YESTERDAY'S WINGS TODAY

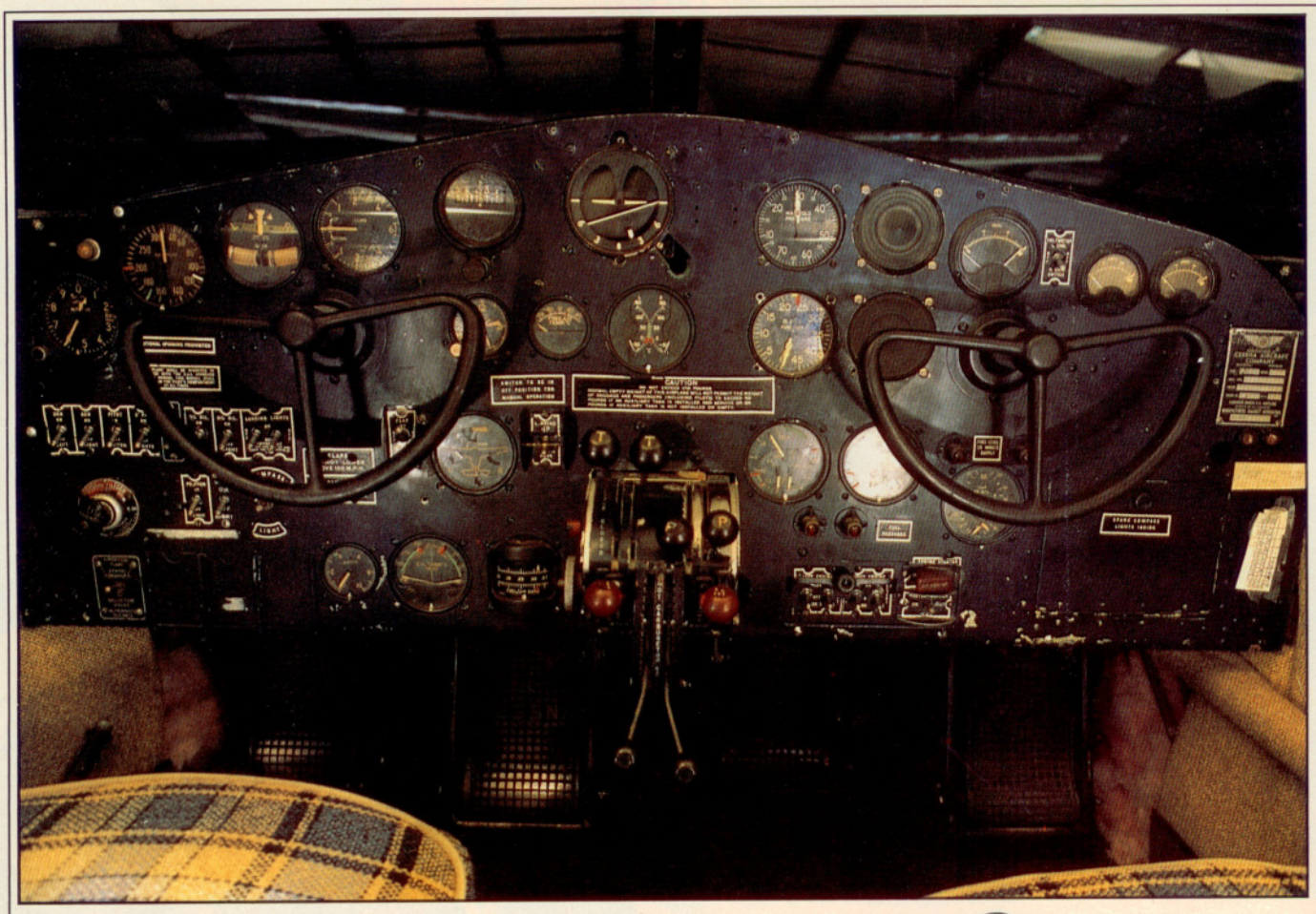
BAMBOO BOMBER

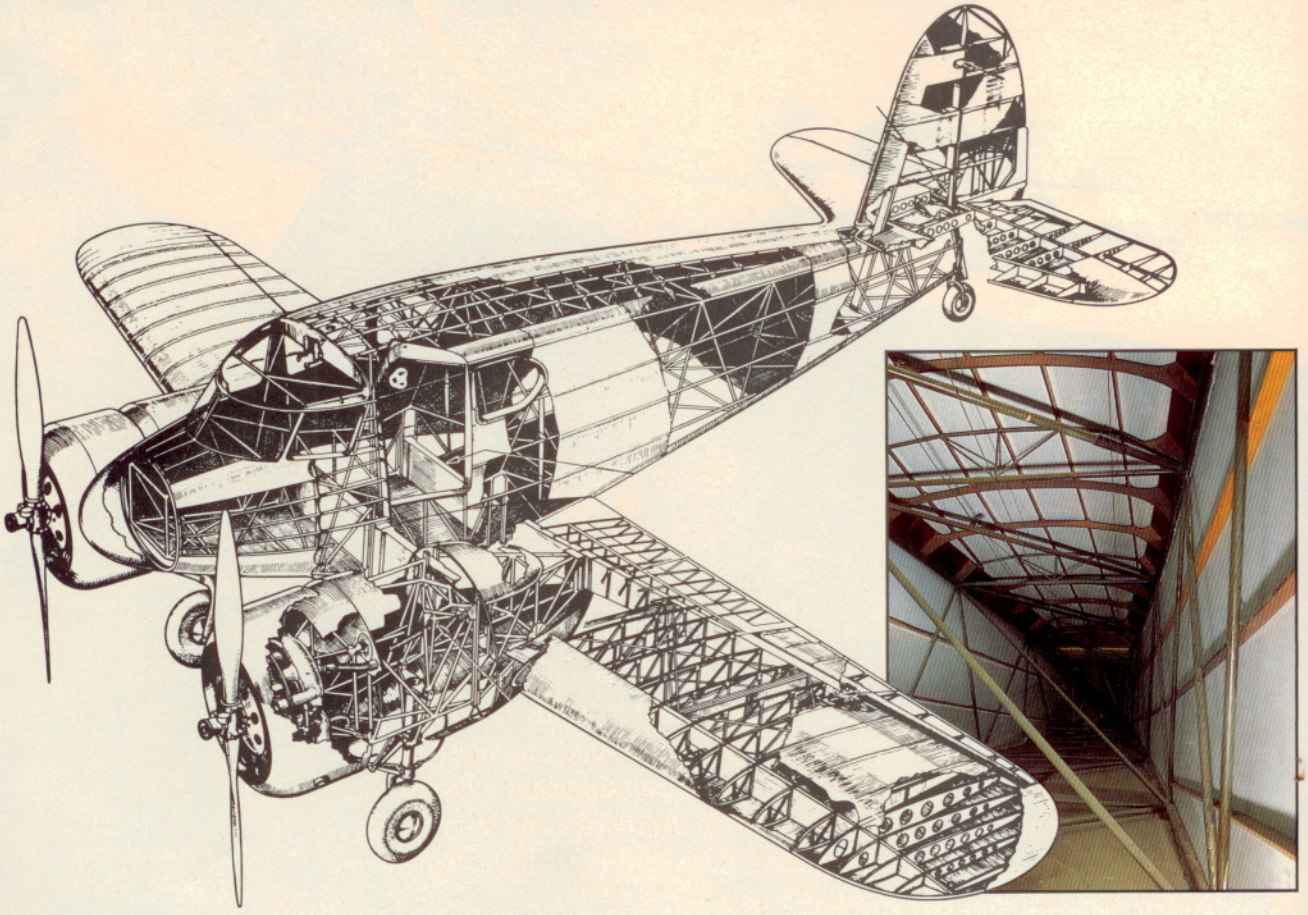
It once trained an air force. Now it brings smiles.

BY THOMAS A. HORNE

IT is a light twin, but there is nothing diminutive about it: a 42-foot wingspan, a maximum wing chord of nine feet, two large radial engines and a cavernous cabin—all propped up on an airframe that stands 10 feet tall. Add