■■ How would you, as a presolo student pilot or a potential student, take to the idea of making your first solo flight without benefit of any dual instruction at all? Don't be shocked by the audacity of such a suggestion or think that it is a joke. A great many student pilots got into the air that way in bygone years, and a small number of glider pilots are still trained in single-seaters today.

The pioneer aircraft builders, of course, had to start this way. There were no instructors around to check them out. They set their open-air ships up on a wide-open field, waited until the wind was calm, and then began a series of ground runs back and forth across the field to get the feel of the plane and master its controls. The taxi runs developed into short straight-ahead hops and eventually reached the moment of truth when pilot and plane got high enough to cross the fence and then had to fly on out and make a turn to get back.

Dual instruction in two-seaters soon became the established method of checking out new pilots, and a specialized class of training plane began to develop well before World War I. The solo concept was not abandoned however, and became famous (or notorious) in France during the war. The French Air Force made an official practice of teaching by the single-seater method. The students were given some ground school instruction in aerodynamics and piloting technique; were taught to operate the motors on test stands; and then were turned loose on broad, level fields in tiny nonflyable single-seaters.

These were complete airplanes in almost every respect except that their wings were so short they couldn't fly. Some had no lateral controls, but most either had ailerons or wing-warping, a type of lateral control still in use for some of the slower airplanes as late as 1918. Fitted with air-cooled power plants in the 20–30 h.p. range, these were called, officially, Roleurs by the French, but generally went by the more popular nickname of "grass cutter." The AEF pilots who trained in them in France called them Penguins after that well-known nonflying bird.

After the solo student mastered the nonflying types, he was put into a more sophisticated model with increased wing area and allowed to make straight-ahead flights and shallow S-turns. From this stage he advanced to real airplanes. The attrition rate was high, but enough survived to justify continued use of the system. About the only "dual" some of these military pilots got between their first Penguin runs and the time they entered combat (with 20–30 hours' total flying time) was an occasional check ride in a two-seater. The United States tried this system in 1917 and bought some 300 American-built Breese Penguins for use on the Texas prairies where the big wartime training centers were being set up. The system didn't work out, and most of the Penguins were kept in storage until after the war.

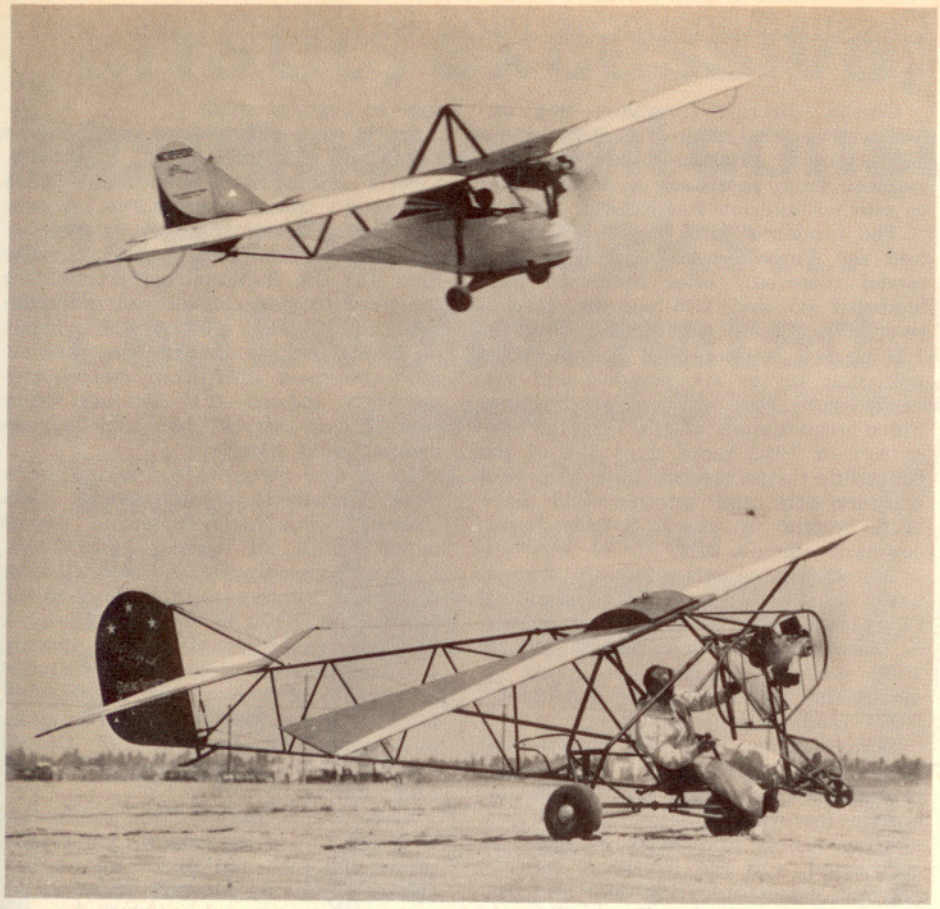
The single-seat instruction system worked very well in the glider movement that developed right after the war. In Europe, notably Germany, where modern gliding started, beginning students were launched for short hops on level ground by crews pulling on rubber ropes. Later, they were launched for longer glides down gentle slopes for landings on open ground below. There was plenty of apprentice manpower available for the launching and retrieving work and plenty of individual attention for the student, backed up by tight discipline to keep him in line. While the rubber rope (or shock cord, called "bunjie" by the British) was the preferred method in Europe, Americans soon developed a preference for rope tows by automobile for level-ground operations.

Auto-tow glider instruction more or less duplicated the old Penguin technique—a standard glider was towed behind a car and allowed not quite enough airspeed to fly but enough to enable the student to balance the ship laterally and longitudinally on its single wheel. This single point of ground contact was a big improvement over the powered Penguin, which was devoid of lateral "feel" and controllability because of its conventional airplane-type two-wheel undercarriage (landing gear is the wrong term here).

