

The Pitcairn Mailwing

By

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Born on December 20, 1897 in Bryn Athyn, Pennsylvania, Harold F. Pitcairn left his imprint on early fixed-wing, autogiro, and rotary-wing aviation, as well as having spawned one of the country's major airlines, and the present Naval Air Station Willow Grove marks the spot where all of it began.

Like so many aviation-minded inventors, Pitcairn, both an engineer and a pilot, was infused with, and therefore enthused by, that elusively definable spirit, soul, or substance which draws a person to the sky. So enticing was it, in fact, that it propelled him through the unresolved obstacles of getting there.

Also like them, it initially manifested itself as tiny, child's hands transforming seemingly unaerodynamic materials into flyable model airplanes at a time when the real counterparts they attempted to emulate had yet to exist.

But air-minded people often have approaches as unique as their personalities, and his was to ultimately design what he considered the "Safe Airplane," or an aerial, car-counterpart that would enable his opposites—unairminded people—to get in and fly to wherever they needed to go.

Perhaps propelled by pain toward that goal, he was emptied of his emotions when, early in life, he lost both his mother and sister and therefore filled this void with his interests.

He continually kept abreast of aeronautical development and those inventors who all-too-often met their fates trying to attain it. Indeed, while his classmates played games and sports, he "played" aerodynamics, experimenting with airfoil shapes and attaching them to models.

As with many disciplines, students learned from their masters. In this case, Glenn Curtiss served as the latter, and Harold Pitcairn, following his father's advice, became his apprentice, learning aircraft construction techniques in Hammondsport before attending his Newport News, Virginia, flying school in 1916 to become a pilot.

Establishing Pitcairn Aviation in 1924 to transform the Bryn Athyn cow pasture he had purchased into an airfield next to his own farm, he plowed a 2,000-foot runway and constructed a hangar. Offering flight instruction, sightseeing, contract flying, and 200- to 300-mile charter flights, he acquired an initial, eight-

aircraft fleet, comprised of his own Farman Sport; a Standard Trainer; two British, enclosed-cabin Martinsyde biplanes; and four Curtiss Orioles, attracting 20,000 spectators to the field's official opening and air show.

Drawing upon his earlier business studies, he realized that the sightseeing revenue earned from the two-passenger Orioles could be doubled if he designed his own aircraft with a forward, four-place cockpit, and from the field's hangar, which soon became the Pitcairn Aircraft Factory, emerged the PA-1 Fleetwing.

Powered by a 160-hp Curtiss C-6 engine turning at 1,750 rpm, the 25.11-foot biplane incorporated Pitcairn's very mark of design integrity with a robust chrome molybdenum, square-section steel tubing fuselage faired by a wooden frame and covered with fabric. Three cockpits, accessed by a port side integral ladder and featuring individual passenger windshields, consisted of the two, two-person forward ones and the aft, single-pilot location. The aircraft, with a 2,879-pound maximum weight, could cruise at 80 mph.

Yet this advanced aerodynamic package was quickly unwrapped when its wing dipped to the left seconds after take off on its maiden flight. Despite attempts to correct the deviation, it only worsened, leaving the pilot with the hopeless choice of climbing in order to avoid the eagerly observing crowd. Although the inevitable stall resulted in impact with the ground and a pile of shards, he survived and the cause was traced to inversely rigged aileron cables.

A second, and successful, Fleetwing followed.

Pitcairn had, at last, reached the sky, establishing Pitcairn Aircraft to design, manufacture, and sell his own airplanes; Pitcairn Aviation, to operate the airfield and conduct flight operations; and Pitcairn Aeronautics, to engage in rotary-wing design, experimentation, and patenting.

Fixed- and rotary-wing production remained in Bryn Athyn, while commercial flight operations were relocated to a larger field ten miles away in Willow Grove.

Integral to this expansion plan was exposure, and its key, concluded Pitcairn, was a second aircraft design he could enter in the pending National Air Races, to be held in conjunction with the Sesqui-Centennial Celebration.

In order to partake of both its speed and efficiency events, he proposed a single, multi-purpose platform whose common mount would equally accept the 90-hp OX-5 and 160-hp C-6 engines, designated the PA-2 Sesqui-Wing after the very event. Sporting a 22.10-foot overall length, the 2,092-pound biplane racer, appearing in 1926, could cruise at 96 mph and attain maximum 120-mph speeds with the OX-5 powerplant and 116- and 145-mph speeds, respectively, with the C-6, in which case it had a 2,218-pound gross weight.

Following the efficiency course, the PA-2 was retrofitted with the more powerful C-6 engine with the aid of a specially constructed engine stand before it flew the closed, 100-mile circuit, winning both the prize and the Pitcairn coveted publicity.

