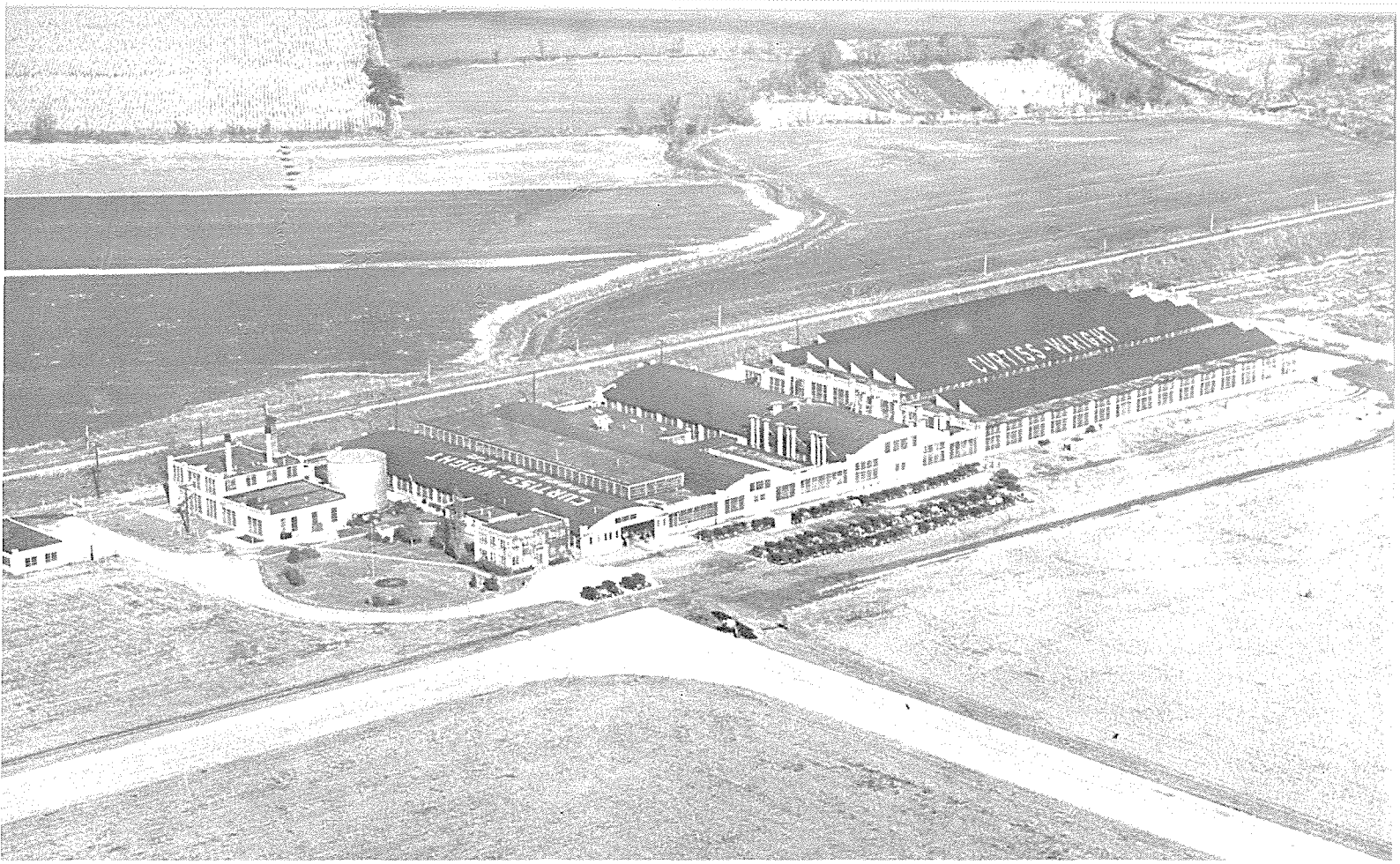


CURTISS-WRIGHT

ST. LOUIS

by Frederick W. Roos

On May 20–21, 1927, Charles A. Lindbergh made the epic transatlantic flight that triggered a tremendous worldwide growth in aviation. Lindbergh had planned his New York–to–Paris flight while flying air mail between St. Louis and Chicago for Maj. William B. Robertson, president of Robertson Aircraft Corporation, the operator of Contract Air Mail route 2. In addition to being an active pilot himself (he was trained as an Army aviator during World War I), Robertson had developed a highly successful business reconditioning and selling surplus WWI aircraft. A dedicated aviation booster, Robertson had enthusiastically assisted Lindbergh in obtaining financial backing for his *Spirit of St. Louis* project.

Always the entrepreneur, Robertson wasted no time in capitalizing on the greatly heightened interest in aviation that followed Lindbergh's flight. Within two months of that flight, Robertson was hard at work selling the Curtiss Aeroplane and Motor Company on the idea of manufacturing light aircraft for private use. The Curtiss organization showed interest in Robertson's arguments, which included specific ideas about the airplane (a three-place, single-engine monoplane) and the plant location (Lambert Field at St. Louis, of course), and access to the sizable quantity of war-surplus OX-5 engines that Robertson had acquired. Curtiss engineers spent a couple of months studying Robertson's concept, and in September began detail design of the airplane.

A formal agreement between Robertson and Curtiss was tentatively struck on November 9, 1927, forming the Curtiss-Robertson Airplane Manufacturing Company. Financial backing for the new enterprise was readily arranged, with $500,000 in capital soon available. On January 28, 1928, Robertson resigned the presidency of Robertson Aircraft Corporation to become president of Curtiss-Robertson, turning over the reins of his former company to his younger brother Frank. Vice-President of Curtiss-Robertson was Clement M. Keys, president of the parent company (Curtiss), which retained a majority interest in the new company.

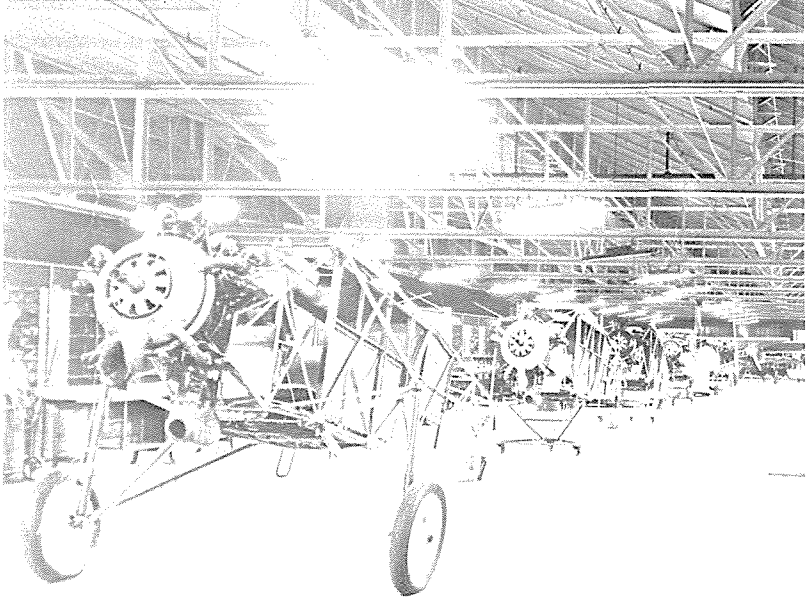
Ground was broken on March 4, 1928, for the new 45,000-square-foot plant, located adjacent to the railroad line that ran along the north side of Lambert Field. By late May, tools and manufacturing equipment worth some $80,000 were

The Curtiss-Wright factory at Lambert Field, after several expansions, in the mid-1930s. (Gerry Balzer)

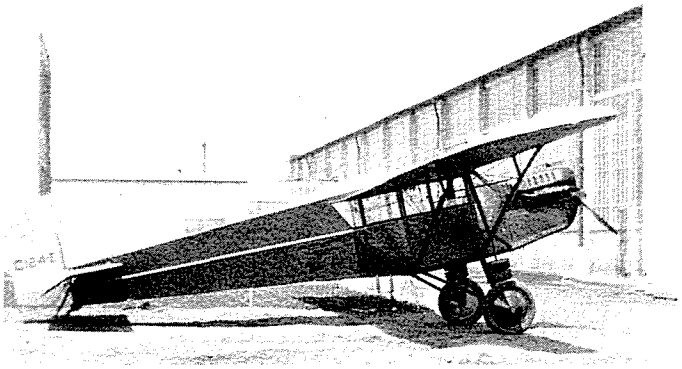
being moved in.

Meanwhile, engineering, fabrication and testing of prototypes of the *Robin,* as the new plane had been named, proceeded rapidly at Curtiss' engineering facility in Garden City, Long Island. Appropriately enough, the first prototype *Robin,* X-5049, flew in the early spring of 1928. Flight testing went smoothly, and on March 27, 1928, this ship was ferried to St. Louis by none other than Charles Lindbergh himself, with Major and Mrs. Robertson accompanying him.