When the student could keep things under control on the ground he was given a bit more speed, enough to get the glider a few feet into the air, after which he released the tow rope and landed straight ahead. Rather than have the student try a turn to miss the tow car while so close to the ground, the car (if it could) speeded up to get farther ahead of the glider or turned away from the line of flight.

The student was given progressively higher tows; taught coordination exercises and gentle S-turns; and finally was pulled high enough to make 90° turns with landings across the field, if there were room, or 180° turns to land in the opposite direction. Most American glider instruction is now given in two-seaters, but the solo auto-tow method is still used to a limited extent. Incidentally, this is a lot harder on the instructor, who isn't right there to take over if the student gets into trouble. The instructor has to know his student extremely well: that he is capable of performing the next maneuver; that he will follow instructions and not try something unauthorized. Also, he must make allowances for the student's lack of experience and judgment by issuing alternate sets of instructions that should be followed if all of the human, meteorological, and mechanical variables in the glider launch operation don't make it possible for the glider to reach the customary release altitude on the next flight.

The only serious American effort to make a commercial operation out of the powered Penguin technique appeared when the depression began to have its effect on the aviation boom that had started in the late 1920's. The ground-training procedure, followed by solo flight in a docile airplane that was virtually a powered glider, looked like a good way to cut down on the cost of learning to fly. With this in mind, the



Cycloplane flight trainer passing over a two-seat ground trainer being operated by a solo student who is banking the turn on a ground run. Notice some details on the ground trainer: tubular propeller guard; wire mesh, which kept student's feet away from prop; and small, flat windshield (in front of student's hand).

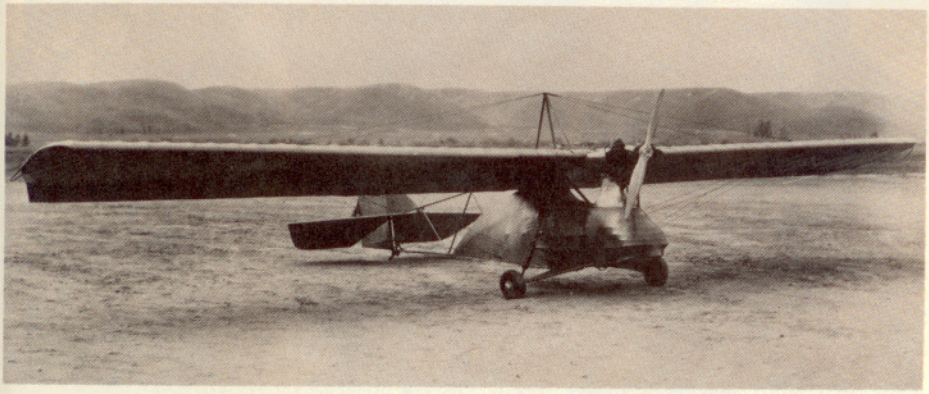
Yesterday's Wings:

The CYCLOPLANES

Cycloplane Company developed ground and flight trainers that helped cut down on the cost of learning to fly

by PETER M. BOWERS / AOPA 54408

The Cycloplane flight trainer was virtually a powered glider bearing a superficial resemblance to the contemporary Aeronca C-3. *Photos courtesy of Joseph P. Juptner*



Cycloplane Company, Ltd., was formed at Los Angeles in 1930.

The Cycloplane System sold comprised a two-unit package, a ground trainer and a flight trainer. The ground unit had one major improvement over the wartime Penguins. While it retained the laterally stable two-wheel undercarriage, the entire airframe above the wheels was pivoted so that the student could actually bank the machine in the turns during his ground runs. For those who felt that some dual in the initial stages was still necessary, a two-seater version of ground trainer was developed.

The ground trainers were powered with two-stroke two-cylinder air-cooled Cyclomotors, developed specially for them, which delivered 23 h.p. at 2,350 r.p.m. Because they were not flyable, the ground trainers didn't have to meet certification requirements and could take drastic cost-saving shortcuts in structural detail and overall refinement. Photos of ground trainers show considerable variation among them.

The ground trainers were so balanced on their main wheels that they rested in the normal "three-point" attitude, but could be "flown" on the ground in a tail-up attitude at considerably less than the normal lightplane flying speed. A small nosewheel protected the propeller from the consequences of too much forward stick. The ailerons were made exceptionally large—actually running the full span of the wing—so the trainer could operate at low speeds. The two-seater didn't have full dual controls. The instructor didn't have to take over completely to avoid a crash and could reach over the student's shoulder to take the stick if he had to.

The flight trainer was a complete airplane, albeit a very minimal one, and as such had to meet full Federal licensing requirements and be given an Approved Type Certificate before it could be used in commercial operations. The prototype, built in 1930, was powered with a 25 h.p. Cleone two-stroke engine, but the production articles of 1931–32 used the Cyclomotor, which had been developed from the Cleone and could put out 27 h.p. at 2,600 r.p.m. The fuselage and tail surfaces were welded-steel tubing and the wing used wooden spars and ribs with fabric covering.

Whether the Cycloplane System simply didn't win acceptance or was merely another good idea that was killed in the depression is hard to say at this date. In any case, the company went out of business in 1932 after producing only a few units of a most interesting training device. □

CYCLOPLANE FLIGHT TRAINER SPECIFICATIONS

Wing Span	40 ft. 0 in.
Length	19 ft. 7 in.
Wing Area	193 sq. ft.
Empty Weight	440 lbs.
Gross Weight	665 lbs.
High Speed	65 m.p.h.
Cruise Speed	50 m.p.h.
Landing Speed	25 m.p.h.