As predicted, demand for aircraft orders, increasing as a result of air race notoriety, and factory space dictating, single-type production, resulted in a hybrid design to succeed the PA-2. Designated PA-3 Oriwing, and quickly considered the Piper Cub of its day, it retained the square-tube fuselage construction of its predecessor, but was mated with the elsewhere-manufactured Oriole wings and Curtiss OX-5 engines, resulting in a three-place, 2,100-pound trainer. It was Pitcairn's first financially successful design.

Ever cognizant of the latest aviation developments, he set his sights on the growing air mail network, presently comprised of 13 Contract Air Mail (CAM) routes, and he once again dug into his business foundation to analyze the benefit of bidding for the 760-mile one from New York to Atlanta, one of four new networks announced by the Postmaster General. Studying existing train schedules, rail and air journey times, and mail weights and volumes, he decided that it would fit his operation like a glove.

The award, however, carried several stipulations. Because the Post Office's eastern terminus was located at Hadley Field, in New Jersey, its "New York" point would be served by that New Brunswick city, and operations could only occur after official banking hours, resulting in the additional obstacle of night flying. The route, furthermore, would only be granted for a four-year period and was then subjected to rebidding.

Yet these obstacles were minuscule in comparison to the true holes in the operation: aside from a handful of unprepared, muddy fields along the eastern seaboard, there were no real airports nor any air mail-specific airplanes to fly to them—not to mention the lack of pilots to take them into the black, navigation aid devoid skies. But Pitcairn, always solving his problems with self-sufficiency and ingenuity fueled solutions, wanted this prize.

The lack of aircraft proved the smallest gap to be plugged. Like any aeronautical tailor, as already proven several times before, he could stitch a route- and mission-fitting suit, designing and building an airplane that would meet its targeted size and performance parameters more precisely and at lower cost, than any off-the-rack one. The intended air mail design was optimized for single-pilot accommodation, a 250-pound mail load, a 100-mph speed, and a 500-mile range, the latter of which was sufficient to enable an aircraft to return to one of its intermediate stops in the event of deteriorating weather conditions.

The idealized design, based upon the original PA-1 Fleetwing, was granted its type approval in 1927 and designated the PA-4 Super Fleetwing or Fleetwing II. Featuring the multiple-engine mount, it sported a 30-foot lower and 33-foot upper

wing, the latter of which omitted its predecessor's dihedral, and the formerly boxy fuselage was replaced with a sleeker, more aerodynamic one. The aft pilot cockpit was retained, but the forward one introduced an enclosed mail compartment. The 1,950-pound biplane could carry a 340-pound payload.

Yet incorporating reserve capacity, it could, with modifications, carry 500-pound loads and operate 600-mile sectors, and this potential enabled Pitcairn to produce the definitive model, the PA-5 Mailwing, which proved pivotal to the envisioned, and received, Contract Air Mail Route 19 on January 28, 1927.

Retaining the PA-4's wingspan and 252-square-foot area, it introduced a 26-cubic-foot mail compartment, capable of carrying 500 pounds and positioned so that its center-of-gravity fostered longitudinal stability. But its major improvement was its entirely more capable, 220-hp Wright Whirlwind J5-9 radial engine. Stretching 21 feet, 10.5 inches, it had 1,612 empty and 2,620-pound maximum gross weights, and was able to climb at 100 fpm and attain 131-mph speeds.

First rolled out of its Bryn Athyn factory and flown in June of 1927, the aircraft completed a highly successful maiden flight. "As the exuberant pilot (Chief Pitcairn Pilot Jim Ray) pirouetted and soared against a background of fluffy white clouds, the golden wings flashed the sun's rays again and again, signaling the design's success," according to Frank Kingston Smith in his book, *Legacy of Wings: The Harold F. Pitcairn Story* (Jason Aronson, 1981). "It was light on the controls, full of heart, it climbed like a skyrocket," the pilot proclaimed after landing.

It was not the only element in Pitcairn's ever-expanding and successful aeronautical empire. Willow Grove-located Pitcairn Field #2 had grown into the largest commercial facility east of the Mississippi River the previous year and Pitcairn Aviation had counted almost 125 flight students on its roster and had flown more than 16,000 sightseers from it during that time.

A premature decision to cease Mailwing production after Pitcairn Aviation's needs had been met, despite the dissuading tactic of increasing the per-airplane price to \$12,000, was subsequently reversed when orders poured in, and the revenue aided the company in its solvency pursuit. Indeed, so tailor made had it been, that it became the standard airmail type operated by 12 US and Canadian carriers, including Colonial Airlines and American Airways, forerunner of American Airlines.

But Pitcairn never rested longer than it took to make a refueling stop. Although his passion and unquenchable thirst had, at times, caused him to stretch the company's financial fabric so thin that only a thread remained to hold it together, a second airmail route, or CAM 25, was opened for bidding, and he was compelled to pursue it.

