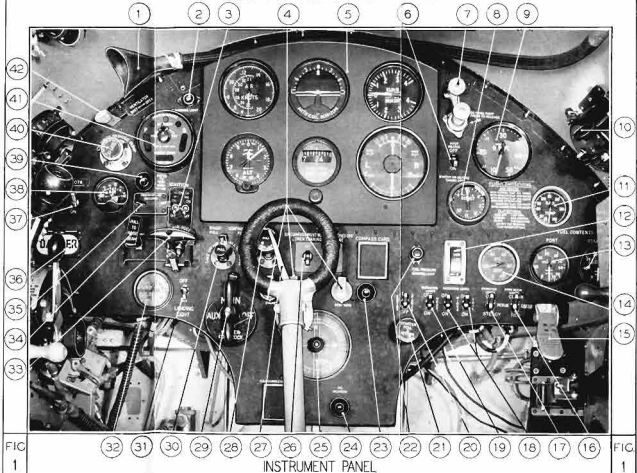


Fig. 2

COCKPIT—PORT SIDE

- 43. Travelling lamp master switch.
- 44. Travelling lamp dimmer switch.
- 45. Avoiding action control.
- 46. Ship's speed control.
- 47. Dimmer switch for item (48).
- 48. Instrument panel floodlight.
- 49. Radio change-over switch.
- 50. Radio R.1147 tuning control.
- 51. Radio R.1147 volume control.
- 52. Torpedo or bomb release button.
- 53. Throttle lever.
- 54. Propeller speed control lever.
- 55. Priming pump hand-cock.
- 56. Friction adjuster.
- 57. Brake pressure gauge.
- 58. Undercarriage control lever.
- 59. Flaps control lever.
- 60. Deck hook lever.
- 61. Elevator trimmer control.
- 62. Rudder trimmer control.
- 63. Location for Auto controls (when fitted).
- 64. Auto controls master switch (when fitted).
- 65. Auto controls pressure gauge (when fitted).
- 66. Cockpit lamp and dimmer switch.

(43)

(44)

(45)

(46)

(47)

(48)

(49)

(66)

(65)

(64)

(63)

(50)

(51)

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(58)

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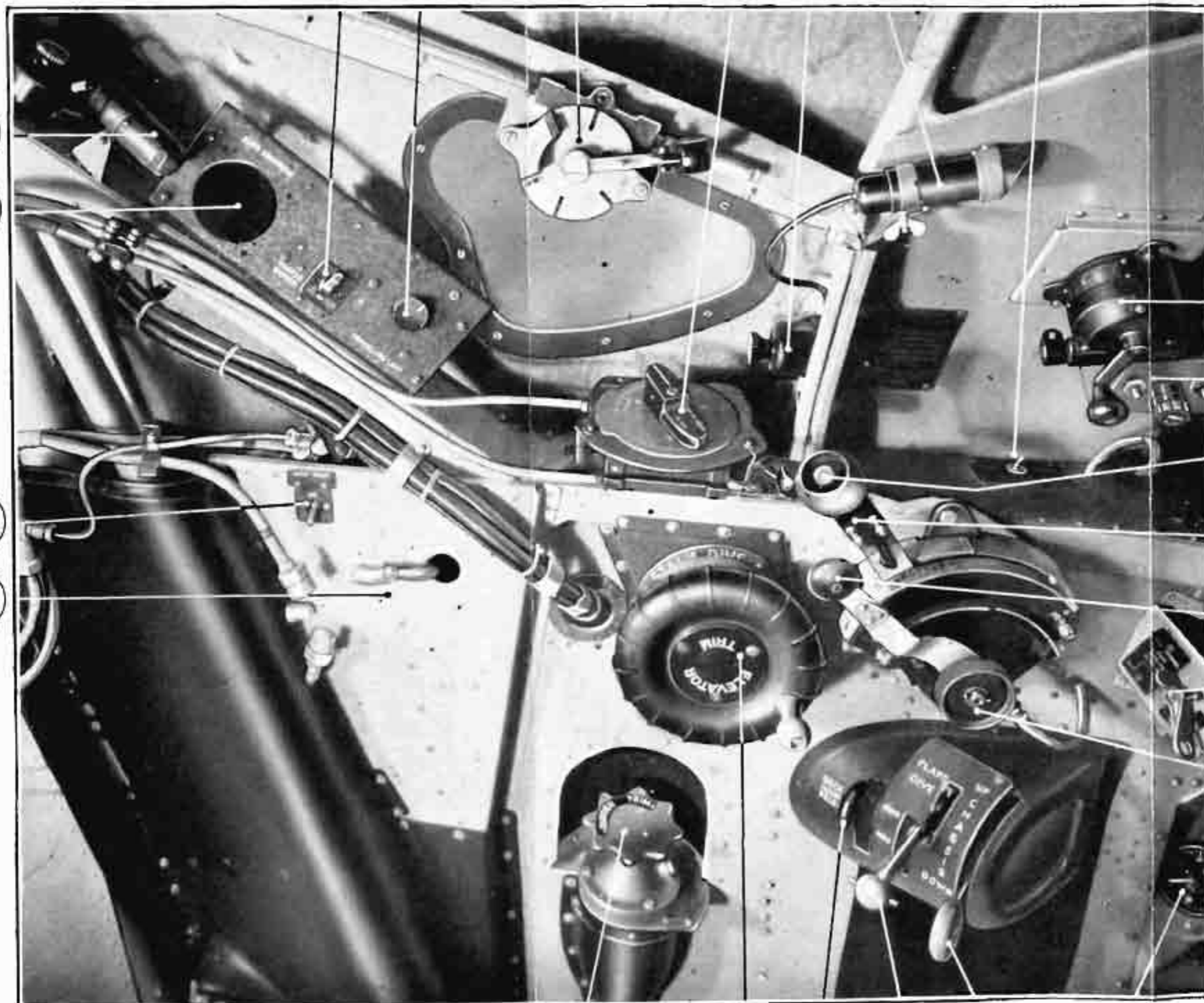
FIG.

