COURTESY JOHN UNDERWOOD

The Heath Parasol

Under the Heath umbrella—airplanes and hi-fi kits

BY PETER M. BOWERS

Many readers are familiar with the Heathkits assembled at home by electronics and hi-fi buffs. Few, however, are aware that this firm is a direct descendant of the Heath Airplane Company, Incorporated, which between 1926 and 1933 produced kits for lightplanes. The Heath firm, then based in Chicago, built several different models, but the best known is the one simply identified as the Heath "Parasol."

The company did not start out to manufacture airplanes. Owner Edward Bayard Heath had designed and built his first airplane in 1908 and subsequently managed to stay in aviation. After World War I, he had a successful aircraft surplus and supply business and a flying school, plus he modified an occasional airplane, notably the Heath "Favorite," a 1922 modernization of the war-surplus Curtiss JN-4 "Jenny."

Several events for lightplanes with engines smaller than 80 cubic inches at the 1924 National Air Races encouraged Heath to return to original designs. In 1925, assisted by Clare Lindstedt, he developed two models. The first was the design that was to become the Parasol and the other was an all-out racer. Both were powered with converted Henderson motorcycle engines. These were four-cylinder, in-line, air-cooled models that were then in wide use by the police and were becoming popular with the builders of ultra-light airplanes. There were no small-displacement airplane engines readily available at the time. The 1925 racer was not a big winner but did well enough to attract attention to Heath designs.

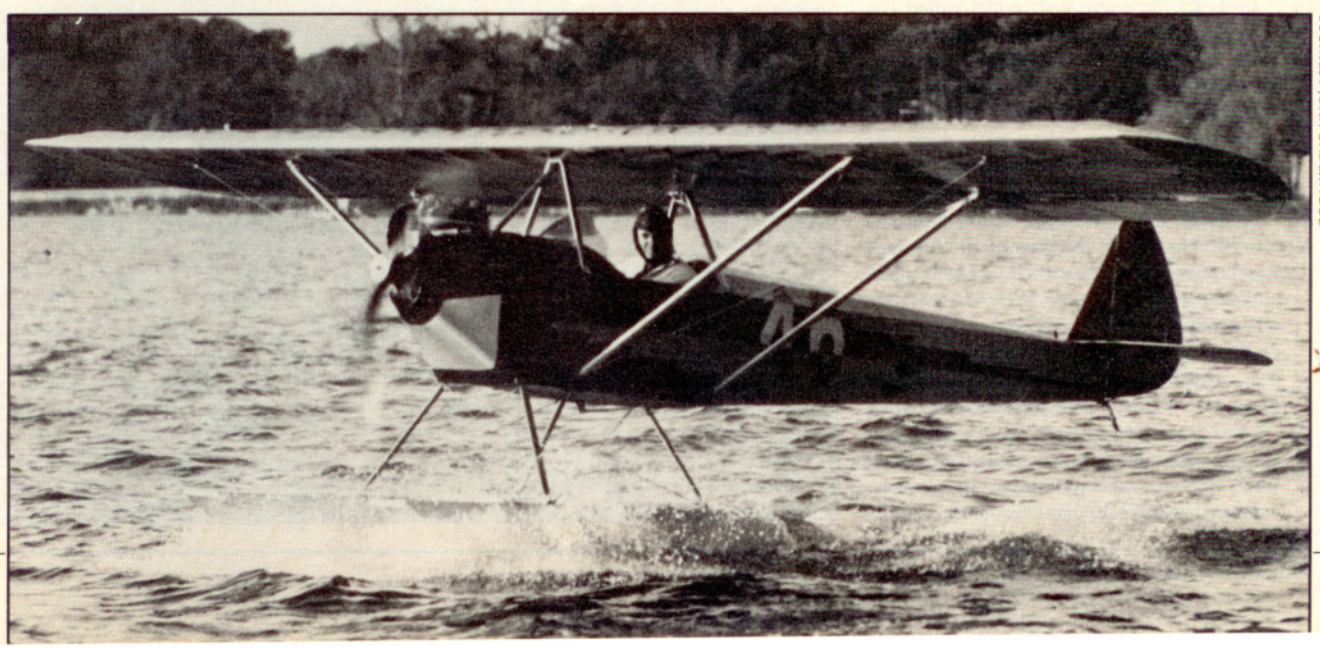
Heath's Parasol was a conventional, single-seat design with the pilot seated under the wing and directly on the center of gravity. (The parasol design is a monoplane with the wing held above the fuselage by struts, rather than being attached directly to it.) The fuselage was welded steel tubing with wire bracing, and the tail was a combination of wood and metal. Both were fabric covered. For the benefit of unskilled, amateur builders, the fuselage tubes could be joined by easily bent-to-fit, sheet-metal fittings secured by twopenny nails used as rivets, instead of by welding.