By midsummer, the Curtiss-Robertson plant was in full operation, with 160 employees hard at work. The first production *Robin* was flown at Lambert Field on August 7, 1928, just as the citizens of St. Louis were voting overwhelmingly in favor of a $2,000,000 bond issue that would soon turn Lambert Field into one of the nation's finest airports. The Curtiss-Robertson factory had been planned for volume production, featuring the first assembly line for civil aircraft. The *Robin*, too, had been designed with quantity production in mind. For example, the wing was made with stamped aluminum ribs that could be turned out 60 times as quickly as built-up ribs, once the substantial capital investment in stamping machinery had been made.



Robin **assembly line, showing Wright *Whirlwind*-powered models under construction. (Curtiss-Robertson Photo)**



An early *Robin* B at the Curtiss-Robertson factory. The first *Robins* were powered by the WWI-surplus Curtiss OX-5 engine, a water-cooled V-8 of 90 horsepower. (Robert Whelove Photo)

Of Robins and Records—The *Robin* was one of the new breed of aircraft in its day, being a single-engine, high-wing monoplane with an enclosed cabin. Powered by the reliable, widely used Curtiss OX-5 engine, a 90-hp water-cooled V-8 of World War I vintage, the three-place *Robin* cruised at a leisurely pace of 85 mph over a 550-mile range. While its excellent engineering, reasonable price, and look of rugged, honest simplicity all contributed to its immediate success, at least one of the factors responsible for the *Robin*'s popularity was the widespread publicity it received as a result of a spectacular stunt flight. In December 1928, Dale Jackson dizzily executed the record number of 417 consecutive barrel rolls in a *Robin* over Lambert Field.

In that same month, December 1928, a new version of the *Robin* was introduced. This was powered by the newly developed Curtiss *Challenger* air-cooled radial engine, whose six cylinders generated 170 hp. Although the new *Robin*, which was very similar to the original model except for the more powerful engine, cost about twice as much as the OX-5-powered version, the improvements in payload and speed made it an attractive alternative for many buyers. It was in proving the reliability of this new *Challenger* engine that the *Robin* made what was to be its most famous flight, an endurance marathon that lasted more than 17 days.

Endurance flying had become a nationwide craze following the 150-hour, nonstop flight of the Army's Fokker trimotor, *Question Mark,* in January of 1929, during which the practicality of in-flight refueling was clearly demonstrated. Pilots and manufacturers scrambled to prove themselves and their products, and new endurance records were set and broken in quick succession. To capitalize on the public enthusiasm for this endurance flying, Curtiss-Robertson officials seized upon the idea of an endurance flight to demonstrate the capabilities and dependability of the *Challenger* engine. A standard *Challenger*-powered *Robin* was taken from the production line and fitted with catwalks and handrails between the cabin and engine, and an extra 125-gallon fuel tank was installed in place of the rear seats. Painted in the standard *Robin* colors of orange and yellow, the endurance ship had the name *St. Louis Robin 1* emblazoned on its sides.

Only hours after two Los Angeles fliers had set the most recent endurance record, the *St. Louis Robin* lifted off from Lambert Field at 7:17 A.M., July 13, 1929, on what was publicly billed only as a test of the plane's *Challenger* engine. The ship's two crew members were Dale "Red" Jackson, of barrel-rolling fame, and Forrest "Obie" O'Brine, a Curtiss-Robertson test pilot. After several hours of orbiting the St. Louis area, the *St. Louis Robin* made its first refueling contact. As pilot Ray Wassall eased the tanker aircraft, another *Challenger-Robin*, into position above the *St. Louis Robin*, crewman "Shorty" Chaffee lowered the refueling hose to one of the waiting airmen. Following the fuel transfer, containers of food, messages, and oil were lowered to the *St. Louis Robin*. In all, 77 of these contacts were made during the flight, 48 of which were for refueling. The fliers became so adept at the routine that they were soon able to accomplish a complete fuel and food transfer while flying in circles over Lambert Field.

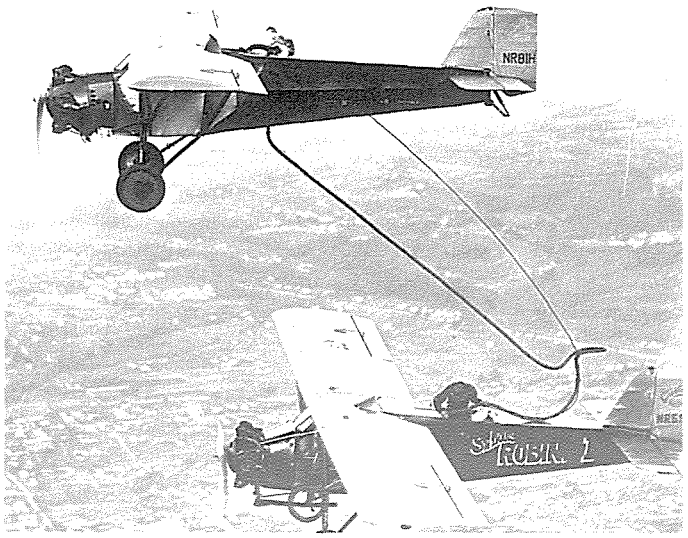
Four days into the flight, the *St. Louis Robin* was joined in its endurance attempt by the *Missouri Robin,* another *Challenger-Robin* that had been similarly prepared by the Curtiss-Robertson factory. The *Missouri Robin,* which had its own

refueling plane and crew, was forced down with an oil leak after only 117 hours aloft. Meanwhile, the *St. Louis Robin* droned on steadily, while spectators and reporters from all over the country continued to gather at Lambert Field to measure the progress of Jackson and O'Brine's flight. On July 23, an impromptu air show was held to celebrate the surpassing of the existing 246-hour endurance record. The flight continued with very little difficulty through daily oil changes, occasional spark plug replacements, and even a magneto repair. A press tent was set up at Lambert Field to accommodate reporters who came from all over the country to follow the flight of *St. Louis Robin 1.*

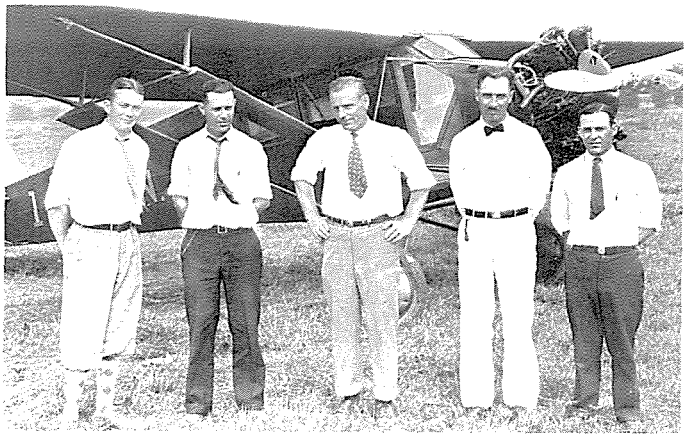
Although the fliers had begun enthusiastically eyeing the 500-hour mark, they were finally asked to land on July 30 by Major Robertson, president of Curtiss-Robertson and sponsor of the flight, who explained that "objectives of the test flight have been fully accomplished, as the Curtiss *Challenger* motor has more than proved itself, and the *Robin* airplane has proved itself, and the technical data that was wanted has been secured." Jackson and O'Brine landed the *St. Louis Robin* before a cheering crowd of 13,000 people at Lambert Field at 7:38 P.M. that evening, having set a new endurance record of 420 hours, 21 minutes, 30 seconds, a record that was to stand for nearly a year. In addition to providing them with considerable personal fame, the fliers' efforts paid off in handsome rewards. When their pay, bonuses, and all other awards were summed up, each of the pilots was over $15,000 richer.

More popular than ever by this time, the *Robin* continued in production into 1930, with various options offered, such as a four-seat cabin, a Wright *Whirlwind* engine, or floats for water-based operations. To handle the high production rates, which Plant Manager Ralph Damon had increased to 17 per week by late 1929, the plant was enlarged to 145,000 square feet. When production finally ceased, 769 examples of the *Robin* had been manufactured, making it easily the most successful civil airplane of its day.

Jackson and O'Brine, pilots of the *St. Louis Robin 1,* were



St. Louis Robin 1 **takes on fuel during record 420-hour endurance flight over St. Louis, July 13-30, 1929.**



(L-R): Dale "Red" Jackson and Forrest "Obie" O'Brine, pilots of *St. Louis Robin 1;* M.A. Schultz, manager of the flight for Curtiss-Robertson; C. Ray Wassall and P.V. "Shorty" Chaffee, crew of the refueling plane.

St. Louis Robin 1 **as cleaned and painted up for publicity tour after record endurance flight. (Gulf Oil Photo)**

The eight-seat *Kingbird,* a twin-engine sister of the *Thrush.*
(Curtiss-Wright Photo)

not to be so fortunate. After their 420-hour record was broken in 1930, they joined forces again to attempt to regain the record. Using their own plane, a *Challenger-Robin* named the *Greater St. Louis,* and without factory sponsorship, they again flew from Lambert Field and succeeded in setting a phenomenal record of over 647 hours, good enough to stand for five years (until broken by another *Robin*). Unfortunately, the public had grown bored with endurance flights, and little enthusiasm was generated. This time, the financial rewards barely covered the expenses of the flight. Both Jackson and O'Brine later died in plane crashes.

