The Rise of Aeronautics in California, 1849-1940

BY ARLENE ELLIOTT

On a windy October day in 1940 an experimental fighter was moved a few feet from its North American Aviation factory to the adjacent Los Angeles Municipal Airport. Its British purchasers, already at war, would name this desperately needed plane Mustang in respect for its range and endurance. It was an apt name: the hardy fighter would be the first to protect Allied bombers all the way to Germany and return the key to maintaining vital daylight-precision bombing.¹ Responding to this accomplishment, the crews of the Flying Fortresses and Liberators would gratefully give their escorts the radio call-name, "Little Friends."² The prototype of such protectors sped across the runway on that October Saturday—splashing through puddles left by rain during the night—and rose into the California overcast sky. As this aerodynamically smooth plane began its test flight, arcing between the near land mass and the Pacific Ocean, it reflected almost a century of aeronautic development in California.

In any attempt to determine what first drew the new science of aeronautics to California, an element of the state's physical structure must be cited—gold! In 1849 Rufus Porter witnessed New York's excitement about the California gold rush and decided that this was the proper time to promote his steam-driven *Aerial Locomotive*. Porter had first described the machine, during the autumn of 1845, in the columns of the *Scientific American*, a magazine of which he was co-founder and editor.³ He published the pamphlet *Aerial Navigation* to explain fully the airship's design and actually to solicit passengers for a seven-day round-trip from New York to the gold fields. Although \$200 was to be the regular fare, an incentive for quick response was provided by Porter's stipulation that the first three hundred people would be charged only \$50 for the trip.⁴

The Aerial Locomotive was essentially a hydrogen-filled, semi-rigid dirigible in the general shape of an ellipse but brought to a point at

either end. A separate compartment, suspended by steel wires, would hold the passengers and two steam engines. Unfortunately, the two hundred people who had subscribed for passage by February 15, 1849 were not early '49ers by means of a three-day passage to California, for R. Porter & Company did not obtain sufficient funds to even construct the advertised aircraft.⁵

Among the immigrants who were in the vanguard of the rush, though, was another writer-inventor—Frederick R. Marriott. Marriott came from England already initiated into aeronautics through his association with William Henson and John Stringfellow, both of whom were experimenting with steam-driven monoplanes. As an experienced newspaperman who had founded *The Illustrated London News*, Marriott was soon editor of the San Francisco *News Letter.*⁶ Not until July 2, 1869, did he publicly demonstrate his design of a steam-driven dirigible, called the *Avitor Hermes*, *Jr*.—the "Jr." signifying it was only the model for a larger airship.⁷

The Avitor, Jr. had a 28-foot, hydrogen-filled bag with delta-shaped, cloth wings of five-foot span attached on either side.⁸ At Shellmound Park, south of San Francisco, it flew in a circle at five m.p.h. above the people gathered to witness powered flight. Although there is no record that the airship carried a pilot, the demonstration encouraged San Franciscans to subscribe \$5,615 towards a full-size version. This larger ship was never built because Marriott could not obtain a steam engine powerful enough to carry a payload.⁹ Such success awaited the gasoline engine.

John Joseph Montgomery had been in the crowd that enthusiastically greeted the Avitor, Jr.'s flight.¹⁰ Montgomery, then only eleven years old, was already intrigued with the problems of flight. During his second eleven years he strengthened his aeronautic studies by acquiring a background in physics, earning a Master of Science degree from St. Ignatius College of San Francisco in 1880. Three years later Montgomery built his first glider, with the help of his younger sister Jane and his older brother James. Since Montgomery had spent much time studying the sea gulls along the coast, this craft was dubbed the *Gull Glider*. Before dawn one August morning the two brothers left their ranch near San Diego and secretly carted their apparatus to Otay Mesa. Intent upon avoiding ridicule, Montgomery carried a rifle to support his explanation that they were hunting, should curious neighbors inquire. Had he allowed such observers, their confirmation of the approximately 600-foot glide he

made that day would have acknowledged John Montgomery as the first person in the United States to fly by using wings!

The cautious Montgomery finally arranged a spectacular public demonstration of his aerodynamic theories at Santa Clara College on April 29, 1905. He had been associated with this college since 1896, dividing his time between teaching physics and continuing aeronautic research. His latest glider—a tandem-winged monoplane appropriately named the *Santa Clara*—was lifted 4,000 feet into the air by a hot-air balloon; J. Daniel Maloney, a professional parachutist, then released the craft and maneuvered it through spirals and dives to a pre-determined landing spot.¹² The extraordinary control exhibited in this design caused the respected gliding-experimenter Octave Chanute to send his congratulations for such a daring and tremendous accomplishment.¹³

While Montgomery had been working to improve the maneuverability of the heavier-than-air craft, Thomas Scott Baldwin was expending his energy obtaining steerability for the lighter-than-air one. On August 3, 1904, Roy Knabenshue piloted the United States' first real dirigible in a circle over Oakland, California. This was Baldwin's *California Arrow*, a 96-foot, non-rigid airship utilizing a twenty-horsepower, Curtiss motorcycle engine. The choice of name was obvious to viewers because the airship's substructure had a pointed tip forward and a vane in the rear, which truly made it look like an arrow directing the gas bag above it.

When Roy Knabenshue began building his own dirigibles and landing them on rooftops, Lincoln Beachey then learned the art from Baldwin, who had found his own weight too impressive to allow his airship to win races.¹⁴ Beachey was in his late teens at the time he started working in exhibitions, but by 1907 an even younger aeronaut appeared on the western circuit when fourteen-year-old Cromwell Dixon of Seattle began a four-year tour with his airship *Moon*. Dixon's mother had sewn the 25-foot gas bag which was propelled manually by using a bicycle mechanism.¹⁵

During the years these daring aeronauts were thrilling their western audiences, airplane inventors were attempting to improve on the coupling of gasoline engine and heavier-than-air machine then being demonstrated in the East—first by the Wright brothers whose public flights really began in the 1908 trials of their first Army plane, and later by Glenn Curtiss who in that same year won the first aviation prize to be awarded in the United States, the *Scientific American* Cup. One such experimenter in Piedmont, near Oakland, was Fung Joe Guey. He built a biplane in

1909 and after two successful flights decided to take it back to China, in the belief it would astound his countrymen. Most likely it did as *All the World's Airships*, 1910–1911 listed only two airplanes in China—a Bleriot owned by Tsai Tao, Prince, and a small biplane reported in the American papers as having been taken there by Fung Guey.¹⁶

Despite Fung's defection, the number of avowed aircraft builders in California was rapidly increasing, and as their ranks expanded so did opportunities for important discussions of problems and theories. At last an essential unifying element, the aeronautic societies, began to form. In 1908 the Aero Club of California was organized in Los Angeles, and by the next year had 200 members.¹⁷ Another important society, the Pacific Aero Club of San Francisco, held its first annual exhibition in 1909 and within a year fifty heavier-than-air machines—not all flyable of course—were listed by its members.¹⁸

Even if the leaders of these organizations were not using the proper approach to gain flight themselves, the society could still be helpful because it promoted association with so many other experimenters. An excellent example was the Junior Aero Club at John H. Francis Polytechnic High School in Los Angeles organized in 1908 by Harry LaVerne Twining, head of the Physics Department.¹⁹ His club members built a glider and entered it in the Aero Club show held May 1–2, 1909; the glider managed to sail 24 feet and won second place.²⁰ The following year *All the World's Airships* presented a picture of Twining's own invention of 1909 with the following description:

Twining Flapper

Motor-None. Man power only.

Propeller-None.

Steering—Elevator none. Operator leans back to rise, forward to fall. Rudder, none.

Completed Oct[ober] 1909

Remarks—First flight, in October the machine was run by wing flapping three times for testing. A first machine failed. *Special features*: man power wings. Designed by H la [sic] V. Twining, President California Ae [ro] C [lub].²¹

Obviously the Twining ornithopter did not advance California aviation, but Twining's organizational ability did. Already president of one aeronautic society, in 1909 he joined Dick Ferris, George B. Harrison, and Henry E. Huntington in founding the California Aviation Society with the intent of hosting the United States' first international air meet.²² Joseph and Edward Carson offered the use of their property—



The Avitor Hermes, Jr., demonstrated powered, steerable flight over California in 1869. (Courtesy Henry E. Huntington Library.)



Roy Knabenshue landed his dirigible on the grounds of the Raymond Hotel in Pasadena in 1905. (Courtesy Henry E. Huntington Library.)



This is John Morrell's airship under construction; while being launched at Berkeley in May 1908 the balloon burst. (Courtesy Henry E. Huntington Library.)



The Los Angeles *Herald's* captive balloon, shown observing a dirigible race, enriched that paper's reporting of the Los Angeles International Air Meet of 1910. (Courtesy Henry E. Huntington Library.)



Many of the participating aircraft in the Los Angeles Air Meet of 1910 pass over the grandstand in this montage. (Courtesy Henry E. Huntington Library.)



The "incomparable Lincoln Beachey" exhibited his skill at Los Angeles in 1910. (Courtesy Henry E. Huntington Library.)



During January of 1911 the first successful hydroaeroplane was tested by Glenn Curtiss on San Diego Bay. (Courtesy Department of Special Collections, University of California at Los Angeles.)



