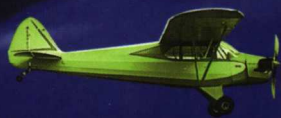


# A HISTORY IN THE MAKING

80  
Turbulent Years  
in the  
American  
General Aviation  
Industry



Donald M. Pattillo

# **A History in the Making**

**80 Turbulent Years in the  
American General  
Aviation Industry**

*Donald M. Pattillo*

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# Preface

Aviation history is a highly developed field. Numerous works cover specific periods such as the Golden Age of 1919–1939; famous aircraft and major aircraft classes; histories of such major firms as Boeing, Lockheed, and McDonnell Douglas; and biographies of leading personalities such as the Wright brothers, Lindbergh, and Earhart. There are also histories of major aeronautical developments such as the jet engine and the helicopter, of record-breaking flights, and of other aeronautical feats. In addition, there are scholarly studies of the societal and economic impact of aviation and of its technical development. No aspect of aviation history has been ignored by scholars or aviation professionals.

A conspicuous gap in the literature, however, is a comprehensive, balanced historical survey of the general aviation manufacturing sector of what is now the aerospace industry. There are, of course, numerous books on private flying and published histories of such companies as Piper, Beech, Cessna, Taylorcraft, and Luscombe, but there has been no overall survey history of general aviation manufacture. This gap stands in marked contrast to the extensive literature on the large military and commercial aircraft sectors. Yet the general aviation sector predates both, extending to the beginnings of powered flight, and has been particularly characterized by a spirit of entrepreneurship. General aviation also differs from the much larger military, commercial, and space sectors in that it more closely approaches a consumer products industry, marketing a range of aircraft for individual customers rather than scores or hundreds of a single type to a large airline or military service. General aviation dominates in such important measures as numbers of active aircraft, airfields, pilots, and flying hours, yet it is the least understood sector of the industry. A major reason is a lack of historical perspective.

This work bridges that gap in both aviation and business history. Yet defining which firms should be included in a history of the general aviation sector was not always clear. Leading companies like Beech and Cessna have important military operations, and indeed would have been unlikely to survive without that strong military base. Conversely, many large military and commercial firms have been involved in general aviation as well. Most general aviation helicopters, in fact, have been developed by primarily military firms. Their activities in civil helicopters have been allotted extensive coverage in this work.

An overlap in civil and military design has always existed, as business and personal aircraft have been adapted for military training and utility use, while certain military and commercial designs have been adapted as executive transports, firefighting aircraft, and for other civil roles. That overlap is particularly evident in smaller helicopters. Accordingly, certain determinations were necessary as to which firms and operations were included. Further, given the numerous attempts at designing, building, and selling light aircraft, only those firms judged to have been significant, either in production or innovation, have been included. Thus many may find an obscure or short-lived firm of their knowledge missing.

Maintaining a manageable focus also presented a challenge. In more recent years, the homebuilt or kit industry segment has gained in significance, largely succeeding the factory-built small trainer aircraft segment. Several firms now offer innovative, successful kit designs. Accordingly, that segment is given substantive treatment. But ultralight/microlight sport aircraft, sailplanes, racing aircraft, and experimental prototypes generally are excluded. While undoubtedly significant to many, these activities are very narrow segments of general aviation, which is primarily oriented toward business flying and other revenue-generating activities. Moreover, microlights do not require FAA certification or pilot licensing. Also generally excluded are modification and conversion firms, as they do not involve original design and production.

The general aviation industry has experienced a turbulent history, with a very high failure rate. But general aviation is indeed a national resource with a significant impact on the economy. It remains an underappreciated aspect of the national aviation heritage. It is the author's hope that this work will be a step toward fuller understanding.

