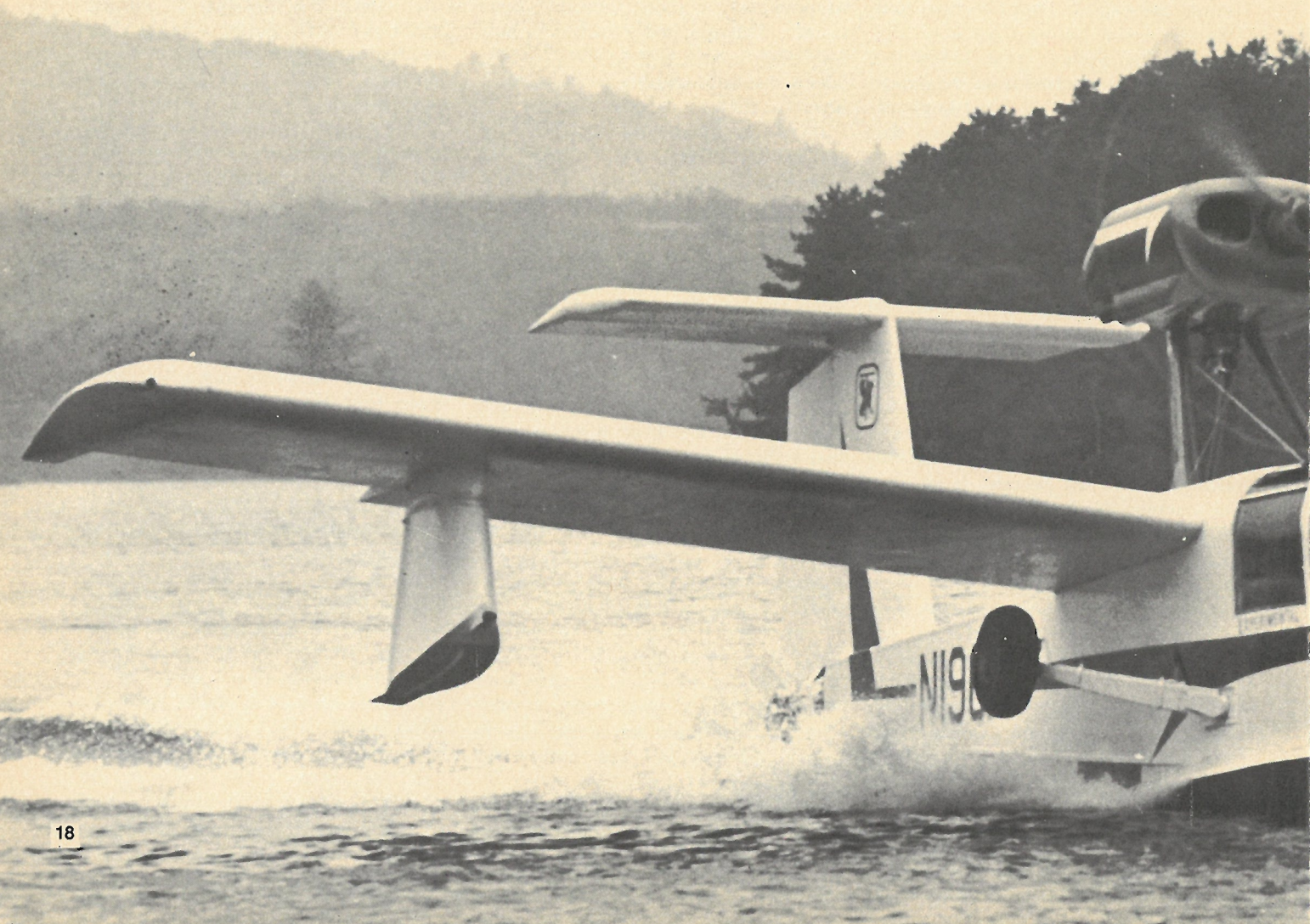
THE THURSTON "TEAL" AMPHIB

Aiming at a big void in the seaplane trainer market, the new TEAL amphibian shows that it has what it takes to be a pilot pleaser in water, the sky or at big city air terminals.

by ED DeCHANT,
PHOTOS by HOWARD LEVY

The seaplane community hasn't grown much in the past few decades. This is due to many factors not the least of which is lack of a good training aircraft. The advent of the Thurston TEAL promises to eliminate at least this problem, for it is an economical, well powered, easily flown, two-place, side by side amphibious trainer.



