CHAPTER 3

THE CHIPMUNK

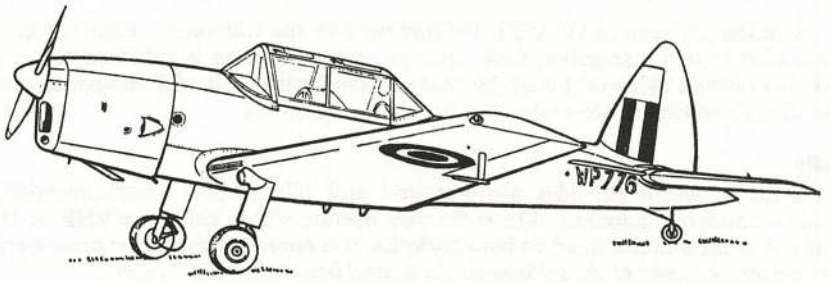

Fig 7 The Chipmunk

Introduction

1. The Royal Air Force has a number of units throughout the country known as Air Experience Flights. These units exist for the sole purpose of providing air experience flying for cadets. They are equipped with Chipmunk aircraft.

2. The Chipmunk is a small single-engined, low-winged monoplane with a simple, clean appearance. It was designed by De Havilland's of Canada in the late 1940s.

3. A fixed undercarriage is fitted, with brakes on the two main wheels and a fully castoring tail wheel. The tandem cockpits are totally enclosed and equipped with dual controls, enabling either pilot to have full control of the aircraft. Cadets fly in the rear seat.

4. The fuselage, fin, tailplane and the leading edges of the wings are metal covered. The rest of the wings and the control surfaces are fabric covered, for lightness. Whilst the fabric covering is strong enough for all normal purposes it will not take the weight of anyone who treads on it. When entering or leaving the cockpit great care must, therefore, be taken to avoid stepping off the strengthened wing root which is provided with a rubber "walking strip" (*see* Fig 8).

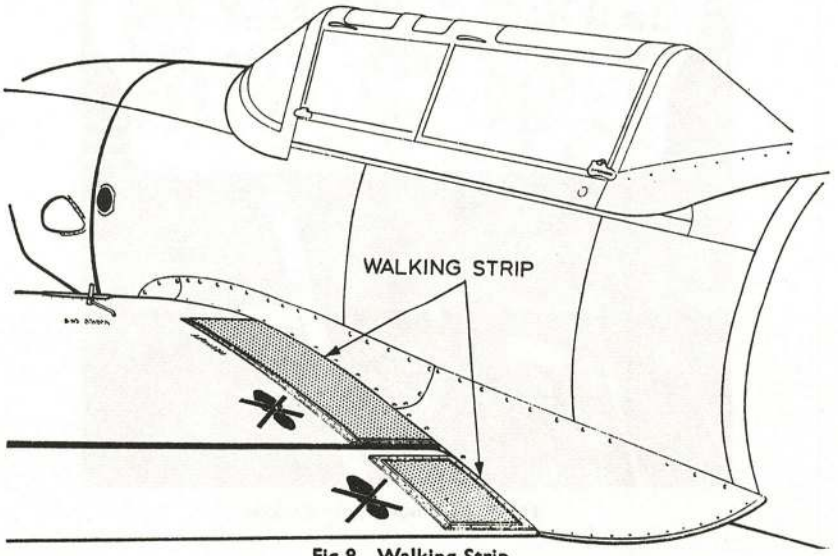

Fig 8 Walking Strip

5. The aircraft is powered by a Gipsy Major Mk 8 engine of 145 horse power which drives a two-bladed, fixed-pitch, metal propeller. The engine is started by a cartridge self starter.

6. Aviation gasolene (AVGAS) is the fuel used by the Chipmunk. Eighteen gallons are carried in two nine-gallon tanks, one in each wing. This is sufficient to provide 2½ hours normal flying (although by modern standards it is hardly enough to permit a jet aircraft to taxy to the end of the runway for take-off).

