

A U.S. Army Signal Corps balloon at the Aeronautics Division Balloon Shed at Fort Myer, Va.

San Diego Air and Space Museum

# Balloonists in the Family Tree

The first chief of the air arm was a pilot—but not an airplane pilot.

By John T. Correll

**T**he U.S. Air Force celebrates its birth date as Aug. 1, 1907, when the Aeronautical Division of the Army Signal Corps was established.

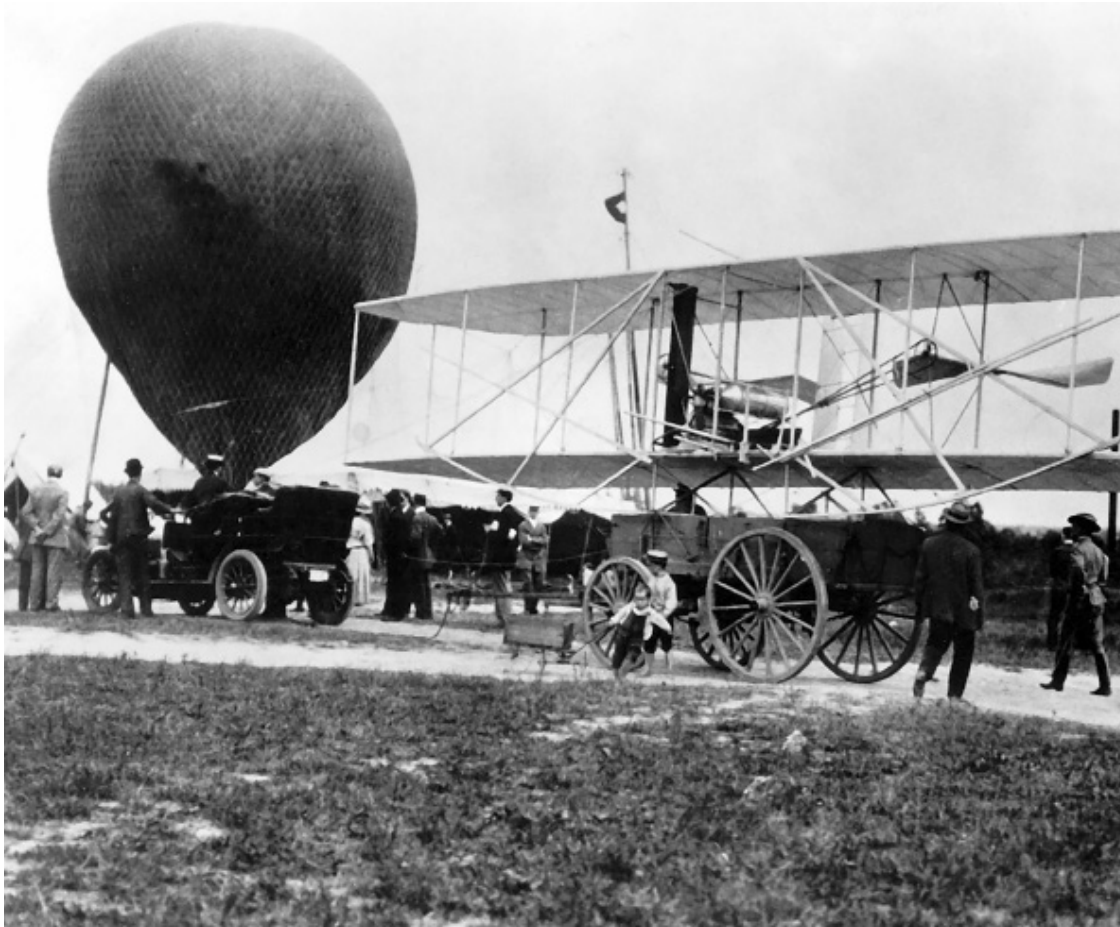
The first chief was Capt. Charles DeForest Chandler, a balloon pilot. There were no airplane pilots in the Army at that point. In fact, the Army did not even have any airplanes yet—and would not get its first one for another two years. Its small air fleet consisted entirely of lighter-than-air balloons.

