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### Curtiss-Wright CW–1 Junior

# *Pretty bird*

## Waddling and sputtering into your heart

**BY BARRY SCHIFF**

The silhouette of a Curtiss-Wright CW–1 Junior is distinctive and unmistakable. It has a petite radial engine perched atop a parasol wing that shades a fuselage resembling the hull of an amphibious flying boat.

The two-place, open-cockpit landplane also looks like a powered glider. The pilot sits way out in front. Without an engine cowling in the way, he enjoys the same superlative visibility as those who fly sailplanes, and the pusher engine behind him precludes the possibility of his being sprayed with oil.

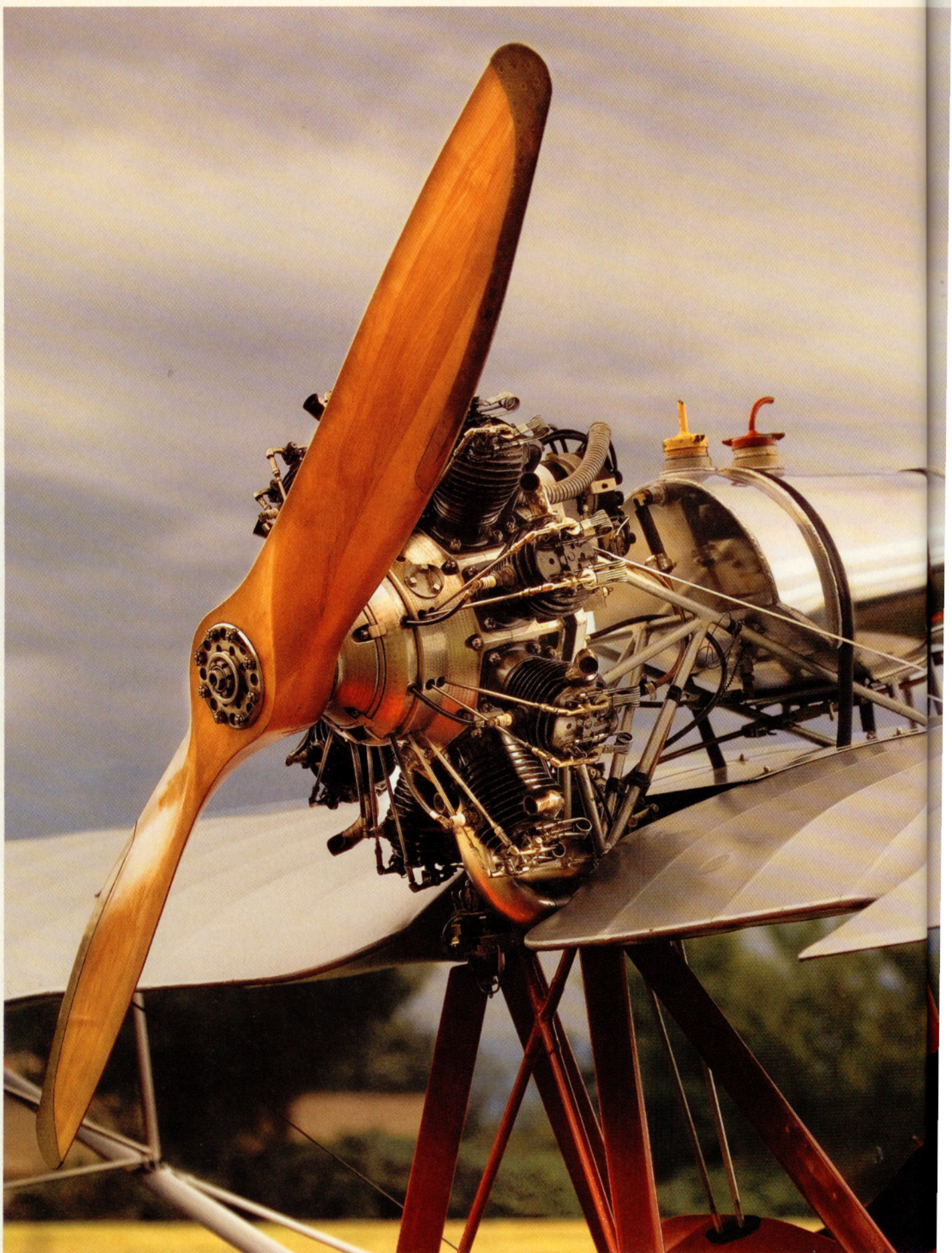
The Junior was significant because it represented an effort by Curtiss-Wright Corp. to produce an affordable, personal aircraft that would appeal to the average citizen. It was the beginning of the industry wide attempt to produce an "airplane for every garage."

