CORBEN BABY ACE

Clive Davidson flies an important aircraft in homebuilt history, which remains as much of a pleasure to fly as it was back in 1929. Pictures by Neil Wilson

(Top) **Gerry's owned G-DACE since late 2012, the Baby Ace 'D' variant being built in Savannah, Georgia, by a JC Cole.**
(Above) **The Baby Ace's well-designed controls and spartan yet functional instrument panel put everything within easy reach.**
(Above right) **The polished cowling and the exposed cylinders of the Continental A-65 engine crown the Baby Ace's vintage appeal.**
(Right) **The tailwheel is a solid-tyred Scott, which is steerable via the rudder arms and spring tension.**
(Far right) **Gerry's Father fought with the 'Chindits' in Burma, hence the tribute above the 'Ace' decal on G-DACE's fuselage.**

The White Ox Mead grass farm strip, south-west of Bristol, is unmarked on the half-mil chart, but as our directions noted, "it isn't too far from the Radstock visual reporting point", and its surrounding features are better seen on a quarter-mil chart. I headed there with Jeremy in his Jodel Sicile, at 1,500ft on the QNH. We'd flown up from the south, past Frome – which is pronounced 'Froom' – picking up the winding course of the Kennet and Avon Canal.

I had the chart aligned with our heading and was scanning the area, trying to orientate the surrounding features and intuitively feeling that we must be close, when Jeremy's finger shot past my left eye as he called "There it is!" Indeed it was, in our two o'clock, between the nose and wing tip. We were running parallel to the runway, and banked to position for a dead side join as I scanned for traffic.

The strip is 524ft amsl and comprises a generous 530x 30m of healthy grass. From downwind, it looks to be atop a hill and as flat as a pancake, but lower down, on base leg, and progressively more on final, the first half of 24 is clearly an uphill gradient. The upslope isn't as much as at Eggesford but is enough to be aware of. The orange windsock was showing eight or so knots, 15° from the right.

Sliding in over the recently trimmed, flat-topped, white thorn hedge, Jeremy brought us in for a particularly smooth three-pointer. We slowed without needing to brake, turned around at the apex and taxied towards an already open hangar, outside of which the Corben was sitting, prepared and chocked, patiently waiting with her owner, Gerry Holland, who was beaming away in his characteristically jovial manner.

Following warm, hearty handshakes, Gerry made the offer of tea and biscuits – a selection, no less – what an hospitable host. We sat in the open hangar, out of any wind, in mild temperatures with the elusive February sunshine warming us. It was lovely spot to while away the time, but we had 'work' to do.

A RETURN VISIT

Around a year ago, we'd spoken to Gerry to see if there might be a chance of putting his aircraft in front of Neil's camera for a *Flight Test* and, very kindly, he'd readily agreed.

The plan had been to also fly Richard Webber's delightful, JAP J-99-powered Luton Minor, an aircraft of similar vintage to the Baby Ace, for a comparison between vintage American and British-homebuilt ultralights. Unfortunately, for all manner of reasons – including weather, tech problems and expired permits – we've yet to fly the Luton. And given this winter's weather, we'd emptied the cupboard of *Flight Test* material, so decided to run a feature focusing solely on the Baby Ace.

This visit was for me to take another flight as, rather clumsily, I'd lost my notes but wanted to really do the Corben justice. I recalled that when I'd previously flown the Baby Ace I had really enjoyed it, and did remember some distinctive snippets of information, such as her throttle and trimmer quadrant grouping, and the ever-so-benign, hardly definable stall. Thankfully, Gerry was happy to oblige, so there we were, once again enjoying his hospitality, drinking tea and nibbling the odd biscuit, or two!

In his own words, Gerry describes his Baby Ace as 'shabby chic', an expression that's generally associated with furniture which has a rather 'distressed' painted look. It's an acquired taste, I'll admit. I confess that I think the description is perhaps a little unkind for G-DACE as, all-in-all, I think she's a rather aesthetically charming and tidy looking machine. Let's call her 'visually presentable with sound underlying engineering and systems'.

Approaching the aircraft, the sunshine reflected off the polished aluminium cowling and cockpit sides, from where fabric covering continues rearward, its cream colour contrasting with the dusky powder blue of the wing's leading edge and detailing, the latter including a matching pair of spats. A varnished wooden prop by the American manufacturer Flottorp compliments the chrome rocker covers of the Continental A-65 engine, the exposed cylinders of which crown the vintage appeal of this parasol-winged single-seater, which can trace its design history back nearly ninety years, to designer Orland George Corben.