**The Wrights' "flying machine is not suitable for military purposes."**

—Brig. Gen. James Allen, the Army's chief signal officer in 1907

The Wright brothers had achieved the world's first manned, powered, sustained, and controlled flight in a heavier-than-air machine at Kitty Hawk, N.C., in 1903, but airplanes were new and little understood. Balloons were familiar. They had been around for more than 100 years and had seen military service in the Civil War. The Signal Corps had operated a balloon section since 1892.

The Wright brothers' "flying machine is not suitable for military purposes," said Brig. Gen. James Allen, the Army's chief signal officer in 1907. "An appropriation from Congress with a



The Wright brothers' Flyer arrives at Fort Myer, Va., aboard a wagon, attracting the attention of children and adults.

Department of Defense via National Archives

view of purchasing one or more of these flying machines is not recommended.”

Even those usually thought of as forefathers of the Air Force initially had balloon connections. Capt. Billy Mitchell in 1903 was an assistant instructor at the Signal Corps school at Fort Leavenworth, Kan., where he “lectured on the uses of the balloons and dirigible in reconnaissance and bombardment.”

Lt. Benny Foulois is famously and fondly remembered as “the Air Force’s first pilot.” He qualified in the Wright Flyer in 1910, but before that he was a balloon pilot in 1909. He was also extensively involved in the testing of balloons for the Army.

Nudged along by President Theodore Roosevelt, the Army in 1907 decided to obtain both a dirigible—a steerable, maneuverable airship—and an airplane. The dirigible, “Signal Corps No. 1,” was delivered in August 1908. It was the Army’s first powered aircraft of any type. It moved along on a 30-horsepower engine. Direction was controlled by a rudder in back. The first military airplane, a Wright Flyer, was accepted for service a year later, in August 1909.

Side-by-side comparison with the airplane was devastating for the balloon, and the influence of airship advocates declined. By 1913, the Army’s focus had shifted almost completely to airplanes.

On his second tour as chief of the Aeronautical Division (June 1911-Sept. 1913), Chandler qualified as an airplane pilot at the aviation school at College Park, Md., where he was taught by 2nd Lt. Henry H. “Hap” Arnold, one of the Army’s first flight instructors.

World War I brought a resurgence, of sorts, for balloons. In 1917-1918, Chandler commanded the American Expeditionary Forces balloon section at the front in France. He retired as a colonel in 1920.

Despite their greatly reduced role, airships remained around for a while. Vestiges of the Army balloon corps persisted until 1937.

## FLOAT THROUGH THE AIR

It all began in France, where multiple balloon ascensions took place in the course of a single year, 1783. The first of them got off the ground by inflating the spherical bag with heated air. However, hydrogen—which weighed just one-fourteenth as much as air—was a much superior lifting element, and the French knew how to produce it from the reaction between iron filings and sulfuric acid.

In August 1783, a hydrogen-filled balloon arose from Paris and sailed above the city to descend about 15 miles to the northeast. Among those watching with rapt interest was the American diplomat and scholar Benjamin Franklin.

