

The monoplane Moth

The DH 94 Moth Minor had great potential, but the outbreak of World War II spoiled its chances, says David Ogilvy



The appearance of the DH 94 Moth Minor in 1937 heralded a major reappraisal by the de Havilland enterprise in relation to their future light aircraft. Until this time all production Moths had been biplanes or strut-braced high wingers. The current best-seller was the DH 87B Hornet Moth, which although a biplane, offered a side-by-side enclosed cabin with high levels of comfort and convenience. The new Minor, though, was a sleek aerodynamically clean cantilever low-wing monoplane, initially with an open cockpit but very soon available in enclosed form, with a very creditable performance on the new de Havilland Gipsy Minor of only 90hp and an attractive fuel economy to match.

The prototype, later registered G-AFRD, flew for the first time on 22nd June 1937 from Hatfield in the hands of Geoffrey (later Sir Geoffrey) de Havilland Senior, who took a special interest in this new venture. An early misfortune occurred during spinning trials with

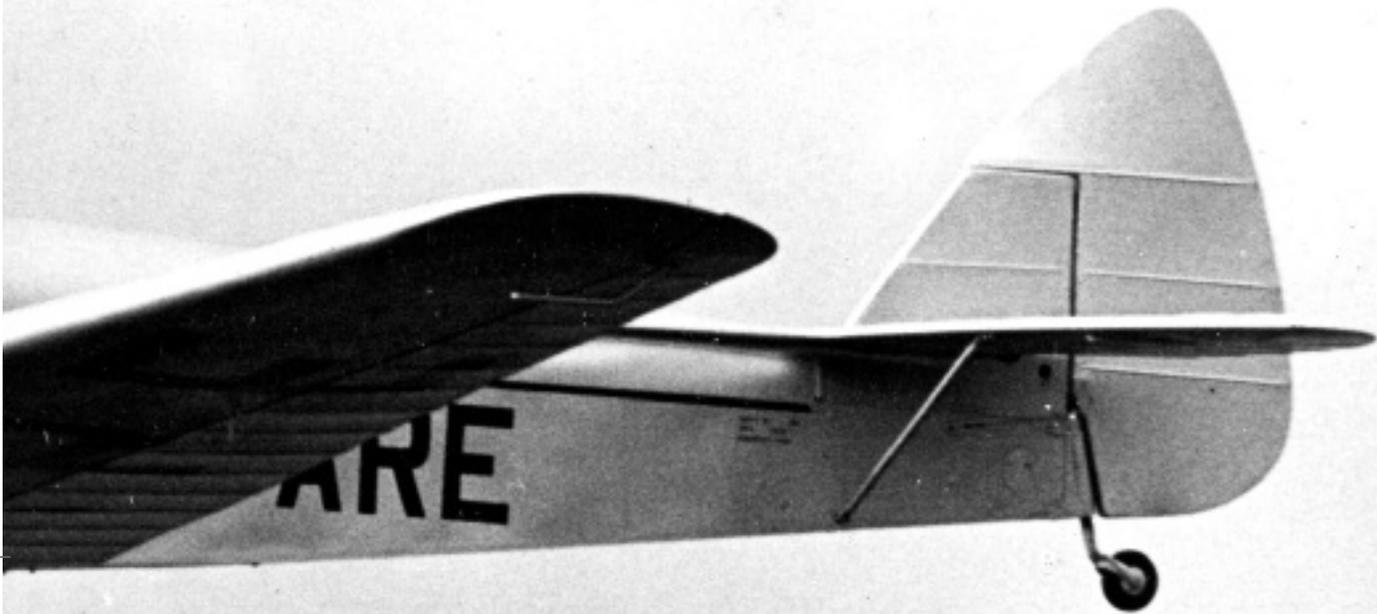
the centre of gravity at the aft limit. Despite wide-ranging attempts by two experienced pilots to recover, all efforts failed and two subsequently well-known names – Geoffrey de Havilland Junior and John Cunningham – baled out successfully. The problem was solved by fitting the seemingly inevitable fuselage strakes immediately ahead of the tailplane. I wonder if anyone knows how many types with potentially hazardous spin recovery characteristics were made safe by this well proven solution.

After this unfortunate setback, everything went well. By 1939, production was up to eight or nine aircraft a day, with a growing demand from purchasers at home and in many countries, especially through the DH associate companies in Australia, Canada, India and South Africa. Although originally intended as a non-aerobatic tourer, its economy (100mph on about 4.5 gallons per hour) appealed strongly to flying clubs, so the

Minor entered the training field. This was fortunate, for on the outbreak of World War II, production for the civil market ceased and the Hatfield factory's resources were concentrated initially on building the more rugged Tiger Moth (back to the biplane!) for the Royal Air Force. The DH 94's drawings, jigs and partly completed airframes were shipped to Australia where the type was built as a trainer for that nation's Air Force, to serve until Tiger Moths could be made available. About 40 Minors were completed or built at Bankstown and half of these survived the war to be registered as civil machines.