Miss Harriet Quimby, the "Dresden China Aviatrix," received a bouquet before becoming the first woman to fly across the English Channel. (Courtesy Department of Special Collections, University of California at Los Angeles.)

situated near the present city of Compton—which was accepted and designated Dominguez Field. To insure an international flavor, the muchadmired French flier Louis Paulhan was guaranteed \$50,000 to compete.²⁸ Paulhan came; he and Mme. Paulhan even led the Grand March during the Charity Ball held at the Hotel Maryland in Pasadena.²⁴

When the air meet opened, deputy sheriffs on horseback were stationed along the fence that surrounded the airfield. This precaution proved wise, as the crowd along the quarter mile of fence with the best vantage point averaged six people deep. While a carnival near the airfield tried to entice this crowd away, Glenn Curtiss took his khaki-colored biplane into the air and the meet began.²⁵ Curtiss, winner of the James Gordon Bennett Trophy during the first international meet at Rheims in 1909, had received \$10,000 to participate at Los Angeles.²⁶ At this meet, he set a world record for speed with a passenger by traveling 55 m.p.h. Equally determined to make the meet memorable, Paulhan set a crosscountry-alone record of 45.1 miles, a cross-country-with-passenger (Mme. Paulhan) record of 21.25 miles, and an altitude record of 4,165 feet.

Roy Knabenshue, participating in his flashy yellow dirigible, suddenly realized that airship exhibitions were ending.²⁷ The representative for *Sunset* magazine, Charles Field, expressed this same reaction in his review:

But the crowd though cordial was not there for balloons. Interest centers in the heavier-than-air machines. Men have been lifted from the earth by heated air and by gas for many years—the world has been waiting for them to rise on wings!²⁸

Even Thomas Baldwin learned to fly a plane that year. He chose a red Curtiss one which he symbolically named *The Red Devil.*²⁹

America's first international air meet had spectacularly displayed the rapid advancements being made in aviation. A good representative of women's part in this science was Mrs. Minta Martin. Always an encourager of the aviation experiments of her son, Mrs. Martin helped him build his first airplane in a vacant church in Santa Ana, California.³⁰ Glenn Martin first flew this plane, powered by a Ford Model T engine, on August 1, 1909.³¹ It was after an August 1 two years later, however, that such active interest of women in aviation became well publicized; for on that date, Harriet Quimby passed the pilot's test of the Aero Club of America and received License No. 37—the first issued to a woman in this country.³²

Miss Quimby, born at Arroyo Grande in San Luis Obispo County, California in 1884, began a writing career by contributing articles to San Francisco's newspapers.³³ During her stay in that city, she also sat for a portrait by Mrs. Ada Shawhan. As Harriet Quimby was later known as "the Dresden China Aviatrice," it is not surprising that until the 1906 fire this portrait "was one of the most admired ornaments on the walls of the old Bohemian Club."³⁴ Miss Quimby designed an outfit for flying that combined utility with fashion; her choice of material was a wool-lined, mauve-colored satin!

Harriet Quimby had attended the Moisant Flying School on Long Island because she was employed by a New York magazine, *Leslie's Weekly*, but there were similar flying schools on the West Coast. Glenn Curtiss ran a prominent one on North Island, in San Diego Bay. The Spreckels Company had offered the use of North Island because it believed such a school would be an asset to the area.³⁶ Although Curtiss had his factory in Hammondsport, New York, he was also influential in developing aviation in California, where the mild climate allowed yearround flying. A further inducement was the bordering Pacific—an expanse that could be both an excellent testing area free of obstructions and an economical, easy-to-find landing field.

On January 26, 1911 Curtiss took off from San Diego Bay in the first pontoon-equipped airplane in the United States, a craft he designated the hydroaeroplane. This unusual design was part of his efforts to convince the Navy that it could utilize the airplane. During the San Francisco Air Meet of January 1911 the Curtiss flier Eugene Ely had given a spectacular preview of naval aviation when he flew from the Presidio and landed on a platform constructed for that purpose on the cruiser U.S.S. Pennsylvania. To the Navy, though, such a platform on a ship of the line was highly impractical. On February 11 Curtiss flew his hydroaeroplane from San Diego Bay and landed beside the same ship, by then just off San Diego. The plane was hoisted aboard; later it was returned to the water and Curtiss flew it back to San Diego. This was the air-sea cooperation envisioned by the Navy and the maneuver earned Curtiss the Navy contract for its first two planes.

The hydroaeroplane had valuable assets for civilian flying as well, for it had the ability to immediately transform any lake or navigable river into a municipal landing field. Other pioneering California aircraft manufacturers realized the long list of cities established along these channels of commerce and began investigating the versatile aircraft. In

1911 Martin formed the Glenn L. Martin Company and began publicizing his aviation work; on May 10, 1912 he proved the endurance of his hydroplane by flying from Newport Beach to Avalon Bay of Catalina Island.

The Christofferson brothers, originally from Oregon but drawn by California aviation activity, established an airplane concern on San Francisco Bay by the end of that same year. They, too, valued publicity with the hope of convincing the public that the airplane was as safe as the automobile.³⁷ In 1914 Silas Christofferson flew a Christofferson biplane over the Tehachapi Mountains after five attempts and, later, over Mt. Whitney.³⁸ Roald Amundsen, the first to navigate the Northwest Passage between the Atlantic and the Pacific, ordered two Christofferson hydroplanes for use in his further studies of the passage.³⁹

The "incomparable Lincoln Beachey" used the Christofferson facility when he designed an 80 h.p. monoplane to fly at the San Francisco World's Fair Exhibition of 1915.40 Contemporaries called a daring pilot a birdman, and Beachey personified the term. His favorite feat was to climb a mile or more into the air, then nose his plane into an almost perpendicular dive. In the Curtiss biplane Beachey often flew, the many wires between the two wings would set up a loud whistle as the plane dove through the air, a thrilling sound for the crowds waiting below. At the World's Fair Beachey overstressed the wings of his design in this stunt while performing over the Bay, and fell to his death. The preponderance of aircraft design of that day was of the trial and error method which doomed Beachey; no wonder birdmen looked to proven builders for their planes. It was this logic that had induced Allan and Malcolm Loughead, working in San Francisco in 1913, to christen their first design the Model G so that prospective buyers would think this craft was the seventh Loughead design rather than the first!

The brothers moved to Santa Barbara in 1916 where Burton Rodman, owner of a machine shop, helped finance the Loughead Aircraft Manufacturing Company.⁴¹ Santa Barbara was another California city interested in advancing aviation. Milo Potter of the Potter Hotel had been instrumental in arranging the first flight in the area on January 1, 1911 when Dadier Mason flew over the city and circled the hotel tower; and even Lincoln Beachey had been drawn there by March 1, 1914, giving an exhibition in a biplane designed in collaboration with Glenn Martin.⁴² John K. Northrop, a twenty-year-old draftsman and mechanic whose father was a local contractor, joined the Loughead organization

after its move to the city and was soon designing the wings for a seaplane which the firm hoped to sell to the Navy.⁴³

Aviation interest was awakening slowly in the armed services. Back in November 1910 Curtiss had written to both the War and Navy Departments, extending an offer to train one or more officers at his soon-to-open San Diego flying school, at no charge. The Navy sent Lieutenant Theodore Ellyson; the Army assigned volunteers, Lieutenant Paul Beck of the Signal Corps, and Lieutenants G. E. M. Kelly and John Walker of the Infantry.⁴⁴ Not until March 3, 1911 did Congress appropriate money with specific reference to aircraft although General James Allen, Chief Signal Officer of the Army, had formed an aeronautical division on August 1, 1907, composed of Captain Charles DeForest Chandler and two enlisted men. Still, the \$100,000 to be used by the Army to purchase and repair aerial machines was far superior to the \$25,000 specified in the first naval aviation appropriation made in the same year. The Navy set up an aviation camp at Annapolis, moving it to North Island during that winter. The Army also had its first camp in Maryland, at College Park, but moved permanently to North Island in 1013 partly because the Spreckels Company allowed the impoverished division the free use of their land.

On July 18, 1914 Congress established an Aviation Section within the Signal Corps, at the firm suggestion of the War Department and after eleven months of debate. This statutory recognition meant that henceforth men would be assigned to aviation duty, not just detailed from other branches of the Army which could recall them at any time. Congressional opinion of the hazards of military flying is suggested by the specification in this bill that only officers under the rank of captain who were also bachelors under thirty years of age could be accepted as aviation cadets. Further indications that these officers were considered sacrificial were the provisions for pay of the next higher grade and a death benefit of one year's pay to be given to a named beneficiary. Fortunately, in 1916 Congress removed the age and marital restrictions on cadets and gave the Aviation Section its largest appropriation yet, \$500,000, followed within five months by the exceptional grant of \$13,281,666-in a belated attempt to prepare for the approaching war.⁴⁵ By October the Signal Corps School at North Island had 45 officers in flight training.46 This was a large enrollment, considering that when the United States entered the war in 1917 the entire Aviation Section of the Signal Corps was composed of only 130 flying officers and 1,087 enlisted men; the

Navy total at the beginning of the war was even smaller, with only 38 aviation officers and 163 men with aviation ratings.⁴⁷

Three weeks after the war declaration, English and French diplomats were in Washington explaining their urgent need for a strong air arm on the Western Front. France alone asked the United States for 4,500 planes—an impressive number to a nation whose Army had received only 325 aircraft in the last fourteen years.⁴⁸ Aircraft manufacturing went into its first boom as factories expanded frantically. The large producers were in the East in 1917; the Curtiss factory was located in New York, and Martin had moved east to merge with the Wright Company the previous year. California consequently contributed to the war effort through smaller concerns, such as Loughead in Santa Barbara which worked on seaplanes for the Navy, and Schiefer and Sons in San Diego whose pursuit plane was sold to the Siganl Corps for \$11,000 in 1918.⁴⁹

To expedite pilot training the Signal Corps expanded to eight ground schools and eighteen flying fields.⁵⁰ In California a preliminary aviation school was placed on the Berkeley campus of the University of California, but North Island still gave the first actual flying instruction, designating graduates as "junior aviators." The Army Observation Balloon School was moved from Omaha's cold weather and strong winds to Ross Field near Arcadia, California. Soon huge "sausage" balloons began to sprout from the field which was part of the Elias J. "Lucky" Baldwin estate graciously loaned by his daughter, Honorary Colonel Anita Baldwin.