UPS & DOWNS

Born in Des Moines, Iowa in 1904, Orland Corben was learning to fly in a Curtis Jenny at fourteen, and by the early twenties he was making his living barnstorming. Corben set about designing a two-seat aircraft sometime in the mid-twenties, and by late 1928 his Topeka #1 'Ace', powered by a 27hp Henderson engine, had taken to the air.

In July 1929, the Ace Aircraft Manufacturing Corporation was incorporated in Wichita, Kansas, and a single-seat variant, the Baby ›

(Above) **Paul Proberezny's original Baby Ace, as featured in *Mechanix Illustrated* during 1955, is displayed from the ceiling of the EAA Musueum at Oshkosh, Wisconsin.**

Ace, was advertised being as available as plans, a kit or a completed aircraft. Over the next few years, like so many American aircraft companies of that period, Ace had its ups and downs, changing name and location, until it ended up in Madison, Wisconsin, in late 1932.

The then Corben Sport Plane and Supply Company offered kits and complete, open or closed-cockpit, variants of the single-seat Baby Ace, with either Heath B-4 or Salmson AD9 engines, and the two-seat Junior Ace.

The company ran until the start of America's entry into WW2, in 1942, although only 32 registrations for ready-to-fly Corben aircraft were allocated throughout its eleven-year history. However, throughout the thirties, Corben published plans and build articles in the popular aviation magazines of the time, and sold plans, kits and components to homebuilders.

After the war, the company didn't resurface and its assets were stored at a machine shop in Madison. One Mr Paul Poberezny, who founded the Experimental Aircraft Association (EAA) in early 1953 then entered the story.

Poberezny bought the assets of the Corben company and engaged Stanley J Dzik to upgrade the original Baby Ace 'B' plans to meet then-current US CAA requirements, and made the resulting 'C' variant plans available to EAA members.

The upgrade modifications included using the undercarriage, fuel tank and cowlings from the Piper Cub, they being parts which were readily available at the time, due to the high number of the type having been produced for military service during the war years.

In 1955, Proberezny wrote a series of articles following his own Baby Ace 'C' build for *Mechanix Illustrated*, which gave a tremendous boost to the level of interest in homebuilding around the globe. The Baby Ace was again upgraded by Dzik, to become the 'D' variant, and the production of kits and parts was re-started in the mid-fifties. A two-seat variant was derived from the Baby Ace D, to become the Junior Ace 'E', with plans becoming available in 1958.

In time, the assets of the Baby Ace business were sold on, and they have changed hands a number of times over the years. They're now held by Ace Aircraft (*www.aceaircraft.org*) which, as of 2014, was advertising plans, parts and kits for the Baby Ace B, C and D models, plus the Junior Ace E two-seater. In addition, Aircraft Spruce & Specialty sells plans, materials and hardware kits for the two-seat Pober (Corben) Junior Ace.

CLASSICALLY AMERICAN

The Baby Ace follows the classic American practice of having a welded steel tube fuselage and tail surfaces, and a wooden wing. The wing, tail and rear section of the fuselage are fabric-covered, the forward section being partly sheathed in riveted sheet aluminium.

The pictures of Baby Aces that I've seen show, aft of the cockpit, the rear fuselage as a simple flat deck. However, Gerry Holland's example has a raised headrest, which I find visually appealing, as it adds to the Baby Ace's otherwise straight lines. It's formed around the rear wing attachment point and also serves as a useful cubby hole to hold a few essential items.

Looking directly from the front, the wood and fabric-covered parasol wing, which are actually two separate wing panels, can be seen to have a slight amount of dihedral, doubtless adding to its inherent pendulous stability. The wing features the classic Clark 'Y' aerofoil, developed by Colonel Virginius Clark in 1922 by deforming one of the wartime Göttingen airfoils to make the aft seventy per cent of its bottom flat. The flat bottom turned out to be a very attractive feature for designers because it greatly eased wing construction.

This parasol wing is supported at two points in its centre section, forward with a four-strong pyramidal cabane strut grouping, and at the rear by an inverted vee. Laterally, there are two pairs of parallel wing-to-fuselage struts. Jury struts compliment the wings struts, which also feature a drag cable, running from the lower front strut-fuselage attachment to the upper, rear strut-to-wing attachment.