Before leaving the *Robin* story, mention must be made of the most controversial, and perhaps amusing, flight ever made in a *Robin*. In mid-August of 1938, Douglas Corrigan flew a *Whirlwind*-powered *Robin* (converted from an OX-5 model) nonstop from New York to Ireland. Having been refused official permission to make the transatlantic flight, Corrigan announced that he would fly nonstop from New York to Los Angeles. After taking off from New York, he flew out over the Atlantic, reaching Dublin in slightly more than 28 hours. Corrigan steadfastly blamed a faulty compass for his directional "error," which has earned him everlasting fame as "Wrong-Way" Corrigan.

Surviving the Thirties—Endeavoring to build on its success with the *Robin*, Curtiss-Robertson began work in 1929 on a pair of aircraft that was quite similar to each other, based on an enlargement of the original *Robin* design. Following Curtiss practice of the time, prototypes were developed at

The *Thrush* of 1929; only 10 were built. (Clifford Karvinen Photo)

Curtiss' Garden City, New York facility, with later development and production taking place at the Curtiss-Robertson plant in St. Louis.

The first of the new designs, the six-seat *Thrush,* appeared in June of 1929, just as Jackson and O'Brine were getting under way with their record-setting 420-hour endurance flight in a *Robin* at Lambert Field. When it entered production in the fall of 1929, the *Thrush* was equipped with a larger engine, but remained underpowered compared to its competition. At the same time, development was proceeding on the *Kingbird,* essentially a twin-engine version of the *Thrush.* The *Kingbird,* able to carry eight with its greater power, was intended for commercial operations. It finally went into production in early 1930, first appearing publicly at the St. Louis Aircraft Exposition in February. Several *Kingbirds* eventually entered service with Eastern Air Transport. Unfortunately, the beginning of the Great Depression in late

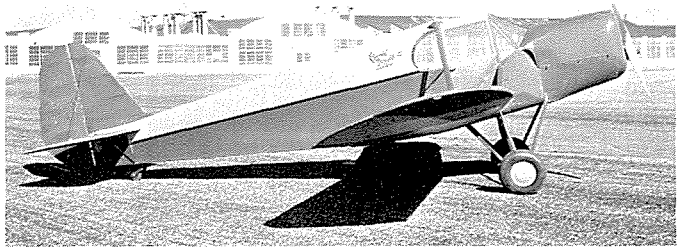
1929 hit the aviation industry hard, dooming these new Curtiss-Robertson projects. Only 10 *Thrushes* and 14 *Kingbirds* had been built when production ceased.

Meanwhile, Curtiss-Robertson was involved in some massive corporate changes. On June 26, 1929, the historic Curtiss and Wright aeronautical enterprises were merged to form the Curtiss-Wright Corporation. Included in the new giant were Curtiss-Robertson, the famous Travel Air Manufacturing Company of Wichita, and the Moth Aircraft Corporation (American manufacturers of Britain's de Havilland *Moth* light biplane). Within months, *Moth* production had been moved to the Lambert Field plant, and a small factory had been established elsewhere in St. Louis by Wright Aeronautical to produce the *Gipsy* engine that powered the *Moth* and other light aircraft. During 1930, the Curtiss-Robertson and Travel Air organizations were combined into the Curtiss-Wright Airplane Company, headquartered at St. Louis with Walter Beech (formerly head of Travel Air) as its president. Soon thereafter, Major Robertson, founder and president of Curtiss-Robertson, left to pursue other aviation interests.

By this time, the St. Louis plant had begun developing its own aircraft projects. The most important of these was the CW-1 *Junior,* an extremely light, simple, two-seat, pusher monoplane. This unusual project originated when Walter Beech, new president of the St. Louis company, asked for a "two-place light airplane that would have enough gas to get off a field and fly the girlfriend around a little, and sell for under $1,500." The result, intended to compete with Aeronca's new lightweight, was essentially a powered glider named (by Beech) the *Skeeter,* first flown on October 5, 1930. Further refinement led to the *Junior,* which was publicly introduced in February 1931. The simplicity, gentle nature (top speed was only 80 mph), and low cost of the *Junior* made it a Depression-era success, and about 270 had been manufactured by the time production ceased in early 1932.

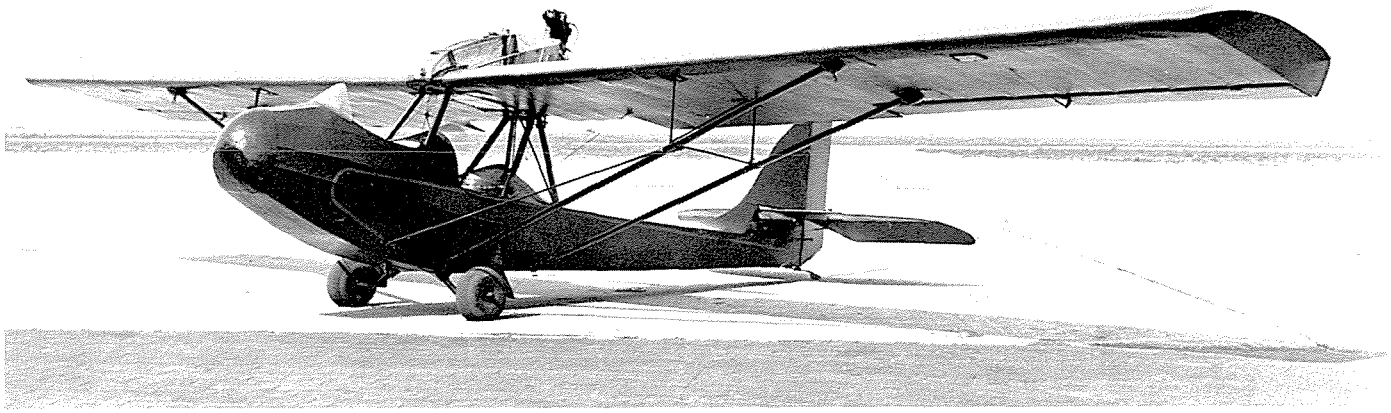
With the Depression deepening, Travel Air operations were consolidated into the Curtiss-Wright plant at Lambert Field by mid-1931. This brought to St. Louis all further production of the series of new and refined Travel Air airplanes that were introduced at the Detroit Air Show that year. These designs, which were given Curtiss-Wright (CW-) model numbers, were joined by a new St. Louis development with Travel Air ancestry, the four-seat CW-15 *Sedan.* Because of the depressed aircraft market, none of these airplanes was particularly successful in terms of sales. Typically, total production of any of these models was in the range of 15–20 units. Despite keeping as many as a half-dozen models in production, covering a wide range of sizes and prices (from $1,600 for the two-seat *Junior* to $12,500 for the six-seat Travel Air Six), Curtiss-Wright struggled to stay open, and

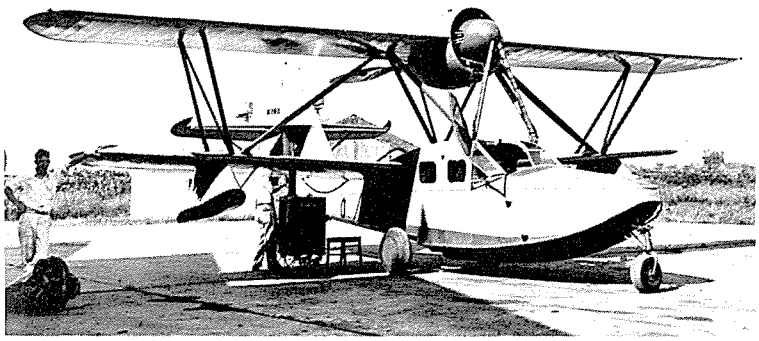
CW-15-N *Sedan* of 1931, parked on Lambert Field flight line in mid-1930s.



The original *Coupe* was this *Gipsy*-powered CR-2, started as a Curtiss-Robertson project to replace the *Moth.* Note 145,000-square-foot Curtiss-Wright plant in background. (Curtiss-Wright Photo)

The unusual, inexpensive, and quite successful CW-1 *Junior* appeared in 1931. (Warren Shipp Photo)





The Courtney CA-1 amphibian, also known as the Curtiss-Wright *Commuter*. Shown is the last of three aircraft built. (Robert Whelove Photo)

employment dropped from over 500 early in 1931 to around 200 during 1932.