the bulbous projections and cartoonish lines and you have Cessna Aircraft Company's first twin-engine airplane, the T-50. Its concept and design reflect the engineering ideals of general aviation in the pre-

PHOTOGRAPHY BY ART DAVIS





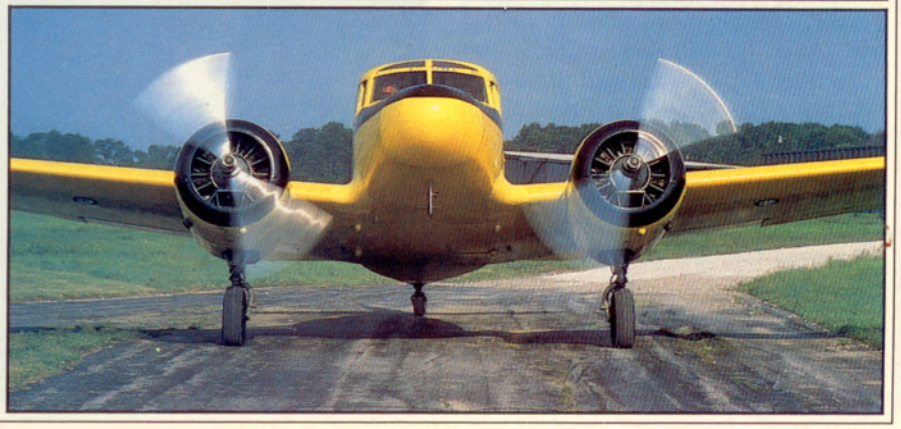
World War II era. In its time, it represented a significant step in general aviation technology and a marketing risk of gigantic proportions.