As a production shortcut, the first Parasol used the complete upper wings of a war-surplus Thomas-Morse S-4C Scout, the "Tommy." The thin airfoil of this wing did not produce much lift, and with the engine delivering a bare 23 hp through an inefficient, high-speed propeller, the first Parasol was a marginal performer. Subsequent models used the original wing design with the new Clark-Y airfoil but retained the 25-foot wingspan of the Tommy.

The improved Parasol was a success and encouraged Heath to expand the business to include the manufacture of complete Parasols, the production of Parasol kits and the modification of Henderson engines for aircraft use. He also built propellers. In 1926, the factory-built Parasol, complete, sold for $575, and a complete kit—less engine—was available for $188. The sale of uncertificated designs and do-it-yourself kits was legal then—civil air regulations, aircraft type certification and pilot licenses were not adopted in the United States until 1927.

The Heath conversion of the Henderson engine, later to become the Heath B-4, is worthy of separate mention here because of its importance to Heath's own Parasol line and because it is one of the few non-aircraft engines in its day to be adapted successfully

A pair of early Heath Parasols is shown above. The 1925 prototype, back, has the thin-section Thomas-Morse wing. Subsequent models used the Clark-Y airfoil. The Parasol below is equipped with flat-bottom wooden floats. Until modern ultralights, the Parasol was probably the lightest floatplane ever built.



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The improved 1930 Super Parasol also was known as the V-Parasol because of its V-struts. Plans for this improved version were serialized in Popular Aviation *magazine in 1930. The aircraft shown above was built in England and has modified landing gear and a British-built 36-hp Aeronca E-113 engine.*

continued

and significantly for use in an aircraft.

Heath made gradual modifications until there was not much Henderson left other than the crankshaft, cylinders and some moving parts. He enlarged the valves, added finned valve covers for cooling and replaced the rear crankcase cover with a new casting containing a thrust bearing, making that the front end of the engine. He also added a larger and deeper sump. A single Bosch magneto was installed on the right side of the upper crankcase. The bore was 2.75 inches and the stroke was 3.5 inches for a displacement of 83 cubic inches. The compression ratio of the next-to-rear cylinder was decreased from the standard 4.6:1 to offset a tendency to preignition caused by a compression-ratio increase that resulted from carbon build-up in this poorest-cooling-cylinder. The B-4 delivered 27 hp at 2,700 rpm. Though the B-4 never qualified for an engine Approved Type Certificate (ATC), it did win a lesser approval that allowed it to be used in licensed airplanes. Production continued into 1936.

In 1927, an improved model called the "Spokane Parasol" gave a good account of itself in the National Air Races in Spokane, Washington. A production model that incorporated the Spokane improvements was marketed as the "Super Parasol," which was still available as a kit with the option of a welded or the nail-riveted fuselage.

A notable improvement was a bottom-hinged door on the left side of the fuselage to simplify the acrobatic feat of getting in and out of the tiny craft. Why the left side when most airplanes with doors had them on the right? The engine was responsible for that. The Henderson was a left-hand engine—it rotated counterclockwise when viewed from the cockpit. (Most American aircraft engines rotate clockwise.) With small airplanes like the Heath, it was then common practice to hand prop the engine from behind when the pilot was starting it alone. When standing on the left side, the pilot's left hand was on the prop while his right worked the switch (remember, only one magneto) and the throttle and held the airplane back. Plans for the Super Parasol were published in serial form in *Modern Mechanics* magazine in 1929 and were reprinted in the same publisher's *Flying and Glider Manual* in 1930. By late 1929 the price of a factory-built Parasol had risen to $925.

Although licensing requirements were now in effect, the ultra-light and homebuilt industries managed to carry on. It prospered mainly in those states that had not adopted the new federal regulations yet; but it did reasonably well in others by keeping a very low profile. A major problem that the historians have with this period is in finding really "pure" examples of the various designs. Without regulations to hinder them, many builders modified their airplanes before completion or made changes afterward as experience dictated. The use of other than the original engines was commonplace, of course, and many builders altered the shapes of the wing tips and tail surfaces to give a personal stamp to the basic design. With the Heaths, some builders went so far as to stretch the design into a two-seater; some also beefed up the Parasol to handle bigger engines and increased the wingspan to improve takeoff and climb performance and to reduce sinking speed. The original dimensions of the Parasol had been tailored to Ed Heath's measurements, and he only weighed 110 pounds.