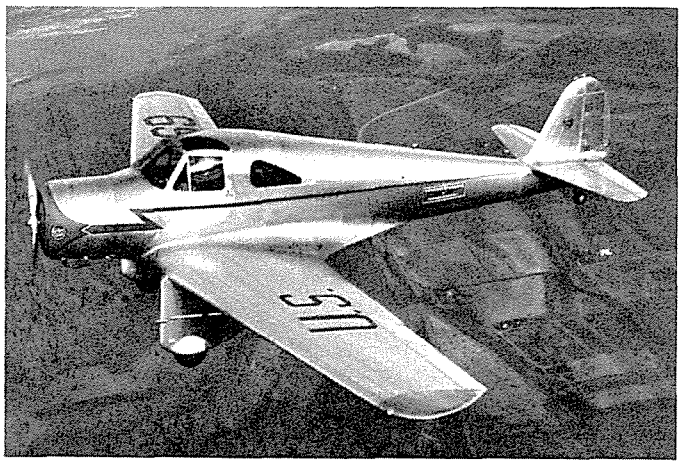
In a twist of fate, the tragic March 1931 crash of a TWA Fokker trimotor in which famous football coach Knute Rockne was killed proved to be a boon to Curtiss-Wright at St. Louis. In the wake of that crash, airlines began looking for replacements for their fleets of lumbering, noisy, high-maintenance trimotors. The Curtiss-Wright Corporation therefore decided to proceed with an airliner project that had originated that year at its main Buffalo plant, transferring the project and its designer, George Page, to St. Louis, where Page became chief engineer in April 1932. Competition would be stiff, for Boeing was already at work on its all-metal monoplane Model 247, and Douglas would soon start work for TWA on the even more advanced DC-1 (progenitor of the immensely successful DC-2/3 series). At a disadvantage because of its unfamiliarity with the new all-metal, stressed-skin technology, Curtiss-Wright gambled that a combination of comfort, low cost, serviceability, and short development time would lead to at least some success for its big biplane, fabric-skinned Model T-32 *Condor.*

Design development and prototype construction proceeded during 1932, leading to the *Condor*'s first flight on January 30, 1933. Ordered by two airlines, the *Condor* immediately entered production, giving Curtiss-Wright/St. Louis the hoped-for shot in the arm: by mid-1934, employment had increased to 520. Eastern Air Transport placed the first *Condor* in service in March 1933, followed shortly by American Airways. An anachronism when introduced, the biplane *Condor* was soon eclipsed by the DC-2; only 20 *Condor* airliners were built (all but one went to Eastern or American), and all were out of airline service by late 1936. Ironically, it was the sleeper berths built into some of American's *Condors* that led to the ultimate, total success of its competitor. The popularity of its sleeper service led American to request a sleeper version of the Douglas DC-2, the result becoming the famous DST/DC-3.

Another 25 *Condors* were built as freighters, military transports, and even bombers. Most of these served foreign countries, as did the airliner *Condors* after they were sold by Eastern and American. Though only modestly successful, the *Condor* had indeed served its purpose by enabling Curtiss-Wright/St. Louis to continue operating through the worst of the Depression. It also enabled Curtiss-Wright to begin plans for a truly modern airliner that would eventually appear as the CW-20, or C-46 *Commando,* of World War II fame.

After pursuing an unsuccessful single-engine amphibian project, the Courtney CA-1, during 1934–35, Curtiss-Wright next undertook a program that would mark a turning point for the St. Louis concern. The resulting airplane was the CW-19 *Coupe,* developed under contract to the U.S. Bureau of Air Commerce (ancestor of today's FAA). This effort was one of several sponsored by the Bureau in an attempt to modernize the private aircraft side of the aviation industry through the design and manufacture of prototypes embodying the new technology appearing in military and commercial aircraft.

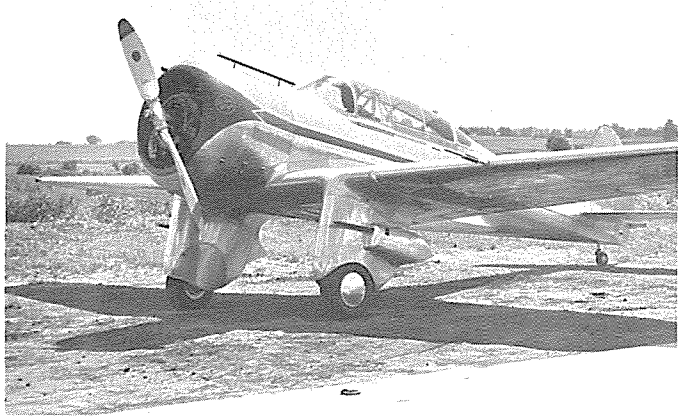
The CW-19 constituted Curtiss-Wright's plunge into all-metal, stressed-skin, cantilever-monoplane aircraft construction, an area pioneered by Jack Northrop and masterminded at Curtiss-Wright/St. Louis by C.W. "Scotty" Scott. In fact, the Northrop approach apparently had a great impact on the CW-19 design. For example, the CW-19 wing structure, aerodynamic features, and landing-gear housings were all clearly inspired by Northrop's *Gamma* series.



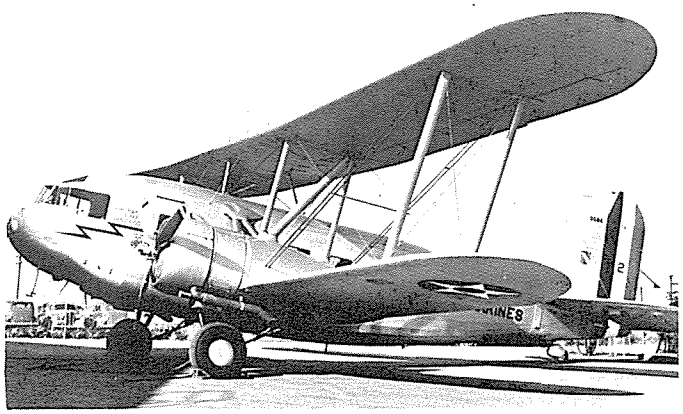
Curtiss-Wright/St. Louis's first all-metal airplane, the sleek, stylish CW-19 *Coupe* of 1935. (Curtiss-Wright Photo)

When the CW-19 appeared late in 1935, it was immediately obvious that Curtiss-Wright had managed a "quantum leap" from its anachronistic *Condor* to the state-of-the-art, all-metal *Coupe.* The new airplane was sleek, attractive, and thoroughly modern. The CW-19 was not without its faults, however. Early flight tests revealed vicious stall characteristics that called for a redesigned wing section. With that problem alleviated, the government accepted the *Coupe,* allowing Curtiss-Wright to install a more powerful engine that eased another of the CW-19's problems: insufficient power.

While the *Coupe,* a hot, sophisticated, rather expensive airplane, did not succeed in the private market, other opportunities were already being pursued. Even as the CW-19 was being designed, Curtiss-Wright engineers realized the development potential inherent in its strong, clean, all-metal structure. For one thing, the newly acquired technology was quickly applied to the CW-20 transport project then under way. More immediately, the CW-19 design seemed readily adaptable to the military training role. Revised with a tandem cockpit layout and a 420-hp engine, a trainer version of the CW-19 appeared early in 1937 (a sport version was also of-



CW-A19R, the armed trainer version of the model 19. Note the .30-cal. machine guns (one in cowling, two in pods on landing gear) and gunsight. (Curtiss-Wright Photo)



Marine R4C-1 *Condor* that was eventually used and abandoned by Byrd during an Antarctic expedition. (USMC Photo)

American Airlines T-32-C *Condor* with long-chord NACA cowlings, at Lambert Field A.A. hangar ca. 1935. (Robert Whelove Photo)

fered). The CW-19 trainer attracted considerable attention, and more than 20 were sold to foreign countries, several of these equipped with armament.

The Substratosphere Transport—As has been noted, the *Condor* airliner was understood from the outset to be a short-term, stopgap project. No sooner had the design and engineering effort on the *Condor* been completed than the Curtiss-Wright engineering staff began work on what would prove to be the St. Louis plant's most significant development. The airplane was to evolve as the CW-20 "Substratosphere Transport," a huge, all-metal, twin-engine airliner that was intended to set a new standard in passenger service. Under the direction of George Page, chief engineer at St. Louis, and with substantial input from "idea men" Scotty Scott and Charlie Hurkamp, design studies began in 1933, developing into a firm design during 1936 (around the time of another company name change, to St. Louis Airplane Division of the Curtiss-Wright Corporation). Detail design and wind-tunnel testing of the CW-20 took place in 1937, along with completion of a full-scale mockup. Construction of the prototype airplane commenced in May 1938.

Many novel features were designed into the new 36-passenger airliner. Foremost of these was cabin pressurization, an untried concept at the time. The CW-20 was designed to minimize frontal area and efficiently use fuselage structure. Curtiss-Wright engineers devised an unusual fuselage cross-section consisting of two eccentric circles meeting in a common chord line. This common line was actually a tension diaphragm that served as the cabin floor. Pressurization was to be sufficient to maintain the cabin at an effective altitude of 6,000 feet while the CW-20 cruised at 20,000 feet.