Up to 1939, the fledgling Cessna Aircraft Company had built its reputation on the single-engine Airmaster series of airplanes, of which a total of 186 were sold. Under the initial guidance of President Clyde V. Cessna (who retired in 1936), Vice President Roscoe Vaughn, son Eldon Cessna (who assisted in the development of Cessna's first racing airplanes, the GC-1, GC-2, CR-1, -2 and -3 single-engine, high-wing monoplanes) and nephew Dwane L. Wallace (appointed plant manager in 1934), the company had weathered the Depression. Times were exceptionally hard. While the racing airplanes created a sensation, they were one-off machines. In 1931, 1932 and 1933, Cessna built no production airplanes, and in 1934 and 1935 Cessna and Wallace worked without salary. By the end of the 1930s, only the Airmaster's modest success kept the company from going bankrupt.

In 1938 Wallace, by now president, decided to gamble. He envisioned a market for a relatively inexpensive ($20,000 to $30,000—still a great deal of money in the Depression) light twin. After just nine months, the first prototype T-50 was ready for flight tests. First flight was on March 26, 1939, with Wallace himself at the controls. In December 1939 the Civil Aeronautics Authority granted the T-50's type certificate.

The gamble paid off. As the first orders were placed, it became apparent that the existing Cessna factory could not accommodate the construction of both Airmasters and T-50s. Wallace undertook another gamble: the construction of a brand new 25,000-square-foot assembly plant.

Of course, war had already begun. Nazi Germany and Japanese Imperial forces had conquered substantial territory, and everyone in the United States sensed that it was just a matter of time before American forces would become involved. Deliveries of T-50s to civilian customers had just begun when the U.S. Army began to express an interest in the T-50 as a trainer for future bomber and transport pilots. In July 1940 the Army placed its first order—for 33 T-50s, which were to receive the military designation of AT-8. Thus began a lengthy production run of T-50s destined for military service under a variety of designations. By the time the T-50 and its



many variants (see "Bobcat Brethren," page 41) had finished their production run in 1944, some 5,402 airplanes had been sold.

Its official nickname, the Bobcat, was the result of a 1941 employee contest. Military users came up with more colorful monikers, such as Rhapsody in Glue and Useless 78. But the nickname that most univerally stuck with the airplane was the Bamboo Bomber, a play on the T-50's wooden construction. By whatever name, the T-50 saved Cessna, provided the military with the pilot expertise needed to defeat the Axis powers and gave the company the foundation for its post-war growth. It was, by any measure, a great accomplishment.

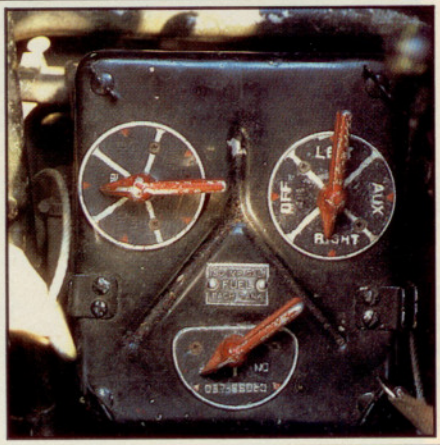
While not difficult to fly, the airplane certainly has its quirks, not the least of which is its single-engine performance. The Hamilton Standard constant-speed propellers are nonfeathering. Some military versions were even worse, being fitted with Hartzell fixed-pitch wooden propellers (aluminum had to be conserved for the war effort). The pilot's operating manuals warn repeatedly never to let airspeed drop below 90 mph (78 KIAS), the airplane's "single-engine speed" (the T-50's Vmc—minimum controllable airspeed with an inoperative engine—is 86 mph, or 75 KIAS).

