CESSNA 170 NEO CLASSIC

Before there were Skyhawks, there were tailwheels.

BY MARK TWOMBLY

IT is a hectic Monday afternoon on the Butler Aviation ramp at Washington National Airport, one of the busiest parcels of airport real estate in the world. Like cops working a rush-hour intersection, the Butler linemen have their hands full parking expensive corporate transports chauffering captains of industry to high-level meetings. At the height of the activity, a Cessna 170 taxis onto the ramp. Instead of shooing the tailwheel relic off to the overflow parking area on the far side of the airport, one of the lineman gestures toward a choice spot near by the terminal—just 30 feet from Butler Aviation's front door.

As soon as the 170's engine shudders to a stop, the lineman walks up to inspect the airplane with an admiring eye. Someone else steps out of a nearby terminal to pay his respects. Another lineman approaches and nods approval.

Bob G. Yates, the owner of the 170, is pleased. He had not expected the attention, considering that his is the oldest airplane on the ramp, and the only one with just one engine. But the Butler linemen, who constantly are surrounded by multi-million-dollar turbine aircraft, obviously are intrigued by the appearance of an elderly tailwheel airplane, a symbol of a more leisurely, uncomplicated time in aviation. The linemen also appreciate the fine quality of Yates's restoration.

A new generation of pilots who grew up with nosewheels are curious about tailwheels and are discovering that the four-seat, 145-hp 170 is an economical and versatile airplane in which to make the transition. Owners of 170s speak glowingly of mini-

PHOTOGRAPHY BY ART DAVIS

mal maintenance and performance equal to Model 172 Skyhawks that can cost many times more.

Cessna Aircraft built 5,136 170s between 1948 and 1957. Production ended soon after the Model 172 was introduced. Suddenly, it seemed everyone wanted a nosewheel, even 170 owners. Met-Co-Aire in Fullerton, California, obtained a supplemental type certificate to change the 170 to a tricycle gear configuration, and sold about 500 conversions. The conventional landing gear was seen as a shortcoming, and, compared to the Skyhawk, the 170 attracted only lukewarm interest in the used aircraft market. Now the 170's popularity is on the rise after years of relative obscurity. Prices range from $9,000 to $15,000 or more, depending on condition and equipment.

Yates discovered N1221D, the 170 he now owns, in 1977 in a clump of weeds behind a hangar. The 1951 170A had all but been abandoned. Yates saw potential beneath the beehives, rodents' nests and bird dung that clogged the engine compartment and littered the interior. Although it looked rough, all the pieces were there.

Yates wanted to buy it. The elderly owner, an optimist who talked of restoration, refused to sell. Yates persisted. Finally, the owner agreed to a price of $5,500. Yates spent hours cleaning up the worst of the mess so the airplane could be flown to its new home.

It soon became evident that restoring the 170 would be much more work than Yates had thought. He ended up disassembling the airplane and trailering the parts to his basement. It took two years to put it back togther, and another year to complete the interior. The engine was overhauled, the interior completely refurbished, and the airframe rebuilt and painted. Yates, who is a machinist, did much of the work himself, under the supervision of a qualified mechanic.

Yates bases his 170 at Darr Field, a private, 2,300-foot-long turf strip located south of Greensboro, North Carolina. Runway 13 begins at the base of a clump of trees, and power lines drape across the approach end of Runway 31, but there is ample room to operate.

Yates and his wife, Barbara, enjoy cross-country trips in the 170, especially if they are interrupted with frequent stops at country airports. Yates often chooses a destination by closing his eyes and putting his finger down on a sectional chart. The airport closest to his index finger is the target for the day. The mission: Land, buy a soft drink and some cheese and crackers, and explore. He has made lots of friends through his airport hopping, and his 170 has acquired a lot of admirers.

During the rebuilding of N1221D, Yates added a combination exhaust-gas temperature/cylinder-head temperature gauge, an air-driven artificial horizon and directional gyro, and an electric turn coordinator. The original three-inch manifold pressure gauge was replaced with a new two-inch gauge.