Radio

7. A radio, which provides air-to-ground and pilot-to-pilot communication, is fitted as standard equipment. The radio may operate within either the VHF or UHF bands. A control box is fitted to both cockpits. *It is important that cadet passengers do not interfere with any of the settings on the control box in the rear cockpit.*

Instruments and Controls

8. An aircraft cockpit is a fascinating collection of dials, instruments, levers, knobs, switches and controls. Many of these are extremely important and, if moved, could not only prove very embarrassing to the pilot (and subsequently to the cadet) but might result in a very dangerous situation—even stopping the engine. *It is absolutely essential, therefore, that cadets* **Touch nothing in the cockpit** *unless and until the captain of the aircraft tells them what to touch and when to touch it.*

9. **General Cockpit Layout.** The cockpit of the Chipmunk is very simple—certainly compared with that of a modern operational aircraft. The general layout is illustrated in Fig 9.

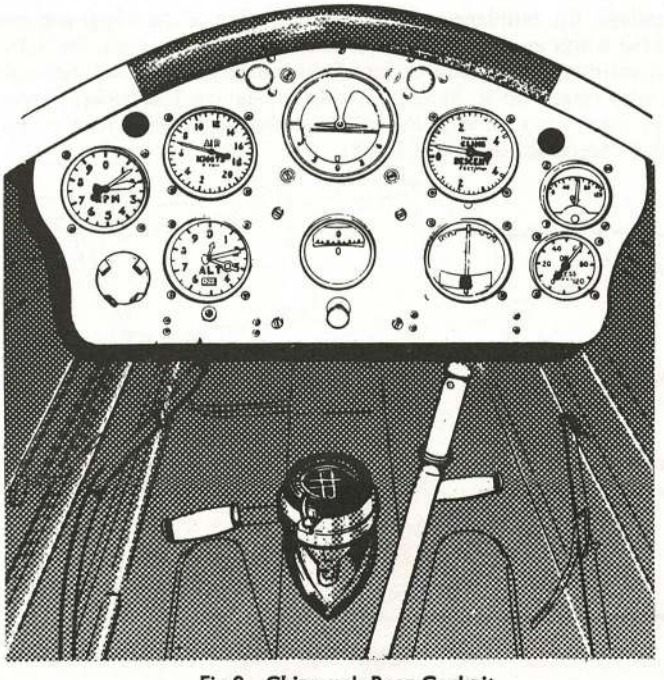

Fig 9 Chipmunk Rear Cockpit

Instruments and controls are divided into those that affect the flying of the aircraft and those concerned with the control of the engine—*ie* flying instruments and controls and engine instruments and controls. Let us look at each group in turn.

10. Flying Instruments and Controls. There are *six basic instruments* and *three controls* concerned with the aircraft itself and its flight through the air. These are illustrated in Fig 10 and discussed below.

a. *Flying Instruments.*

(1) *Artificial Horizon (AH).* The artificial horizon indicates the attitude of the aircraft—nose up, nose down, banked to right or left, *etc.* It is a gyroscopic instrument.

(2) *Airspeed Indicator (ASI).* The ASI tells the pilot the speed at which the aircraft is travelling through the air. It is calibrated in knots (the reading "4" indicating 40 knots).

(3) *Altimeter.* The altimeter indicates the aircraft's height above a pre-set datum. Most instruments have three hands—one to indicate hundreds of feet, one to indicate thousands of feet and one to indicate tens of thousands of feet—and the dial is calibrated in single figures, 0 to 9. *Care is needed to ensure that the aircraft's correct height is read.*

