

■ ■ As far as most people are concerned, the "Monoplane Age" of aviation began with Lindbergh's 1927 flight to Paris in his Ryan NYP, the "Spirit of St. Louis." This is not exactly so. The flight of the "Spirit" did not start something new; what it did was move a slowly evolving trend into high gear.

The benefits of the monoplane over biplanes of equivalent power for most commercial operations had been well known for several years prior to Lindy's world-shaking flight. However, the state of the aircraft industry in the United States was such that new designs couldn't find a place in the market in competition with the glut of World War I surplus biplanes. The disadvantages of the old biplanes were obvious. They could only do something like one-half to two-thirds the job that an equivalent monoplane could do, but they could be had for about one-quarter the cost of a factory-new design. A few monoplanes had been used commercially in the United States in the early 1920's, but these were imports: German Junkers JL-6s and Dutch Fokker F-IIIs. A few farsighted American designers and builders were pushing for monoplanes. However, they were unable to sell them in competition with the surplus biplanes.

The first U.S. commercial monoplane of significance was the Loening *Air Yacht* of 1922. This was so good technically that it set numerous seaplane records and won the Collier Trophy for 1922, an annual award for significant advances in American aviation. Good as it was, it didn't sell, and designer Grover Loening dropped monoplanes and concentrated on selling biplane amphibians to the Army and Navy.

The first American monoplane to achieve distinction through significant production numbers and airline use was the Stout 2-AT *Air Pullman*. This was used by William B. Stout's own Detroit-Cleveland Airline, founded in 1925, and evolved into the famous Ford *Trimotor*.

Where the Stout design was a "big money" operation from the start, another very significant commercial monoplane had a very small grassroots beginning on the West Coast. Ryan Air-

YESTERDAY'S WINGS

Lindy's 1927 flight put spotlight on monoplane design, but it wasn't first. 'Spirit of St. Louis' based on the Ryan M-1, 'an odd mixture of old and new design concepts,' and the Ryan M-2

The RYAN Ms

by PETER M. BOWERS / AOPA 54408

lines ran a daily passenger service between Los Angeles and San Diego, using several rebuilt WW-I Standard biplanes [PILOT, July 1969] and the first Douglas airplane, the one and only *Cloudster*. This also was a biplane.

Foreseeing a need for more efficient equipment to handle the new contract airmail routes that were to be awarded

in 1926, airline owner T. Claude Ryan initiated the development of a new mail/passenger monoplane in the airline's own shops. The little company had the capability. It was more than just the airline that the name implied. It also operated a flying school and had the shops and engineering talent that had redesigned and rebuilt the Standards into cabin planes, plus had converted the open-cockpit *Cloudster* into a closed transport.

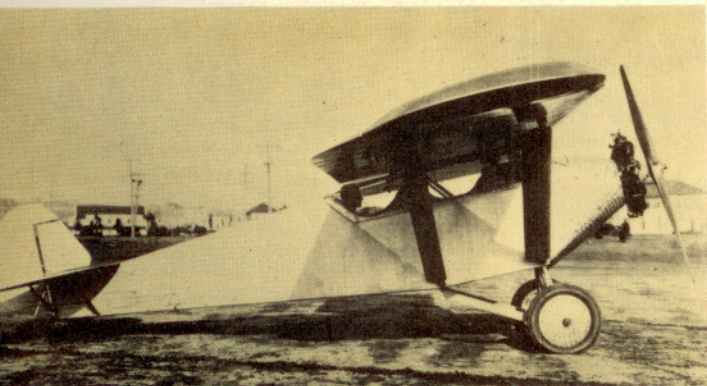
The new monoplane, designated M-1, was an odd mixture of old and new design concepts. It was a high-wing monoplane with the wing right on the upper longerons. This was a logical location for a cabin design, yet the M-1 used open cockpits! This unique feature was made possible by running secondary longerons aft from the firewall at the top of the removable engine mount. The area between these longerons and the wing was left open to create what, for all practical purposes, was a parasol monoplane. A separate door was provided for each cockpit on the left side of the fuselage.

