



Why the Elf fell short

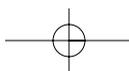
*The Parnall Elf of 1929 had novel features but could never match the Moth and the Avian, says **David Ogilvy***

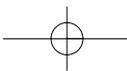
In the late 1920s the world of private and club flying was developing steadily, largely due to the introduction of the de Havilland DH60 Cirrus Moth in 1925. The Air Ministry had subsidised the supply of these Moths to six English flying clubs and this had encouraged other aircraft makers to enter the sales race. Among these were Avro, whose Avian met with substantial success, Spartan, who sold a number of Arrows, and Parnall who endeavoured to join the growing band. All these firms followed a broadly similar pattern with two-seat tandem open-cockpit biplanes powered by four cylinder in-line engines in the region of 100 hp.

George Parnall & Co, originally shop fitters in



via Philip Jarrett





Bristol, had 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 736cc Douglas engine that achieved 76.1 mph and won the Abdulla speed prize at Lympe 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 Yate in 1927.

From this assortment, many of which had been designed by Harold Bolas, the Elf evolved. The first of the three to be built made its public debut at the Olympia exhibition 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 just two, G-AAIN and G-AAIO, completed the Elf line. The prototype flew behind a Cirrus Hermes I of 105 hp while the two later machines boasted the additional 15 hp of the

Hermes II. Only G-AAIN has survived, owned by the Shuttleworth Collection at Old Warden.

The absence of sales success was not through lack of effort. Parnall's advertisements in the *Aeroplane* dated 31 July 1929 claimed the Elf as 'a machine with the most distinctive appearance on the market this year', adding 'rigid wing bracing' and 'reduced maintenance' among the machine's 'features of outstanding merit.'

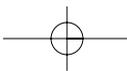
Although broadly conventional at first sight, the Elf has several novel features, some of which are good, but others of which are less bright. Among the former must be counted the wing bracing, for instead of the usual vertical interplane struts towards the tips, with landing

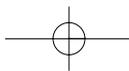


Image clipped via Philip Jarrett



Main photo: the layout of the Warren girder system of struts is clearly seen in this photo
From far left: George Geach Parnall with the first Elf
Wings folded—the makers' booklet claims that in this condition the Elf is 1ft 6in narrower than other existing machines
G-AAFH, the first Parnall Elf
G-AAIN at Hendon in July 1951 for the Daily Express '50 Years of Flying' display





via Philip Jarrett

Above: restoration nears completion at Shuttleworth, 1979
Below: the author carried out several test hops before embarking on the first full test flight in April 1980. This was the first time in 34 years that the Elf had flown
Bottom: Elf taxis out for the start of the test-flying programme, April 1980
Below right: the late Wing Commander Dicky Martin, then the Shuttleworth Collection's senior pilot, asks the author 'what was it like?' on completion of the first full test-flight

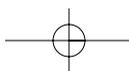


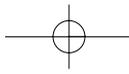
and flying wires inboard of those struts, a system of Warren girders provides the necessary rigidity and even eliminates the need for a jury strut when the wings are folded. The makers' booklet claims that in this condition the Elf is 1ft 6in narrower than other existing machines, to facilitate transport through gateways when being retrieved after a forced landing. How they must have known what was to come!

This brings thoughts to the fuel system, which caused problems; unlike the gravity-fed Moths and Avian, which have tanks in the top wing centre section, the Elf's main supply of 18 gallons is in the fuselage and therefore pump-dependant for its flow to the carburettor. A capacity of only 3 gallons in the top (gravity) tank leaves a very limited safe endurance for take-off, landing and circuit work, at which times it is unwise to rely on a pump. This applies also to display flying, which is at low level, so it is important to check before take-off that the top tank is full. Both the other Elves ended their lives prematurely following pump failures.

A bonus feature is that almost all vibration is damped between the engine and airframe. Although the upright four-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/airframe combination of any aeroplane that I have met. This applies both on the ground (where it is most noticeable) and in the air. Another 'plus' is the tailskid's ability to caster for a few degrees, which is helpful for taxiing compared with the early Moths and the Avian, which have firmly fixed skids.