Integrated with his existing, New York-Atlanta run, the southern section, from Atlanta to Miami, promised lucrative mail volumes, and he deliberately submitted a below-cost bid for it, precluding acceptance of any other's. His tactic bore fruit: on November 19, 1927, he was awarded it.

Inaugurating the earlier CAM 19 route, Pitcairn dispatched the northbound Mailwing from Atlanta's Candler Field on May 1, 1928, while the reciprocal service departed New Brunswick's Hadley Field, making enroute stops in Richmond, Greensboro, and Spantenburg, before alighting in Georgia. Both carried three-fourths of a ton of mail.

Because of its design integrity, reliability, and performance, the PA-5 Mailwing hardly signaled the end of the line; indeed, it was just the beginning of it. Unexpected interest from both sport and private pilots led to the Sport Mailwing version, which featured a comfortable, dual-passenger forward cockpit in place of the mail compartment.

But demand for increased mail and, in some cases, passenger capacity from now-established carriers quickly eclipsed the basic PA-5's size. Passengers, particularly, had up until now been excluded from any air system because they had failed to generate sufficient revenue without accompanying mail subsidies. But expanding route networks, coupled with increasing reliability, had unearthed demand on routes where there was no comparable rail service, and the more heavily traveled Los Angeles-San Francisco corridor had given rise to passenger airlines which relied on specifically designed, ten-seat Fokker triplanes.

Targeting this sector of the evolving industry, the Pitcairn PA-6 Super Mailwing of 1928 employed the same lift and thrust foundation as that of its PA-5 predecessor, but introduced a one-foot longer fuselage and an increased mail capacity—from 21.5 to 40 cubic feet. The aircraft became associated with several then-significant carriers—Colonial Air Transport, Colonial Western, Canadian Colonial, and National Air Transport among them.

For the second time in his career, Pitcairn inaugurated airmail service, connecting Contract Air Mail Route 25 with its existing 19 system on December 1, 1928 and, in effect, monopolistically creating the country's longest north-south network, which stretched 1,500 miles from New York to Miami. It was subsequently appendaged to an inter-Florida spur line encompassing Jacksonville, Daytona Beach, and Tampa.

Post Office Department figures, released in January of 1929, revealed the true size of Pitcairn's aerial empire. It had become the third-largest airline in terms of miles flown and the fourth largest in terms of revenue.

Demand for mail carriage could only be met by the next, stretched-fuselage Mailwing version, the PA-7M Super Mailwing.

Powered by a 240-hp Wright J6-7 engine, it featured a new, 23.9-foot length, 42-cubic-foot mail compartment, 636-pound payload capability, and 3,050-pound gross weight. First rolled out in 1929, it could attain 120-mph cruise and 145-mph maximum speeds.

The definitive version, the PA-8M Super Mailwing, seemed more the product of steroids than slide rules: a 24.10-foot overall length, a 35-foot upper wingspan, a 55-cubic-foot mail compartment, a 300-hp Wright J6-9 or Pratt and Whitney Wasp Junior engine, a 1,000-pound payload, and a 4,000-pound maximum weight. But it also signaled the end of the line, in more ways than one.

All lives, whether personal or professional, ultimately lead to forks in the road, and it was at this time that Harold Pitcairn arrived at his. Despite his expanding and profitable airmail venture—and the fleet he had optimized for it—he returned to his original passion of creating rotary-wing aircraft.

Yet, because of his airline's very success, and the increasing trend toward passenger-exclusive, mail subsidy independent services, it had been continually targeted for a buyout or a merger, and the Curtiss-Keys Group, chewing on the concept until it could taste it, ultimately succeeded in swallowing Pitcairn Aviation on June 12, 1929. Assuming its coveted, New York-Florida airmail routes, systemwide airport infrastructure, and personnel, it equally purchased the only six PA-8Ms ever made, displaying the founding Pitcairn name on its aircraft until 1930, at which time it was rebranded Eastern Air Transport.

Despite the superlative, super-stretch characteristics of the PA-8M, the passenger transport trend, once set in motion, was unarrestable and quickly outgrew its capacity, indicating that its early-era lineage had been eclipsed by the needs of burgeoning traffic. Instead, it had no choice but to pass the torch to the next generation of specifically designed cabin aircraft, and toward that end, it was quickly replaced with larger equipment on the increasing number of scheduled air routes. Nevertheless, it served to mark the transition between the single-engine, open-cockpit barnstorming types and the commercial, profit-generating breed of airliners.

After the Army's disastrous, albeit temporary, assumption of mail-carrying duties and the call for civil operators to replace them, Eastern Air Transport, renamed "Eastern Airlines," was re-awarded the original, New York-Miami Pitcairn routes and these became synonymous with it throughout its six-decade existence as one of the country's major carriers.

Old Rhinebeck Aerodrome's Mailwing, a PA-7, had taken part of its air shows between 1963 and 1980, and is currently on static display in the Golden Age museum building on the hill.