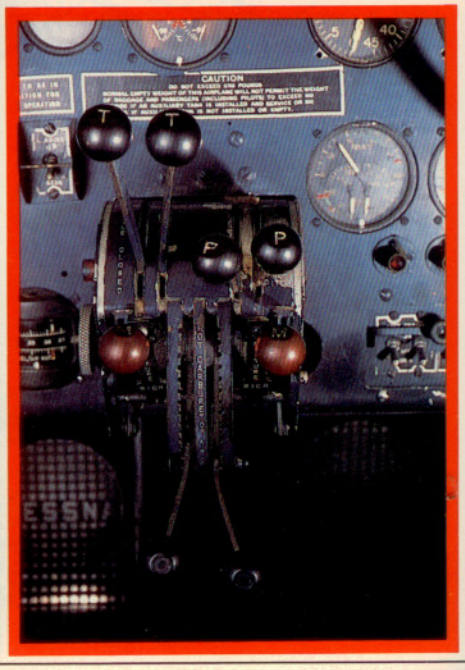
By any other name—Rhapsody in Glue, for example—the Bamboo Bomber is still a treat

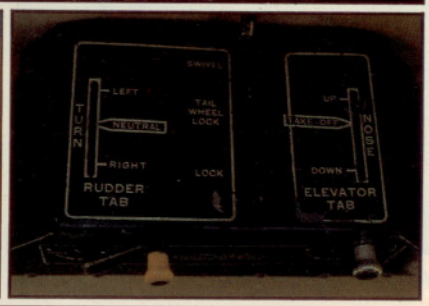
Consider these excerpts from military flight operating instructions:

- *"[After Takeoff] Never Climb Over Ten Feet Off The Ground Until Your Airplane Has Picked Up Single Engine Speed."*
- *"Never Attempt To Climb. Never Use Over 10 Degrees Aileron To Maintain Directional Control, And Don't Let Your Airspeed Get Below 90 MPH At Any Time."*

Yes, the T-50 is a marginal performer on a single engine, in spite of what the promotional brochures that were offered







to potential civilian customers may have said. The operating engine may allow the pilot to hold altitude under the best of conditions, but do not count on it. Its chief advantage is to allow the pilot a better choice of sites for a forced landing.

Another oddity is the fuel system. Fuel management controls (mounted on the floor between the pilots' seats) include an engine selector valve, a tank selector valve and a crossfeed valve. The crossfeed lines are designed such that if a break occurs when the valve is in the On position, fuel is pumped overboard. The result is a dual engine failure. With the valve in the Off position, only one engine stops when a fuel line breaks. This is hardly reassuring, especially if one engine has already stopped and a break occurs in the line feeding the operating engine.

The landing gear is an electrically actuated, chain-drive system with an emergency hand crank. Look up in the wheel wells and you will see the chains winding around large sprockets, looking every bit like an oversized bicycle drive assembly. Surprisingly, retraction time is approximately 12 seconds, the same as more modern Cessna retractables. Emergency retraction and extension require patience, a strong arm and about 150 turns of the crank.

About the Jacobs radial engine much has been said, but the "shaky Jakes," as they are commonly called, are a good match with the airframe, assuming that both are running. They do leak oil, however, and in the T-50 require some special procedures. For example, one of the engines' dual ignition systems uses an automobile-style, battery-driven distributor for starting: the other is a magneto. Distributor ignition is used for starting because it provides a more advanced spark timing. Once an engine has started, its magneto switch is also turned on for normal operations.

The airframe construction is also noteworthy. It consists of a fuselage with chrome-moly steel tubing, faired to shape with wooden formers and covered with fabric. Wings are built of laminated spruce spar beams with spruce and plywood wing ribs; leading edges and wing tips are formed of plywood sheet. Torsional stiffness is provided by a system of flat steel straps and turnbuckles both above and below the spars.

But while the T-50's wooden construction may have been a thing of beauty, it proved to be the seed of the

airplane's downfall. In 1942, the military began to experience difficulties with the wing spars. Water running down the fuselage and seeping through the gaps in the wing-root fairing eventually pooled on the spars. Sooner or later, the spars began to rot. When the military noticed the problem, it restricted the gross weight of the affected airplanes. Cessna developed a fix that added a spar face of mahogany plywood. Airplanes so equipped were allowed to operate at a maximum gross weight of 5,700 pounds. Another wing modification was closer spacing of leading edge ribs. Originally, these ribs were spaced eight inches apart, but to meet the structural demands of wartime transport flying, ribs of later models were spaced just four inches apart.

There were other problems. In one case, some airplanes based in the arid southwest experienced shrinkage of their spars. Maintenance crews compensated by tightening the spar attach bolts. When the airplanes were reassigned to the moist climate of the northwest United States, the spars expanded, causing compression failures. These airplanes had to be scrapped.