This last point is extremely important to any future development in seaplane flying because the seaplane flight schools are spread too far apart for the average pilot to get to. Ohio, for example, has four areas of seaplane operations and six planned in the near future. Yet, that state has only one training facility, at South Dayton Airport in the Southwest corner of the state. Heading East the next training facility is at Roberta Wassel's Gateway Seaplane Base near downtown Pittsburgh, Pa.

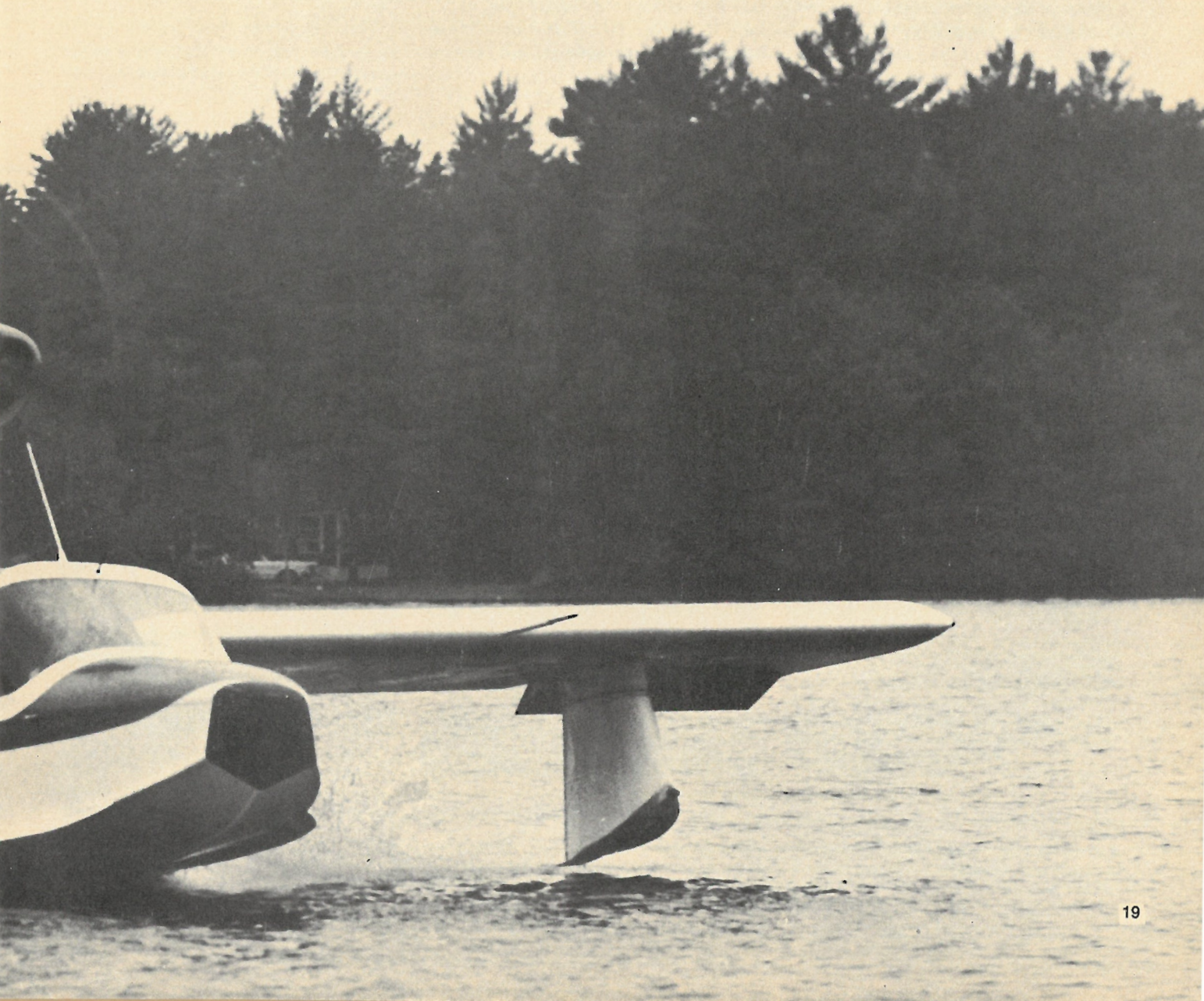
The "Teal" will now permit any "land based" fixed base operator located near an approved seaplane landing area to offer a seaplane rating as part of his courses.