The wood and fabric-covered ailerons are blunt-nosed and have a maximum upward and downward deflection of 20°. Leaning into the cockpit and waggling the stick, there's a little bit of friction, but the cables do have a somewhat convoluted journey – under the floor panel, up the fuselage sides, exiting by the rear struts of the front cabane, and then up into the wings and off to the ailerons. No flaps are fitted.

The tailplane is wire-braced to the upper end of the sternpost and the lower fuselage longerons, with the elevator having a small trim tab on the left trailing edge. The tailwheel is a solid-tyred Scott, steerable via the rudder arms and spring tension. It seems almost superfluous to say that there are no aerodynamic balances on any of the control surfaces, on such a super-simple design one would hardly expect there to be any!

On both fuselage sides, just below the cockpit, is a personal tribute to a British India 'Special Forces' unit whose actions are only just still within living memory, and then for just a few. It's a decal of a mythical Burmese animal, sitting on its haunches beside a building, named a *Chinthe* or *Chinthat*, which guarded temples. This creature is the adopted emblem of those who served as 'Chindits' in

(Above) **As you'd expect, for many modern pilots, the Baby Ace's cockpit is something of a snug fit, but facilitated by a small, forward-hinging door, which latches against the fuselage. Unwisely, Clive ignored Gerry's advice, which made his entry much trickier!**

(Above) **The quality of Orland Corben's original design, and Paul Poberezny's upgrades, are certainly worth celebrating.**

Burma during 1943-1944. The Chindit units operated for long periods, in very inhospitable conditions, against the Japanese, behind their lines. Gerry's father fought with the Chindits, in the 8th column commanded by Major Scott.

CLAMBERING ABOARD

I invariably comment upon the technique of getting into the cockpit and recently read of a test pilot's report on a potential Royal Navy torpedo bomber of the WW2 era, the Blackburn Firebrand. What an enthralling and image-stirring name – a shame it met with little success. To paraphrase, the comment was, 'Entry into this cockpit is awkward, it should be made impossible! It was plagued, not by locusts, but by unacceptable handling traits.'

In complete contrast, entry into the Baby Ace's cockpit is certainly worth the effort, and with a little forethought it's really quite easy, as long as you try it from the right-hand side, where a small cockpit door swings forward and latches against the fuselage.

Getting in, I did precisely the opposite of what Gerry suggested – I should've gone behind the wing and used the step aft of the rear strut, then pulled myself up and into the cockpit. However, I couldn't see how I'd sidle past the rear strut and still get onto the seat.

Instead, I got between the struts, placed my left foot around the stick and as far into the far left-hand side of the cockpit as I could, then used a convenient tube to lean in and slide over the low cockpit edge. Then, leaning as far as I could to the left, I concertinaed my right leg with my arm and pulled my foot into the narrow confines of the fuselage. Getting out, as I was to find later, became a bit of game. Top marks must go to Gerry's suggested method, which he performs with ease and aplomb!

The wing was just above my hatless head, and the back of a fuel tank featuring a placard indicating that it holds 12 gallons / 54 litres is right over my knees. The Baby Ace has that simplest of fuel indicators, a wire rod on a float through the tank cap, and the tap is an easily accessible lever beneath the tank which moves left or right for On and Off. Heel-operated, hydraulic, Cub-style Scott brake pedals sit between those for the rudder.

The cockpit itself is well presented and uncomplicated. The left side-mounted throttle quadrant is a solid and smooth-operating affair, with the elevator trimmer rigged just abeam and under the throttle, so it may be adjusted with your thumb without taking your hand off.

The carb heat lever – just pull for hot air – is neatly placed at the back of the throttle quadrant. Beneath this assemblage is a small panel containing the master switch – a knob to pull up for service – and although the wiring for the various amenities is open it's hard to think how these might accidentally be pulled out of their connectors. The headset jack sockets are conveniently sited just in front of the master. I liked the ergonomics of this arrangement.

The matt-black instrument panel contains the minimum of VFR instruments. Central to the needs of navigation, and smack in the middle of the panel is an Airpath compass in its polished copper mount. The altimeter is to its north, and spaced clockwise are an rpm gauge, a huge smile of a slip ball and the ASI. There are smaller oil temperature and pressure dials left and right of the altimeter, just under the lip of the cockpit's forward edging.

The 'in and locked', Ki-Gass-type primer is ergonomically sited forward of the throttle quadrant, and below it sits an XCOM 760 radio with a remote backlight switch. Across the other side are the tumbler-style magneto switches. Looking directly forward, there's the circular face of an outside air temperature gauge, and that completes the instrumentation.