2

COCKPIT - PORT SIDE

FIG.

2



COCKPIT—STARBOARD SIDE

- 67. Bomb containers jettison switch.
- 68. Nose and tail fuzing switches for bombs.
- 69. Radiator shutter control.
- 70. Radiator shutter indicator.
- 71. Instrument floodlight dimmer switch.
- 72. 16-point bomb selector switch-box.
- 73. Navigation lights dimmer switch.
- 74. Cockpit lamp and dimmer switch.
- 75. Automatic 16-point distributor.
- 76. Pilot's sanitary container.
- 77. Pilot's seat adjusting lever.
- 78. Pilot's seat.
- 79. Pilot's Sutton harness release lever.
- 80. Stowage for signal pistol mounting blanking cap.
- 81. Signal pistol mounting, with blanking cap in place.
- 82. Cabin heating control.
- 83. Starboard rudder pedal.
- 84. Pilot's map case.
- 85. Emergency undercarriage mechanical lever.

(67) (68) (69) (70) (71) (72) (73) (74)

(85)

(84)

(83)

(75)

(76)

(77)

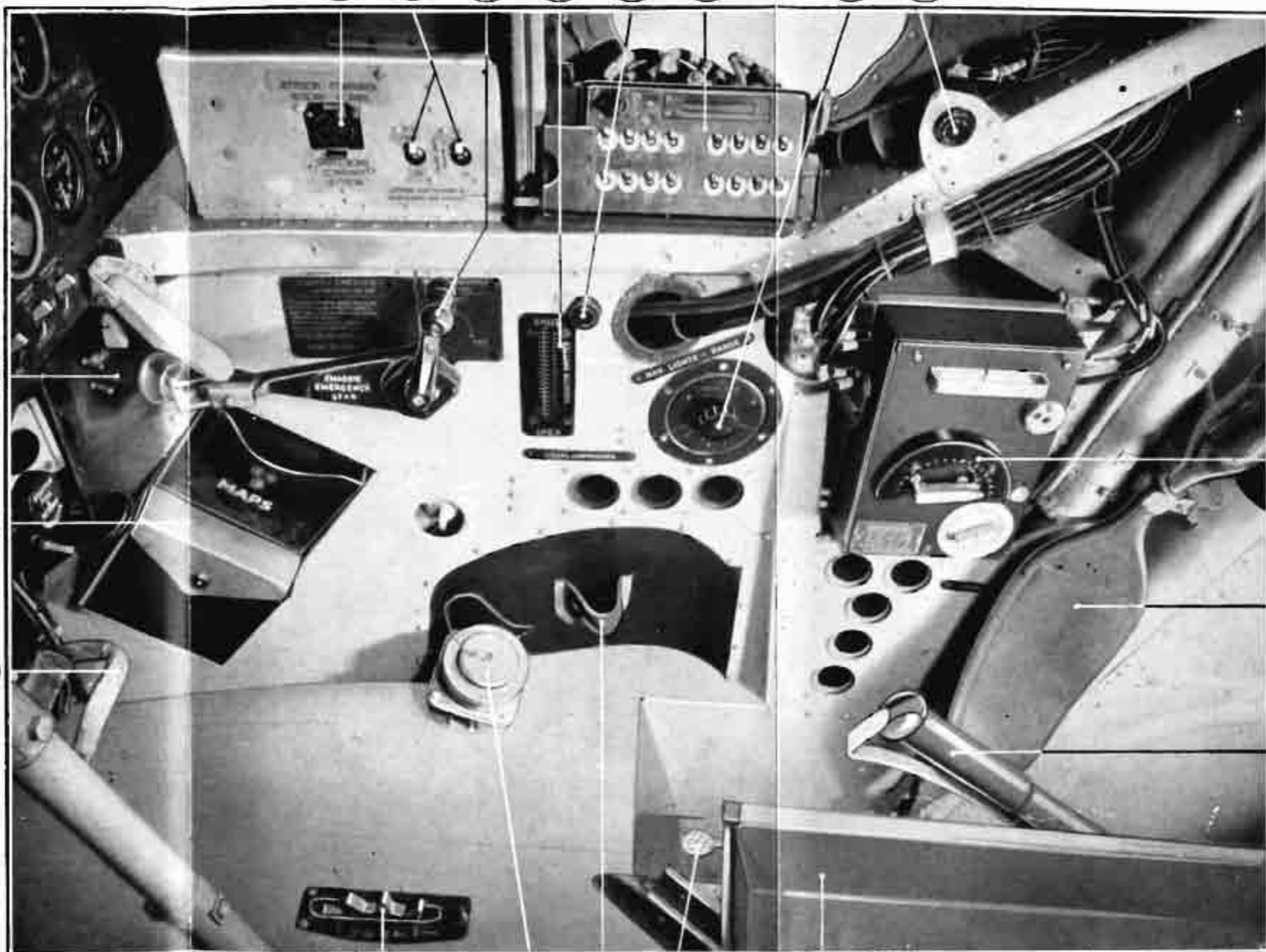


FIG.
3

(82) (81) (80) (79) (78)

COCKPIT-STARBOARD SIDE

FIG.
3