Although fitted with dual controls, the M-1 could accommodate two passengers side-by-side on the front seat, or one passenger and a couple of mail sacks. This was common practice with the early contract airmail carriers. Mail was the principal business, but if there were room for a passenger who wanted to go along, he (and his money) were welcome.

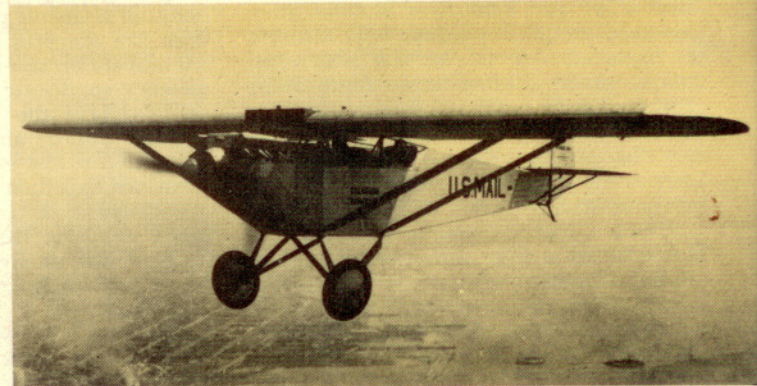
Fuselage, tail surfaces, and ailerons were welded steel tubing and the one-piece wing used wooden box spars and wood-truss ribs. The airfoil was the relatively new (1922) Clark "Y" that was just catching on with new designs. It was developed by Col. V. E. Clark of the U.S. Army Air Service Engineering Division at McCook Field, Dayton, O.

One up-to-date feature was the use of a divided-axle landing gear. However, this retained the old-fashioned practice of using rubber shock cord wrapped around the axle and the diagonal spreader bars for shock absorbing. No brakes were fitted, but a steerable tailskid was offered as an alternate to the standard fixed skid. Another relatively new feature was the

Early Ryan M-1, probably the prototype, with Super Rhone radial engine installed. Notice that the tandem open cockpits are below the upper longerons. Ryan Aeronautical Library photo



There were considerable differences of detail between similar Ryan M models. This M-1 for Colorado Airways has the door on the right side of the fuselage, as on the later M-2. Notice the radiator built into the center of the wing. Ryan Aeronautical Library photo



use of a stabilizer that could be adjusted in flight by the pilot. Contributing designer Edwin Morrow reports that this was so powerful and effective on early M-1s that the pilot had to slow the plane down practically to a stall in order to retrim without having the stick jerked out of his hands. After this cautious operation, he could open the throttle and move up to the speed that he had just trimmed for.

Morrow also reports a unique economy that was observed during design and construction of the prototype. When some tubing heavier than what was on hand was needed for some main fuselage stress members, Ryan did not go out and buy additional tubing of the required size. Two pieces of the tubing already on hand were installed side by side. This expedient became a standard feature and was carried on into the construction of the "Spirit."

The powerplant was optional; an eye was kept on economy by providing for a number of the available war-surplus engines starting with the 90 h.p. Curtiss OX-5 and going on to the new 200 h.p. Wright J-4 "Whirlwind" air-cooled radial. The engine option was simplified by the fact that the M-1 was one of the earliest American designs to feature removable and interchangeable engine mounts.

The prototype M-1, with a 150 h.p. Wright-Hispano or "Hisso" installed, flew on Feb. 14, 1926. After that it flew with a variety of engines, including the OX-5, to obtain actual performance figures for the various options. One of the engines tried was the 120 h.p. Super Rhone. This was a postwar conversion of the war-surplus Le Rhone rotary that was modified to operate as a fixed radial. Known later as the Quick Radial, this was referred to by Ryan pilots as the "Soupless Rhone" because it didn't come up to expectations.

