

AIRCRAFT  
DESCRIBED

## "PARNALL ELF"

by David Ogilvy



David Ogilvy, general manager of The Shuttleworth Collection of Historic Aircraft at Old Warden, Beds, at the controls of the restored machine, built in 1932 and once owned by Lord Apsley, which made its second 'maiden flight' on June 24th 1980.

TO FILL A newly-found demand for aeroplanes, for private and club ownership during the late twenties and early thirties, tandem two-seat biplanes with engines of about 100 h.p. were produced in Britain by a number of makers. Hordes of *Moths* and *Avians* were joined in smaller numbers by such types as the *Spartan Arrow* (see April 1980 *Aeromodeller*) and the *Parnall Elf*.

George Parnall and Co, originally shop fitters in Bristol, produced Service aircraft during the 1914-18 war and these included *Avro 504s* and their own (not very successful) *Parnall Scout*. Subsequently they built the interesting *Parnall Peto* seaplane, which was designed to operate from a submarine, and the single-seat *Pipit* naval fighter. In the civil light aeroplane field, however, they began with the little *Pixie* — a low-wing monoplane with a 736 cc Douglas engine that achieved 76.1 mph and won the Abdulla speed prize at Lympne in 1923.

A two-seat development followed in the *Pixie Mk III*, which flew in both monoplane and biplane forms; then came the *Imp*, powered by a Genet of 80hp, which flew from the company's aerodrome at Yale in 1927.

From this assortment, many of which had been designed by Harold Bolas, the *Elf* was evolved. The first of the three to be built made its public debut at Olympia in February 1929, later to fly from Yate as G-AAFH. Several improvements were incorporated into the mark II, including a reduction from full to half-span ailerons and a change from a tailplane with a facility to adjust the angle on the ground only, to a unit with in-flight variable incidence. A production run of G-AAIN and G-AAIO completed the *Elf* line. The Mk 1 flew behind a *Circus Hermes I* of 105 h.p. while

the two later machines boasted the additional 15 h.p. of the *Hermes II*. The lone survivor, G-AAIN, reverted at some time to the lower powered engine and flies with this today.

Although broadly conventional at first sight, the *Elf* has several novel features, some of which are good, but others of which are distinctly less bright. Among the former must be counted the wing bracing, for instead of the usual vertical interplane struts towards the tips, with landing and flying wires inboard of those struts, a system of Warren girders provides the necessary rigidity and even eliminates the need for a jury strut when the wings are folded. The maker's booklet claims that in this condition the *Elf* is 1 ft. 6 ins. narrower than the other existing machines, to facilitate transport through gateways when being retrieved after a forced landing!

This brings thoughts to the fuel system, which has caused problems in the past; the main supply of 18 gallons is in the fuselage and therefore pump-dependant for its flow to the carburettor, with a capacity of only 3 gallons in the top (gravity) tank in the wing centre-section. This leaves a very limited safe endurance for take-off, landing and circuit work, at which times it is unwise to rely on a pump. Both the other *Elves* ended their lives prematurely following pump failures.