The Elf is flown from the rear cockpit, which is further back than on most designs, for even the front seat is behind the centre of gravity. Clearly the distance between engine and occupant(s) contributes to the lack of vibration. The layout is pleasant, but a baffling feature is the duplicated fore-and-aft trimming facility. A large geared wooden 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 have been unable to find anyone who could advise on the need or use for this unique combination, but as no Elf had flown for almost 34 years when we launched 'AAIN' following restoration at Old Warden in 1980, (surprisingly it had flown once during wartime in 1940 – and four times in 1946-47) 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.

The large slotted ailerons have no cables or tie rods, but are moved by external steel tubing; compared with the Moths and Avian, the aileron travel is restricted, but this is a handicap only when manoeuvring at relatively slow speeds in lumpy conditions, when it is easy to be frustrated by hitting the stops with a solid clunk. The rudder and elevators have normal cable connections. The small wing gap brings the upper wing very close to the top of the fuselage at little above eye level and therefore offers a better view than on many biplanes, while the designer's aim was 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'!

It is always wise to check a type's stalling characteristics early in the test process, for often it is at the low end of the speed scale that any unwelcome characteristics reveal themselves. Here there is nothing unusual to discover, except that there is very little pre-stall buffet to serve as a warning of things to come. The break-away itself occurs at about 45 mph, which is comparable with the Avian, for which my notes recorded 43 mph IAS; it is very innocuous and recovery is immediate on moving the stick forward centrally.

Unlike the Moths and the Avian, both of which would loop smoothly, the Elf is not cleared for aerobatics. It is essentially a tourer, cruising at about 80 mph using 6.5 gallons an hour at 1900 rpm so, in respect of performance, all three types are broadly comparable. An additional check throughout a flight on this machine, though, is to ensure



**Above: on short finals to Old Warden above the spotters heads on the Biggleswade Road
Right: the upper wing is very close to the top of the fuselage at little above eye level and therefore offers a better view than on many biplanes**

via Philip Jarrett



that adequate fuel pressure is maintained as, in the event of pump failure, the main tank will be unusable.

Prior to landing, primarily to retain adequate control on the ailerons with their limited displacement, it is wise to maintain 75 mph until settled on the final straight approach; then the speed can be reduced progressively to cross the aerodrome boundary at 55. The long nose ahead calls for a more marked hold-off than either of the other two types to achieve a three-point touch down. The general tendency to swing as the speed decreases is broadly similar on all three, although, with the weight of the pilot so far behind the centre of gravity, I imagine that once started, a ground loop would be unstoppable; it is important to remain alert, especially if not directly into the wind.

The Elf is an interesting product of an imaginative designer's mind and well worth preserving as a flying historic exhibit. It is pleasant to fly in calmish conditions and has an attractive appearance in the air. While not a world prize-winner, it contains several unusual features; experience with these should have had some influence on the design of light

aircraft from other manufacturers. It came to light of day when the builders of Moths and Avians were well established in the aviation market and clearly it was not a competitor in terms of numbers. Apart from its reliance on a fuel pump that caused the loss of two out of three, it is a likeable little aeroplane that deserved a happier history. As a broad, overall assessment, though, I think the production numbers – Moth, Avian and Elf, in that order – reveal the truth.

Unfortunately the Elf was not alone in failing to capture the market. Eight examples of the last Parnall design, the Hendy Heck, were built for private owners, but the variant with the greatest potential, the Parnall 382 Heck 3, missed out and only one was made. Intended to cover an Air Ministry requirement for an elementary trainer for the RAF, the contract was granted to Phillips and Powis Ltd of Woodley, near Reading, for production of the Miles Magister, almost 1300 of which were made shortly before and during the early stages of World War 2. So the Parnall name slipped away quietly from the aviation scene, known only to those who were close to the pulse of the time. ■