At war's end, the military's stock of T-50s was sold at auction. Thousands flooded the market, serving as multi-engine trainers and personal transportation and filling the ranks of the growing corporate and charter market. Nevertheless, even for those who picked up a Bamboo Bomber for a song, the spar problems would not go away. The ex-

A FAMILY AFFAIR

The airplane featured in the accompanying photographs is owned by the Donald A. Mather family of Sandusky, Ohio. It was certificated as an AT-17B on November 13, 1942, and carries Cessna serial number 3084. Mather, AOPA 174221, bought the airplane two years ago at auction for $8,700. It had two previous owners, one in McCamey, Texas, who restored it 10 years ago, and another in Paul's Valley, Oklahoma. Because the fuel placards are labeled in Imperial gallons, Mather believes the airplane may have served with the Royal Canadian Air Force, but definitive historical records have vanished over time.

Mather flies his Bamboo Bomber every weekend he has the chance. He especially likes to drop in on unsuspecting fly-in crowds. "Everything really stops when you taxi up in one of these things," he chortles. Mather is considering the formation of a T-50 club, in order to spread information on parts availability and encourage restorers and would-be restorers.

Mather's son, Todd, AOPA 937403, also flies the Bomber whenever his schedule as a Saab SF-340 captain with Comair Airlines permits. Same goes for Donald's father, Arlo W. Mather, AOPA 937404, a semiretired flight instructor who owned and operated the former Mather Airport near downtown Cleveland.

Together, the family has flown NC 59188 all over the United States. The wives in particular appreciate the Bomber's capacious rear seating area, even if they are sitting on a 30-gallon auxiliary fuel tank, installed according to military specifications.

Pilot creative director Arthur L. Davis, associate editor Mark R. Twombly and myself visited Mather at Griffing-Sandusky Airport to see the Bomber first-hand. Todd was first to show me the ropes. He emphasized the airplane's marginal brake effectiveness and the need for careful ground handling. After beginning the takeoff roll, which is made with full throttle and the maximum propeller setting of 2,200 rpm, the tail was raised at approximately 40 mph (34 KIAS), and liftoff was initiated at approximately 50 mph (43 KIAS). We accelerated in ground effect to the recommended 90 mph (78 KIAS) while retracting the landing gear, then began a slow climb at approximately 100 mph (87 KIAS). I think I saw a climb rate of 600 fpm.

Twombly was seated in the aft cabin. The internal dimensions and seat are so large that normal proportional relationships are distorted. Take a doll and throw it in the corner of a sofa in the Waldorf's lobby: That is how small Twombly appeared in the Bomber's back seat.

After turning final, flaps were selected full down (40 degrees) by flipping a toggle switch; Vfe is 108 mph (94 KIAS). Then the gear were extended, by means of another toggle switch, situated next to the flap switch and identically shaped. Stabilized at 80 mph (70 KIAS) on final approach, airspeed was slowly bled off after crossing the runway threshold until touchdown. "It always turns left as soon as the tail drops," swear the Mathers.

The flight with Donald Mather was for the purpose of photography. The airplane was remarkably stable, though it required relatively heavy aileron pressures. Best of all, the pilot side windows could be opened, allowing a refreshing breeze—and the nostalgic rumble of the Jacobs radials—to enter the cockpit.

Mather, a sales manager for Stein, Incorporated, a manufacturer of automated food processing equipment, is justifiably proud of his airplane, but, as in the case of so many AOPA members, there is another airplane in his life. He also serves Stein as its chief of flight operations and flies the company's Beechcraft B200 King Air. But that's business. For low-level sightseeing over the islands of Lake Erie or lazy cross-country flights, the Bomber's the way to go. —*TAH*

Todd, Donald and Arlo Mather and their T-50.

tent of the problem came to light in early 1946 when "NC-license" kits manufactured by Cessna were first offered to owners of surplus T-50s. The kits were designed to convert the airplanes from military to civil status, but some of the many inspections they required sent many airplanes in the junkyard's direction. If excessive spar rot was detected, if the spars were not faced with the mahogany plywood or if the leading edge ribs were eight inches apart, Cessna recommended against their purchase. Since

OTHER BABY BOMBERS

Early in World War II, pilots finishing advanced training in single-engine AT-6s climbed right into P-38s, A-20s, B-25s, B-26s and other multi-engine aircraft. Their high mortality rate following engine failures quickly underscored a need for intermediate instruction in lifesaving engine-out procedures.

Cessna met this need with AT-8s and AT-17s, military trainer versions of its civil T-50 Bobcat. Less well-remembered today are the U.S. Army Air Force's other twin-engine trainers, the Curtiss AT-9 "Jeep" and the Beechcraft AT-10 "Wichita." All three types were powered by 295-horsepower Lycoming R-680 radial engines, and all three entered service shortly before the United States entered the World War II.