In late 1929, Heath abandoned the nail-rivet option and the old-fashioned wire bracing and went to an all-welded fuselage with the tubes in a Warren-truss arrangement that took care of the torsional loads. The nose lines were cleaned up, the landing gear was changed from a cross-axle to a divided-axle, and the wing struts were changed from two parallel supports on each side to V supports on each side. The revised design was still called the Super Parasol but

	1928 SUPER PARASOL (Uncertificated)	1931 LNB-4 (ATC 456)	1932 LNA-40 (ATC 487)
Specifications			
Powerplant	Heath B-4 27 hp @ 2,700 rpm	Heath B-4 25 hp @ 2,800 rpm	Continental A-40 37 hp @ 2,550 rpm
Wingspan	25 ft	31 ft 3 in	31 ft 3 in
Length	16 ft 9 in	17 ft 3 in	17 ft 3 in
Wing area	110 sq ft	135.5 sq ft	135.5 sq ft
Wing loading	5.09 lb/sq ft	5.16 lb/sq ft	5.16 lb/sq ft
Power loading	20.74 lb/hp	28 lb/hp	18.9 lb/hp
Empty weight	260 lb	450 lb	465 lb
Gross weight	560 lb	700 lb	700 lb
Performance			
High speed	70 mph	73 mph	80 mph
Cruising speed	N/A	62 mph	68 mph
Landing speed	28 mph	32 mph	32 mph
Initial climb	N/A	350 fpm	500 fpm
Ceiling	N/A	9,000 ft	14,000 ft
Range	200 sm	215 sm	200 sm

N/A—data not available.

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COURTESY JOSEPH P. JUPTNER

A major design change was necessary in order to qualify the basic Heath Parasol for an Approved Type Certificate. The most obvious new features, shown above left, on the LNB-4 are the increased wingspan, larger tail and revised strut arrangement. The LNB-4 had the Heath B-4 engine. The LNA-40 above right was built from plans available through the Experimental Aircraft Association, 66 years after the first one flew. The Heath LNA-40, bottom, had noticeably different nose contours; because of the clockwise A-40 engine, the hinge-down door was relocated to the right on this aircraft.

also was known as the "V". The National Air Races still had small-displacement events, and the "V-Parasol" still managed to bring home trophies.

Ed Heath was killed in February 1931 when the wing of an experimental model he was testing broke in flight. His company, however, was not a one-man show. It was reorganized as the Heath Aircraft Corporation and moved to Niles, Michigan.

By this time, air regulations were being enforced to the point that unlicensed, factory-built airplanes no longer could be sold. If the firm was to stay in the airframe business, it had to get an ATC for the Parasol and for a modification of it, which was being marketed as the Heath "Center Wing" because of the new wing location below the upper longerons.

The existing 25-foot wing simply did not allow the Parasol to meet the takeoff and landing performance requirements, even with the engine upped to 27 hp. Chief engineer Charles W. Morris took the route that some homebuilders already had taken and increased the wingspan to 31 feet 3 inches, changed the strut arrangement, revised the landing gear and fitted larger tail surfaces for a new shape. An aerodynamic oddity for the time was the use of full-span ailerons.

The new Parasol, with the designation LNB-4 for Model LN with Heath B-4 engine, received ATC 456 on December 16, 1931. The company still was interested in the kit business and was able to receive approval for kit sales of the ATCed design. The homebuilt could be issued a standard license, provided it was inspected by the government frequently during construction to ensure that the workmanship was up to standard and that it did not deviate from the approved plans. The 1932 price for the LNB-4, F.O.B. factory, was $1,074, which was lowered to $925 because the Depression hampered sales even at that low price. The kit, still less engine, was $499 but dropped to $399; the engine alone cost $300.

The 27-hp B-4 engine was barely adequate for the enlarged airplane, so a more suitable powerplant was found—the 37-hp Continental A-40, a bona fide airplane engine. The airframe on the new Model LNA-40 (for an LN with the A-40 engine) was identical to the LNB-4, but the nose was altered notably. Some airframes that had been started for B-4 engines retained the left-side door, but the remainder switched the door to the right side.

The LNA-40 received ATC 487 on June 3, 1932, and sold for $1,224, which soon dropped to $1,085 because of the Depression.

As did many other aircraft builders, the Heath firm fell on hard times during the Depression. It was reorganized in 1933 as the International Aircraft Corporation. The airplanes still were marketed as Heaths, but the new management did not seem to know much about the aircraft business. On the complaint of discontented stockholders, the firm was seized by the Treasury Department in 1935 and sold to a new owner, Howard E. Anthony. He renamed it Heath Aviation Company and moved it to Benton Harbor, Michigan. The LNs and the Center Wing were still on the market as late as 1936, but it was subcontract work for other manufacturers that kept the firm going. After World War II, Anthony bought large quantities of surplus electronic equipment and started the Heathkit business that proved to be more profitable than the airplane line ever was.

The electronic era did not spell the end for the Heath Parasol, however. The Experimental Aircraft Association (EAA) acquired the rights to the design of the LNA-40 and redrew the plans for amateur builders. The ATC has long since expired, but the homebuilt, powered with a 65-hp Continental A-65 or similar engine, is eligible for licensing under the current Amateur-built category.

Heath Parasols have been flying somewhere in the country continually since 1925, when the first one flew. Several LNs built from the EAA plans are flying today, along with a few restorations of factory-built models and of those built from the magazine plans, continuing the 56-year saga of this pioneer homebuilt. □

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