During the war period almost 14,000 planes, mostly trainers, were constructed in the United States and 6,000 more were obtained in Europe. When the war ended, the status of these airplanes quickly changed from defender to unwanted surplus as the saturated market pushed the price of a Curtiss Jenny, for instance, from \$5,500 to under \$500.⁵² Forced to close their factory in 1919, the Loughead brothers were representative of ninety percent of the American aviation industry. Congressional appropriations to the armed services were cut so completely that Air Service strength dropped from 200,000 men to under 10,000 by 1920.⁵³

Into this difficult postwar gap came the United States Air Mail Service. Flying modified war planes, these civilian pilots advanced aviation's cause by starting a transcontinental mail route in September 1920, utilizing railroads for the night portions of the trip. The next year a courageous relay team of mail pilots chose Washington's birthday to prove the mail could be flown even through the night. The feat had its

desired result when an impressed Congress appropriated \$1.25 million to continue and expand air-mail service.⁵⁴ On July 1, 1924 through air-mail service began between New York and San Francisco with a schedule that took care to put the night flying between Chicago and Cheyenne, as this was the only completed stretch of the planned lighted airway across the continent.

Equally aware that needed government appropriations were directly related to expressions of public interest, the Army aviators perfected the technique of spectacular, well-publicized flights through the first half of the 1920's. Lieutenant James Doolittle spanned the continent in less than a day in a one-stop flight between Jacksonville, Florida and San Diego in September 1922. On May 1-2 the following year, Lieutenants John Macready and Oakley Kelly flew from New York to San Diego on the first non-stop transcontinental flight. San Diego was becoming a familiar name from its role as a terminal point; in 1923 it added exceptional endurance records when the fliers stationed at Rockwell Field. where Major Henry H. "Hap" Arnold was base commander, began experimenting with mid-air refueling. By 1924 the Army Air Service decided to try for the honor of being the first to fly around the world. The United States was not alone in the attempt. France, England, and Italy tried: their representatives wrecked at Shanghai, at Kamchatka, and in the Atlantic, respectively. Happily, there were no fatalities.55

The Air Service team divided its route into seven parts and sent an officer to each section to locate landing and repair facilities.⁵⁶ A two-man crew was chosen for each of the four Douglas biplanes built for the trip. The planes were named for cities representing each section of the country -Seattle, New Orleans, Chicago, and Boston. As the flight took place in the midst of Prohibition, each plane was christened with a bottle filled from the important waterway near it: the Seattle received a splash of Lake Washington water; the New Orleans, water from the mouth of the Mississippi; the Chicago, Lake Michigan's water; and the Boston, salt water from the Atlantic.⁵⁷ The crews received their planes from the Douglas plant in Santa Monica and flew them north to the official starting point of Seattle, then westward around the world. Two of the original planes returned successfully. Ironically, the Seattle had crashed on the first part of the trip. The Boston, though, did not crash until reaching the Atlantic, so a Boston II flew the remainder of the route with the original Chicago and New Orleans.

The reaction of the people to such flights is suggested in this

description of the reception awaiting the returning fliers in Santa Monica as told by Lieutenant Lowell Smith, commander of the *Chicago*:

All around was a heavy line of guards. As we crawled out of our cockpits, the crowd went wild. With a roar they knocked down the fence. They knocked down the police. They knocked down the soldiers. They knocked us down. They tried to pull our ships apart for souvenirs, but somehow we fought them off.⁵⁸

In 1926 such valiant efforts were rewarded by legislation which included a five-year expansion plan for Army aviation, renamed the Air Corps. The new Corps established a Materiel Division to improve its supply service and located one of the four major depots at San Diego.

On May 20 of the same year commercial aviation also received important government aid. The Air Commerce Act created the Aeronautics Branch of the Department of Commerce which became responsible for licensing all interestate planes, pilots, and mechanics; lighting airways, and investigating accidents. This, combined with the Post Office Department's authorization in 1925 to contract with private companies for air-mail routes, advanced commercial aviation throughout the country. Pioneering Edward Hubbard had proved mail-passenger service feasible on the Coast through his privately contracted mail route between Seattle and Victoria, British Columbia, begun in 1920. In 1925 Ryan Air Lines began daily flights between San Diego and Los Angeles; Western Air Express linked Los Angeles and Salt Lake City, Utah the following spring. Boeing Airplane Company associated with Hubbard in 1927 to form Boeing Air Transport and received the lucrative Chicagoto-San Francisco section of the transcontinental air-mail route.

Air-mail and transport business expansion finally began exceeding the capabilities of World War I planes and furnished a market for new aircraft designs. The Loughead brothers again teamed with Northrop and found Fred Keeler, a Los Angeles businessman ready to invest in their company. The brothers decided they could only lose the misnomer of "Loghead" by substituting the phonetic spelling for their Scottish name and titled the new company the Lockheed Aircraft Company in December 1926.⁵⁹ In the intervening years between Loughead companies Northrop had worked for the Douglas Company at Santa Monica where he helped design the Air Service World Cruisers. This apprentice system was an integral part of the pioneering aircraft companies. Donald W. Douglas had served as Glenn Martin's chief engineer before founding his own company in Santa Monica in 1920. Similarly, George Prudden

was chief engineer for Stout Metal Airplane Company of Detroit prior to forming the Prudden-San Diego Airplane Company in 1927.⁶⁰

The year 1927 was to be a memorable one in aviation history on the West Coast. One reason was the public indignation aroused when ten people lost their lives in an air race from California to Hawaii, sponsored by James Dole. The offer of a valuable prize, \$35,000 in this instance, was not so unusual; the novel part of this contest was the specification of a particular day for the race and the use of an air route already successfully flown earlier in the year. The race was scheduled for August 12, but was postponed four days, after both the Aeronautics Branch of the Department of Commerce and the Navy asked that additional time be given for the contestants to find navigators and make flight tests.⁶¹ Of the fifteen entries, eight planes managed to be ready for the flight from Oakland Airport on August 16. Of these eight, only two arrived safely in Honolulu; two had crashed during take-off; two had disappeared over the ocean; and two had turned back to Oakland.

One of the planes that had returned, with the fabric torn from its fuselage, was the *Dallas Spirit*. Its pilot, Captain William Erwin, was the United States' third-ranking ace of World War I. He and his navigator, Alvin Eichwaldt joined the search for the missing planes on August 19, after their plane had been repaired. That night, the *Dallas Spirit* also crashed into the ocean. Erwin, foreseeing such a possibility when he entered the Dole "pineapple derby," had written a letter to be given to his sponsors if he should not return. In this thoughtful message, he explained his reasons for entering the race:

Tomorrow begins the great adventure. Flying personifies the spirit of man. Our bodies are bound to the earth; our spirits are bound by God alone, and it is my firm belief that God will guide the course of *Dallas Spirit* tomorrow over the shortest route from the Golden Gate to the Isle of Oahu. I want to thank each and every sponsor for the opportunity of doing this thing. If we succeed it will be glorious.

Should we fail, it will not be in vain, for a worthy attempt could never result in a mean failure. . . .

Another ocean had been spanned by Charles Lindbergh earlier that same year. His *Spirit of St. Louis* monoplane had been built in sixty days by the Ryan Company in San Diego. When Lindbergh returned to the United States, the Daniel Guggenheim Fund for the Promotion of Aeronautics sponsored a nationwide tour by him to further the interest of the country in aviation. During this tour it was estimated that thirty



A further proof of the utility of the pontoon-equipped plane was Glenn Martin's May 10, 1912 flight across the channel between Newport Beach, California and Catalina Island. (Courtesy Department of Special Collections, University of Southern California.)



The "incomparable Lincoln Beachy" often flew a Curtiss biplane. This model was termed a "pusher" because of the rear-mounted engine. (Courtesy Department of Special Collections, University of California at Los Angeles.)



The first design of Allan and Malcolm Loughead was a seaplane called the Model G. It carried a pilot and two passengers. (Courtesy Lockheed Aircraft Corporation.)