Yates monitors power settings with the manifold pressure gauge, rather than the tachometer. Propeller speed slows during climb, increases on descent, and can fluctuate in cruise even though throttle setting remains constant. The manifold pressure gauge provides a more stable monitor of engine power than does the tachometer. Yates uses an economy cruise power setting of 20 inches, which yields 2,300 rpm. That equates to about 65 percent power and fuel consumption of 7.5 to 8 gallons per hour with an indicated airspeed of 100 knots (115 mph). "If I'm in a hurry, I'll go to 21 inches," Yates said. That boosts propeller speed to 2,350 rpm, and indicated airspeed to 104 knots (120 mph).

Pneumatic pressure for the attitude and directional gyros in N1221D is supplied by venturi tubes mounted on each side of the fuselage. The Continental C-145-2 engine that was standard on all 170 models does not have an accessory pad for an engine-driven vacuum pump. The alternative to venturi tubes on the 170 is a belt-driven vacuum pump kit.

A supplemental type certificate is available to mount the vacuum pump kit in the engine cooling inlet just behind the propeller. A split pulley bolts around the crankshaft to drive the belt, which turns the pump. The 170 nosebowl must be replaced with a 172 nosebowl that has larger cooling inlets. New baffling also is required in the engine plenum to compensate for the airflow restriction imposed by the vacuum pump.

More than 100 supplemental type certificates have been issued for Cessna 170 modifications. Many no longer are available, such as the Met-Co-Aire tricycle gear conversion. The International Cessna 170 Association (Route 2, Box 186, Hartville, Missouri 65667; telephone: 417/741-6557) publishes a book that lists the modifications, which range from Lycoming O-360 engine installations, to autopilots, to auxiliary fuel

CESSNA 170

The restoration took three years. One year was spent on the inside.