*Donald M. Pattillo*

# Acknowledgments

This history of general aviation aircraft manufacturing began as a component of a larger and more comprehensive history of the American aircraft industry. As work progressed, however, it became a concern to many with whom I had contact that the eventual work would be too lengthy and unwieldy to be widely marketable. Accordingly, I separated the general aviation sector from the overall work and undertook its development as a separate history. While reluctant initially, I soon became completely committed to the project, spurred by the knowledge that such a work had never been accomplished previously. In addition, it became apparent that a separate treatment of general aviation manufacturing was logical in that the structure, size, and market for general aviation aircraft were entirely different from those of the large military and commercial aircraft manufacturers.

As I began to extend and expand the coverage of general aviation history, I sought and received help from many sources and many individuals. Without that assistance the work would not have been completed, or certainly would not have been of the quality it attained. In no particular order, I feel indebted to Pat Reilly of the New Jersey Aviation Museum; to Dr. Roger Bilstein of the University of Houston, Clear Lake City; to Dr. William F. Trimble of Auburn University; to Dawne Dewey of the Special Collections and Archives of the Library of Wright State University; to Ronald E. Green of the Aerospace Policy and Analysis Division, International Trade Administration, U.S. Department of Commerce; to librarian Mary Jane Townsend of the Kansas Aviation Museum; and to Mike Kelly and Mary Nelson of Special Collections, the Ablah Library, Wichita State University.

I have received specific and continuing assistance from Shelly Snyder of the General Aviation Manufacturers Association. I have also

benefited from a discussion with Ed Phillips of *Aviation Week & Space Technology*. Ned Preston, historian of the Federal Aviation Administration, provided generous assistance. Mrs. B. D. Maule of Maule Aircraft was very generous with assistance about her company. Several individuals at the Experimental Aircraft Association provided information in their area of expertise.

I owe a special thanks to my wife Sharon, who as a professional librarian helped me with numerous data sources, particularly computer data searches, with which I remain rather clumsy. She also has been very supportive in my relentless demands on what should have been her leisure time in that regard.

Finally, but perhaps most important, I am deeply indebted to Shelley Carr, acquisitions editor of the Aviation Program of McGraw-Hill. Without her interest, active support, encouragement, and advice, this book would not have become what it is. Her assistant Gwen Myers also was extremely helpful. Further thanks are due to Jane Palmieri, senior editing supervisor, McGraw-Hill, for the professional and expeditious manner in which she moved the manuscript through to publication.

I have endeavored to achieve factual accuracy and to present sound analysis and interpretation of conditions and events. In that effort I have of course relied, in varying extents, on the work and views of others. But as the author, the responsibility for any factual errors, omissions, or flaws in analysis or inference is mine and mine alone.

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# 1

## Origins of Personal Aviation

In the early years of powered flight, as aircraft first began to be produced in series, almost all aviation activity was encompassed within what would later be defined as general aviation. There were no well-defined military roles for aircraft and no scheduled commercial services. Thus the market for aircraft was largely limited to sport flying and training by and for a wealthy few. But the First World War saw military applications developed and implemented, and the military sector dominated aviation. Then with the return of peace, many saw the potential for a large civil sportplane market, building on major technical progress and on the increased awareness of aviation brought about by the war. Other aircraft categories and roles to become included in general aviation were not then foreseen and thus had not evolved. But as this opening chapter illustrates, many developments important to the future of aviation, and to personal aviation specifically, occurred during the 1920s.

### The Light Aircraft Market

Efforts to fill the anticipated peacetime market for sport flying and new sport aircraft were made on both coasts. The inventor Lawrence Sperry of New York and the Loughead (later Lockheed) brothers of California were among the first to develop small sportplanes. The Loughead S-1 monoplane of 1919, designed by John Northrop, had many advanced features, as did the Sperry M-1A Messenger, a single-seat biplane. Both were worthy designs but did not sell given the glut of surplus wartime models on the small civil market, although the Army procured 20 Messengers in 1921 as communications aircraft. Sperry, tragically, died in a crash on December 13, 1923, at

age 31, also ending his company's prospects. The Loughead firm suffered bankruptcy in 1921.