Without doubt the DH 94 would have been a great sales success and it was a leader among other light aircraft with fortunes broken by the war. By the time home production forcibly ceased, about 100 had been built and 32 of these were impressed into military service.

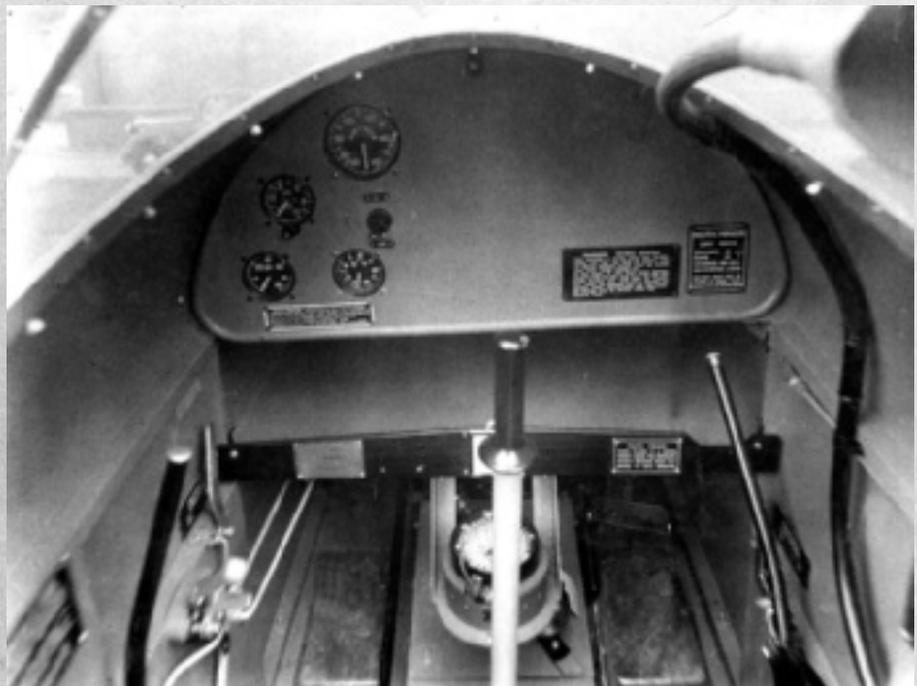
Now let us look at the physical



Top: early Moth Minor without tail strakes had poor spin characteristics
Main photo: unlike other tandem Moths, the Minor was flown from the front cockpit
Below: brakes, throttle, mixture and trim controls on left, air brake handle on right

characteristics of this interesting aeroplane. Although I am tempted to call it little, I could be taken to task as it has a span of 36ft 7ins, which is not surprising as the wing is of a high aspect ratio, easily foldable. There is a narrow fixed centre section to which the undercarriage is attached. The fuselage is a traditional plywood box structure, but the cantilever wing, with two spars, is ply covered from the leading edge to the rear spar, with fabric skinning behind. There are no flaps, but as it is such a clean design the gliding angle is very flat, so a very large and effective perforated air brake enables the machine to go down quite steeply, when required to do so. If fully extended this reduces the lift/drag ratio from 9.5 to 7.5:1. Power is provided by the 90hp DH Gipsy Minor, a neatly scaled down development of the bigger and more ubiquitous brother, the Gipsy Major. With wings folded, the packed width is only 12 feet.

Entry to the cockpits is via a wing walkway; the layout is reasonably spacious and more than usually comfortable with armrests on what are like small office chairs. Unlike previous tandem Moths, the Minor is flown from the front and instruments are fitted for that cockpit only. A



Photos via Phillip Jarrett



Above: about 100 Moth Minors had been built when the war stopped the show
Left: demand was strong across the Commonwealth, including South Africa
Below: ailerons are light and more responsive than long wingspan would suggest



very useful tray for maps and accessories is mounted below the panel and a large P-type compass sits beneath that. The lever for the cable-operated drum brakes is on the left, as are the throttle, mixture and trim controls; the last of these applies spring pressure to the sticks and there are no trim tabs. On the right is a long lever to operate the air brake.