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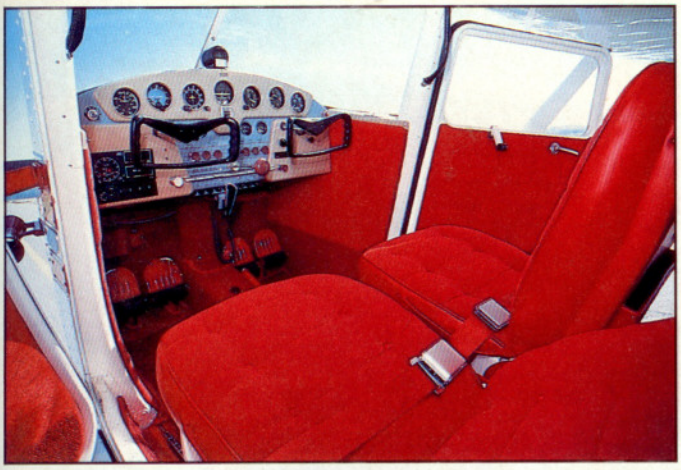
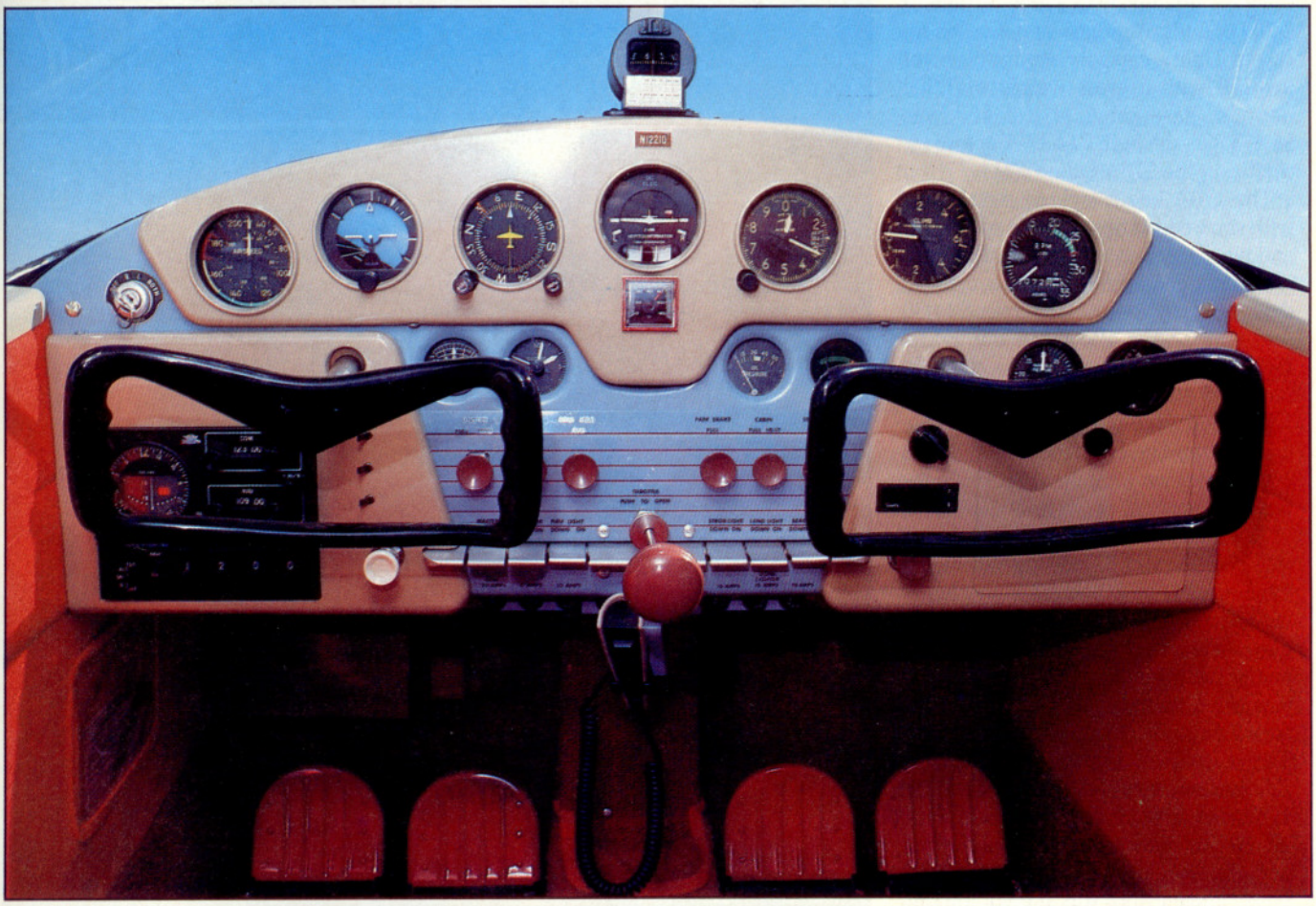
Bob Yates and wife Barbara review a photographic record of restoration efforts.




N1221D



tanks. The 170 association hosts regional fly-ins and a national convention each year, and can provide a 170 owner or pilot with informed advice on technical issues and parts availability.

The Cessna 170 was conceived as a growth version of the two-seat Cessna 120/140. Like the 120 and 140, the first 170s had fabric-covered, constant-chord wings with rounded tips and V-type wing struts. The 170 also had three of the 12.5-gallon fuel tanks first used on the 140. Two prototype 170s were built in late February 1948. The 170 was certificated in June 1948 as a Normal category airplane, with a gross weight of 2,200 pounds. A month later, Cessna received Utility category certification for the 170 with a gross weight of 1,900 pounds. Base price of the 170 was $5,475. Cessna built 714 170s before introducing the 170A late in 1948.