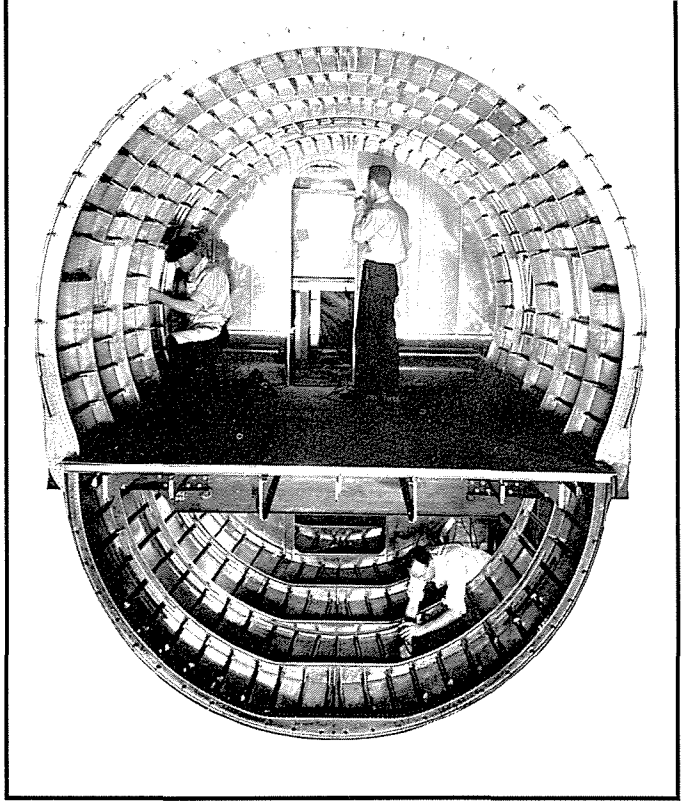
Powered by 1,700-hp Wright *Cyclone* engines, the CW-20 prototype made its first flight from Lambert Field on March 26, 1940, with famed test pilot Eddie Allen at the controls. The largest twin-engine transport in the world evidently dis-

played some stability difficulties, for the original twin tail was soon replaced by a large conventional empennage. Otherwise, the test program was very successful, and Curtiss-Wright proceeded to tool up for production of as many as 50 aircraft.

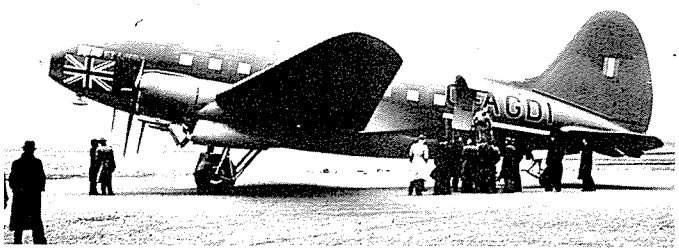
The U.S. Army Air Forces showed immediate interest in the CW-20, and participated in the testing and evaluation of the aircraft. Very much impressed by the CW-20, the Army ordered an initial production batch of 46 aircraft in September 1940, well before testing of the CW-20 prototype had been completed. Additional orders followed within weeks, and soon 200 aircraft were scheduled for production. Designated C-46 (and later named *Commando*) by the USAAF, the production aircraft were to differ from the prototype in several ways: 2,000-hp Pratt & Whitney R-2800 engines were to be fitted, cabin pressurization was to be deleted, and a simpler landing gear was to be installed. In addition, the 26th and subsequent production aircraft were to have strengthened floors and large cargo doors. Buildup to handle these and other production orders increased plant employment to 1,950 by December 1940.

Upon completion of the test program, the CW-20 prototype itself was purchased by the USAAF in May 1941. Because it differed appreciably from the production C-46s, the prototype was given a different military designation: C-55 (s/n 41-21041). The C-55 was subsequently delivered to Great Britain in 1942 for use as a special courier transport. Named *St. Louis* by the British, the C-55 was operated by BOAC under the registration G-AGDI. It regularly flew hazardous runs between Malta, Gibraltar, and elsewhere in the Mediterranean area, and was reportedly used on occasion by Prime Minister Winston Churchill.

Curtiss-Wright and USAAF plans called for the C-46 production to take place in a huge new factory to be built at St.

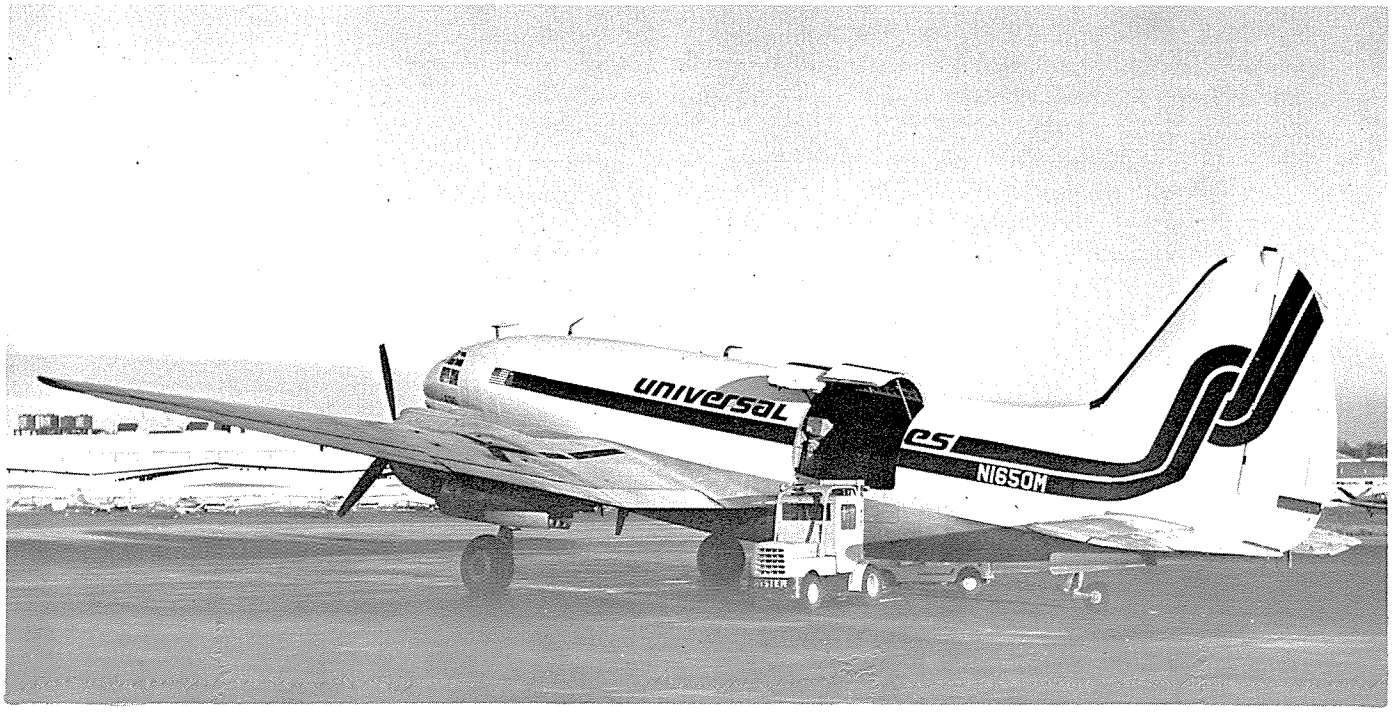


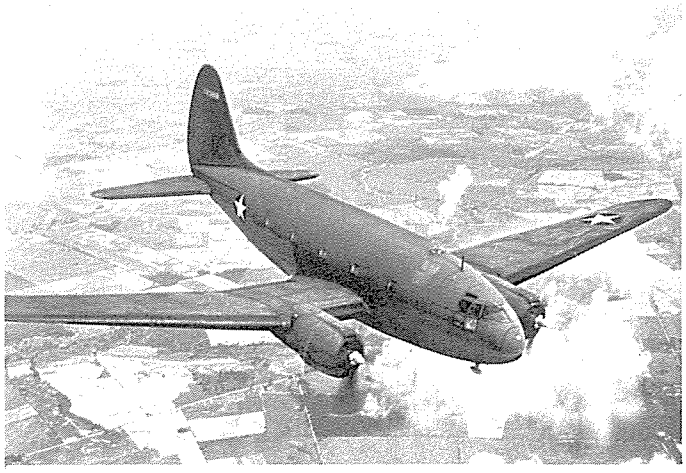
Section of CW-20 prototype fuselage under construction, clearly showing double-lobed fuselage design. (Curtiss-Wright Photo)



In its final form, the CW-20 was dubbed "St. Louis" and operated for the British government by BOAC crews.

C-46F of now-defunct Universal Airlines is typical of freighters that operated into the 1970s. Seen unloading auto parts at Lambert Field, St. Louis, in November 1969. (Author's Photo)