In 1918 the Navy placed its first order with the Loughead Manufacturing Company for a pusher-type seaplane. A subsequent request for 50 of these planes was cancelled when the war ended. (Courtesy Lockheed Aircraft Corporation.)

million people saw the young flier.⁶³ Harry F. Guggenheim, president of the \$2.5 million fund which had been formed in 1926, felt that "Colonel Lindbergh's flight was one of the things which marked the end of the early pioneering period of aviation and the beginning of the industrial period."⁶⁴

The Daniel Guggenheim Fund also furthered the study of aeronautics in universities throughout the United States by awarding grants for research and education in this field. The West Coast institutions that received such aid were the University of Washington, the California Institute of Technology, and Leland Stanford University. When the trustees of the fund announced that it would cease on December 31, 1929, a comment in *Commonweal* succinctly expressed the fund's work:

Having done its best to make the airplane "safe, popular and regularly available," the Fund goes out of existence, and its end is simply a dramatic announcement of the fact that civil aviation is now able to fend for itself.⁶⁵

California was definitely active in the field; it led the nation in both the number of airports and federally licensed personnel, with 154 airports, 1167 pilots, and 877 chief mechanics.⁶⁶ Since federal licenses were required to operate aircraft in interstate or foreign commerce, this was a promising position.

The year of 1929, however, is primarily associated with business failures-a fact not inconsistent with the formation of both the International Zeppelin Transport Company and the Pacific Zeppelin Transport Company. The former company planned to use German and American capital to operate dirigibles between the United States and the Rhine Valley, while the latter proposed flights between San Francisco and Tokyo.⁶⁷ The Graf Zeppelin proved the reality of these intentions in August, when it anchored at Los Angeles during the first around-theworld flight by an airship. California was already familiar with working, military dirigibles. The Shenandoah, designed from Zeppelins captured during the war, had moored at North Island during a transcontinental trip in 1924, and that same year an airship built as part of Germany's war reparations, the Los Angeles, had begun cross-country flights. Throughout the fall of 1928 California sightseers paid 25¢ each to see Thomas Slate's vain attempt at building a metal-clad dirigible near Glendale's Grand Central Air Terminal; the Navy, meanwhile, negotiated a contract with the Goodyear-Zeppelin Corporation of Akron, Ohio to spend almost eight million dollars in the construction of two more

conventional airships.⁶⁸ California's interest grew during the construction of the first of these dirigibles when it was suggested that the framework for airships used on a Pacific run would be constructed on the West Coast.⁶⁹

On August 8, 1931, Mrs. Herbert Hoover christened the Akron—a ship only seven feet shorter than the sixty-story Woolworth building, with twice the gas capacity of the Graf Zeppelin, and capable of carrying 12 officers, 60 enlisted men, and 5 airplanes. Within two years this floating giant crashed into the sea during a storm off the New Jersey coast. One of the 73 persons killed was Rear-Admiral William Moffett, chief of the Navy Bureau of Aeronautics and a strong spokesman for the airship he believed to be "the new merchant marine of the air."⁷⁰ During the same April that the Akron was lost, the Navy launched its second airship, Macon, and opened the first airship base on the West Coast, at Sunnyvale, California.

The *Macon* was making its way back to its Sunnyvale base on February 12, 1935 when it entered a line squall off Point Sur. Realizing the storm was tearing his ship apart, Lieutenant Commander Herbert V. Wiley one of the three survivors of the earlier *Akron* disaster—managed to maneuver it into the sea and save most of his crew. The Sunnyvale Naval Air Station, Moffett Field, was turned over to the Army on October 25 and the vision of huge commercial airships in the United States ended.⁷¹

If there had been no alternative, the airship would have been honed into a safe carrier, but by 1935 the airplane was fulfilling air transport needs. Whereas the Macon was one of the fastest airships built at 85 m.p.h., 56% of American transport planes averaged 160 m.p.h. In addition the airlines had flown 140 million passenger miles that year with only four deaths-making airlines twice as safe as the automobile.⁷² Most important of all, however, airlines were big business. Boeing Air Transport, not satisfied with its San Francisco-to-Chicago run, had merged with National Air Transport to extend to New York; by 1930 it had been joined by Pacific Air Transport and Varney Air Lines, both western lines, as subsidiaries of the Boeing group, United Air Lines. The following year Western Air Express linked its Salt Lake City-to-Los Angeles run with Transcontinental Air Transport's New York terminus to become Transcontinental & Western Air. The entangling alliances in progress are obvious in Transcontinental Air Transport's case as its president Clement M. Keys was also president of the previously merged

Curtiss-Wright Corporation, as well as the holding company of North American Aviation. Yet it was through these powerful mergers that the airlines developed into a nationwide web of airways with trained personnel—valuable assets for a nation soon to be thrust into war. One company, Pan American Airways, even aided in destroying isolationist hopes as it pushed into the Caribbean in 1927, South America in 1929, and then looked to the Pacific despite Japan's protests.⁷⁸

During the afternoon of November 22, 1935, Postmaster General James Farley, California Governor Frank Merriam, and Pan American Airways President Juan Trippe spoke to the crowds gathered at Alameda to see the first commercial plane depart for Manila via Honolulu, Midway, Wake, and Guam. The *China Clipper* then took off past a namesake, the three-masted *Star of Finland*, anchored in the marina as part of the historic event.⁷⁴ Captain Edwin Musick realized that his plane, responding slowly because of its double mail load of 100,000 first-flight letters, would not lift quickly enough to clear the cables of the San Francisco-Oakland Bay Bridge, so he dove under it—an act that enthralled the afternoon spectators.⁷⁵ As the clipper gained altitude to pass over the unfinished Golden Gate Bridge, the nation learned that the auspicious flight had begun by the pre-arranged signal of extinguishing post office lights in the winter darkness of Chicago, Boston, New York, and Washington.⁷⁶

The 21-ton, four-engine Martin flying boat that opened the Pacific to air travel was an excellent gauge of the progress being made in commercial aircraft design. In California that year Douglas built the two-engine, 21-passenger DC-3 that would become a standard on airlines because of its economy and safety. By 1937 the Douglas payroll of 4,400 people represented more than one-third of the aircraft workers in the country.77 The other important California air-transport builder during the thirties was Lockheed. The original company had been sold to the Detroit Aircraft Corporation in July 1929; when that holding company went bankrupt in 1932, a seven-man syndicate purchased the plant and introduced the ten-passenger, twin-engine Lockheed Electra. In 1937 Lockheed wisely advertised how its current transport design could be quickly converted into a bomber, a process by which the problem of exporting munitions was neatly avoided. Sales climbed from the \$2 million level of 1936 to \$35 million in 1939, giving Lockheed the greatest airplane sales in the nation that year.⁷⁸ Both of these prosperous companies obtained their own subsidiaries-Lockheed's Vega Airplane

Company and the Northrop Corporation of Douglas—which concentrated on smaller transports. An ex-Lockheed chief engineer, Gerard Vultee, was also a competitor in this field, for his Vultee Aircraft Division in Downey built single-engine transports as a division of the eastern-based holding company of Aviation Corporation.⁷⁹

During this decade California even drew two established eastern firms. On October 20, 1935 Consolidated Aircraft Corporation, formerly of Buffalo, dedicated its new plant at San Diego's Lindbergh Field. Lindbergh Field was constructed on land-fill of the San Diego Bay, a most convenient location for Consolidated's flying-boat activities. This city had already reclaimed its pioneering Ryan Company which had become Mahoney-Ryan in 1928 and re-located at Lambert Field near St. Louis. Actually San Diego acquired an entirely new company, Ryan Aeronautical, formed in 1931, but it was founded by the same T. Claude Ryan who built the *Spirit of St. Louis.*⁸⁰ In 1936 the Los Angeles Municipal Airport became the site of the other eastern plant. North American Aviation merged its B/J Aircraft Corporation of Baltimore with the former General Motors subsidiary, General Aviation of Dundalk, Maryland, invited Douglas' chief engineer James "Dutch" Kindelberger to accept its presidency, and moved its operations across the continent.

Several reasons have been advanced for the attraction southern California was exerting on the aircraft industry. Most likely a primary one was the availability of capital in a newly developing area. Douglas suggested that another inducement was the climate which allowed yearround testing, required little building maintenance, and caused less illness among personnel. Union leaders argued that the low wages accepted by non-organized aircraft workers in the area were responsible. Richard Millar, President of Vultee Aircraft, managed to include all these possibilities in his observation:

This part of the country has always been a little cracked. It's the most wonderful place in the world to start an ism or a religion or a new business. People fall for it here a little more.⁸¹

Apparently aircraft building fitted well into this atmosphere, for its rate of expansion continued to accelerate as the 1930's ended. The \$65 million in orders and 12,000 employees recorded in October 1938 climbed to \$108 million and 20,000 workers the following autumn.⁸²

Interestingly, the major part in this success story belonged to the military, both foreign and domestic. Between 1927 and 1937 Congress



The Douglas World Cruisers left Clover Field, Santa Monica, California and flew to Seattle, Washington to begin their historic around-the-world flight in 1924. (Courtesy McDonnell Douglas Corporation.)



Pilot Charles "Jimmy" James brought approximately 200 lbs. of mail in his Douglas biplane on the first Salt Lake City-to-Los Angeles air-mail flight on April 17, 1926, putting Los Angeles within 30 hours of New York. (Courtesy Department of Special Collections, University of Southern California.)