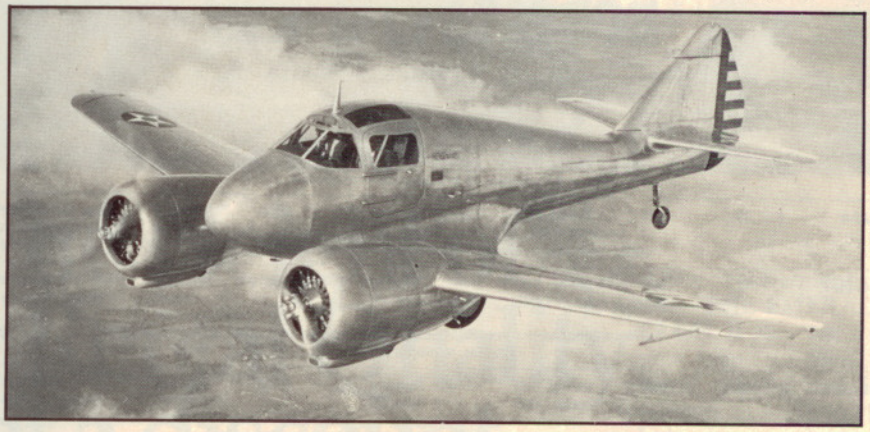
Despite its single tail, Beech's AT-10 Wichita bore a noticeable family resemblance to its older and slightly larger brother, the Model 18. The Wichita was built of wood except for the cockpit and engine nacelles and was slab-sided to facilitate the construction of major sub-assemblies by furniture manufacturers. Even its fuel tanks were made of wood, a synthetic rubber lining being used to keep them dry. Production of this bargain-basement trainer exceeded that of both its rivals combined, Beech building 1,771 AT-10s in 1941 and Globe, under government license, producing 600 more the following year.

Curtiss, in contrast, made no effort at all to conserve aluminun or spare the hard-pressed aircraft industry. Its all-metal, semi-monocoque AT-9 was the sports car of trainers with a top speed of 197 mph (171 knots). Designed to display the unforgiving characteristic pilots might later find in combat aircraft, tricky to fly and land, it won few friends, but pilots who mastered it could fly anything in the AAF inventory. Jeeps proved especially valuable to pilots transitioning to hot Martin B-26 Marauder medium bombers. A total of 791 AT-9s were built before production ended in 1943.

Beech Model 18s also played a role in pilot training, but no examples were procured for this purpose (AT-7s and plexiglass-nosed AT-11s trained navigators and bombardiers, respectively). The capacious "Twin Beech" proved to offer a key advantage over the multi-engine trainers, however, for it was big enough to permit some degree of coordinated crew training.

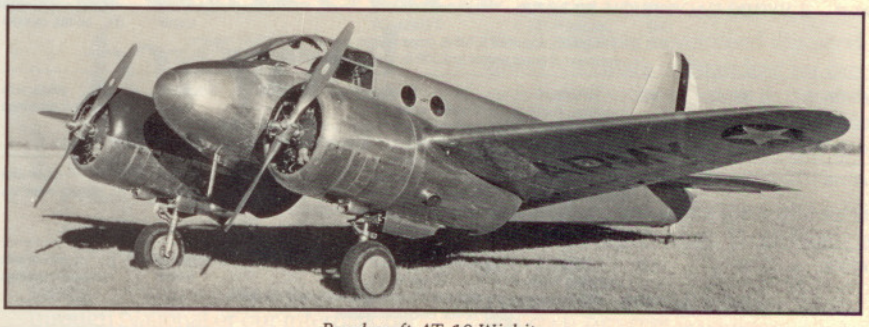
By 1943, the need for training entire crews as an integral unit, and the availability of bombers for training duty, saw the gradual phase-out of multi-engine pilot trainer use. After the war, the Cessna T-50 returned to the civil market, but the Beechcraft Wichita and the Curtiss Jeep found only the scrap heap awaiting their weary bones. Sadly, no AT-9s or AT-10s survive in any museum.