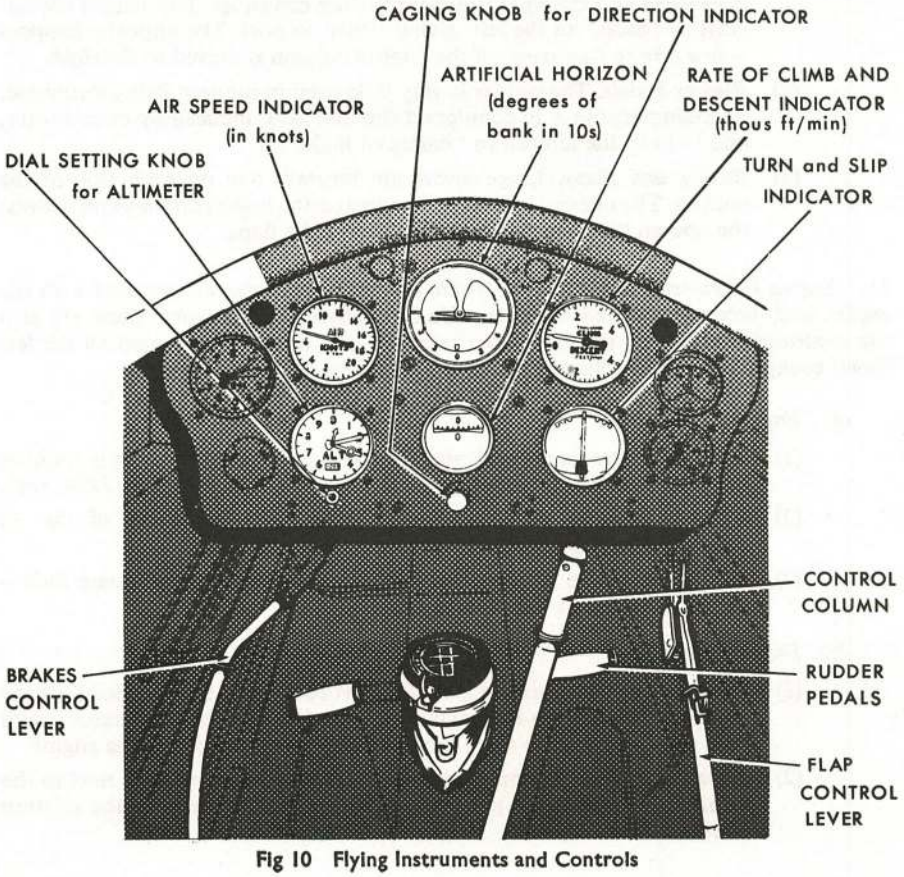

Fig 10 Flying Instruments and Controls

(4) *Rate of Climb or Descent Indicator.* This instrument shows the pilot the rate at which the aircraft is climbing or descending—in hundreds of feet per minute.

(5) *Turn and Slip Indicator.* This instrument informs the pilot of the rate of turn of the aircraft, and the direction of the turn, and whether the aircraft is skidding or slipping. The turn needle is gyroscopic but the ball is left in the central position *in balanced turns* by the resultant of gravitational and centrifugal forces. In *slipping* turns, the ball falls *inwards*; in *skidding* turns, it flies *outwards.*

(6) *Direction Indicator.* The direction indicator (another gyroscopic instrument), after being synchronized with the compass, tells the pilot the *heading* of the aircraft.

b. *Flying Controls.*

(1) *The Control Column.* The control column is used to control the flight path of the aircraft. When the control column is moved *forward,* the nose of the aircraft goes *down*; when moved *back*, the nose *rises.* When the control column is moved to the *left*, the aircraft's left (port) wing goes *down* and the *right* (starboard) wing comes *up.* This causes the aircraft to "bank" to the left, giving a turn to port. The opposite happens *—ie a turn to starboard—*if the control column is moved to the **right.**

(2) *Rudder Pedals.* The rudder is very little used in modern flying technique. Its main purpose is to counteract slip and skid, induced by other means, and to keep the aircraft in "balanced flight".

(3) *Brakes and Flaps.* Large levers are located, one on each side of the cockpit. The one on the left (port) operates the brakes on the main wheels; the one on the right (starboard) controls the flaps.

11. **Engine Instruments and Controls.** There are *three instruments* associated with the *engine,* and these are grouped on either side of the flying instruments. There are also *two controls* for adjusting the engine performance and these are mounted on the left (port) cockpit wall. Fig 11 illustrates the engine instruments and controls.

a. *Engine Instruments.*

(1) *RPM.* The rpm gauge indicates the speed at which the engine is rotating in *revolutions per minute* (rpm). The reading "2" indicates 2,000 rpm.