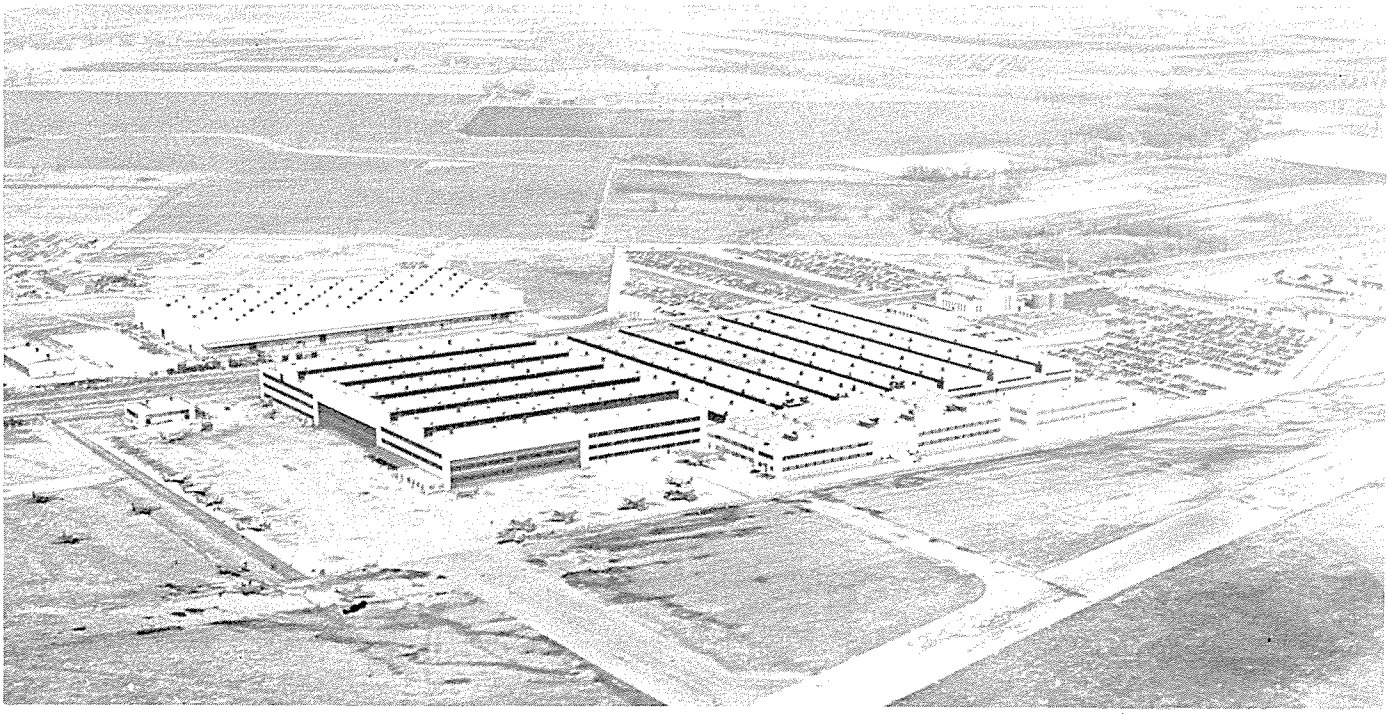
Production version of CW-20 was the C-46 *Commando* transport for the USAAF in WWII (C-46A shown). Plane gained fame for flying "over the Hump" to and from China. (USAF Photo)

Louis as part of Curtiss-Wright's expansion of production capacity in preparation for wartime needs. Curtiss-Wright began negotiating with St. Louis in June, successfully concluding a lease for 60 additional acres at Lambert Field in October. Ground was broken for the federally funded $11-million factory on November 19, 1940. Since the existing Curtiss-Wright plant site was determined to be the only suitable location for the new plant, construction literally surrounded the old buildings, which were vacated and torn down once 50 percent of the new factory had been completed. The new factory, which would provide eight times the floor space of the old plant, was at the time a controversial development, primarily because it encroached on the area of Lambert Field and impeded operations on the airport's longest runway. Major A.B. Lambert himself, the dean of St. Louis aviation boosters, objected to the plant expansion. Other objections involved concern that Curtiss-Wright would abandon the new plant, and St. Louis altogether, upon completion of its huge military production contracts. Curtiss-Wright officials countered with the prospect of large-scale airliner production after the war.

Completion of the plant expansion at St. Louis, expected in the spring of 1941, ended up being delayed many months, for a variety of reasons. Pressed by the USAAF to begin production of the C-46, Curtiss-Wright changed plans and shifted production of the transport to its Buffalo complex. The St. Louis plant contributed to the C-46 effort primarily by producing and shipping wing and tail subassemblies to Buffalo and, later on, to Louisville. Delivery of production C-46s began in May 1942, and built up rapidly in the following months. Contract followed contract after U.S. entry into the war. Toward the end of the war, the C-46 was in heavier production than any other transport. By the war's end, 3,180 *Commando*s had been manufactured. Although this number may appear small compared to the 14,000 or so P-40s manufactured by Curtiss, the C-46 production program generated more business income than any other Curtiss-Wright aircraft.

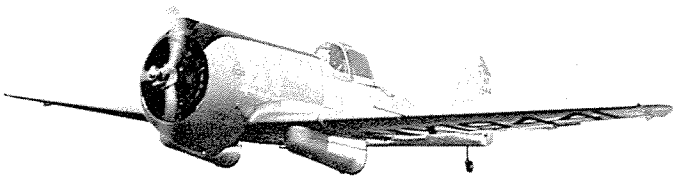
While the C-46s were put to use in all theaters during World War II, they achieved their enduring fame for the remarkable service they performed in flying vital cargo "over the Hump" from India into China. After the Japanese closed the Burma Road in 1942, the only means of providing supplies for the Allied efforts in China was to airlift them over the Himalayan Mountains, and C-46s established a reputation for safety and efficiency in performing this mission. The utility of the C-46 didn't end with the war either. The USAAF (later USAF) continued to operate some C-46s well into the 1960s, and commercial operators were carrying freight in C-46s into the 1970s.

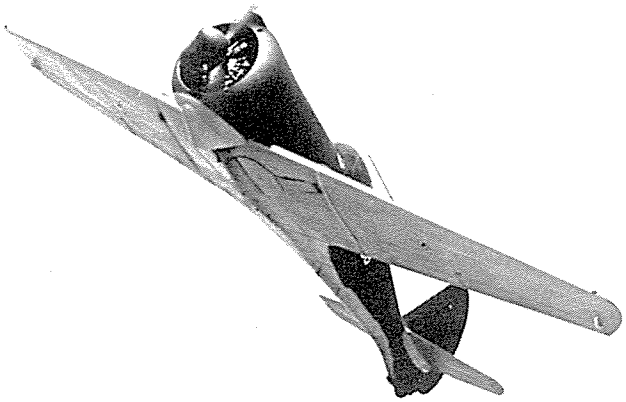
Some C-46s remained in Air Force service through the 1960s. This C-46D operated with USAF Air Commandos in the Canal Zone, ca. 1967. (USAF Photo)

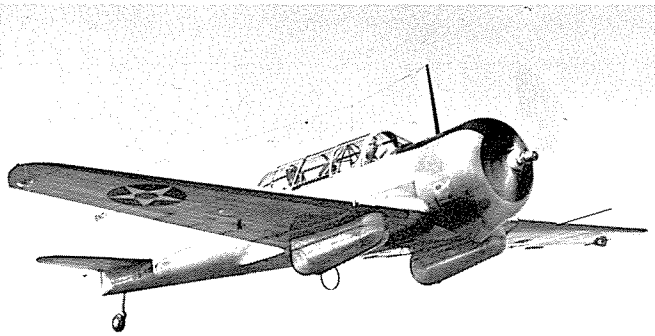


Military Aircraft Production—Increasing tensions and hostilities in the world led many nations to improve and expand their air forces in the late 1930s, and Curtiss-Wright/St. Louis responded by turning its energies toward the development of military aircraft. In 1938, Curtiss-Wright married the basic wing and structure of its CW-19 all-metal sport/training airplane with a 1,000-hp Wright *Cyclone* engine to produce the lightweight, single-seat CW-21 interceptor. Armed with two .50-cal machine guns, the CW-21 possessed a remarkable climb rate of 5,000 feet per minute, fastest of its time. An improved model, the CW-21B with flush-retracting landing gear, was developed in 1939. Unsuccessful in generating U.S. Army or Navy orders, the CW-21 did appeal to hard-pressed foreign governments, and 55 of the planes (some sources say 60) were sold to the Chinese and Dutch (many in "kit" form). Another version of the same basic airplane, the lower-powered, two-seat CW-22, did succeed in stimulating the interest of the U.S. Navy, which ordered it into production in November 1940 as the SNC-1 advanced trainer. Deliveries began in July 1941 and 305 SNC-1s were ultimately built for the Navy. In addition, Curtiss-Wright sold 136 more examples of the CW-22 to various foreign nations.

Greatly expanded manufacturing capacity at St. Louis resulted from the construction in 1940–41 of the new Curtiss-Wright factory at Lambert Field. Delays in completion of the new plant kept it from being used for C-46 production, as