This new amphib also offers the sportsman an economical two-place cross country sport plane. It takes two men, full fuel and everything but the kitchen sink to almost any remote lake that's big enough to put a boat on; for, the TEAL will lift off the water after a 600 ft. water run, and will climb at 1050 fpm at full gross.

At first glance the TEAL seems to resemble the LAKE LA-4 which is a modern version of the old Colonial Skimmer. A closer inspection, however, will disclose that the only similarity is both employ a shoulder wing, pylon mounted engine, and similar appearing tip floats. This similarity is easily explained by the fact that Dave Thurston, designer and builder of the TEAL, also played a major part in the design and construction of the Colonial Skimmer and later the Lake.

Thurston graduated from Guggenheim School of Aeronautics, New York University in 1940. During his senior year he won the Chance Vought Design Award for his aircraft design project. The next 14 years were spent as a project engineer in design supervision with the Grumman Aircraft Engineering Corporation. As previously stated, he designed both the Colonial Skimmer and the Lake and has recently been involved as director of hydro-ski and hydro-foil research for the U.S. Navy.

With more than twenty years of design and development experience in



TEAL AMPHIB CONT'D.

the amphibian field Thurston built the TEAL to offer pleasure and profit at comparatively realistic initial cost, with operational ease and low maintenance as primary criteria.

Thus, the TEAL has no hydraulic systems to operate or service. This eliminates weight and lowers cost. The design permits near STOL performance with out flaps and the landing gear is manually actuated.

The landing gear is of the conventional type instead of tri-cycle gear common to other amphibians. The conventional gear is lighter, has fewer moving parts, and eliminates the need of a nose wheel well and wheel well doors. Beaching of the aircraft is also much easier. A common problem with tri-geared amphibians is that the nose wheel will often dig in and get stuck in the sand when beaching the plane.

Tri-gear also poses a problem when approaching a ramp which is perpendicular to the wind. As the nose wheel makes contact with the ramp there is a tendency for the aircraft to pivot about the nose into the wind. The conventional gear eliminates this problem and allows the Teal to be driven up a ramp regardless of the wind.

The water rudder is connected to the tail wheel. If water rudder is required for directional control in windy conditions then the gear must be lowered. The water rudder is only used at slow taxi speeds in any seaplane. In this case the lowered landing gear provides protection for the hull and good breaking action via hydrodynamic drag when approaching a dock.

Of course this decade has seen almost all aircraft manufacturers turn to tri-cycle gear for their land planes. There is no doubt but that the conventional geared aircraft requires the attention of the pilot throughout the landing or take off roll. But, those who've had the privilege of flying a taildragger know that after a few hours instruction the conventional geared airplane is no more difficult to fly than its tri-geared cousin. As a matter of fact it is cheaper to install and maintain. Its lighter (and this means more payload) and far superior for sod or rough field operations.