PRE-FLIGHT CHECKS

Gerry placed his iPhone in a mounting bracket on the left side, by the windscreen, to use an aviation nav app – he also keeps a current chart tucked behind the trim cable sheath on the left-hand side of the fuselage.

He then checked the oil level, which is very simple as the filler is accessible without having to remove – or even open – anything on the cowling. The level should be around the three and a bit quarts, more than that and the engine chucks it out. The tank's capacity is four quarts and, it being winter, Gerry's using Shell W80. In the summer, he switches to W100

I was successfully strapped in the cockpit so Gerry began the start sequence by confirming, using sight and feel, that the magnetos were down and off. I closed and 'snicked' the door shut. "Set the throttle a quarter of an inch open", he instructed, and pulled the prop through four healthy compressions. "Give her four full primes," he advised. I checked that the fuel selector was on, unscrewed the primer, gave it four full shots and locked it in. "Left mag… on." I flicked it up and raised a thumb to acknowledge and she fired with Gerry's first blade – marvellous!

I was just putting the right mag on as Gerry's head appeared and told me to set 1,200 rpm. All I had to do was sit in the slight waft of a breeze and let her warm up. Helmet on and jacks plugged in, time and wind noted, and altimeter set to zero for the strip.

I hadn't quite a fist's width of headroom above my helmet, but I certainly could bounce a flat hand up and down between it and the lower wing – there was enough space. I was aware that I could scan laterally and down, all of the way from the left hand tailplane at seven o'clock, over the nose, around to five o'clock and the right tailplane. However, any upward view is masked pretty much entirely by the wing – I'd just have to raise the wing to clear the sky rather frequently.

With the oil temp nearing the 150°F mark, I raised the power to 1,600rpm, and checked the mags and carb heat. Having signalled me to throttle back, Gerry removed the chocks and I leant forward as he stowed them in the rear headrest. After checking the approach, I taxied forward, applying right rudder and a touch of brake. The Baby Ace's short nose swung ›

The A-65 fired with Gerry's first blade and was ready for take-off – marvellous!

in a narrow arc and I was off on my second flight to uncover her true character.

The journey of this particular Baby Ace 'D' variant is that it was built in Savannah, Georgia, by a JC Cole – the serial number, as is common enough, reflects his initials, JC-1. It was built in the early sixties and imported in the late eighties, passing through the hands of seven individual owners and one small group before coming into Gerry's custody in late 2012.

GETTING AIRBORNE

Applying power smoothly and positively and keeping the tail on the ground as I squeezed on a touch of right rudder, I counted slowly to four and lifted the tail, which improved the already good view over the nose. A superb marker, the Wells mast, was sticking up prominently above the horizon, directly in line with the centre of the grass runway.

The sensation of the wings generating lift was increasing and the Baby Ace was becoming light on its wheels. At under 40mph we were airborne and remained in ground effect until 50mph and climb-out at 55. Ah, it was good to again be airborne in a basic but characterful, open-cockpit light aircraft.

I turned left away from the curved road at Wellow, glad that I had a good neck-warmer on. I estimated the rate of climb around the 400fpm mark. The uninterrupted view downward was marvellous and I started a series of wing raises to check that the horizon was clear of traffic. There was little or no onward rush of air or slipstream blast behind the screen, and the fuel indicator rod settled as I reached the top of the climb at 1,200ft.

The placement of the trimmer on the throttle quadrant is particularly well sited for setting cruise trim. Floating around the local area, I used 1,800rpm for a return of 70mph, at which setting she was burning 15 litres per hour. Gerry says that he sets up to 2,300 revs and, on a cold, dense day his cruise rises to over 85mph at eighteen litres per hour.

TIME TO PLAY

As expected, she was stable in all three axes; in pitch the return to a stable attitude returns in two phugoids, the nose swings to the lower wing after a side slip, and the wings to level from crossed controls. The short nose does wander away from the direction of roll, but it's only a slight divergence.

Pitching was light on the stick and rudder pressures are 'normal', but the ailerons, hmm… they're a bit stiff. I intended to see what the rate of roll was, starting from a 30° left and rolling to 30° right, and then in reverse. But I was slightly taken aback as the stick force was out of all proportion for the roll rate gained.

On the ground, while checking for 'full and free', the aileron circuit range of movement and column action was full and without restriction, there was a tad of friction but no sticking or squeaking. So, the conclusion is that the stiffness is down to the aerodynamics of those blunt-nosed ailerons. However, in normal, smooth flight this trait would be unnoticed, as only small control deflections are used. And anyway, during steep turns, the lowered wing, when looking into a turn, masks the very area you're aiming for. A reduced angle of bank both removes stick pressures and maintains a view of the horizon.