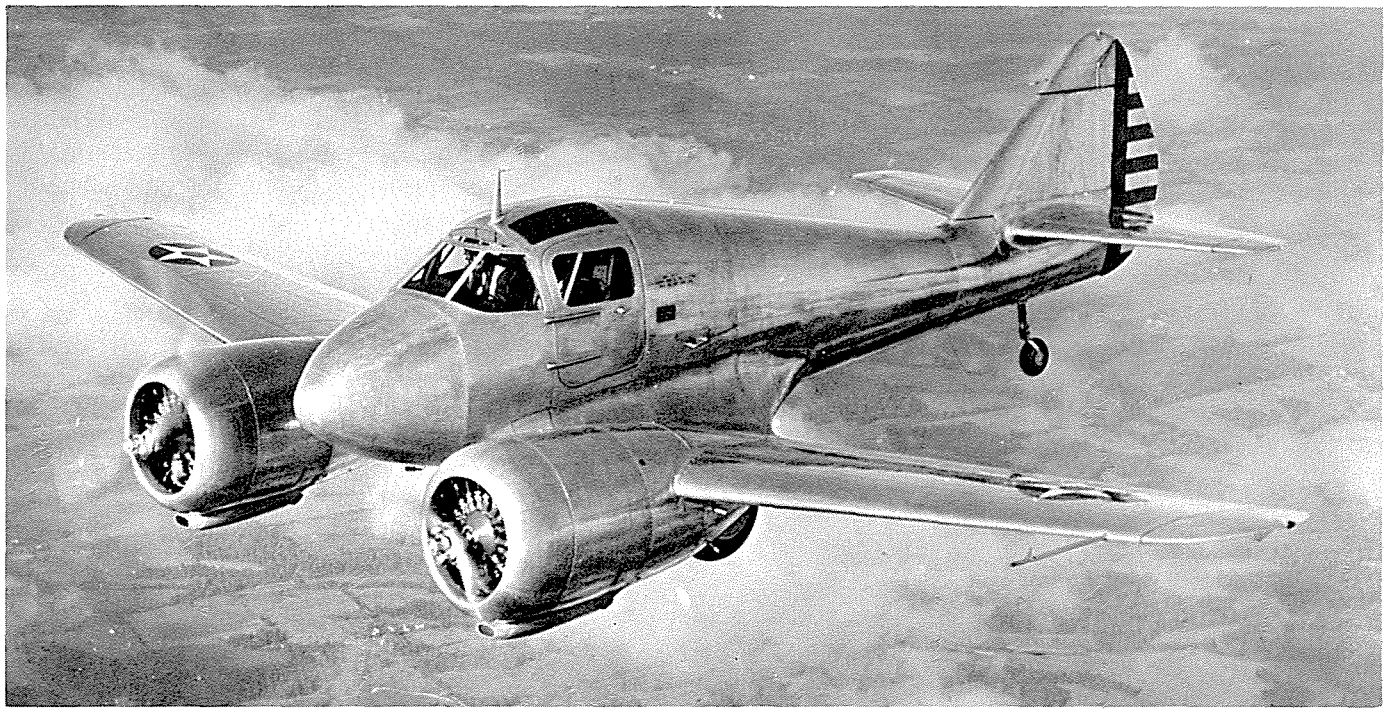


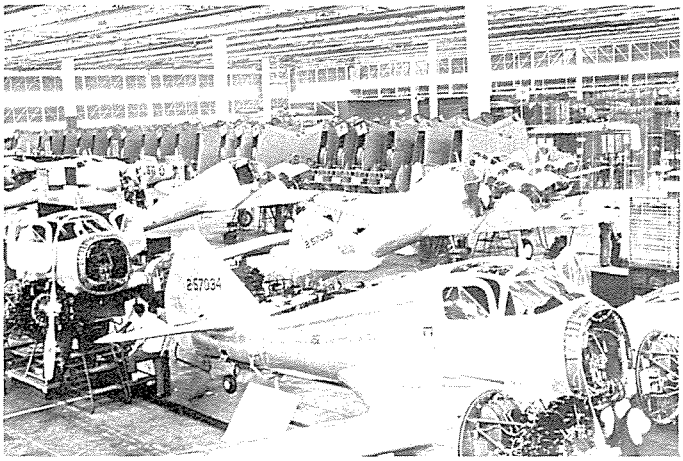
Huge 1.2-million-square-foot Curtiss-Wright/St. Louis factory in November 1943. (Curtiss-Wright Photo)

First production example of the CW-21 *Demon* of 1938. The fast-climbing interceptor was the first fighter built in St. Louis. (Curtiss-Wright Photo)

The retractable-gear CW-21B appeared in 1939, was first shown publicly at November 1940 groundbreaking for new Curtiss-Wright/St. Louis factory. (Curtiss-Wright Photo)

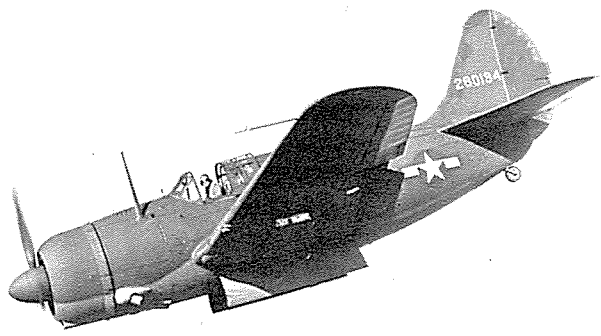
The U.S. Navy ordered more than 300 of these SNC-1 *Falcon* two-seat advanced trainers. (U.S. Navy Photo)

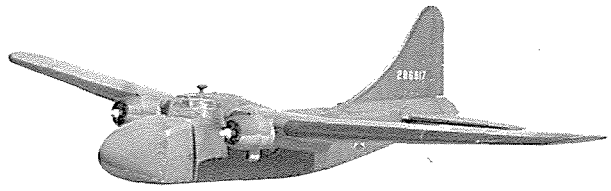




originally planned. Consequently, when the plant was completed late in 1941, other production contracts were assigned to St. Louis. The first of these was, in fact, a St. Louis-generated program. Initiating use of the continuously moving assembly lines at St. Louis was the AT-9 *Jeep,* a sleek, twin-engine, two-seat, pilot-transition trainer developed for the Army. Begun in 1941, the AT-9 production line continued in operation into 1943. The all-metal *Jeep* first flew in July 1941; a total of 791 airplanes was eventually manufactured.

Army interest in dive bombers, stimulated by early German successes, led to Army orders for existing Navy dive-bomber models, the most modern of which was the Curtiss SB2C *Helldiver.* A batch of 100 *Helldivers* for the Army was included in December 1940 Navy production orders. Within months, Army interest had grown to the extent that 3,000 A-25A *Helldivers* were on order. Although the primary production lines for the Navy *Helldivers* were set up in Curtiss-Wright's new plant at Columbus, Ohio, the magnitude of the overall effort led to the establishment of a separate line for the Army *Helldivers* in the under-utilized St. Louis plant. By the time A-25A production deliveries commenced in 1943, the Army's interest in dive bombers had diminished appreciably. In fact, only 900 A-25As were built, and over 400 of these were sent directly to the Marines as SB2C-1As; 10 A-25A *Helldivers* were delivered to Australia. Production of the A-25A, the most numerous Curtiss-Wright/St. Louis aircraft, ended in March 1944. While a few of the Marine SB2C-1As may have seen combat in the Pacific, almost all the St.



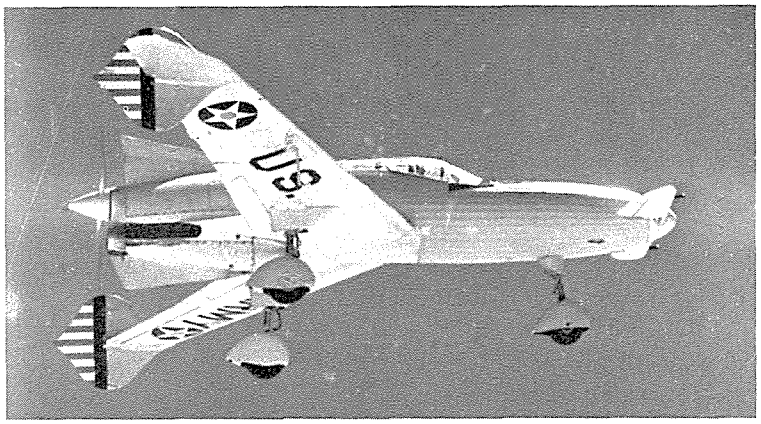


Nearly 800 AT-9 *Jeep* transition trainers were built by Curtiss-Wright/St. Louis for the AAF. (Curtiss-Wright Photo)

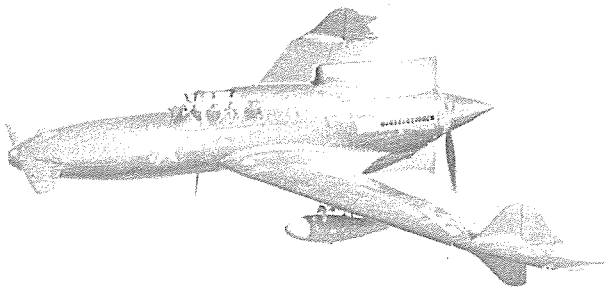
AT-9As in large-scale production at Curtiss-Wright/St. Louis, In background are C-46 outer wing panels. (Curtiss-Wright Photo)

Late production A-25A on a test flight. Only first 10 aircraft retained Navy *Helldiver* features such as leading-edge slats. (Curtiss-Wright Photo)

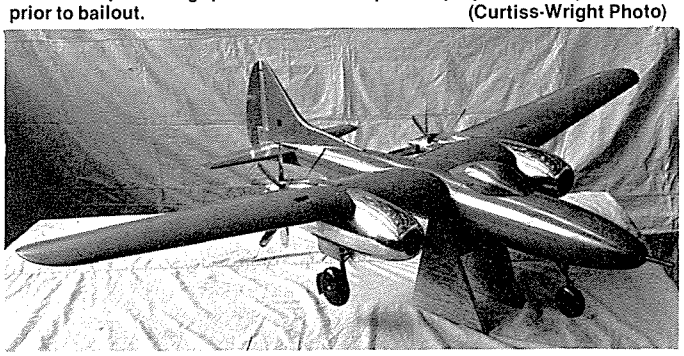
Last of the five St. Louis-built, all-wood C-76 *Caravan* transport prototypes for the Army. (Curtiss-Wright Photo)



Flight view of CW-24B aerodynamic prototype of XP-55 clearly reveals the design's unorthodox layout. Note fixed gear, tube-and-fabric fuselage of the Menasco-powered "flying mockup." (Curtiss-Wright Photo)



Third (and last) XP-55 in flight with rarely seen drop tanks installed. Note extra sweep on wingtips. Allison-driven pusher prop could be jettisoned prior to bailout. (Curtiss-Wright Photo)



Powered wind-tunnel model of huge XP-71 fighter shows R-3350 nacelles, counter-rotating pusher propellers, bubble canopy, and 75mm cannon in nose. (Curtiss-Wright Photo)

Louis *Helldivers* were used in training and utility roles.