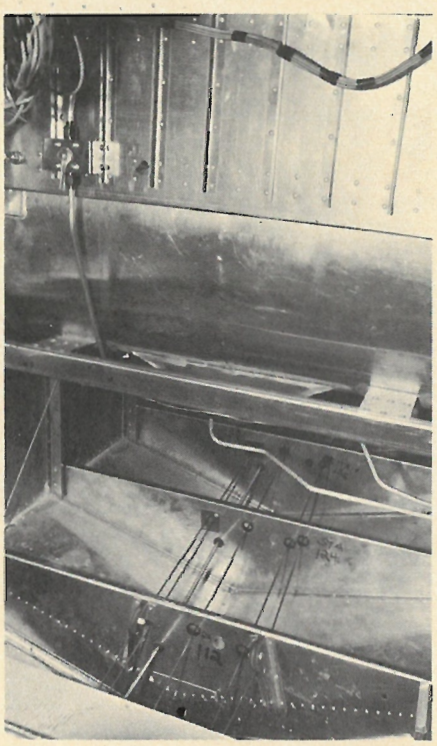
Inside the aircraft the landing gear handle sits between the seats in the same position as the flap handle on the Cessna 170. The gear is held in either the up or down position by a double down and up locking system. The second lock trips a micro-switch which lights the gear position lights on the panel.

The shoulder mounted cantilever wings are located above and aft of the pilot, similar to the Cessna Skymaster. Their location provides excellent visibility in both level flight and during aerial turning maneuvers. The wing location is designed to permit high speed and step turns in cross-winds without danger of capsizing as the wind cannot get under a wing and overturn the TEAL.

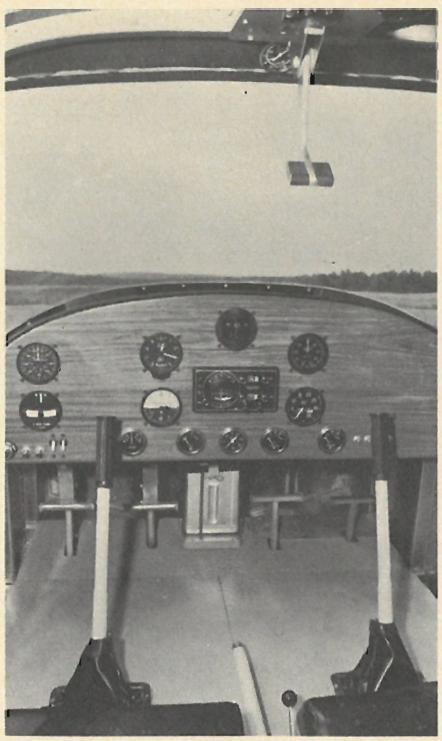
The wing tip floats are designed so that they likewise cannot be buried in cross-wind turns, even at high speeds.

The airframe and covering of the TEAL is aluminum alloy except for non-structural bow and cabin top skins of fiberglas.

The pylon-mounted Lycoming 150 hp engine will show that it is a puller (tractor mounted) rather than a pusher. The tractor installation is quieter because the exhaust does not strike the propeller disc. In addition the prop



Teal's interior aft of cockpit details the fine workmanship. Fuel tank and spar are clearly shown. Un-chromated metal interior would soon corrode in salt water operations but production aircraft will be treated and protected in these vital areas.



Sport flyers will delight in the stick control but instructors will have to have dual brakes not shown on this model. Throttle lever is mounted overhead in seaplane fashion. It is understood that shoulder harness will be incorporated in production aircraft providing good cockpit safety.

Conventional landing gear makes beaching in muddy or rough beach area easy and spring steel landing gear can take its lumps without problems.

is clear of any spray or green water and the conventional right hand configuration is readily available. Recent tests have proven that a tractor top mounted engine is more efficient than a pusher. Thus, Thurston's installation increases take off and climb performance of the TEAL.

Thurston Aircraft is the first lightplane manufacturer to apply for an FAA Type Certificate to a T-tailed lightplane. The T-tail configuration provides minimum trim change with power changes due to the slipstream effect. The high mounted horizontal stabilizer and elevator are free of tail-wetting during water operations. This is important if the aircraft were operated in salt water.

