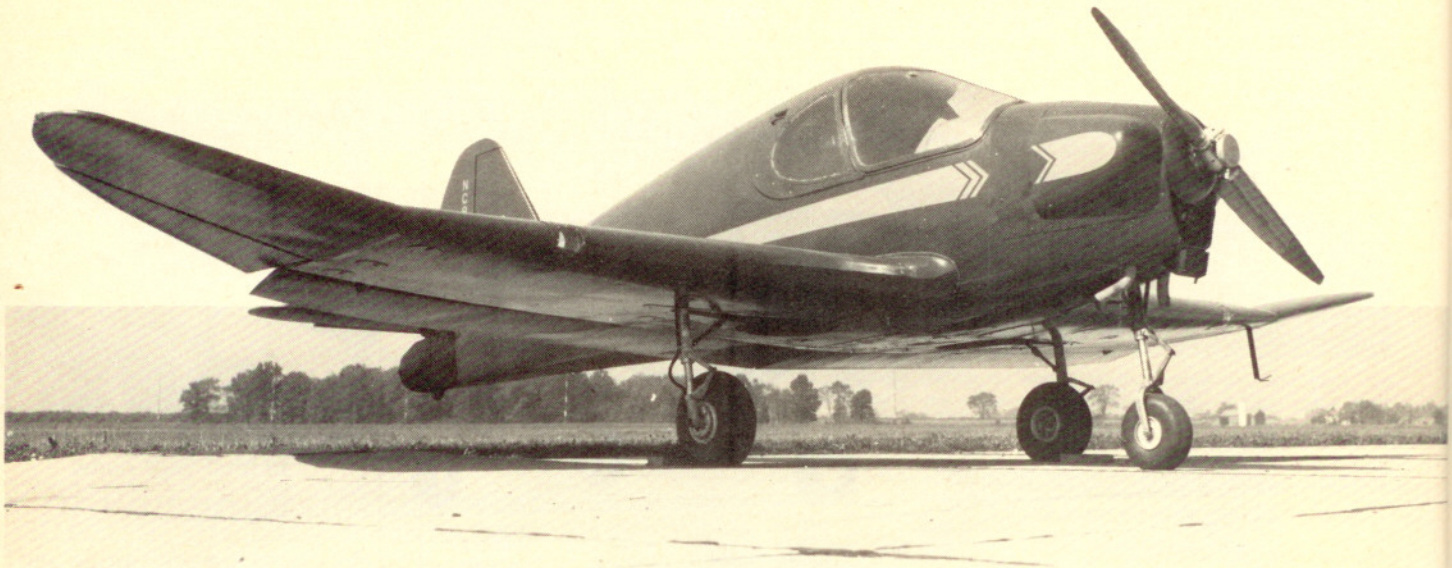


Yesterday's Wings **The Culver V**



This view of a Culver V shows the distinctive elliptical shape of the unique upturned wingtips. Note the recessed handgrip above the rear window.

by PETER M. BOWERS / AOPA 54408

■ ■ Traditions die hard, they say, and some seem to have enough life in them at the end to bite the shovel that buries them. Most of today's production airplanes are all sheet aluminum, a form of construction that can certainly be called traditional now.

It was not always so, of course. From the days of the Wright Brothers into the early 1920s, most airplane structures were of wood, with the longerons,

struts and wing drag bays liberally braced with piano wire and literally hundreds of turnbuckles. The covering over all of this was fabric, and this combination was traditional for about 20 years.

Gradually, at least for fuselages and tail surfaces, welded steel tubing replaced the wood, which didn't stand up well under the wrenching of tail skid operations and blast-around turns made by no-brakes airplanes. Wood was still good for wings, however, and remained so until well into World War II, at least for general aviation and military trainer types. The all-wood tradition was largely replaced by the mixed construction of steel and wood for about a decade and a half. This latter tradition is now virtually dead, too, except for the low-wing Bellanca with its all-wood wing, skinned with plywood. The few contemporary designs that use wood spars to support metal ribs and fabric covering can hardly be regarded as truly carrying on the tradition.

Even after steel tubing and sheet aluminum came on strong, all-wood design still had some staunch advocates, some of whom went far beyond the wire-braced frame concept to develop full monocoque structures with plywood covering. The best-known examples of the late 1920s are the Lockheed Vega, Sirius, and Orion. These had a virtual monopoly on that kind of construction, before adopting metal fuselages for the last few Vegas and an Orion and then abandoning wood altogether.

A near approach to Lockheed's total-wood concept was the Culver Cadet



The flaps of the Culver V ran clear under the fuselage. It was a long step from the ground over the flap and onto the walkway on the wing. Note the "up" position of the horizontal tail.

CULVER V

Specifications

Powerplant	Continental C-85J, 85 hp @ 2,575 rpm
Span	29 ft
Length	28 ft 8½ in
Wing area	125.9 sq ft
Empty weight	1,070 lb
Gross weight	1,600 lb

Performance

Cruise speed	125 mph
Initial climb	660 fpm
Service ceiling	13,100 ft
Range	700 mi

two-seater of 1939, which was all wood except for fabric covering on the wings and movable control surfaces. This model was converted to a radio-controlled aerial gunnery target early in World War II, after which the Wichita-based firm developed new models specifically designed as targets.