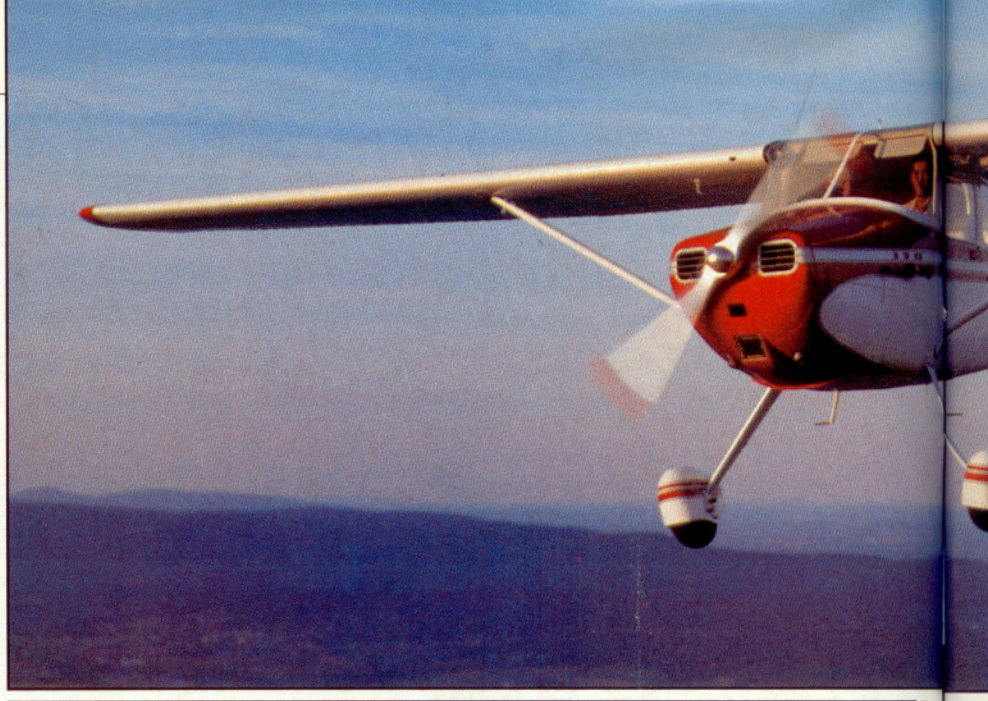
The 170A had a tapered metal wing with squared-off tips, a single wing strut and two 21-gallon wing tanks. The flaps were enlarged and could extend to 50 degrees. (Flaps on the 170 extend to 30 degrees.) Cessna also fitted the Model 195 dorsal fin to the 170 to increase directional stability. There were 1,522 170As built during the three-year production run. The 170A sold for $5,995 in 1949. The price went up to $6,495 in the next two years of production.

The final and most popular version of the 170, the 170B, was introduced in 1952. Cessna incorporated a number of changes in the 170B to improve handling. Whereas the 170 and 170A wings had virtually no dihedral, the 170B wing was given three degrees, and twist was added from the wing roots to the tips. The 170/170A hinged flaps were changed to a semi-Fowler design on the 170B. The flaps also were enlarged and given four positions: 0, 20, 30 and 40 degrees. The shape of the horizontal stabilizer and elevator was altered, the trim tab enlarged and a mass balance inserted in the tips of the elevator to relieve the heavy stick forces characteristic of earlier models. In 1953, Cessna switched to a stiffer, more tapered main landing gear. Unlike the original, the right and left gear legs were not interchangeable.

Cessna made changes inside the 170B as well. Heating was improved, and the instrument panel was redesigned from a small floating center section to a full-width panel with push-pull switches in place of piano keys. In the same model, radios and fuse panels were relocated, and dome lighting was added.

The 1955 C170B appeared with squared-off rear-passenger windows and a new tailwheel steering mechanism. The 1957 170B also featured a dubious innovation first seen on the 172: molded plastic interior panels.

The 170B sold for $7,245 when it was introduced in 1952. Four years later, the base price had increased to $8,295. There were 2,900 170Bs built from 1952 through 1957, when production of the Cessna 170B ceased.



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The 170 became the 172 when Cessna decided to switch to tricycle gear. Otherwise, the two models were identical. In fact, Cessna built three dozen 170s in 1957 by plucking 172s off the production line and installing conventional landing gear. But, it was clear that pilots were ready to switch to nosewheels.