The T-tail allows the wings to be folded back like a glider for towing behind a car since the wings can be removed similar to a sailplane. For this reason, the fuel tank has been fitted into the fuselage and not the wing. The only disconnect requirement is to remove three bolts per wing and the aileron cable. This reduces width to about six feet and height of eight feet, eleven inches. The TEAL will thus fall within highway trailer allowances and can be towed on its own landing gear at a reasonable speed. The 110 lb. wings can be installed at any airport or boat ramp in 12 minutes.

The windows raise on each side and are stowed in grooves along the sides of the cabin access door which also raises vertically to allow easy entry, departure or fishing from the cabin. The seat backs can also be folded down and stood upon for fishing. This design permits the windows to be opened either on the water, or in flight.

Inside the aircraft is roomy. Two men can easily sit side by side without that cramped feeling common to so many side by side models. The instrument panel contains ample room for a multiple radio complex and full IFR instruments.

The controls are simple stick and rudder. The stick is more easily removed than a wheel would be during entry, exit, or when fishing.

Engine controls are mounted overhead and include a throttle, prop control, carb heat and mixture control. The pilot sitting in the left seat may find this a little awkward at first if he's flown stick controlled airplanes. Most stick aircraft are flown with the pilots right hand controlling the stick and his left hand on the throttle. In the TEAL it is just the opposite.

Any water which might enter the TEAL's hull can be easily removed through the new hull drain fittings which were designed to eliminate the constant struggle with "frozen" drain plugs. Thurston claims this new design cannot corrode in place, another economy which, though a small item, will save much frustration.

The wheelless version of the TEAL is called the T-BOAT. This is basically the same aircraft without a landing gear and is intended only for water operation. The folding wing principle will allow the owner to haul his fiying boat to and from the nearest lake, just as he would a boat.

The flight tests done by this pilot were conducted at a field elevation of about 500'msl, 74 deg. F. OAT, with windy and turbulent conditions throughout the testing program. The TEAL handled extremely well in the rough air, better in fact than the new bird used to get to Thurston's Sanford, Maine factory.

TSC-1A "TEAL" AMPHIBIAN

TYPE:

Two-seat cabin monoplane amphibian

WINGS

Cantilever shoulder-wing monoplane. Wing section NACA 4415 Aspect ratio 6.5. Chord 5 ft-0in. constant. Dihedral 4°. Incidence 4° constant. All-metal D-spar construction. No flaps.

HULL:

All-metal semi-monocoque structure with fiberglass foredeck and cabin top skins.

TAIL UNIT:

Cantilever all-metal structure.

LANDING GEAR:

Retractible conventional type; manually actuated. Spring type main struts, with tail wheel integral with the water rudder. Size 6.00 x 6 main wheels, 8.00 x 3.00 tail whel. Single disc brakes on main wheels.

POWER PLANT:

One 150 HP Lycoming O-320-A3B four cylinder horizontally opposed air cooled engine. Two bladed fixed pitch metal propeller, diameter 6 ft. All-metal fuel tank in hull aft of main bulkhead. Standard fuel capacity 25 gallons. Oil capacity 2 U.S. gallons. Constant speed propeller optional.

ACCOMMODATIONS:

Enclosed cabin seating two side by side. Dual stick controls standard. Baggage compartment behind seats, which fold down for access and stand-up fishing from cabin. Door on each side. May be flown with window open, permitting cool taxiing and aerial photography. Ventilation standard.

EQUIPMENT:

Standard flight instruments. Provision for blind flying, radio communications and navigation equipment, and increased generator size. 12 volt standard. Anchor, mooring line, and paddle provided.

DIMENSIONS, EXTERNAL:

Wing span — 31' - 11"
Length overall — 23' - 7"
Height overall — 8' - 11"
Tread — 7' - 0"

AREAS:

Wing, gross — 157 sq. ft.
Ailerons, total — 10 sq. ft.
Fin — 10.7 sq. ft.
Rudder — 6.8 sq. ft.
Stabilizer — 15.4 sq. ft.
Elevator — 12.6 sq. ft.