For the anticipated postwar light-plane boom, Culver designer Al Mooney combined the basic Cadet side-by-side low-wing configuration, with later production techniques, and the revived tricycle landing gear to produce the Culver Model V, which made its first flight in September 1945. This went the Cadet one better in the wood department, with plastic-bonded plywood skin on all surfaces.

The Model V was so loaded with goodies and advanced features that it

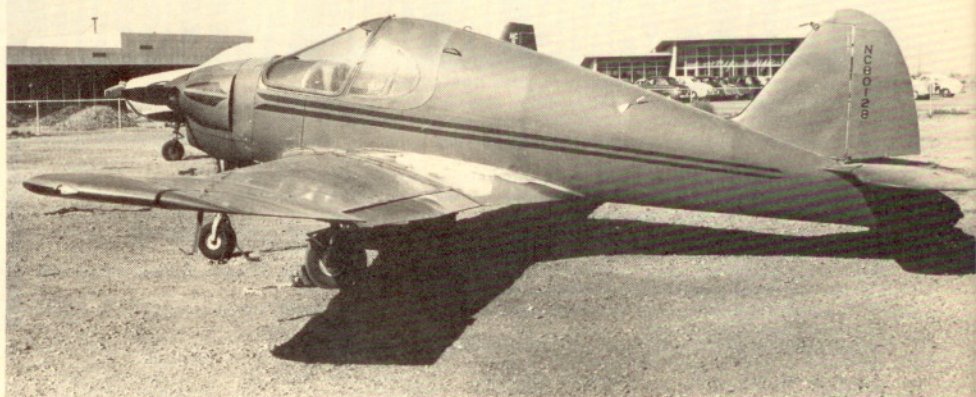
was almost revolutionary in its weight class. The tricycle landing gear was electrically retractable, the 32-gallon fuel load was carried in two bladder tanks in the leading edge of the wing and the sloping windshield hinged forward for crew access.

The 85-hp Continental C-85 engine was fuel-injected and turned a two-position Sensenich hydraulic Skyblade propeller. The engine was completely enclosed, which was nothing new, but the manner of cooling was. The air was taken in under the propeller instead of directly in front of the cylinders, flowed upward between the cylinders, instead of down, and then escaped through openings at the rear of the cylinder fairings.

The plywood-covered flaps had a combined span of 20 feet and passed com-



The Culver V-2 squared off the wingtips, enlarged the ailerons, shortened the flaps, and deleted such refinements as the recessed handgrips.



Other than the redesigned wingtips, the most notable change on the V-2 was the addition of a conventional sheet metal fillet at the wing-fuselage intersection. This resulted in a greatly reduced flap size.

THE CULVER V continued

pletely under the rounded fuselage. The small ailerons were virtually tabs by contemporary standards and were located in the upturned wingtip area that had a dihedral angle of 10 degrees. The 20-foot center portion of the wing had a dihedral of just under three degrees, making it necessary to divide the flaps at the airplane centerline.

The horizontal tail beat the "flying tail" of modern general aviation types like the Piper Cherokee by many years, being a single moveable unit fitted with a very large trim tab. This surface was

tied into Culver's patented Simplify system that was supposed to take the work out of flaps and trim coordination. Trim was set up automatically when a particular flap setting was selected.

Control was by dual sticks, with nose wheel steering and hydraulic toe brakes. There were two baggage compartments, one with 60-pound capacity ahead of the instrument panel and another for 10 pounds behind the seats.

The V zipped along fine once it was in the air (Culver advertising claimed a cruise of 125 mph, but did not mention a high speed), but the linked flaps and trim sometimes made for excessively long takeoff runs and shallow



climb-outs. Maybe the one that a friend of the author's had was a lemon, or had a worn-out engine, but I can remember that tower operators who knew that airplane wouldn't clear it for mid-field takeoffs on a 7,000-foot runway.

Some of the shortcomings of small wing area, excessive weight (the contemporary 85-hp Globe Swift, a rather notable dog at the time, had six square feet more wing area and weighed 30 pounds less) and the gadgetry, were soon recognized at Culver; improvements quickly appeared on a V-2 model that had extended and squared-off wing-tips and big fillets at the intersection of the fuselage and the wing trailing edge. This resulted in much shorter flaps and about double the aileron area.

While the improvements were successful on the airplane, they were unable to save Culver, which became one of the first of the prewar lightplane builders to shut down in the postwar lightplane bust. Al Mooney went on to become the country's only notable designer and successful seller of a production single-seater—the cute little Mooney Mite. This was to be the last stand for the all-wood airplane, even though it did fudge a bit and use fabric for the wing and control surface covering.

Mooney later brought out the four-place M-20, with sheet metal fuselage and wooden wing. However, that final fling with wood didn't last, and the M-20's wing was changed to metal. □