—Jay P. Spenser

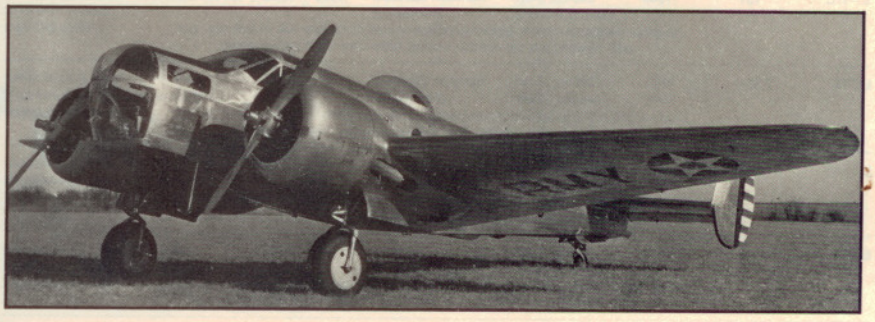


NATIONAL AIR AND SPACE MUSEUM

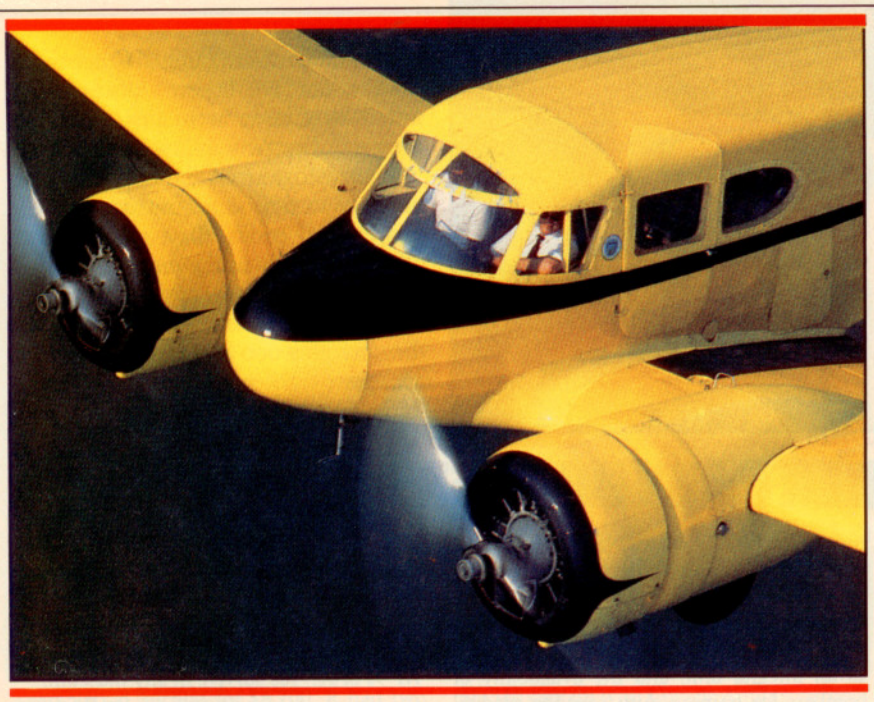
Curtiss AT-9 Jeep



Beechcraft AT-10 Wichita



Beechcraft AT-11 (Model 18)



these fixes could not, with rare exception, be carried out in the field, many T-50s that could not comply were left to languish.

The most famous T-50 had to be the "Songbird," featured in the 1952 and 1953 seasons of the popular television show "Sky King." Kirby Grant, the actor who starred in the show, bought a surplus T-50, only to have spar rot render the airplane unairworthy. He reportedly sold it for one dollar. (Subsequent "Sky King" shows ran in the 1955 through 1962 seasons, but they featured a Cessna 310 named "Songbird II.")

Today, general opinion is that there are only 12 of these airplanes in flying condition. Another 20 or so may be undergoing restoration. The rest have succumbed to spar rot and diseases of neglect: a sad end for such beautiful and historic airplanes. Happily, though, as the photographs on these pages demonstrate, some T-50s live on in style, and as long as there are owners with a sense of history and a dedication to the mark, there will remain a few shining examples of this classic airplane. □