My first contact with the DH 94 was in 1949 with the Community Flying Club at the now long defunct Woodley, near Reading, for many years the home of the Miles stable. Although the CFC operated for a few years, it made little impact on those outside it, for when the history of the aerodrome was being compiled no one seemed aware of its past existence. The Club operated an open Minor, G-AFNI, on loan from Hugh Bethel, who also

had a Proctor. When I booked it for the first time there it was, ready to go, but with no form of guidance, so I had the pleasure of discovering for myself what life was like aboard this sleek machine. It took very little time to find that it was good.

Whilst getting to know where things were within, I had time to digest the world outside and was favourably impressed by the shallow ground angle, which helped to provide the above-average view. I took a little time to grasp the fuel situation, but found that the port wing root held a tank of 13 gallons capacity, with a gauge immediately above it, while on the opposite side there was no tank, but space for small items. Apparently a second tank was available as an option. The main luggage holder, which I had failed to find, but then I

had no need for it, came to light as being accessible from inside the rear cockpit.

The Minor has no starter and is hand-swung, as was the norm for the time. Before getting going, though, I found an engine data plate, which confirmed that the small Gipsy was a higher-revving unit than its older, bigger

brother. Once running, it offers its own relatively high-pitch exhaust note, with a slightly hollow ring to it, which together gives the DH 94 its own unique aural identity. As far as I can discover, the Gipsy Minor was not used on any other aircraft, although it seems to have served well on this one allotted task.

I have heard comments about the Minor's brakes, both favourable and otherwise. I am convinced that everything depends on the cable adjustment and I found them to be more than adequate, making taxiing a happy event, with less need for weaving than on most more nose-high taildraggers.

The little Gipsy builds up to 2400rpm and take-off acceleration is good, but experience soon shows that to keep straight the tail should be held down for longer than on many types, as the rather undersize rudder fails to bite until there is a really worthwhile airflow. A subsequent climb at 65mph IAS generates about 600 ft per minute and calls for a fair amount of pressure on the left rudder pedal. On the level, 2200rpm provides about 95mph IAS, which accords well with the maker's claim, for a slightly higher power setting – still within the cruising range – can produce a mile or two above their sales figure of 100.

The DH 94 handles nicely and very little rudder is needed for balanced turns. The ailerons are light and more responsive than such long-span wings might suggest. Fore-and-aft damping checks indicate that stability is just positive, but the rudder, perhaps, is a touch too light for choice.

Turning to the all-important slow-speed characteristics, there is no cause to complain.

smoothly with remarkably light stick loads; rolling was a different story and with such high aspect ratio wings I found difficulty in maintaining a steady rate and keeping the nose on the horizon; perhaps practice would have improved things a bit!

Gliding at 65 felt right, reducing over the hedge to 60; the subsequent round-out was a modest procedure due to the flat ground 'sit'. On an imperfect touchdown the undercarriage felt a bit hard, but this is a characteristic of the use of rubber blocks in compression, later used with such success on the Mosquito. As on take-off, the rudder was only marginally effective when the tail was down and ground loops were not unknown!

Several years later I flew the coupé version. Although the two variants are basically identical with similar performances, I found their effects on my attitude to be very different: not surprisingly the open machine had a sporting touch and invited investigation into various manoeuvres, while its hooded brother

made a much more staid impact and asked to be treated as a tourer. I am biased, I admit, but in every way I preferred the one that offered the fresh air.

In a general assessment, I rate the Moth Minor very positively. I have heard it described as a lightweight Chipmunk and there are certain common characteristics. It is reasonably fast (top speed 118mph), very economical, pleasant to handle and can be housed in a small space. It is unfortunate that its potential could not be fulfilled, for I think it would have sold in big numbers over a considerable time span. At the right price, I believe that many people would buy it now.

Today there are five Moth Minors on the UK Register, including my old friend, G-AFNI. Four of these survived wartime impressments but, according to CAA records, only one is currently airworthy. It is too good an aeroplane to allow to die, so I am sure that I am not alone in wishing to see the others restored to their former active lives. ■



Above: right wing root held either extra fuel tank or baggage compartment

Top right: some 32 Moth Minors were impressed into wartime RAF service

Right: with wings folded the aircraft had a maximum width of only 12 feet

Bottom right: the Coupe was rather more staid and asked to be treated as a tourer



The straight stall occurs at about 45mph IAS and one wing – usually the left – goes down in an unhurried manner. With the air brake fully extended, there is no difference, which is as one would expect as, unlike a flap, it is not a lift generator; recovery is quick and easy. I did not spin her as, at the time, I had no knowledge of her recovery behaviour.

The Minor has gone through various stages of flight limitation categories; when introduced it was intended as a non-aerobatic tourer and only later became cleared for basic manoeuvres. In recent years it has operated on a permit basis so the original restrictions apply again. When I flew 'FNI, though, there were no such constraints and she went round a loop