While a market for new private aircraft did not develop in the early 1920s, wartime aeronautical progress still conveyed major benefits to private aviation: the number of pilots had increased rapidly, and there had been enormous advances in aircraft production techniques. The open-cockpit biplane constructed of wood and fabric still dominated, but the abundance of surplus wartime trainers, especially the ubiquitous Curtiss JN-4D Jenny, enabled many to learn to fly relatively cheaply. Interest in private flying was further stimulated in the early 1920s by the barnstorming era and by the popular military-sponsored air races. Barnstormers, or "flying gypsies," traveled from place to place conducting flying exhibitions in the Jenny and comparable aircraft. But barnstorming, while undoubtedly promoting interest in aviation, declined after the mid-1920s. Further, flying was still publicly regarded, not inaccurately, as dangerous. Yet the groundwork had been laid for a permanent private aviation sector.

Development of scheduled airline service began roughly concurrently with growth of the private aviation sector. But development of efficient, safe, and comfortable passenger-carrying aircraft was painfully slow. Scheduled passenger services in fact lagged air mail, the first commercial growth area, by several years.

All commercial and private aviation, or civil aviation, began to be encompassed within a somewhat nebulous aerial service sector. While lacking precise definition, aerial service involved much more than sport or exhibition flying. Among the first to see a broader potential for light aircraft was Sherman Fairchild of New York, who pioneered not only aerial photography but also development of specialized photographic planes. The State Experimental Station of Ohio first tested airplanes for agricultural use in August 1921. Lieutenant J. A. Macready of McCook Field, a record-breaking Air Service pilot, conducted the experiments.<sup>1</sup> A new firm, Huff Daland Airplanes of Ogdensburg, New York, first adapted an airplane for aerial cropdusting in 1924. The company thereupon founded Huff Daland Dusters in Macon, Georgia, as the first aerial cropdusting service, using its own designs. The present-day Delta Air Lines sprang

from that service. Huff Daland also experimented with, but did not produce, personal aircraft.

Despite innovation and development, the market for new airplanes remained depressed. Public concerns about flying safety further inhibited market expansion. The government had done little to develop civil aviation policy, and there was a lack of licensing, training standards, and airways development. Then-active aero clubs, led by the New York Aero Club, developed and administered their own standards and regulations. Further, the light aircraft manufacturing sector was too small to exert political influence. Both the Manufacturers Aircraft Association (MAA) and the Aeronautical Chamber of Commerce (ACC) focused chiefly on military aviation and commercial, primarily air mail, operations. The National Advisory Committee for Aeronautics (NACA), the government agency conducting research and experimentation in the field, did little specifically to advance personal aviation or light aircraft development.

Another deterrent to those potentially attracted to the field was that light aircraft design generally overlapped technically with military aircraft. Military-oriented firms could and did serve both the military and civil sectors. Curtiss, for example, while a leading military firm, was among those active in private aircraft. Accordingly, a firm wishing to specialize in light civil aircraft could find itself at a disadvantage in resources.

In the midst of dismal financial and market prospects faced by all aircraft manufacturers in the mid-1920s, the President's Aircraft Board, popularly known as the Morrow Board and established in reaction to Billy Mitchell's charges of neglect of air power, carried an impact. The Morrow Board report at the end of 1925, while emphasizing military needs, spurred passage of the Air Commerce Act of 1926. Signed into law by President Coolidge and implemented by Secretary of Commerce Herbert Hoover, the Act benefited all civil aeronautics, including personal flying and other aerial service activities. Aircraft safety and airfield development advanced, and the first federal pilot's licenses were issued in 1927. William P. MacCracken, head of the MIT aeronautical engineering program, was named first chief of the new Aeronautics Branch, and was issued license No. 1 on April 6, 1927. The Act also enabled reliable statistics to be compiled on flying and pilots for the first time.