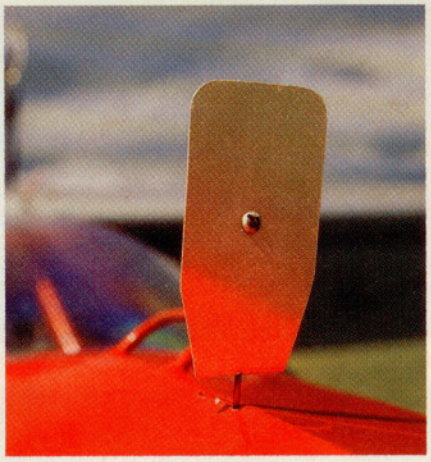
The airplane made its first flight on December 10, 1930, and had a price tag of $1,490. Orders poured into the St. Louis plant at rates that were unprecedented in the fledgling aircraft industry. For a while during 1931, the factory produced 21 Juniors per week, outselling its three main competitors combined. (The Junior competed primarily against the Aeronca C–2, American Eagle's Eaglet, and the Buhl Pup.)

But the CW–1's production line came to a screeching halt in early 1932 after 270 aircraft had been built. A victim of the Great Depression, the Junior was Curtiss-Wright's last attempt to build light airplanes for the "sportsman."

The airplane shown on these pages belongs to Paul T. Cullman, a retired

PHOTOGRAPHY BY MIKE FIZER





**Mud guards (above left) prevent the main tires from slinging debris into the propeller disc. Ram air pressure pushes against the spring-loaded exterior plate of the safety meter (above center) and registers safe airspeed (the white band) or dangerous speeds (the red bands) on the instrument panel (above right).**

rancher, and is based at Meadowmist, a residential airpark at Ferndale, Washington (between Bellingham, Washington, and Abbotsford, British Columbia).

An actively flying octogenarian, Cullman soloed in a Piper J-3 Cub on skis in 1942, has accumulated more than 5,000 hours, and has had an uninterrupted AOPA membership since 1943. He has owned numerous aircraft over the years and presently has a Stinson L–5B Sentinel, which I flew as the camera platform for these photos, an American Eagle Eaglet (into which I could not fit), a Mooney MSE equipped with a Garmin 480 and an MX20, and his pride and joy, NC11832, the Curtiss-Wright Junior.

He purchased the airplane in 1985 for $3,500, but it needed quite a bit of work. He built new wings and ailerons, and fabricated a mount for the petite French-made, 187-cubic inch, nine-cylinder, 40-horsepower Salmson AD-9 radial engine that was built in 1929.

The Junior originally had a cantankerous, temperamental, three-cylinder, 45-horsepower Szekely (pronounced *SAY-kay*) SR-3 radial engine made in Holland, Michigan. This relic ran rough and had a nasty habit of throwing cylinders. A steel restraining cable had to be attached to each cylinder head to prevent it from being blown into the pusher propeller.

Cullman's airplane, serial number 1206, rolled out of the factory on June 19, 1931. He estimates that it currently is worth more than $40,000 but would not sell it.

Fuel and oil tanks are combined in a single aluminum, compartmentalized tank above the wing and ahead of the engine. The forward and largest part of the tank holds 9.2 gallons of avgas (the red vented filler cap), and the smaller aft section holds six quarts of oil (the yellow cap) that the engine sprays, drips, and spits almost as quickly as you can refill the tank.

Cullman's Junior has no electrical system and is certified only for daytime, VFR flight. Aerobatics are prohibited.

NC11832 has an empty weight of 570 pounds and a maximum-allowable takeoff weight of 975 pounds. It qualifies, therefore, as a light sport airplane. Like many other aircraft of its era, it has a chrome-molybdenum, tubular-steel frame covered in fabric, and the wing has a solid spruce spar.

There is no baggage compartment, but "cargo" may be stored on the rear seat during solo flight, which is allowed only from the front seat. Strangely enough, baggage is limited to 14 pounds, much less than the weight of the passenger or instructor who otherwise could be sitting there.