Just over half—2,600—of the Cessna 170s built during the 10-year production run still are registered with the FAA, including 382 Cessna 170s, 646 170As and 1,572 170Bs.

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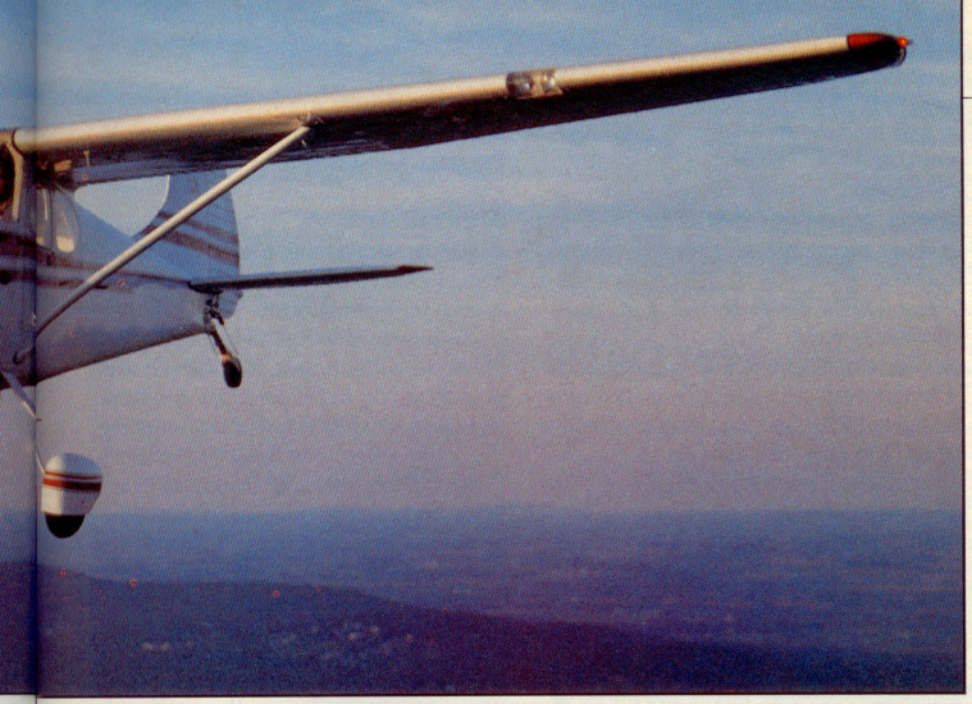
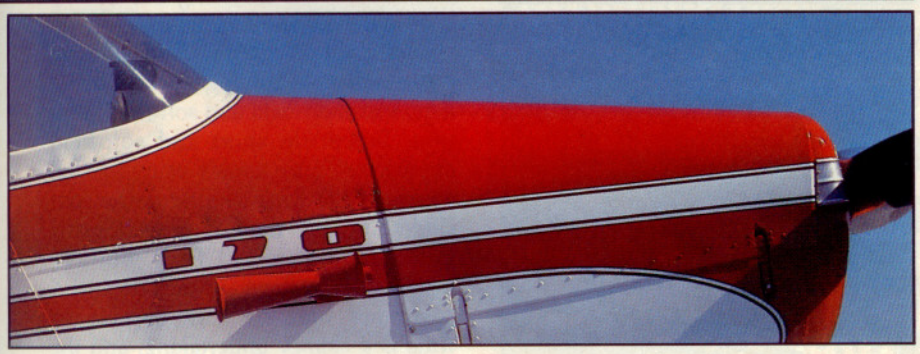
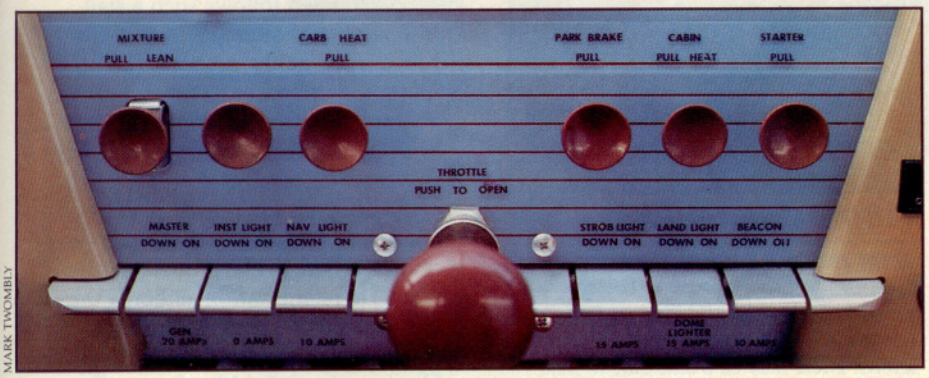