The aerial service sector concurrently gained more precise definition, to include industrial uses such as crop dusting, aerial photography and survey, forest fire patrol and wildlife management, as well as air taxi work and flying instruction.<sup>2</sup> Air mail service continued to grow, as did sport or recreational flying, as the number of pilots increased. Skywriting, oil and timber survey, and emergency medical transport roles also appeared. Another aerial service function which emerged was that of news coverage, as aircraft could reach the site of a major event or disaster faster than other means of transport. Scheduled passenger service, while embryonic, was also considered within aerial service, as the personal and commercial sectors did not become largely separate until the early 1930s.

Fixed-base operators, primarily involved with training and maintenance, were established from 1920. Such operations facilitated growth of the sector, especially cross-country flying. Partially reflecting the rather primitive technology of the day, however, was that personal aircraft still used automobile gasoline. Specially refined aviation fuel had not yet appeared.

One private aviation function, little discussed at the time and for years afterward, was the transportation of illegal liquor during Prohibition. The pilot Ben O. Howard, later to gain fame in air racing and as a designer, admitted in later years to aerial bootlegging during the 1920s.<sup>3</sup>

Another civil aircraft role beginning in the 1920s, which was to attain near-legendary status in decades to come, was that of bush flying. The term *bush*, originally referring to the scrublands of South Africa, was extended to include all remote or wilderness regions. Originating in northern Canada, Alaska, and remote regions of the Pacific Northwest, bush flying eventually extended to Australia, New Guinea, Mexico, and South America. Roles involved not only transportation of hunters, fishermen, and prospectors but aerial mapping, transportation of vital food and medical supplies, and emergency evacuations from sites unreachable by land or water. Float- and ski-landing gear largely developed from bush flying.

Business flying, however, still was very rare: only the largest corporations and a few wealthy businessmen used personal aircraft. But business or executive aviation began to expand from the mid-1920s,

and the Loening Air Yacht, a comfortable enclosed-cabin design powered by a pusher Liberty engine, was a popular business amphibian. The Douglas Dolphin of 1929, with six to eight seats and twin engines, also was a successful business amphibian, and was ordered by the Army, Navy, and Coast Guard as well. President Roosevelt used a Dolphin during the 1930s on official travel. Keystone Aircraft (formerly Huff Daland), after acquiring Loening in 1928, also produced a civil Air Yacht, although unrelated to the Loening design.

## Personal Aircraft Entrants

Despite the virtually nonexistent market for new light aircraft in the early 1920s, production ventures, based more on future optimism than response to current demand, were formed. Among the earliest firms specializing in light aircraft was that of the barnstormer George E. "Buck" Weaver, who had worked for the early East Coast aircraft firms L-W-F and Aeromarine, and his brother-in-law Charles W. Meyers. The partners first located in Lorain, Ohio, late in 1919 to test Weaver's design. The partnership was dissolved early in 1920, but a successor, Weaver Aircraft Company, emerged in 1921 at Medina, Ohio. Weaver brought in two acquaintances, Clayton J. Brukner, with experience at Curtiss and other East Coast aircraft firms, and his friend Elwood James "Sam" Junkin, as investors. Both contributed to design and production. After financial struggles Weaver was reorganized as Advance Aircraft Company on February 26, 1923, in Troy, Ohio, with further financial backing from the wealthy Alden Sampson II. Junkin became president. Buck Weaver departed the company and died in July 1924, but Advance Aircraft, trading under the acronym WACO, continued his designs and became one of the most successful producers of open-cockpit biplanes.

Sampson later withdrew his interest; then Junkin, who had married Weaver's widow, died on November 1, 1926. But the company progressed during the late 1920s under Brukner as majority owner, and by avoiding debt was able to survive the depression. In June 1929 it floated a public stock offering as WACO Aircraft Corporation and was numerically the largest producer in the industry. From 1930 all designs were given letter designations, and the product line included cabin monoplanes as well as biplanes.<sup>4</sup>

E. M. (Matty) Laird, a young aviator and businessman from Chicago and a friend of Buck Weaver, located in Wichita, Kansas, in the summer of 1919 to produce personal aircraft. This marked the first manufacturing venture in the city which was to become the light aircraft or general aviation capital. Wichita, enjoying an oil boom at the time, had investors available, and Laird attracted support from local businessmen W. A. (Billy) Burke and Jacob Moellendick of \$15,000 each, while he contributed designs, materials, and experience. The group purchased Moellendick's Wichita Aircraft Company, formed only in July, in December 1919. The E. M. Laird Company was formed in May 1920, and Wichita Aircraft Company was dissolved.