The Junior cannot be trimmed during flight but does have a ground-adjustable stabilizer that is positioned during preflight preparation according to the anticipated load distribution. (Given my not-inconsiderable mass, the stabilizer was set to full nose-down trim prior to my solo flight.)

Starting the engine involves first turning on the fuel by rotating the valve handle (on the leading edge of the wing) and leaving it on until the carburetor begins to drip fuel. You then turn off the fuel and turn on the oil using a small in-line valve below the oil tank. Starting is accomplished the old-fashioned way, by hand-propping the engine. You have about 30 seconds to turn the fuel back on before the engine quits.

The airplane has a two-leaf, spring-steel tailskid and no brakes, so be sure that the airplane is headed in the right direction before advancing the throttle to taxi. The Junior does have a relatively large rudder, so taxiing turns are made

**The landing gear has no shock absorbers, but the balloon tires are filled to only 10 psi to soften the landing.**

easily by blasting prop wash across the tail. Tighter turns are made by applying full rudder in the direction of turn and pushing the stick forward to lower the elevator and take some weight off the tailskid. It is surprisingly easy and almost as effective as a steerable tailwheel. (An optional tailwheel was available from the factory for $10.)

The nose-high attitude of most taildraggers is a result of the need to provide adequate propeller clearance above the ground. This is unnecessary in the case of a Junior, so the landing gear was made short. This results in less weight, less drag, and a nose-low taxi attitude. S-turning to avoid obstacles is unnecessary.

There is not much to the runup because there is none. Without brakes to restrain the aircraft at high rpm and with only one magneto, the ignition check consists of simply verifying that the engine is running smoothly. Turning off the magneto, of course, would shut down the engine. Cullman has the carburetor heater wired open because of the carburetor's propensity for icing. Finally, there are no flaps to deploy or trim to adjust.

With such a high thrust line, adding power for takeoff helps to raise the tail and poise the Junior for flight. Liftoff from the downhill, 2,000-foot-long grass strip at Meadowmist took only about 200 feet.

A pleasant surprise is that there is hardly a breeze in the open cockpit; goggles are unnecessary. Cullman reports, however, that it is windy in the backseat and much noisier. (The rear cockpit contains a control stick, rudder pedals, a throttle, and nothing else.)

Because the wing is behind the pilot and the nose is short and blunt, visibility from the front seat is incredible. This made the Junior popular as a photo platform, and aerial scenes for some of Hollywood's epic films were shot from

There is no pilot's operating handbook for the Junior. During the formative years of aviation, pilots learned about an airplane by flying it.

Critical airspeeds? There aren't any. The airplane does not even have an airspeed indicator. A Curtiss-Wright instructor probably would tell you to "raise the nose for $V_Y$, and pull back a little more for $V_X$." According to original advertising literature, the Junior cruises at 65 mph.

The airplane is equipped, however, with a safety meter designed by a Curtiss-Wright engineer named Walter Beech. It consists of a small metal plate that projects into the relative wind ahead of the front windshield. Wind pressure on the plate pushes against a coiled spring and causes a pointer to move up and down in a slot on the indicator plate on the instrument panel.

The plate is marked with a lower red band (too fast), a white band (normal range), and an upper red band (too slow). The idea is to keep the pointer "in the white."

When asked how the beginning of the high-speed (lower) red band was established, the Junior's designer, Karl White, said, "We dived the Junior until we fig-

**The safety meter above the compass is used instead of an airspeed indicator. The switch for the single magneto is in the lower center of the panel (below).**

there. Because a hunter sitting in front had clear shots from so many angles, the airplane also was used to hunt coyotes (as well as for patrolling pipelines and power lines).

Frise ailerons reportedly eliminate some of the significant adverse yaw effect typical of older designs, but the Junior is still very much a stick-and-rudder airplane and is intolerant of sloppy flying. Although there is no slip-skid ball on the panel, uncoordinated flight is easily sensed through the seat of one's trousers.

The Junior also has a low wing loading and bounces around easily in turbulence. It is one of those airplanes that are easy to fly but not easy to fly well.

It is even difficult to accurately maintain a given altitude. First, there is no part of the airframe ahead of the pilot to position with respect to the horizon. Second, the nonsensitive altimeter is of little help. The single altimeter hand makes one rotation every 2,000 feet—it moves only 2 degrees during a 100-foot altitude change, which is difficult to detect. You can use the wings to maintain the desired attitude but only by looking somewhat aft.