CESSNA 170

The 170 is from a more uncomplicated time.



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The 170 has a relatively clean record with respect to airworthiness directives. AD 79-8-3 required a modification of the cigar lighter circuit breaker and wiring, and AD 79-10-14 mandated replacement of the fuel tank filler caps with vented caps. The Continental C-145 engine that was standard on all 170s was the subject of three airworthiness directives issued between 1949 and 1951. Piston pin and plug assemblies had to be replaced, the generator drive coupling disc had to be inspected every 100 hours or replaced, and the crankcase had to be inspected for cracks.

Other airworthiness directives affecting the 170 address problems with the Marvel-Schebler carburetor, Slick and Bendix magnetos, vacuum pumps, air filters and accessories common to many piston-engine aircraft.

A Cessna 170 that has been gathering dust on a remote corner of the airport may represent a potentially good buy, but there could be some high hidden costs if airworthiness directives dating back years have been ignored. Someone considering the purchase of a 170, or any aircraft that has been out of license for some time, should get a complete list of all applicable airworthiness directives, then check it against the aircraft engine and airframe logbooks to see if the inspections or modifications have been performed. Factory service bulletins also should be reviewed, but, unlike airworthiness directives, they do not require mandatory compliance.

The Cessna 170 has been out of production for nearly 30 years. Age has exacted its toll on many 170s in the fleet. Corrosion is the most common service problem affecting the Cessna 170, according to FAA service difficulty reports. Corrosion has been found in empennage spars and attach bolts, seat rails, wing attach bolts, landing gear support brackets and rivet heads on aileron balance weights. The Cessna 170 also seems to be plagued with broken axles, which were probably caused by too many hard bounces and drifting, crosswind landings.

The FAA's five-year file of service difficulty reports for the 170 is comparatively slim (258 entries) considering the number of 170s still flying.

The Cessna 170 may have a good service history, but its accident/incident record is disappointing. A lot of 170s have been in takeoff, landing and taxiing accidents. The FAA synopsis of 170 accidents and incidents from 1980 through mid-September 1985 is revealing: "Lost directional control on runway during solo touch and go; time in make and model: 11 hours. Lost directional control on landing, veered off runway and overturned; unskilled in taildraggers. Aircraft ground-looped during landing roll; pilot inexperienced. Instructor unskilled in taildraggers lost control on demo of short-field landing, airplane veered into snowbank. Ground-looped during rollout in light crosswind. Gusty crosswind landing, lost control, unable to get power off, ground looped." The accounts of "loss of directional control" that follow crosswind landings, takeoffs in gusty conditions, downwind taxis, overbraking and undercontrolling go on and on.

Lack of overall or recent experience in the airplane is a factor in many of the mishaps, but not all. The lesson seems clear. The 170 has no treacherous characteristics that are revealed at the critical moment in a landing approach or takeoff roll. It simply has a tailwheel, and tailwheel aircraft require more pre-

cise control on the ground than do aircraft with nosewheels.

"These airplanes have to be flown a certain way," said John P. Luce, AOPA 253678, of Charles Town, West Virginia, who has owned his 1953 Cessna 170B for 21 years. "If they aren't, they'll let you know it." Luce, who is a flight instructor, spent several hours with me demonstrating the handling characteristics of his 170.