The U.S.S. Macon, moored above her Akron, Ohio construction site, was assigned to Sunnyvale, California in 1933. (Courtesy Goodyear Aerospace Corporation.)



Captain Edwin Musick flew the *China Clipper* over the uncompleted Golden Gate Bridge on the first air-mail flight to Manila in 1935. (Courtesy Department of Special Collections, University of California at Los Angeles.)

had averaged yearly appropriations of \$23.5 million to the Army and Navy. During these years 91% of Douglas' sales and 79% of Consolidated's were to the United States military branches.⁸³ Other countries were becoming even more sensitive to the airplane's war potential; as South America, China, Japan, and Europe began to prepare for modern warfare, the United States' aircraft exports multiplied. By 1938 these exports were estimated at 46% of the total production of the country. This figure included the first Douglas DC-4 design which was sold to the Japanese after flight testing proved it slow and uneconomical for transport service.⁸⁴

The aircraft companies were quick to accommodate the expanding sales area. Vultee's first aircraft was the V-1A transport but its second was the V-11 attack bomber developed from the same design. North American's B/J Corporation had always concentrated on military orders; after the move to Los Angeles this policy continued with work on observation planes, trainers, and fighters. Lockheed began developing the XP-38 fighter in 1937. Consolidated in San Diego continued work on navy—Argentinian as well as United States—flying boats.

Slowly Congress increased its Air Corps appropriations, first to \$77 million in 1938, then \$300 million in January 1939, and finally \$896 million in January 1940.⁸⁵ With the 1939 funds, aircraft plants added second and third shifts.⁸⁶

John K. Northrop founded his final firm, Northrop Aircraft Incorporated, on March 7, 1939 and built twin-engine fighters and attack bombers. Ryan moved into a new, enlarged factory that year and continued work on military trainers. During 1939 and 1940 Lockheed increased 70%, listing 7,500 employees; Douglas increased 140% to 15,000 people; North American doubled with almost 5,000 workers; and Consolidated even doubled its plant area, for its first B-24 Liberator had flown on December 29, 1939.⁸⁷ This rate of growth pushed the American aircraft industry from seventy-ninth in total employment in 1937 to twentyseventh by 1940.⁸⁸

Over half of these workers were employed in southern California by the spring of 1940, establishing the state as the major aircraft region in the country. Within the span of years bracketed by the first flight over California of Marriott's *Avitor Hermes*, *Jr*. and that of North American's Mustang, the triumphs in controlled flight by airship advocates had been surpassed by the airplane demonstrations of Montgomery, Curtiss, and Martin; these individual breakthroughs, in turn, had given way to

team efforts as advances in design and production transformed the airplane from an experiment into an industry. This organization originally composed of pioneering California manufacturers like the Lougheads, Douglas, Northrop, and Ryan, but later interspersed with corporations such as Lockheed and North American—had responded to the benevolent financial and physical climate and molded California into the aviation center of the United States. ¹ For a comparison of escort-fighter ranges during World War II, see Bruce Robertson (ed.), United States Army and Air Force Fighters, 1916–1961, compiled by K. S. Brown, et al. (Letchworth, England: Harleyford Publications, Ltd., 1961), p. 86.

² Ed Rees, "Mustang!" Air Force Magazine, XLVII (March 1964), 86.

³ Jeremiah Milbank, Jr., *The First Century of Flight in America* (Princeton University, N.J.: Princeton University Press, 1943), p. 75.

⁴ Rufus Porter, *Aerial Navigation*, foreword by Lawton R. Kennedy, introduction by H. V. Wiley (Reprint; San Francisco: Lawton R. Kennedy, 1935), p. 22.

⁵ T. H. Watkins, "The Revoloidal Spindle and the Wondrous Avitor," The American West, IV (February 1967), 25.

⁶ Milbank, First Century of Flight, pp. 91-92.

⁷ Kenneth Johnson, *Aerial California* (Los Angeles: Dawson's Book Shop, 1961), p. 6.

⁸ "Ballooning in California," Scientific American, XXI (July 31, 1869), 75.

[•] Marion and Marvin Martin, "First to Fly in California," Westways, XXVII (April 1935), 33.

¹⁰ Arthur Spearman, John Joseph Montgomery, Father of Basic Flying (Santa Clara, Calif.: University of Santa Clara, 1967), p. 11.

¹¹ Winsor Josselyn, "He Flew in 1883," Harper's Magazine, CLXXXI (June 1940), 31.

¹³ For excellent coverage of this flight by eyewitness accounts, see Spearman, John Joseph Montgomery, pp. 67–77.

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¹⁴ Willis L. Nye, "Lincoln Beachey, Balloonist," American Aviation Historical Society Journal, IX (Spring 1964), 56.

¹⁵ Tugrul Uke, et al. (eds.), Flight, written by editors of Year and News Front, foreword by Donald W. Douglas (New York: Baldwin H. Ward, 1961), p. 52.

¹⁶ Frederick T. Jane, All the World's Airships, 1910–1911, published annually (London: Sampson Low, Marston & Co., Ltd., 1910), p. 120; see also "The Men of Flight," The World's Work, XIX (November 1909), 12203.

¹⁷ "First Show of the Aero Club of California," Aeronautics, IV (July 1909), 18.

¹⁸ Pitt P. Hand, "Western Men Who Would Fly," Sunset, XXIV (March 1910), 259–260.

¹⁹ Johnson, Aerial California, p. 54.

²⁰ "First Show," Aeronautics, IV (July 1909), 18.

¹¹ Jane, World's Airships, 1910–1911, p. 399.

¹³ Joseph Hidalgo, *History of Aerial Navigation* (San Francisco: Pacific Aero Club, 1910), p. 75.

²⁸ Marco R. Newmark, "The Aviation Meet of 1910," Historical Society of Southern California Quarterly, XXVIII (September 1946), 108.

³⁴ Charles K. Field, "On the Wings of Today," *Sunset*, XXIV (March 1910), 246. ³⁵ *Ibid.*, pp. 246–247.

* Aeronautics, IV (December 1909), 217.

³⁷ Mary Jo Clements, "The First United States Air Meet," Westways, XLVII (June 1955), 23.

²⁸ Field, "Wings of Today," pp. 247-248.

³⁹ John P. V. Heinmuller, *Man's Fight to Fly*, foreword by Eddie Rickenbacker (New York: Funk & Wagnalls Co., 1944), p. 260.

³⁰ Uke, *Flight*, p. 78.

⁸¹ Francis Devon, "Glenn L. Martin's First 40 Years," Flying, XLVI (January 1050). 26.

³² Francis Trevelyan Miller, The World in the Air (2 vols.; New York and London: G. P. Putnam's Sons, 1930), II, 247.

³⁸ "Elizabeth Hiatt Gregory Collection Relating to American Aviation, 1900–1945," Box 5, Folder 1, Department of Special Collections, University of California, Los Angeles, California.

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⁴⁷ The Army Aviation Section strength is given in War Expenditures-Aviation, U.S. House Committee on Expenditures in the War Department, 66th Cong., 2d Sess. (2 Parts; Washington: Government Printing Office, 1920), II, 11. The Navy figures are from W. H. Sitz, A History of U.S. Naval Aviation, U.S. Bureau of Aeronautics, Technical Note No. 18, Series of 1930, U.S. Navy Department (Washington: 1930), p. 9.

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⁵⁰ Carroll Glines, Jr., The Compact History of the United States Air Force (New York: Hawthorne Books, Inc., 1963), p. 78.

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⁶³ Reginald M. Cleveland, *America Fledges Wings* (New York: Pitman Publishing Corp., 1942), p. 8.

⁶⁴ Harry F. Guggenheim, "Giving Wings to the World," *The St. Nicholas Magazine*, LVI (December 1928), 88.

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⁶⁸ Slate's dirigible is discussed in Russ Leadabrand, "Glendale's Amazing Rooftop Dirigible," *Westways*, XLIX (November 1957), 26–27; although he failed, the Aircraft Development Corporation of Detroit did produce an all-metal airship in 1929.

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⁷¹ C. G. Grey, et al. (comps. and eds.), All the World's Aircraft, 1935, originally known as All the World's Airships founded by Frederick T. Jane (London: Sampson Low, Marston & Co., Ltd., 1935), p. 7e.

⁷³ "Aviation Epic," Business Week (February 2, 1935), 12, gives the speed data; "Airmail: Airlines Welcome New Deal, Even With I.C.C. Control," Newsweek, VI (August 17, 1935), 26, mentions the safety record.

78 "Transpacific," Time, XXVI (December 2, 1935), 47.

⁷⁴ San Francisco Chronicle, November 23, 1935, p. 3, col. 7.

⁷⁵ See Carey McWilliams, "The Great *China Clipper*," *Westways*, XXVIII (January 1936), 4; and "Transpacific," p. 47.

⁷⁶ San Francisco Chronicle, November 22, 1935, p. 24, cols. 3-4.

⁷⁷ Mingos, Aircraft Year Book, 1938, p. 278.

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⁸² "City of the Angels," p. 93.

⁸⁸ Congressional average given in "How Many Planes When?" p. 50; company percentages in Freudenthal, Aviation Business, pp. 128, 232.