Ryan records indicate that the prototype M-1 had a surplus 180 h.p. Hisso in it when it was eventually sold. The first commercial customer for M-1s, Pacific Air Transport, specified the new 200 h.p. J-4 for its six Ryans. Other M-1s used the 180 h.p. Hisso. The radiator for this water-cooled engine was initially built into the leading edge

SPECIFICATIONS AND PERFORMANCE

Ryan M-1

Span	36 ft. 0 in.
Length	23 ft. 11 in.
Wing area	220 sq. ft.
Powerplant	Wright J-4B
	200 h.p. @ 1,800 r.p.m.
High speed	135 m.p.h.
Cruise speed	115 m.p.h.
Rate of climb	1,200 ft./min.
Ceiling	19,000 ft.
Range	500 mi.

of the wing. One M-1 used the 250 h.p. Salmson-Menasco, which was a French WW-1 Salmson water-cooled radial converted to air cooling by Menasco Motors of Los Angeles. It is interesting to note here that while Ryan put out an elaborate brochure for the time, and listed detailed performance for the M-1 with four different engines, including payload and range figures, it did not give either dimensions or the empty or gross weights.

Nine M-1s were delivered as such. These were turned out one at a time and each incorporated minor improvements over its predecessor. These included increases of body-tubing size in some areas when tubes were found bent after hard landings.

The tenth and last M-1 incorporated so many improvements by the time it was completed that it became a new model—the M-2. Outwardly, it was hard to distinguish. The M-2 moved the cockpit doors to the right side and added a couple of stringers to the sides of the fuselage to hold the fabric away from the upright and diagonal tubes. On the Hisso-powered versions, the radiator was relocated from the upper wing to a spot on the belly just ahead of the landing gear. The main M-2 change, however, was the substitution

of built-up flange-and-web I-beam spars for the original box spars. In addition to the prototype, 18 M-2s were built.

When some M-1s were modified to M-2 standard, identification was simplified, for a while at least, by Ryan's practice of painting the model number in prominent figures on the rudder.

The first M-2 was built to the standard configuration, using a 200 h.p. Hisso, but was soon converted to a five-place cabin model that was named "Bluebird." This, Claude Ryan's personal runabout, was developed by Hawley Bowlus, Ryan shop foreman, who was later to achieve fame as a glider manufacturer. While there was only one "Bluebird," it was significant in that it was the direct ancestor of the "Spirit of St. Louis."

The improvements in "Bluebird" inspired an order from a San Diego customer for a larger designed-from-scratch cabin model that was eventually named the "Brougham" [PILOT, May 1967]. Work was under way on this when Lindbergh's order was received, but it was put to one side and was not completed until after the "Spirit" was delivered. While the "Spirit" was designed as a completely new airplane by Ryan's new young engineer Donald Hall, it owed much to the M-2 and to the unfinished "Brougham." Its wing used M-2 ribs and the M-2 type of spar construction. The wing was lengthened to 46 feet, compared to 36 feet for the M-1/M-2, and 42 feet for the uncompleted "Brougham." The "Brougham" fuselage was the pattern for that of the "Spirit," with extensive alteration of the cabin and nose. Existing M-2 tail surfaces were used.

While neither the M-1 nor the M-2 qualified for an Approved Type Certificate under the new 1927 airworthiness regulations, they both continued in mail/passenger service until replaced by more modern equipment. Some moved down to dusting work and all were quickly forgotten in the boom that followed Lindbergh's flight, the fame of the "Spirit," and the merchandising of the new "Brougham." One M-2 survives today. Painted as an M-1, it is on display in the AeroSpace Museum in San Diego's Balboa Park. □

Service in the field circa 1926 was pretty basic. Gas is being poured into the wing tanks through a chamois cloth. This Ryan M-1 (note tail lettering and wing radiator) has the right-hand doors and longitudinal stringers of later M-2.

Peter M. Bowers photo



The Ryan "Bluebird," a standard M-2 converted to a five-place cabin model. The lines of the "Spirit of St. Louis" are beginning to emerge.

Ryan Aeronautical Library photo