(2) *Oil Temperature.* This instrument gives the temperature of the oil circulating in the engine (in degrees celsius—°C).

(3) *Oil Pressure.* The oil pressure (measured in pounds per square inch—psi) is indicated in the oil pressure gauge.

b. *Engine Controls.*

(1) *Throttle.* The throttle lever is on the port cockpit wall. If pushed forward (opened), it increases the engine rpm—rather like the accelerator pedal on a car—and this, in turn, increases the power output of the engine.

(2) *Mixture Control.* The mixture control lever is the small lever next to the throttle. It enables the pilot to adjust the fuel/air ratio of the mixture going into the engine.

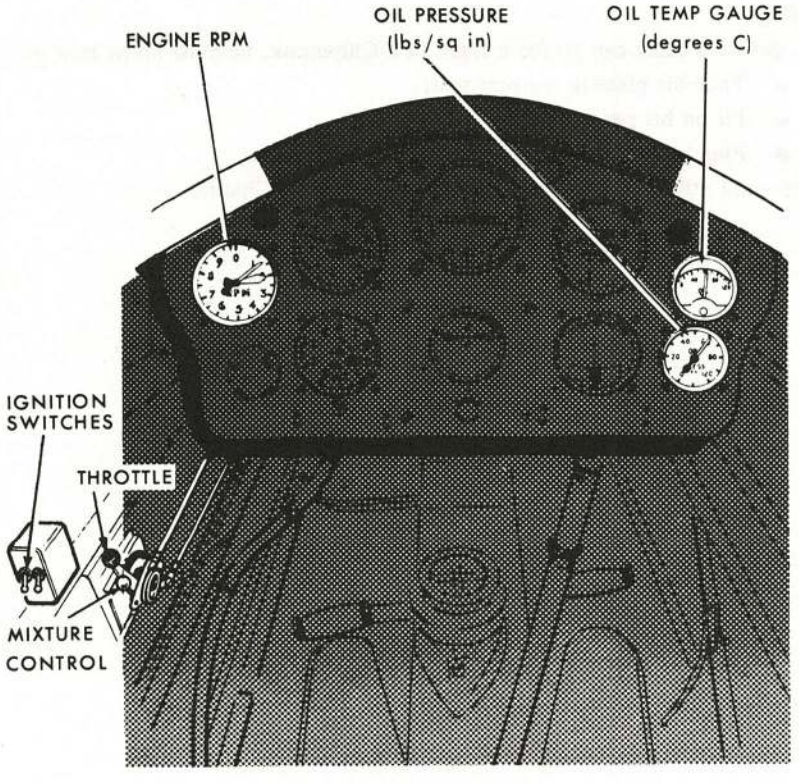

Fig 11 Engine Instruments and Controls

Limitations and Operating Data for Chipmunks

12. The Chipmunk is an easy and pleasant aircraft to fly. However, before a pilot is permitted to fly the Chipmunk, there are certain essential facts and figures that he must know. These are:

a. The maximum diving speed is 173 knots.

b. The best "range speed" is 90 knots.

c. The approximate stalling speed in straight and level flight is within the range 35–45 knots, depending upon the amount of flap used and the power the pilot has selected.

d. To safeguard the engine, the oil temperature should never exceed 100°C on take-off or at full throttle; during normal flight it should never be more than 85°C.

e. The normal oil pressure is 40–45 psi, with an emergency minimum of 30 psi.

f. In a dive, the speed of rotation of the engine must never be allowed to exceed 2,675 rpm.

(AL6, Jun 83)

Briefing

13. Before a cadet can go for a flight in a Chipmunk, he must know how to:

- Take his place in the rear seat;
- Fit on his parachute;
- Plug into the radio and inter-comm. equipment;

These—and other matters—are considered in the next Chapter.