Perhaps the most curious wartime project of Curtiss-Wright/St. Louis was the all-wood, twin-engine CW-27, ordered by the Army as the C-76 *Caravan* transport. This ungainly looking aircraft, designed around an 8'x8'x25' cargo space, was required to use DC-3 engines, to be capable of ground-level loading, and to be built of materials other than aluminum. By March 1942 (before the prototype had even been completed), the Army had ordered 200 C-76s, and Curtiss-Wright erected a large, air-conditioned, humidity-controlled factory at Louisville to build them. Only the first five aircraft were to be produced and tested at St. Louis. Another 2,400 aircraft had been ordered by the time the first C-76 flew at Lambert Field on January 5, 1943. They were never to be manufactured, however, as the C-76 quickly displayed serious problems in weight-and-balance, strength, stability, and control. Various solutions to the numerous problems were tried as the prototypes were completed, to the extent that no two of the St. Louis-made C-76s were alike. Although production did begin at Louisville, the C-76's problems (which included a fatal crash due to tail failure), combined with failure of the anticipated aluminum shortage to materialize, led to the cancellation of the entire program in August 1943. An interesting footnote is that the Louisville factory, after producing a batch of C-46s, was occupied late in the war by another St. Louis firm, Laister-Kauffman, to build 1,000 huge CG-10A wooden gliders for the anticipated assault on Japan.

Another very unusual Curtiss-Wright/St. Louis project was the radical CW-24 fighter, a swept-wing, pusher-propeller design begun late in 1939. So enthusiastic were Curtiss-Wright officials about this airplane that they countered the Army's lack of interest by building and testing, at company expense, the CW-24B "flying mockup," which first flew on December 2, 1941. Impressed by the results of this effort, the Army purchased the CW-24B (s/n 42-39347) and ordered three prototypes of the tail-first fighter as the P-55 *Ascender* (s/n 42-78845/7). The first XP-55 made its initial flight at Scott Field, Illinois, on July 13, 1943, and the unorthodox configuration soon proved to have vicious stalling characteristics. Within four months, the first prototype was destroyed after stalling into a stable inverted fall, pancaking onto a farm field. Testing continued with the remaining two prototypes in 1944, but no further orders were received. The tail-first arrangement evidently continued to intrigue Curtiss-Wright engineers, however, for a four-pusher-engine cargo transport version of the configuration reached the wind-tunnel-model stage of evaluation.

One more unorthodox aircraft design was developed during the war at Curtiss-Wright/St. Louis. This was the huge (82-foot span), single-seat, twin-pusher-engine XP-71 fighter (CW-26), initiated early in 1941 in response to an Air Corps requirement for a bomber-destroyer fighter mounting a 75mm cannon. Two prototypes of the XP-71 were ordered by the Army in 1942 (s/n 42-43258/9). The project did not proceed beyond the mockup stage, however, as the protracted development (primarily associated with the critical cannon rangefinder) and waning Army interest led to cancellation of the project in October 1943.

With volume production of several Curtiss-Wright aircraft types tapering off in late 1943, and in the face of increasing orders for C-46 *Commando* transports, the St. Louis plant was finally given the go-ahead for manufacture of the complete C-46. The first St. Louis-assembled C-46A flew on January 6, 1944, and Curtiss-Wright was soon scheduled to produce 550 C-46E versions of the transport. At the same time, with the end of the war in sight, the St. Louis staff again began to think in terms of marketing the C-46 as an airliner. Late in October 1944, a mockup of the proposed commercial CW-20E was unveiled at St. Louis, and it was announced that both Eastern and National Airlines had placed orders for the airplane. This new version of the CW-20 was to retain the same cabin layout and pressurization as the original prototype, but was to have a stepped, DC-3-type windshield (also fitted to the C-46E) and very powerful

Another factory view showing end of A-25A *Helldiver* line in foreground, with C-76 *Caravan* final assembly in background. Just off the line in this January 1943 photo, A-25A, s/n 41-18775, was second one built. (Curtiss-Wright Photo)

Wright R-3350 *Double Cyclone* engines. Production of the CW-20E airliner was expected to begin at Curtiss-Wright/St. Louis by December 1, 1945.

The End—Despite the encouraging prospects for C-46 and CW-20E production at the Lambert Field plant, the end of the European war quickly changed the picture. After a slow period during late 1944 and early 1945 as the factory was reconfigured for C-46 production, the first C-46E was delivered in April 1945. The surrender of Germany on May 8, 1945, again led to anxiety that the Curtiss-Wright/St. Louis plant would be shut down. Fears increased soon thereafter, when the Army included the St. Louis-built C-46E in the massive aircraft production contract cancellations. Only the 17 C-46Es already in final assembly would be completed. On May 29, a local paper indicated that all work at Curtiss-Wright/St. Louis would stop by January 1, 1946, following the planned July 31 closing of the Louisville plant. Two days later, Curtiss-Wright announced its decision to consolidate all aircraft-related activity into its Buffalo plant, and that the St. Louis plant would be closed on July 31. As the last of the St. Louis-built C-46Es were being readied for delivery, the CW-20E mockup was shipped off to Buffalo. Upon delivery of the 17th and last C-46E, Curtiss-Wright vacated the St. Louis plant, turning it over to the Defense Plant Corporation.

Curtiss-Wright's sudden change of plans, and departure from St. Louis, left many employees, civic leaders, and local government officials stunned and angry. However, as so often happens, the ending was but another beginning. It seems that a dynamic Scotsman who had started an aircraft company at St. Louis in 1939 was looking for larger quarters in which to build his new jet fighter aircraft for the Army and Navy. Even as Curtiss-Wright declined, J.S. McDonnell was anxious to grow. But that's another story. ■

BIBLIOGRAPHY

Anon., "Curtiss-Robertson Plant," *Aviation,* October 20, 1928, p. 1258+.
Anon., "The 'St. Louis Robin' and Its Refueling Flight," *Aviation,* August 3, 1929, pp. 269-271.
P.M. Bowers, *Curtiss Aircraft 1907-1947,* Putnam, 1979.
P.M. Bowers, "Demons by the Dozen," *Wings/Airpower,* pp. 36-51.
W.J. Boyne, "Air Jeep," *Wings,* Feb. 1974, pp. 18-29.
W.J. Boyne, "Ascender," *Wings/Airpower,* pp. 6-15+.
W.J. Boyne, "The Basketcase Bummer," *Wings/Airpower,* pp. 60-65.
G. Casius, "The St. Louis Lightweight," *Air Enthusiast 16,* p. 33 et seq.
R. Fausel, *Whatever Happened to Curtiss-Wright,* Sunflower Press, 1990.
W. Gunston, "Prototype Pursuits," *Aeroplane Monthly,* November 1979.
J.P. Juptner, *U.S. Civil Aircraft,* vols. 1-9.
W. Matthews, "Curtiss Condor II," AAHS *Journal,* Spring 1967.
T.P. Wright, "Curtiss-Wright Model 20 Transport," *Aviation,* August 1938.
Curtiss Fly Leaf (Curtiss-Wright Corporation bimonthly), various issues 1940-1945.
The Curtiss-Wright-er (St. Louis plant weekly newspaper), various issues 1940-1945.
Numerous St. Louis newspaper articles in the Curtiss-Wright file at the St. Louis Public Library.

ACKNOWLEDGEMENTS

Rather than identifying my direct source, I have chosen to indicate the original source of each photograph, whenever known. I do wish to acknowledge the invaluable support of Hal Andrews, Gerry Balzer, Jim Harvey, and Dave Ostrowski, who provided the majority of the photographs that constitute the meat of this article.

ABOUT THE AUTHOR

Fred Roos was born, raised, and educated in Michigan, receiving his Ph.D. in Aerospace Engineering from the University of Michigan in 1968. Since then, Fred has conducted experimental research in fluid dynamics at the McDonnell Douglas Research Laboratories, where he is a Senior Scientist. Interested in airplanes and aviation for most of his life, Fred has been quite active as an aviation historian and aircraft photographer. He has taught college-level aviation history courses and has authored a number of historical articles, including several on USAF Tail Codes for the AAHS *Journal.* Since moving to St. Louis, he has developed a strong interest in that area's aviation history. He has researched and lectured on several local subjects, including Curtiss-Wright/St. Louis, the subject of this article, as well as helping to found the St. Louis Aviation Museum project.