WEIGHTS AND LOADINGS:

Empty — 1250 Lb.
Useful Load 600 Lb.
Gross — 1850 Lb.
Max wing loading — 11.8 Lb./sq ft
Max power loading — 12.3 Lb./hp

PERFORMANCE:

Max speed — 5000 ft. — 125 mph
Max cruising speed (75% power at 5,000 ft.) — 116 mph
Stalling speed-gross weight — 54 mph
Rate of climb - sea level — 1050 ft./min
Take off run - land — 400 ft. water — 600 ft.
Range - with reserve — 400 miles

MODEL TSC-1 T-BOAT SEAPLANE

Specifications as above except landing gear removed; useful load and performance increased as follows:

WEIGHTS AND LOADINGS:

Empty — 1140 Lb.
Useful Load 710 Lb.
Gross — 1850 Lb.

PERFORMANCE (ESTIMATED):

Max speed — 5000 ft. — 130 mph
Max cruising speed (75% power at 5,000 ft. — 120 mph

TEAL AMPHIB CONT'D.

The oil was checked standing on the aircraft fuselage by the engine. Fuel was drained from two quick drains located on the hull near the left wing root.

On the ground handling characteristics of the TEAL are very good. It is very easy to taxi and the stick does not have to be held back to maintain good tailwheel controls. Lift off occurs shortly after advance of throttle and on this day was less than 400 ft. because of a climb out at 70-80 mph produces 100 fpm and 10-15 knot wind.

During the early FAA tests the aircraft was run on the ground at 45% power for taxi tests. Much to everyone's surprise this little amphibian suddenly lifted off. The amazed pilot kept going, circled the field and landed. Calculations later proved that an additional four hundred pounds of lift is created by the hull form.

When one first gets into the aircraft on land he notices that the attitude at which the aircraft sits at rest is not excessively nose high as with most taildraggers. Actually its closer to the attitude of a tri-geared 172 than it is to a conventional 170. Forward visibility is excellent.

On airport landings the aircraft responds very well to a negative angle of attack following a wheel landing. This technique is similar to pushing forward on the wheel in a tri-geared aircraft in order to hold it on the ground in gusty winds.

On water take off the TEAL is very predictable and balanced. The deep V hull has afterbody ventilation which cuts down on the hydrodynamic drag during the beginning of the take off run, thus permitting the aircraft to get on the step in 4-6 seconds. Control response during the takeoff roll is excellent. The elevator, being directly in the slipstream, is extremely responsive. This, of course aids in quickly getting on the step. Once on the step acceleration is very rapid and lift off occurs in about 10-12 seconds. On the day these tests were made the wind was gusty, and extra care was taken not to try a lift off until well above the 54 mph stall speed.