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⁸⁷ Mingos, Aircraft Year Book, 1941, gives Lockheed data on p. 252, Douglas on p. 236, North American on p. 25, and Consolidated on p. 211.

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APPENDIX

An Introductory Chronology of California Aviation, 1869–1929

In researching this article the following list was constructed to obtain a perspective of the period. Care was taken to obtain correct data, but the pitfalls awaiting such a project are suggested by a letter found in the "Elizabeth Hiatt Gregory Collection." In conveying information to Mrs. Gregory for her proposed book on "First Flights in Aviation," a vice-president of the Glenn Martin Company of Baltimore wrote: "We are pleased to forward, under separate cover, a photograph showing Mr. Martin's flight from Avalon, California to Catalina Island in 1912." As Avalon is on Catalina Island, this error was easily righted. It is hoped no more insidious errors have remained.

1869	
July 2	Frederick Marriott tested his balloon-airplane combination, Avitor Hermes, $Jr.$, in an unmanned flight at Shellmound Park, south of San Francisco. The model was equipped with a steam engine.
1883	
August 28	John Joseph Montgomery glided about 600 feet in his Gull Glider above Otay Mesa, near San Diego.
1887	
January 30	Captain Thomas Scott Baldwin made America's first parachute jump at Golden Gate Park, San Francisco.
190 3	
October 18	Dr. Andrew Greth navigated his cigar-shaped dirigible over San Francisco; however, the engine lacked adequate motive power.
1904	
August 3	Roy Knabenshue maneuvered the <i>California Arrow</i> in a circle over Oakland. The 52-foot dirigible built by Capt. Thomas Baldwin used a 20 hp. Curtiss motorcycle engine.
1905	
April 29	In an exhibition at Santa Clara, J. Daniel Maloney demonstrated John J. Montgomery's monoplane glider, Santa Clara. A hot-air balloon raised the glider to 4,000 feet; when cut loose, it spanned eight miles in a 19-minute flight of spirals and glides. Maloney was killed on July 18 when his Montgomery glider went out of control. The accident was probably caused when a truss supporting the control wires broke.
1907	
During the year	Cromwell Dixon, America's youngest aeronaut at fourteen, began a four-year tour of the West in his 25-foot, manually-powered airship <i>Moon</i> . He was killed in a crash at Spokane in 1911.
1908	
May 23	C. A. Morrell's 450-foot, six-engine dirigible exploded over San Francisco Bay. The 16 passengers fell from the airship but were not killed.
1909	
During the year	Glenn Martin used a vacant church in Santa Ana to build an air- plane powered by a Model T engine.
August 18	The Pacific Aero Club of San Francisco held its first annual exhibition at Dreamland Rink.

1910	
January 10–20	The first international air meet held in the United States took place at Dominguez field, Los Angeles. During the meet, Glenn Curtiss set a world speed record with passenger of 55 mph.
January 12	Louis Paulhan set a world altitude record of 4165 feet at Dominguez field.
January 19	Lt. Paul W. Beck tested the feasibility of airplane bombing by dropping sand bags toward a target from a Farman biplane piloted by Louis Paulhan.
December 30	Arch Hoxsey set a world altitude record of 11,474 feet. On December 31, he was killed while trying to better this record.
1011	
During the year	The Glenn L. Martin Company was formed in California.
January 7	Hubert Latham in his Antoinette airplane made the first passage of an airplane through the Golden Gate of San Francisco.
January 15	At the San Francisco Air Meet, Lt. Myron S. Crissy dropped a live bomb onto a target while in an airplane flown by Philip O. Parmalee.
January 17	The Curtiss air training school was opened at North Island, San Diego.
January 18	Eugene Ely, a civilian aviator, landed a Curtiss airplane on a plat- form built on the U.S.S. Pennsylvania.
January 26	The first American hydroplane was flown by Glenn Curtiss.
February 17	Glenn Curtiss took off in a hydroplane at North Island, landed beside U.S.S. Pennsylvania. The plane was then hoisted aboard to demon- strate the cooperation possible between airplane and ship. Fred Wiseman made a flight between Petaluma and Santa Rosa, California, carrying private mail.
September 17 to November 5	Calbraith Perry Rodgers completed the first transcontinental flight in a Wright machine. His route was New York to Pasadena. The trip took 49 days total time but only 3 days, 10 hours, 4 minutes of flying time. Rodgers was killed on April 3, 1912 when his plane ran into a flock of sea gulls near Long Beach, California.
October 19 to February 8	Robert G. Fowler flew from Los Angeles to Jacksonville, Florida. This was his second start as the first route was through Donner Pass and his plane could not make that altitude.
1912	
February 17-25	Oakland, California held an International Aviation Meet.
Мау 10	Glenn Martin flew the channel between Newport Beach, California and Catalina Island in a hydroplane.
1913	
June 15	The first Loughead design, a hydroplane called Model G was flown at San Francisco Bay by Allan Loughead. On the second flight that day he was accompanied by his brother Malcolm.
November 18	Lincoln Beachey did the first loop-the-loop in the United States at San Diego.
December 30	Lt. Joseph E. Carberry won the MacKay Trophy for a flight in which he and co-pilot Lt. Fred Seydel made a report on their observations of military maneuvers near San Diego, which had been planned for this exercise.

1914	
February 18	The first known airplane rescue of a critically injured crash victim took place. Lt. Goodier was pulled from the wreckage of the first Army flying boat by John Cooper who placed him on the front of a float of Glenn Curtiss' flying boat. Curtiss then taxied the short distance to shore.
February 24	Pusher-propeller airplanes were condemned by an Army board that met at the Signal Corps Aviation School at San Diego.
June 24	The first Curtiss tractor-propeller plane was delivered to the San Diego school.
June 25	Silas Christofferson flew over Mt. Whitney in a Christofferson Tractor Biplane.
October 8	Capt. H. LeR. Muller set altitude record of 16,789 feet over San Diego.
1015	
During the year	Glenn Martin earned \$700 a day as a flier and actor in the film <i>The Girl From Yesterday</i> with Mary Pickford.
1916	
February 3	The aeronautic section of the California Naval Militia was begun by a \$1,200 contribution from the Aero Club of America. It was attached to the 9th Division with Ensign Frank Sempson, Jr. in charge.
September 2	Plane-to-plane radio was demonstrated between the plane of Lt. W. A. Robertson and Cpl. A. D. Smith and the plane of Lt. H. A. Dargue and Capt. C. C. Culver. The planes were about two miles apart over North Island, San Diego.
1017	
May 12	Over Rockwell Field, San Diego, Capt. W. A. Robertson set an altitude record of 17,230 feet.
September 22	John J. Montgomery heirs sued Wright-Martin Aircraft Corp. for infringement. The suit was withdrawn on June 6, 1921.
December 11	Katherine Stinson made a non-stop distance flight record of 610 miles by flying from San Diego to San Francisco. The flight took 9 hours and 10 minutes.
1918	
February 2	A "Flying Circus" was held at Rockwell Field, San Diego with over 200 planes taking part.
April 16	Major T. C. Macauley flew from San Diego to Americus, Georgia in 19 hours flying time. He then returned to San Diego.
July 7	Capt. L. H. Smith flew from San Francisco to San Diego for a non- stop speed record, covering the 610 miles in 4 hours and 6 ¹ / ₂ minutes.
July 15	Sid Chaplin Aircraft Co. began a Los Angeles to Catalina daily passenger service.
July 31	Lts. J. M. Fetters and Tobin S. Curtis flew over the Sierra Nevadas from Sacramento to Ogden, Utah, 540 miles.
December 4	The first Army transcontinental flight, using four Curtiss JN4's, flew from San Diego to Jacksonville, Florida. Major Albert D. Smith was in charge. His plane made the complete circuit from San Diego to Jacksonville to New York, and back to San Diego.

1919	
During the year	The Goodyear <i>Pony Blimp</i> was stationed at Los Angeles. This small non-rigid airship could carry two passengers.
June 1	The first sustained forest fire patrol by airplane was begun from Rockwell Field at the request of the District Forester in San Francisco.
December 8–31	An Army transcontinental group flight from New York to San Francisco and return was conducted. Ten planes completed the round-trip.
1920	
During the year	Donald Douglas began his company, using the back of a barber shop as his office, in Santa Monica, California.
September 8	A transcontinental air-mail route was begun which combined train and plane transportation.
1921	
January 1	A Navy seaplane, NC-5, made a non-stop flight with six persons from San Diego to Magdalena Bay, 702 miles in 9 hours and 15 minutes.
January 15	Twelve Navy seaplanes completed a 3200-mile flight from San Diego to the Canal Zone, Panama, with 9 stops, in 17 days.
February 22-23	Jack Knight and E. M. Allison, civilian mail pilots, flew mail from San Francisco to New York in 33 hours and 20 minutes.
February 24	Lt. William D. Coney completed a transcontinental flight from San Diego, California to Jacksonville, Florida, 2180 miles in 22 hours and 27 minutes. His plane was a DH-4B.
March 9	Five men made parachute jumps simultaneously from an Army plane at Mather Field, California.
July 4	Photos of Carpentier-Dempsey fight were delivered by plane to San Francisco just 48 hours and 45 minutes after leaving Hoboken, New Jersey.
July 9–11	Prof. Bailey Willis, president of the Seismological Society of America, studied the San Andreas fault by air.
July 16–17	An International Air Tournament was held at Los Angeles.
1922	
September 4	Lt. James Doolittle made a one-stop transcontinental flight in a DH-4 biplane. His route was from Pablo Beach, Florida to Kelly Field, Texas to Rockwell Field, San Diego, 2163 miles in 21 hours and 20 minutes.
October 5-6	Lts. John Macready and Oakley Kelly set an endurance record at Rockwell Field of 35 hours, 18 minutes, and 30 seconds.
1023	
April 20	First refueling in air using a hose was accomplished over Rockwell Field under the direction of H. H. Arnold.
May 2–3	The coast-to-coast non-stop flight was accomplished by Lts. Oakley Kelly and John Macready in a Fokker T-2. The flight from New York to San Diego took 26 hours, 50 minutes and 3 seconds.
August 27–28	Capt. Lowell Smith and Lt. John Richter made a 37 [‡] -hour endur- ance flight record over Rockwell Field in a DH-4B. Mid-air refuel- ing was accomplished every six hours from a second plane flown by Lts. Virgil Hine and Frank Seifert.