The Laird Swallow biplane, designed with the assistance of Buck Weaver, was tested in April 1920 and attracted immediate orders. A new factory was completed in late 1921. Matty Laird was soon joined by his brother Charles, and then by two former military aviators, Lloyd Stearman and Walter Beech. Weaver continued to help Laird during a time when his own venture was floundering, but was fired by Moellendick late in 1921. Laird produced the Swallow until September 1923 when, after conflicts with Jacob Moellendick over expansion plans, he sold his interest and returned to Chicago.<sup>5</sup> Then on January 22, 1924, Moellendick formed Swallow Airplane Manufacturing Company, named after its major product, and continued production. The improved New Swallow, designed by Lloyd Stearman, was also employed on air mail services from 1926.

Swallow suffered a major setback when its entry into the California-Hawaii air race was lost, and it declared bankruptcy on August 12, 1927, ruining Moellendick financially. The firm was reorganized as Swallow Airplane Company on November 15, 1927, after Moellendick sold rights to Lincoln, Nebraska, investors led by Victor Roos.<sup>6</sup> Swallow sales recovered. Charles Laird established concurrently a separate Laird Aircraft Corporation with himself as president. The firm traded as Whipporwill in order to avoid confusion with the new E. M. Laird Company in Chicago, which Matty Laird had organized in 1926.<sup>7</sup> Whipporwill found little market success with its design, however, and succumbed to the depression and bankruptcy on December 31, 1930. Swallow survived as a corporation, but also exited aircraft production during the depression.



Although Moellendick is a largely forgotten figure in aviation and appears to have been rather difficult as a business associate, he probably deserves more credit than any other individual for establishing Wichita as the center of the light aircraft industry. While he grew wealthy in the oil boom, Moellendick suffered from alcoholism as well as business reverses and died penniless in 1940. But city support, topography, climate, and a trained and experienced labor force enabled Wichita to attract and retain numerous private aircraft firms. The later success of Beech and Cessna secured its claim as the aviation capital. Stearman, a manufacturing division of Boeing Airplane after Boeing became independent of United Aircraft in 1934, later led Wichita into military aircraft production as well.

To have an enduring impact on personal aviation was the Travel Air Corporation, formed late in 1924 and incorporated on February 4, 1925. Walter H. Beech, a former Army Air Service pilot and barnstormer, founded the firm with several associates, including Lloyd Stearman, and served as general manager. While with Laird, Beech and Stearman favored steel airframes for the New Swallow, which Moellendick opposed, and both departed early in 1924. Beech then capitalized on numerous aviation contacts made during his wartime service in organizing the new venture.

Businessman Walter P. Innes Jr., owner of Wichita's largest department store, arranged financial backing from Hayden, Stone and Co., and served as president. Innes also suggested the name Travel Air. Clyde V. Cessna, a pioneer pilot, designer, and builder, joined as vice president. Successful in farming at the time, Cessna also was a major investor. Mac Short, an MIT engineering graduate and, like Stearman, a native Kansan, joined, and Charles Yankey, another Wichita native and friend of Beech, was an original investor.<sup>8</sup> Beech, while neither a designer nor engineer, was the driving force in management. Joining the small staff as company secretary and bookkeeper was 21-year-old Olive Ann Mellor. In 1930 she would become Mrs. Walter H. Beech.

The 2000/3000/4000 series of Travel Air open-cockpit biplanes was one of the most successful of the period. They were later joined by the 5000/6000 series of 6-seat cabin monoplanes, which Clyde Cessna helped design. The Model 6000 also was offered with Edo floats, as floatplane use expanded in the 1920s. (Earl D. Osborn