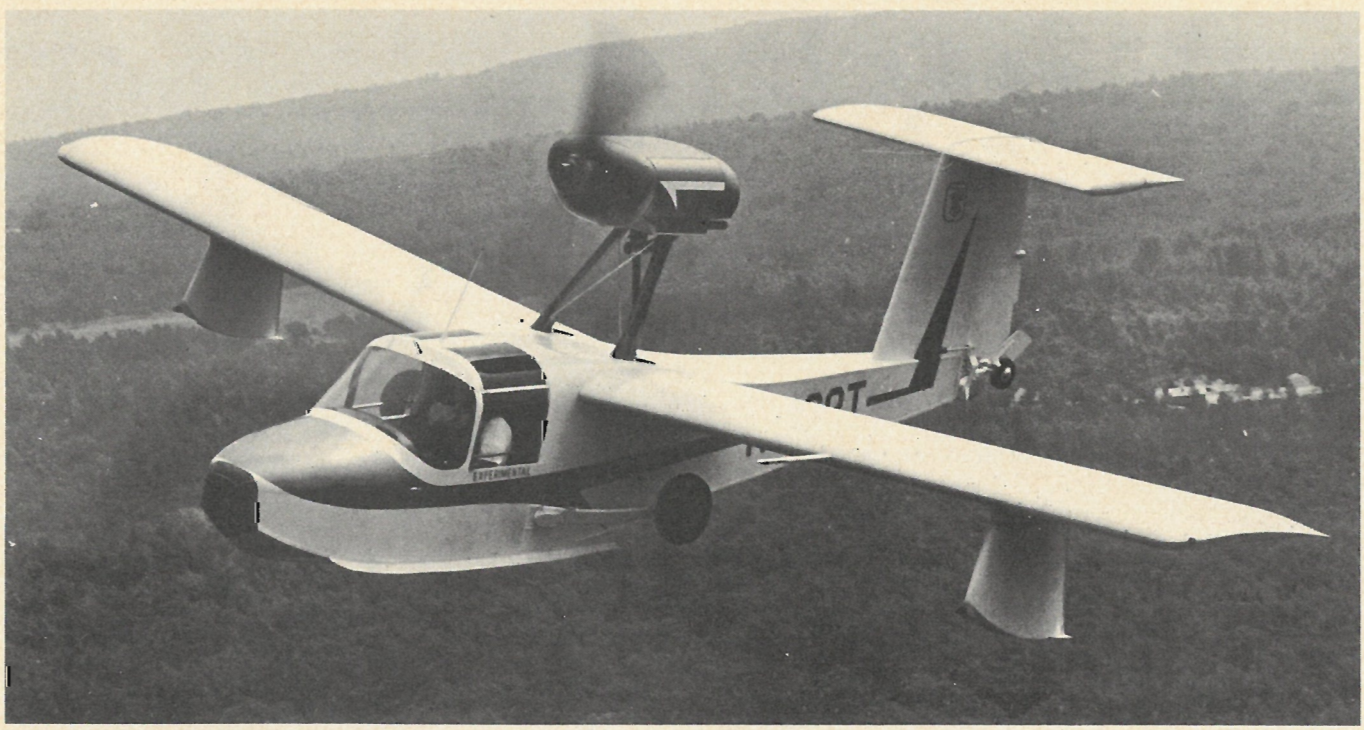
During early certification tests last year the TEAL demonstrated takeoffs from the water in gusty 90 degree cross winds exceding 30 mph and which created 18 inch waves. Later, takeoffs into the 30 mph wind required only 100 ft. to become airborne.

The following day in Zero wind conditions and at a temperature of 75 deg. F., takeoffs from mirror smooth water averaged less than fifteen seconds and covered a measured 600 ft. A simulated 50 ft. obstruction would have required less than 1000 ft. to clear. The demonstrated landing distances in no wind conditions required a water roll out of 450 ft. to a full stop.

On the water the TEAL is the seaplane pilot's dream. She's as maneuverable as a motor boat and twice as responsive. The wing tip floats act as water skiies and permit high speed step turn takeoffs from a very small area. The deep V hull enables the pilot to takeoff from glassy water as easily as in a chop.

In the air the TEAL is equally as easy to fly. Control responses are good with the rudder and ailerons having a heavier feel than the elevator which is very sensitive. The elevator is so sensitive that trim changes seem unnecessary. The trim is there, however, sitting on the floor between the seats. It is similar to the trim control on the Champion Citabria.

Now here comes the sticky part. How much does it cost? The price effective June 1, 1969 is $16,750 for the TEAL Amphibian and $14,950 for the T-Boat seaplane. A lot of money? Maybe, but if a comparison is made to a Cessna 150 with the Doyn 150 hp conversion, a hartzell constant speed prop, and EDO floats the reader will come up with an astounding cost (close to the price of the TEAL.) Furthermore he'll be able to fly from water only. With the TEAL, every airport becomes a gas station, and every lake a sportsmen's dream.



For the first time in many years, land locked operator can offer seaplane training with this outstanding little amphib tractor. Engine pod offers quick servicing of power plant.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