1924	
April 6 to September 28	Two Douglas biplanes of the U.S. Air Service were flown around the world in 51 days, 11 hours, and 7 minutes of flying time. The four planes and crews which began the trip were: the Seattle with Maj. F. Martin and Sgt. Harvey; the Boston with Lt. L. Wade and Sgt. H. Ogden; the New Orleans with Lts. E. Nelson and J. Harding; and the Chicago with Lts. L. Smith and L. Arnold. The New Orleans and Chicago made the complete trip.
June 23	Lt. Russell L. Maughan made the first dawn-to-dusk flight from New York to San Francisco in 21 hours and 48½ minutes. He had three stops for fuel in his 2540-mile race with the sun.
July 1	A New York to San Francisco scheduled air-mail service was begun by the U.S. Post Office Dept.
During October	The Shenandoah—designed by using data from captured Zeppelins during the war—was moored at North Island, San Diego during its 19-day transcontinental round trip.
1025	
During the Year	Ryan Air Lines started a daily passenger service between San Diego and Los Angeles.
August 31 to September 10	Cmdr. John Rodgers, Lt. Byron Connell, O. Stantz, Skiles Pope and William Howlin attempted to fly from California to Hawaii in the PN-9 No. 1. After the plane ran out of fuel, approximately 450 miles from its goal, it was sailed the remainder of the trip.
1926	
January 18	The Daniel Guggenheim Fund for the Promotion of Aeronautics was established.
April 17	Western Air Express began a regularly scheduled passenger service between Los Angeles and Salt Lake City, Utah. The 660-mile route had daily flights in each direction. Between this date and December 31, 258 passengers were carried.
May 20	The Air Commerce Act was passed.
September 15	Pacific Air Transport began mail service between Seattle and Los Angeles.
November 15	The Post Office Dept. advertised for bids on two sections of trans- continental route. Boeing Airplane Company in association with Edward Hubbard received the Chicago-to-San Francisco route, starting July 1, 1927.
December 10-11	Stanford University, California Institute of Technology, and the University of Washington joined with Massachusetts Institute of Technology, New York University, and the University of Michigan in a Washington conference on aeronautic education methods. The meeting was sponsored by the Guggenheim Fund.
1927	
During the year	Inca Lines established its route between El Paso and Los Angeles.
April 28	Charles Lindbergh conducted the first test flight of his Ryan monoplane in San Diego. There were twelve days of testing.
May 9	Charles Lindbergh flew the Spirit of St. Louis from San Diego to St. Louis.
June 28–29	Lts. Lester J. Maitland and Albert F. Hegenberger of the Navy flew a tri-motor Fokker, <i>Bird of Paradise</i> , non-stop from California to Hawaii, 2417 miles in 25 hours and 50 minutes. For this flight, they were awarded the Mackay Trophy on April 11, 1929.

August 16–17	Dole Air Race from Oakland, California to Honolulu, Hawaii. Of the six planes that left Oakland, two arrived in Honolulu. Col. Goebel and Lt. Davis in the <i>Woolaroc</i> won first place and \$25,000, Schluter and Jensen in the <i>Aloha</i> won second place and \$10,000.
Sept. 17, 1927	Oakland Airport was dedicated by Charles Lindbergh.
1928	
April 14	Maddux Air Lines started daily passenger service between Los Angeles and San Francisco.
May 26	Western Air Express started a daily passenger and express service between Los Angeles and San Francisco.
May 31 to June 9	Charles Kingsford-Smith flew the Southern Cross from Oakland, California to Brisbane, Australia, stopping at Hawaii and Fiji. Members of the crew were Charles Ulm, James Warner, and Harry Lyon.
August 20–21	Col. Arthur Goebel and Harry J. Tucker flew the Lockheed Vega Yankee Doodle in a non-stop flight from Los Angeles to New York in 18 hours and 58 minutes.
September 8–16	The National Air Races and Exposition was held at Los Angeles with transcontinental races, a Windsor, Canada-to-Los Angeles race, and local California races.
October 6	Contracts were signed between Goodyear-Zeppelin Corp. and U.S. Navy for <i>Akron</i> and <i>Macon</i> , the first to be delivered in 30 months and the second in 45 months.
October 24	Capt. Charles Collyer and Harry J. Tucker flew the <i>Yankee Doodle</i> non-stop from New York to Los Angeles in 24 hours and 51 minutes.
October 31	United Aircraft and Transport Corporation was founded which included: Boeing Airplane Company, Boeing Air Transport, Pacific Air Transport, Hamilton Standard Propeller Company, Chance Vought, and Pratt & Whitney.
1929	
January 1–7	Army Fokker tri-motor monoplane Question Mark stayed aloft over Los Angeles for 150 hours and 40 minutes. The piloting team was commanded by Maj. Carl Spaatz.
May 29	Lt. Herbert J. Fahy concluded 36 hours, 56 minutes, 36 seconds in the air for an endurance record over Los Angeles. He used a Lockheed Vega plane.
June 27–29	Frank M. Hawks flew from New York to Los Angeles, non-stop, in 19 hours and 10 minutes; after a layover of 7 hours, 16 minutes, he made a return flight to New York in 17 hours and 38 minutes.
July 2–12	L. W. Mendell and R. B. Reinhart set an endurance record of 246 hours, 44 minutes over Culver City, California in a Wright-motored Buhl.
July 4	Combination rail-air passenger service across the continent was begun by Transcontinental Air Transport, Inc.
August 27	The first National Women's Air Derby was flown as part of the National Air Races. The route was from Santa Monica, California to Cleveland, Ohio. Mrs. Louise Thaden won in 21 hours, 29 minutes and 12 seconds flying time in a Wright-motored Travel Air.
December 31	The Daniel Guggenheim Fund for the Promotion of Aeronautics officially ended.



In 1937 Lockheed introduced its Model 14 twin-engine transport, which was converted into the Hudson bomber for Britain the following year. (Courtesy Lockheed Aircraft Corporation.)



The Royal Air Force Mustang was first used as an army support weapon; later the North American fighter became a long-range escort for allied bombers. (Courtesy North American Rockwell Corporation.)

1030	
March 31 to April 6	Frank Hawks flew glider from San Diego to New York. The glider was towed by a Waco plane flown by J. D. Jernigan but was released before each landing. Hawks would then give a spectacular soaring demonstration before landing.
April 29	McNary-Watres Act allowed air mail payments by space available not pounds carried—\$1.25/mile.
During May	Roscoe Turner and his mascot lion Gilmore set east-west record of 18 hours, 42 minutes, and 54 seconds from New York to Glendale, California.
July 16	Transcontinental Air Transport merged with Western Air Express to become Transcontinental & Western Air (T.W.A.).
1031	
September 4	Maj. James Doolittle established new transcontinental record of 11 hours, 16 minutes between Burbank, California and Newark, New Jersey with three refueling stops.
1932	
August 25	Amelia Earhart flew non-stop between Los Angeles and New York. This was the first non-stop air crossing of the United States by a woman.
November 14	Roscoe Turner flew from New York to California in 12 hours and 33 minutes with two stops.
1933	
During the Year	The Besler brothers' steam-engine plane was tested at Oakland.
March 11	U.S.S. Macon christened at Akron, Ohio by Mrs. W. A. Moffett.
April 12	The first Navy airship base on the West Coast was placed in commission at Sunnyvale, California.
May 26	The Mackay Trophy was awarded to Lt. Charles Howard, commander of the 11th Bombardment Squadron stationed at March Field, California, for parachuting food to the snowbound Navajo Indians in January of 1932.
June 2	Frank M. Hawks flew non-stop from Los Angeles to Floyd Bennett Field, Brooklyn, New York in 13 hours, 26 minutes, 15 seconds for new west-east non-stop record, using a Northrop Gamma.
July 1	Roscoe Turner flew from Floyd Bennett Field, Brooklyn to Los Angeles in 11 hours, 30 minutes for new east-west record.
July 1–4	National Air Races were held at Los Angeles under sponsorship of National Aeronautic Association.
September 25	Roscoe Turner flew from Burbank to Floyd Bennett Field, Brooklyn in 10 hours, 4 minutes, 55 seconds.
October 12-15	The <i>Macon</i> flew non-stop from Lakehurst, New Jersey to its base at Sunnyvale.
December 16-17	Pacific International Air Pageant held at Curtiss-Wright San Francisco Airport, San Mateo, California.
1934	
January 10-11	Lt. Cmdr. Kneffler McGinnis led six Consolidated flying boats on a flight from San Francisco to Pearl Harbor in 24 hours, 45 minutes, breaking three world records.
February 9	Postmaster General James Farley telegraphed the domestic air-mail carriers that their government contracts would be cancelled in 10 days.