A postflight chore involves removing turf from the tailskid after landing on grass (below).

ured she was going about as fast as she ought to and made a mark on the plate." The beginning of the other red band is where the airplane begins to stall.

The cost of manufacturing this sophisticated instrumentation in 1931 was 35 cents. (Wouldn't it be fun to have a Beech safety meter in a Bonanza?)

Stalls are unremarkable unless you suffer from acrophobia. As the open cockpit pitched down and with no aircraft structure in front of me, I had the uneasy feeling that I could have been thrown out of my seat and into Puget Sound.

Fuel consumption averages 3.5 gph and provides a safe endurance of two hours. Cullman says he tries not to fly more than 100 miles at a time. Curtiss-Wright borrowed the fuel gauge from a Model A Ford, but it is at the front of the tank and behind the pilot. A mirror is needed to see it during flight, but everything shakes too much to read it.

The approach to landing is made with the indicator of the safety meter near the top of the white band. Although the controls are light, reducing power helps to flare for landing because the high thrust line changes to a high drag line, which raises the nose somewhat.

The Junior has rigid landing gear; there are no shock absorbers. The balloon tires, however, are filled to only 10 pounds of air pressure and do an adequate job of smoothing the touchdown and rollout. A hinged mud guard behind each main-gear tire prevents debris from being flung into the propeller disc, an especially important feature when operating from unimproved surfaces. (The airplane can operate on hard-surface runways, but the tailskid will wear out rapidly.)

Minimal braking after touchdown is available by holding the control stick fully aft and forcing the tailskid to press harder against the turf. Otherwise, allow enough room to coast to a stop.

There is large lettering on the back of the front seat that is clearly visible to the rear-seat passenger. It warns him to walk forward after deplaning to avoid the "whirling propeller."

The Curtiss-Wright Junior is a cute, loveable little airplane that engenders great affection and would be a joyful companion for frolicking on a warm summer afternoon. As Joseph P. Juptner, author of the U.S. Civil Aircraft Series, says, "Flying a Junior is hard to describe. It waddles and sputters its way into your heart and offers a continuous panorama of pleasure." AOPA

*Visit the author's Web site (www.barryschiff.com).*

## SPECSHEET

**Curtiss-Wright CW-1 Junior**
**Base price: $1,490 (1931)**
**Price as tested: $40,000+**

### Specifications

| | |
|---|---|
| Powerplant | Salmson Aero Engine AD-9 40 hp @ 2,200 rpm |
| Recommended TBO | When oil pressure cannot be sustained above 7 psi |
| Propeller | Ted Hendrickson propeller, 75-in dia, fixed pitch |
| Length | 21 ft 3 in |
| Height | 7 ft 4 in |
| Wingspan | 39 ft 6 in |
| Wing area | 176 sq ft |
| Wing loading | 5.54 lb/sq ft |
| Power loading | 18.1 lb/hp |
| Seats | 2 |
| Cockpit entrance (ea), length | 1 ft 10 in |
| Cockpit entrance (ea), width | 2 ft 2 in |
| Empty weight, as tested | 601 lb |
| Max gross weight | 975 lb |
| Useful load, as tested | 374 lb |
| Payload w/full fuel | 319 lb |
| Max takeoff weight | 975 lb |
| Fuel capacity, std | 9.2 gal (all usable) |
| Oil capacity | 6 qt |
| Baggage capacity | 14 lb |

### Performance

| | |
|---|---|
| Takeoff distance, ground roll | 150 to 200 ft |
| Rate of climb, sea level | 580 fpm |
| Max level speed, sea level | 80 mph |
| Cruise speed | 65 mph |
| Fuel consumption (cruise @ 2,000 rpm, 40 hp) | 3.5 gph |
| Safe range | 130 sm |
| Ceiling | 12,000 ft |
| Landing distance, ground roll | 150 to 200 ft |

### Limiting and Recommended Airspeeds

| | |
|---|---|
| $V_X$ (best angle of climb) | unknown |
| $V_Y$ (best rate of climb) | unknown |
| $V_A$ (design maneuvering) | unknown |
| $V_{NE}$ (never exceed) | 80 mph |
| $V_R$ (rotation) | 37 mph |
| $V_{S1}$ (stall) | 30 mph |

*All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions.*