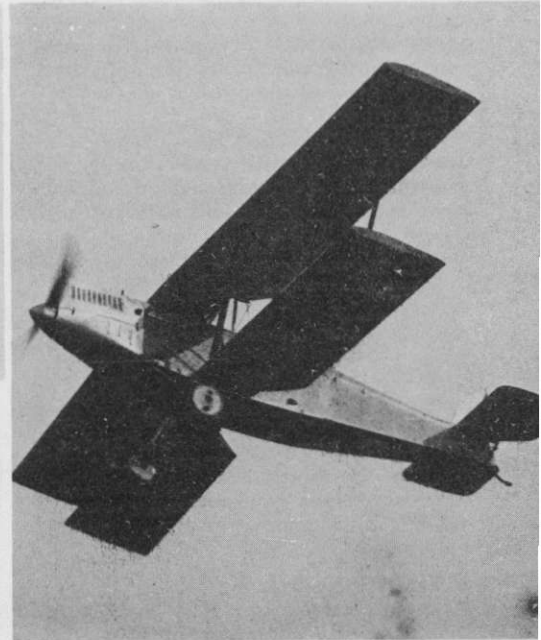
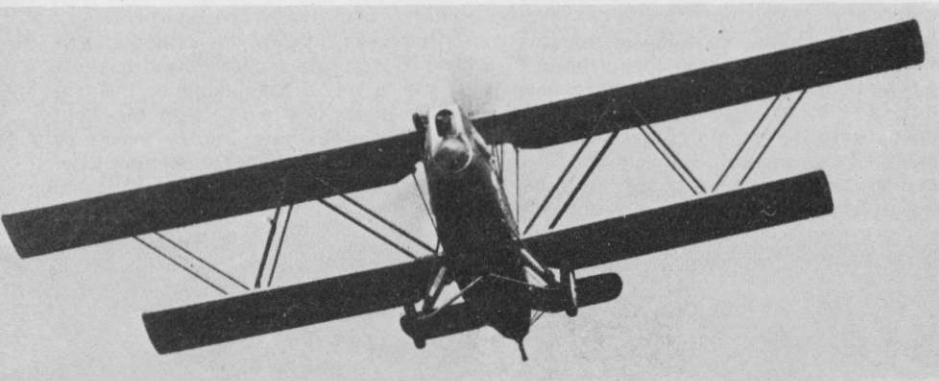
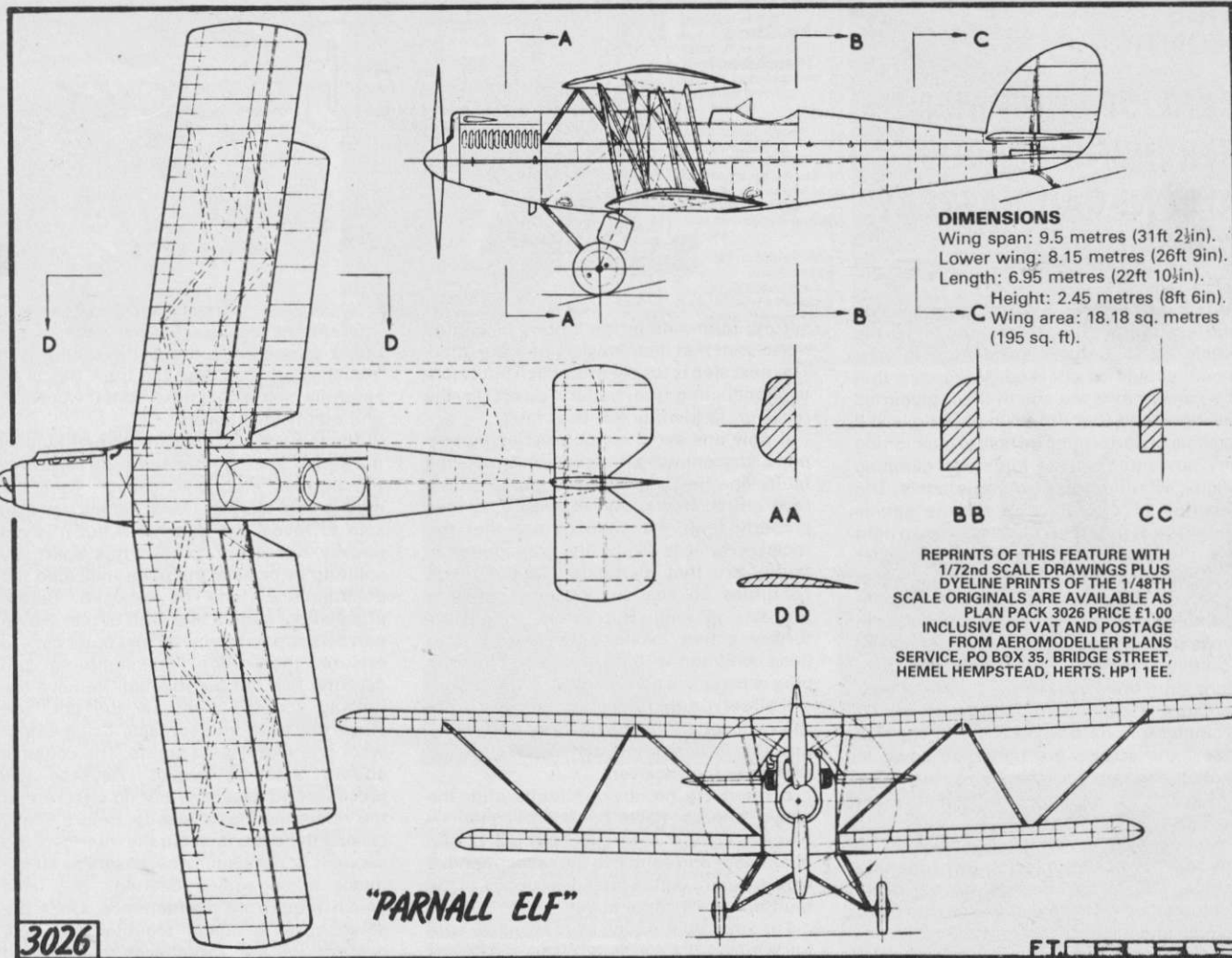
A bonus feature on the *Elf* is the way in which all vibration is damped between the engine and airframe. Although the upright 4-cylinder *Hermes* is itself a smooth-runner, it has a minor lumpy spot at the low end of the power-scale, but even this is not transmitted to the occupants. Possibly it is the smoothest piston engine and airframe combination of any aeroplane that I have met. This applies both on the ground

(where it is most noticeable) and in the air.

The *Elf* is flown from the rear cockpit, which is further back than on most designs, for even the front seat is well behind the centre of gravity. The layout is pleasant, but a baffling feature to find is the duplicated fore-and-aft trimming facility. A large geared handwheel on the right cockpit wall alters the tailplane incidence, while a small lever near the floor, just ahead of the control column, adjusts the stick pressure by a bungee. I was unable to find anyone who could advise on the need or use for this unique combination, but as G-AAIN had not flown for 34 years when we launched her on 24th June, this may not be surprising! By starting with each device in the neutral position and experimenting in the air, we learnt fairly quickly that even with all this help the *Elf* is not over-endowed with usable trim range.

There is insufficient space here to describe all the *Elf's* features in depth of detail, but points that should not be missed are the large slotted ailerons which have no cables or tie rods, but which are moved by external steel tubing; the small wing gap which brings the upper wing very close to the top of the fuselage at little above eye level to therefore offer a better view than on most biplanes, and the designer's aim to eliminate all technical jargon, with ignition switches marked 'stop' and 'run' and the trim lever with its range limits marked 'top speed' and 'stall'!

The *Elf* is an interesting addition to the range of exhibits at Old Warden. It is pleasant to fly and has an attractive appearance in the air. While not a world prizewinner, it incorporates several unusual features, and experience with these must have had some influence on the design of light aircraft from other manufacturers.



Early photographs of Parnall Elf show distinctive Warren girder wing bracing in head-on flying shot above. Full length top wing ailerons clearly visible at right, with full length hinge on lower wing to permit wings to swing back for storage. Left: fin and rudder hinge line differs from restored machine at Shuttleworth. "Air Portraits" & "Flight" photos.