Side slips to the left and right are impressive, but slipping turns can really produce a stonking rate of descent that could easily blow the goggles from your head. The eye-watering rush of air coming in an uninterrupted flow across your face at the approach speed of 55mph isn't just a distraction, and in the prevailing winter conditions was an Arctic-chilled blast!

Uncross the controls, the draught dissipates and normality returns – that windscreen really does work very well.

SLOW SPEED REGIME

Stalling isn't really the correct term to apply to the Baby Ace's humorous reaction, with its high angle of attack, low fluctuating speed and rate of descent. Imagine a courting pigeon in flight, it dives, swoops upwards, flaps its wings and then arcs, nose-down, to glide and repeat its rising and falling path. Well, that's pretty much what the Corben does, but without the billing and cooing.

As the ASI needle falls towards 40mph, with the stick held firmly back and the throttle at idle, the nose drops as if to stall, but very quickly starts to rise again, as the speed almost immediately brings the up elevators into action. Then, having pitched the nose above the horizon, it falls through and repeats the process. There's no shuddering felt through the elevator and stick, due to the air detaching from the wing, presumably as this air is above the tail. Relax the stick pressure and, again, normality is returned.

BRINGING HER HOME

I headed back towards the proximity of the strip and a made a few checks. Fuel-wise, the wire was still bobbing ahead and there isn't a fuel pump to turn on – no slats or flaps, nor park brake either – the straps were still tight and the altimeter set to strip QFE.

I overflew the strip, missed the few settlements around, let down dead side, ran downwind and flew base over the field with cattle in it, checking for wires, posts, ditches or anything else that might disrupt and alter my spontaneous and, up to that point, unplanned arrival.

From a close base leg, the rpm was initially settled at 1,600, the speed trimmed at 55mph and power removed as required. This first approach was to confirm my memory of her character during slow flight, close to the ground, and it wasn't my intention to put her down and stop. I'd already seen, into the turn, that the undersurface of the wing blinds the horizon from view. But as the downward view is exceptional, I thought it would be fun to be high on base, making absolutely sure nobody else was beneath, or outside my position, or on any stage of final, and bring her in with fully reduced power and a sideslip.

All went well and I straightened out within the undershoot, carrying just a few needles' widths of excess speed, to use flaring up the incline on the first half of the landing area. While settling in the flare, the mains touched fractionally before the tail. I'd been slightly too fast over the hedge and needed to bring the stick all of the way back as I settled onto the mains – fractionally – first, instead of on all three points together. More effort required!

Around again, into a bad weather, low-level circuit and, with the standard glide and slipping approach speed of 55mph, she settled down on the uphill section and all worked well. I taxied in beaming, having particularly enjoyed the flight, my refresher on type.

HOMEBUILDING HISTORY

The Corben may well be a rather elderly Baby of 88 years, but she's certainly a sprightly Ace for a pilot's enjoyment. Operating from a strip and simply flying around an area to observe the world below, the Baby Ace allows her pilot to feel and be in contact with the air. Factor in the modest operating costs and she provides a timeless aspect of flying, one far removed from the opposite end of the LAA spectrum, with its glass cockpits, long distances of straight and level, and instrument procedures.

The Corben's niche is still very much both appreciated and enjoyed. Her somewhat hidden yet influential part in the history of the homebuilding movement, particularly in the US, is a rare and very pleasing discovery. She's quite an aeroplane.

My thanks go to Gerry for his hospitality and a very enjoyable flight. Hopefully, I'll see him at Henstridge for our Meet the LAA event on 23 April, where it will be my turn to supply the tea and biscuits! ■

BABY ACE D SPECIFICATIONS

GENERAL CHARACTERISTICS

Length: 17ft 11in (5.46 m)
Wingspan: 26ft 6in (8.08m)
Height: 6ft 7in (2.0m)
Wing area: 110sq ft (10.22sqm)
Empty weight: 630lb (286kg)
Loaded weight: 950lb (430kg)
Powerplant: Continental 65-100hp (50-75kW)

PERFORMANCE

Maximum speed: 110mph (176km/h)
Cruise speed: 95mph (155km/h)
Rate of climb: 1,200 ft/min (370m/min)
Stall speed: 38mph (60km/h)
Service ceiling: 10,500 ft (3,200m)