February 18	At ten o'clock in the evening Eddie Rickenbacker and Jack Frye took fourteen passengers from Los Angeles to New York in the new DC-1 for the last transcontinental mail trip on a private line.
February 19 to June 1	Army Air Corps flew mail routes. There was a halt between March 10-19 because of public criticism of fatal crashes.
April 20–21	U.S.S. Macon flew from Sunnyvale to Miami to participate in Navy maneuvers, returning on May 18.
May 8	Western Air Express' transport routes were taken over by General Air Lines.
May 13	Jack Frye of Transcontinental & Western Air flew a Northrop Gamma from Los Angeles to Newark in 11 hours, 31 minutes, establishing a new record for air mail.
July 17 to September 4	Twelve Navy patrol flying boats flew round-trip from San Diego to Alaska.
August 1	Daily overnight flights were begun by T.W.A. between New York and Los Angeles, with stops at Chicago, Kansas City, and Albuquer- que. Flying time was 16 hours eastbound and 18 hours westbound.
October 20 to November 4	Sir Charles Kingsford-Smith and P. G. Taylor flew from Brisbane, Australia to Oakland, California in a Lockheed Altair, using Fiji and Hawaii as stopovers.
November 8	Eddie Rickenbacker, Silas Morehouse, and Charles W. France made passenger transport record by flying a DC-2 from Los Angeles to Newark in 12 hours, 2 minutes, 50 seconds.
December 3	Charles T. P. Ulm, George Littlejohn and J. S. Skilling left Oakland for a flight to Australia but were lost at sea.
1935	
January 11–12	Amelia Earhart flew a Lockheed Vega from Wheeler Field, Honolulu to Oakland, California in 18 hours, 16 minutes in the first solo flight from Hawaii to the U.S.
January 15	Maj. James H. Doolittle and two passengers flew an American Airlines plane non-stop from Los Angeles to Floyd Bennett Field in 11 hours, 59 minutes for a new west-east non-stop record.
During February	T.W.A. started the first non-stop transcontinental passenger service, eastbound only, using DC-2's.
February 12	The Macon was lost off the California coast.
February 20–21	Leland Andrews, Henry Meyers, and G. D. Rayburn flew an Airplane Development Corporation Vultee from Los Angeles to Floyd Ben- nett Field in 11 hours, 34 minutes, 16 seconds for American Airlines.
March 15	Wiley Post flew a Lockheed Vega from Burbank to Cleveland in 8 hours, 4 minutes at 30,000 feet.
April 16–17	The Pan American Clipper flew from San Francisco to Honolulu in 18 hours, 39 minutes for a test flight.
April 19–20	Amelia Earhart flew between Burbank and Mexico City, with no stop, in 13 hours, 33 minutes.
September 13	In Hughes Special, Howard Hughes made a land-plane speed record of 352.388 m.p.h. at Santa Ana.
November 22–29	Pan American Airways started transpacific air-mail service from San Francisco to Manila, stopping at Honolulu, Midway, Wake, and Guam.
1936	
January 13–14	Howard Hughes flew a Northrop Gamma from Burbank to Newark in 9 hours, 26 minutes, 10 seconds.

February 1–9	The National Pacific Aircraft and Boat Show was held at Los Angeles.
April 17	Capt. Edwin C. Musick was awarded the Harmon Trophy for 1935 for his contribution in establishing Pan American's Pacific route.
May 14	Howard Hughes flew a Northrop Gamma from Chicago to Glendale in 8 hours, 10 minutes, 25 seconds for a new intercity speed record.
June 7	Maj. Ira Eaker made the first transcontinental "blind" flight.
July 2	Donald W. Douglas received the Collier Trophy for 1935 for the development of the DC-2.
September 4–8	The National Air Races were held at Los Angeles.
October 21	Pan American Airways System began a weekly passenger service to Manila.
1937	
January 19	Howard Hughes flew from Burbank to Newark in his Hughes Special. Time was 7 hours, 28 minutes, 25 seconds.
January 22	Sperry Memorial Award for 1936 was awarded to W. Curtiss Rockefeller of California Institute of Technology by Institute of Aeronautic Sciences.
January 28–29	Twelve U.S. Navy planes flew non-stop from San Diego to Honolulu, 2,553 miles in 21 hours, 43 minutes, using Consolidated PBY-1's.
February 28	Howard Hughes was given the Harmon Trophy for 1936 for his contributions to aviation.
March 13-21	The Second Annual National Pacific Aircraft and Boat Show was held at Los Angeles.
April 13	Twelve U.S. Navy planes flew non-stop from San Diego to Honolulu in PBY-1's in 21 hours, 25 minutes.
April 28	Pan American Clipper arrived at Hong Kong, completing the first commercial flight across the Pacific.
May 21	Amelia Earhart and Fred Noonan left on attempt to fly around the world starting east from San Francisco. They were last seen at Lae, New Guinea.
May 25	Richard Archibald flew a Consolidated PBY-1 from San Diego to New York for the first non-stop transcontinental seaplane flight.
June 21–22	Twelve U.S. Navy PBY-1's flew non-stop from San Diego to Coco Solo, Canal Zone.
July 13–15	Col. Mikail Gromov, Comdt, Andrei Youmachev, and Ing. Sergei Daniline flew from Moscow to San Jacinto, California for a world airline record of 6,295 miles.
August 6	Juan T. Trippe, President of Pan American Airways was given the Collier Trophy for 1936 for beginning a transpacific airline.
December 17	The Institute of Aeronautic Sciences presented the Lawrence Sperry Award for 1937 to Clarence L. Johnson of Burbank for design work on the Lockheed 14.
December 29	Pan American began service between San Francisco and Auckland, New Zealand, with Honolulu, Kingman Reef, and Samoa as stepping stones.
1938	
February 15	Frank Fuller, Jr. flew from San Francisco to Los Angeles in 1 hour, 7 minutes, 7 seconds.
April 2–10	The third Annual National Pacific Aircraft and Boat Show was held at Pan Pacific Auditorium in Los Angeles.

April 19	Lt. Col. Robert Olds flew from Langley Field, Virginia to March Field, California in 12 hours, 27 minutes. His Boeing B-17 had a crew of three officers and five enlisted men.
May 25	Frank Fuller, Jr. flew from San Francisco to Seattle in 2 hours, 31 minutes, 41 seconds.
May 28	Frank Fuller, Jr. flew from Vancouver to Oakland in 3 hours, 8 minutes, 43 seconds.
June 1	Earl Ortman flew from San Francisco to San Diego in 1 hour, 48 minutes, 1 second.
June 10–12	The International Air Races were held at the Oakland Municipal Airport.
June 25	Forty-seven U.S. Navy PBY-1's flew from San Diego to Seattle.
July 4	Paul Mantz flew from Wichita to Los Angeles in 7 hours, 11 minutes, 5 seconds in a Lockheed Orion.
August 1	Forty-one U.S. Navy PBY-1's made a non-stop flight from Seattle to San Diego.
August 31 to September 1	Fourteen U.S. Navy planes flew from San Diego to Coco Solo, Canal Zone.
September 3	Jacqueline Cochran won the Bendix Trophy Race, flying Burbank to Cleveland in 8 hours, 10 minutes, 31 seconds.
September 6–7	Seventeen U.S. Navy planes flew from San Diego to Hawaii in 17 hours, 21 minutes.
1030	
February 11	Lt. Ben Kelsey of Air Corps flew non-stop from March Field, California to East Hempstead, New York in 7 hours, 45 minutes, 36 seconds. His plane was an Allison-powered P-38.
April 3	The National Defense Act of 1940 was signed by President Roosevelt.
August 30	Pan American Airways renewed Clipper service between San Francisco and Auckland, New Zealand.
September 2	Frank Fuller, Jr. won Bendix Trophy race by flying from Burbank, California to Bendix, New Jersey in 9 hours, 2 minutes, 5 seconds.
September 15	Jacqueline Cochran set new international speed record of 305.926 mph for 1000 km, over Burbank-San Francisco-Burbank route, using Seversky monoplane.
November 26	Donald W. Douglas received the Daniel Guggenheim Medal for 1939 for his contributions to the transport field.
December 29	The Consolidated-Vultee B-24 Liberator made its first flight, at San Diego.
10.40	
January 23	The 7th Bombardment Group stationed at Hamilton Field, Cali- fornia, proved the ability to fly a complete troop unit—the 65th Coast Artillery—using 38 bombers. The demonstration trip covered 500 miles.
March 26	Commercial aviation in the United States completed a year without a fatal accident.
July 12	Pan American Airways flew airmail over its new route to Auckland, New Zealand by way of Honolulu, the Canton Islands, and New Caledonia.
September 1	Passenger service was begun from San Francisco to Auckland, New Zealand by Pan American.