Our first two outings occurred in gusty conditions. The light wing loading of the 170 makes it especially susceptible to upset from gusts and thermals. I became mildly discouraged because I was having trouble keeping the ball in the turn coordinator from slewing around. The 170 is much more sensitive in yaw than the 172. The rudder is large, and there is no nosewheel to dampen the effects of gusts. It was only when we flew in smooth air that I was able to develop a feel for coordinated control response.

The 170 is easier to taxi than most tailwheel aircraft. The top of the engine cowling slopes down, and the front-seat occupants can see over the nose so there is no need to S-turn your way across the ramp. The tailwheel swivels 16 degrees each side of neutral, then unlocks to pivot 360 degrees.

A light tap dance on the rudder pedals maintains directional control on the takeoff roll. Luce normally uses 20 degrees of flaps for takeoff to decrease the takeoff roll. It doesn't take long for the tail to lift, and slight back pressure on the yoke will bring the airplane off the ground at 47 to 50 knots (54 to 57 mph). After the flaps are retracted, the 170 climbs at about 650 fpm at 74 to 82 knots (85 to 95 mph), the recommended speeds for normal climb.

We flew the downwind leg at 70 knots (80 mph) with one notch of flaps. It was possible to fly a complete pattern, from takeoff to touchdown, without touching the trim wheel. By contrast, Yates's Cessna 170A has to be trimmed to relieve control pressure each time the power setting and flap position are changed. Cessna successfully eliminated the heavy control pressures characteristic of the 170 and 170A by enlarging the 170B's trim tab, changing the shape of the elevator and installing a mass balance in the outboard tips of the elevator.

Luce and I practiced traditional three-point, full-stall landings, wheel landings, and short-field and soft-field landings. Except on short and soft-field approaches, Luce avoids using the full 40 degrees of flaps because of the considerable drag they impose. Cessna called them Para-Lift flaps, but 170 owners refer to them as "barn doors." A go-around with the barn doors open wide is a chancy undertaking, and the 170 owner's manual warns against full-flap slips. The flaps can block airflow over the tail surfaces causing the horizontal stabilizer to stall. A sudden and steep pitch down follows such a stall.

It took several attempts, but finally I made a reasonably smooth full-stall landing and rolled out with the main gear straddling the centerline. We then moved on to wheel landings. The object here was to hold a tad of power at touchdown (Luce pulls the power all the way off on short final, then screws the vernier throttle back in about three-quarters of a turn) to retain control authority during rollout on a crosswind landing, or when the wind is gusting.

Short- and soft-field landings call for full flaps on short final, and enough power to maintain 52 knots (60 mph). When the power is pulled, the airplane will land, immediately, with a very short rollout. Luce demonstrated a short-field landing that had us turning off the runway in about 300 feet.

I finished the checkride feeling pleased with myself for having accomplished the switch from nosewheel to tailwheel in the Cessna 170. Making the transition from a nosewheel to a tailwheel is like learning how to use the

CONVENTIONAL WISDOM

Michael L. Luce's first solo flight is scheduled for March 18, 1986—his sixteenth birthday. The private pilot checkride is planned for one year later. Michael plans to earn all the ratings and licenses and make aviation his profession. But, first things first, which means mastering the Cessna 170 in which he is training. He admits to experiencing some early difficulties in maintaining directional control on takeoff, but he claims to have conquered takeoffs and graduated to landings.

Michael seems unimpressed by the lore that dramatizes the learning of tailwheel flying skills as a rite of passage, perhaps because he has no tricycle-gear experience to compare against the 170. His instructor and father, John P. Luce, thinks that is a good thing. "Whatever Michael lacks in previous experience is more than made up for by not having to unlearn some things," Luce said.

Luce is convinced his son will be a better pilot for having started in the 170 instead of a trainer with a tricycle gear. "There shouldn't be a dime's worth of difference in the way you fly tailwheel and tricycle-gear aircraft but, in truth, there is. The tricycle-gear pilot can drift into habits not compatible with a tailwheel—or a tricycle gear, for that matter. But, the engineering is there in the tricycle gear to mask it."