BOBCAT BRETHREN

Designation	Number built	Years of production	Powerplants	Propellers	Gross weight (pounds)	Mission	Color/ markings
T-50	43	1940-1942	245-hp, 7-cyl Jacobs L4MB	Hamilton Standard 2-blade, CS	5,000	civil	customer choice
		Six delivered to Civil Aeronautics Authority for navaid checking, 14 to Pan American World Airways for use in Guatemala, 15 to military under designation UC-78A					
AT-8	33	1941	290-hp, 9-cyl Lycoming R-680-9	Hamilton Standard 2-blade, CS	5,100	advanced trainer	silver, red & white; horizontal stripes on tail; roundel
		Included Sperry hydraulic autopilot; seats accommodated seat-pack parachutes					
Crane I	640	1941, 1942	245-hp, 7-cyl Jacobs L4MB	Hartzell 2-blade, wood, FP	5,000	advanced trainer; light transport	yellow with military markings
		For Royal Canadian Air Force (RCAF); included winterization kit, special engine baffles, oil dilution system					
Crane II	190	1942	245-hp, 7-cyl Jacobs L4MB	Hamilton Standard 2-blade, CS	5,000	advanced trainer; light transport	yellow with military markings
		For RCAF; sometimes called Crane IA; included 24-volt electrical system					
AT-17	450	1941, 1942	245-hp, 7-cyl Jacobs R-755-9	Hamilton Standard 2-blade, CS	5,700	advanced trainer	silver with stripes on tail; roundel
		U.S. Army originally approved 5,700-lb gross weight, but spar limitations required restriction of gross weight to 5,300 lb; thence redesignated AT-17E					
AT-17A	33	1942	290-hp, 9-cyl Lycoming R-680-9	Hartzell 2-blade, wood, FP	5,700	advanced trainer	yellow with military markings
		Those with 5,300-lb gross weight restrictions due to spar limitations designated AT-17F; some used 12-volt, others 24-volt electrical systems					
AT-17B	466	1942	290-hp, 9-cyl Lycoming R-680-9	Hartzell 2-blade, wood, FP	5,700	advanced trainer	silver with military markings
		Those with 5,300-lb gross weight restriction due to spar limitations designated AT-17G; used 12-volt electrical system					
AT-17C	60	1942	290-hp, 9-cyl Lycoming R-680-9	Hamilton Standard 2-blade, CS	5,700	advanced trainer	yellow with military markings
		Those with 5,300-lb gross weight restriction due to spar limitations designated AT-17H; used 12-volt electrical system					
AT-17D	131	1943	290-hp, 9-cyl Lycoming R-680-9	Hamilton Standard 2-blade, CS	5,700	transport	olive drab with military markings; stars and bars
		No gross weight restriction; factory's solution to spar limitations was to face rear spar with plywood and set ribs four inches, rather than eight inches, apart					
UC-78	1,354	1942, 1943	245-hp, 7-cyl Jacobs L4MB	Hamilton Standard 2-blade, CS	5,700	utility transport	olive drab or silver; stars and bars; some camouflaged
		Those with 5,300-lb gross weight restriction due to spar limitations designated UC-78D; could accommodate hospital litters or eight seats; used 24-volt electrical system					
UC-78B	1,806	1943, 1944	245-hp, 7-cyl Jacobs R-755-9	Hamilton Standard 2-blade, CS	5,700	utility transport	olive drab or silver; some camouflaged
		Those with 5,300-lb gross weight restriction due to spar limitations designated UC-78E; could accommodate hospital litters or eight seats; used 24-volt electrical system					
UC-78C	196	1943	245-hp, 7-cyl Jacobs R-755-9	Hartzell 2-blade, wood, FP	5,700	utility transport	silver with military markings; some camouflaged
		Those with 5,300-lb gross weight restriction due to spar limitations designated UC-17F; could accommodate hospital litters or eight seats; used 12-volt electrical system					

TOTAL PRODUCTION: 5,402

Note: CS = constant speed; FP = fixed pitch

Cessna Model T-50

Base price (1940): $29,695 to $30,000

Specifications

Powerplants	2 Jacobs L4MB radials
	225 hp at 2,000 rpm
takeoff rating	245 hp at 2,200 rpm
Propellers	2 Hamilton Standard, two-blade, constant-speed
Length	32 ft 9 in
Height	9 ft 11 in
Wingspan	41 ft 11 in
Wing area	295 sq ft
Wing loading	16.9 lb/sq ft
Power loading	10.2 lb/hp
Seats	5
Cabin length	9 ft 8 in
Cabin height	4 ft 9 in
Cabin width	4 ft 9 in
Cabin volume	214 cu ft
Gross weight	5,000 lb
Empty weight	3,500 lb
Useful load	1,500 lb
Payload	850 lb
Fuel capacity, std	720 lb (120 gal)
optional	960 lb (160 gal)
Oil capacity	75 lb (10 gal)

Performance

Cruising speed	
optimum altitude, 75% power	166 KIAS (191 mph)
Landing speed, flaps extended	48 KIAS (55 mph)
Vmc	75 KIAS (86 mph)
Vfe (max flap extended)	94 KIAS (108 mph)
"Single-engine speed"	78 KIAS (90 mph)
Takeoff run	520 ft
Max rate of climb	1,525 fpm
Cruising radius, 120 gal	652 nm
160 gal	869 nm
Service ceiling	22,000 ft
Absolute ceiling, one engine	6,300 ft
Fuel consumption	28 gal/hr