As an example, Luce cites full-flare, full-stall landings. "They are almost never done in tricycle-gear airplanes. People drive them onto the ground." Ironically, Cessna introduced the Cessna 172 in 1956 as the airplane that could be driven instead of flown. One advertisement urged pilots to "drive this airplane to appreciate it." The advertisement copy explained that the Cessna's 172's Land-O-Matic landing gear enabled pilots to arrive without stalling or dropping onto the runway. "You drive it up! You drive it down! You drive it around!"

"I'm not an elitist," Luce says. "I think there have been a lot of good safety improvements engineered into modern aircraft. But there also have been cosmetic changes to improve the feel, such as limiting control surface travel and interconnecting the rudder and ailerons. There may be a dark side to that."

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John Luce and student/son Michael.

Luce draws an analogy between tailwheels and transmissions. "A tailwheel aircraft is to aviation what a standard transmission is to cars. A standard transmission allows you to feel the car. You learn how to handle it in all kinds of conditions." In addition to giving his son instruction in the 170, Luce is teaching him to drive a car, a Volkswagen with a four-speed standard transmission.

"If I were king, I'd require all drivers to learn to handle a stick shift and all pilots to log tailwheel time. But I'm not king. I tell my son that, by the time he gets to be my age, he will be one of very, very few pilots who can fly a tailwheel airplane." —*MRT*

stick and rudder all over again.

The tailwheel is the source of enthusiasm owners have for their 170s. It contributes to the 170's good short-field landing performance, respectable cruise speeds and ground maneuverability. The 170 may have succumbed to the tricycle-gear Skyhawk nearly 30 years ago, but times, and attitudes, have changed. Some Skyhawk owners are converting their aircraft to tailwheels, but it has been 20 years since Met-Co-Aire last sold a nosewheel kit for a Cessna 170. □

Cessna 170

Base price: $5,475 (1948) to $8,295 (1954 to 1956)

Current market value: $9,000 to $13,000

Specifications

Powerplant	Continental C-145-2
Recommended TBO	1,800 hr
Propeller	McCauley 1A170
Length	24 ft 11.5 in
Height	6 ft 7.5 in
Wingspan	36 ft
Wing area	174.6 sq ft
Wing loading	12.6 lb/sq ft
Power loading	15.17 lb/hp
Seats	4
Empty weight	1,220 lb
Gross weight	2,200 lb
Useful load	980 lb
Payload w/full fuel	
C-170	779 lb
C-170A and B	758 lb
Fuel capacity, std	
C-170	225 lb (201 lb usable) 37.5 gal (33.5 gal usable)
C-170A and B	252 lb (222 lb usable) 42 gal (37 gal usable)
Oil capacity	8 qt
Baggage capacity	120 lb

Performance

Takeoff distance over 50-ft obst	1,820 ft
Rate of climb, sea level	690 fpm
Max level speed, sea level	122 kt (140 mph)
Cruise speed/Range w/no rsv, std fuel (fuel consumption)	
@ 75% power, best economy	
5,000 ft	114 kt (131 mph)/440 nm (57.6 pph/9.6 gph)
@ 65% power, best economy	
7,500 ft	109 kt (126 mph)/488 nm (49.8 pph/8.3 gph)
@ 55% power, best economy	
10,000 ft	102 kt (118 mph)/539 nm (42 pph/7.0 gph)
Service ceiling	15,500 ft
Landing distance over 50-ft obst	1,145 ft

Limiting and Recommended Airspeeds

Vx (Best angle of climb)	54 KIAS (62 mph)
Vy (Best rate of climb)	77 KIAS (89 mph)
Vfe (Max flap extended)	87 KIAS (100 mph)
Vno (Max structural cruising)	122 KIAS (140 mph)
Vne (Never exceed)	139 KIAS (160 mph)
Vs1 (Stall clean)	50 KIAS (58 mph)
Vso (Stall in landing configuration)	45 KIAS (52 mph)

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, at sea level and gross weight, unless otherwise noted.