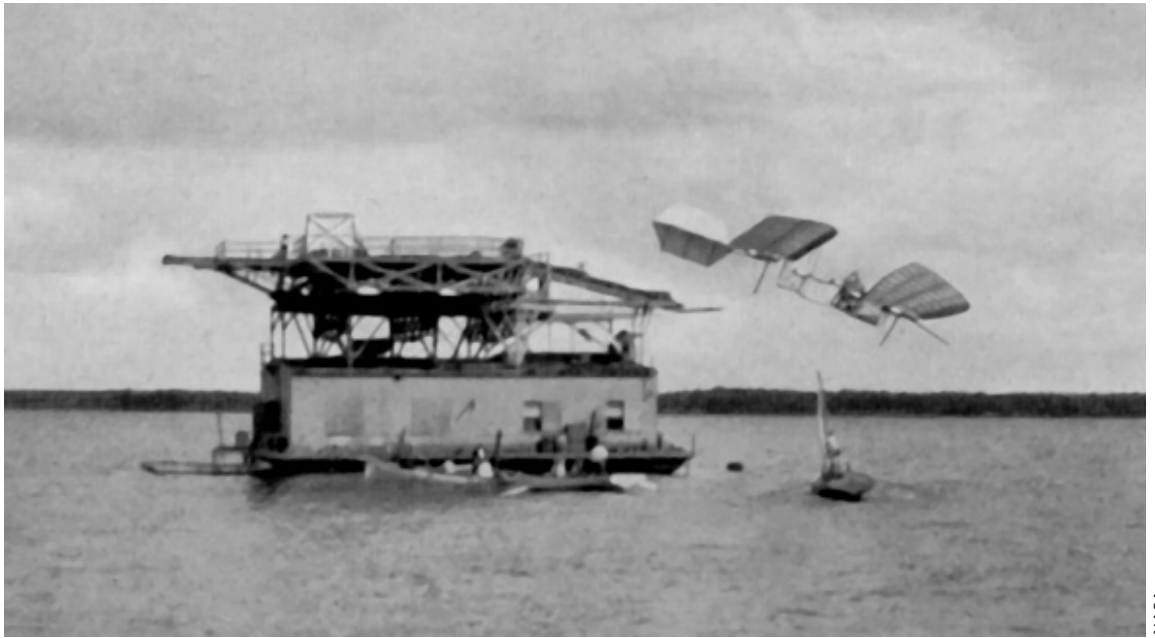
Balloons gained in popularity and attracted a large following in Europe and the United States. Enthusiasts included engineers interested in aeronautics, well-to-do persons who could afford an expensive adventure, and ordinary citizens who enjoyed the spectacle.

Balloon raisings were standard events for fairs and festivals, often with gymnastic stunts and trapeze acts by performers hanging from the basket of the balloon. Even the most serious scientists provided such entertainments as a means of funding their studies.

“Races” could not be decided by speed from point to point. The wind, not the aeronauts, chose the course to be taken, and it was seldom the same for all competitors. The winner was the one that went the greater distance or remained in the air longest.

In the 19th century, gas manufactured from coal emerged

The Langley Aerodrome, piloted by Charles Manly, plunges into the Potomac River immediately after its launch from a catapult mounted on a houseboat on Oct. 7, 1903. A second attempt on Dec. 8 was also unsuccessful.



NASA

as a cheaper, less explosive alternative to hydrogen as a lifting medium. Coal gas—sometimes known as “town gas” because it was commonly available at city mains—was not as buoyant as hydrogen, but it could fill a balloon in two or three hours. Inflation with hydrogen was an all-day job. Coal gas was also slower to leak out.

In 1860, nearly 400 plants in the United States distributed gas as a public utility for the lighting of cities. By 1905, the number had risen to almost a thousand. The gas supply for balloons was abundant.

## BALLOONS FOR THE UNION

The Civil War brought forward a number of balloon operators who offered their services to the Union Army. The first use was for surveillance of the enemy lines at the Battle of Bull Run in July 1861. The balloon was filled with coal gas in Washington and towed, fully inflated, behind a wagon to the battlefield 30 miles west of the city.

Balloons were of some value in observation and direction of artillery fire, but military commanders regarded them as marginal if not irrelevant. Thaddeus C. Lowe, the leading Civil War aeronaut, wanted official status as an Army organization for ballooning, but he did not get it.

Airship activities came, successively, under the jurisdiction of three different branches: the Army Topographic Engineers in 1861, then the Quartermaster in 1862, and finally the Corps of Engineers in 1863. Lowe was paid \$10 a day, slightly more than the rate for a colonel.

Portable generators were available to generate hydrogen in the field with a system of tanks and copper plumbing to make the conversion from iron filings and sulfuric acid. This procedure was sometimes used, but primary reliance was on the regular gas pipelines.

The Confederates had only three balloons, which they deployed for the Peninsular campaign in Virginia in 1862. They had no gas except at Richmond, where the aeronauts inflated the balloon, then hitched it to a railroad engine which ran it down the York River Railroad to the battlefield.

Between 1863 and 1890, there were no military balloon operations in the United States. During the interval, however the British in 1884 developed portable cylinders for the storage and transport of compressed hydrogen. This was a significant

improvement in capability over the traveling generators Lowe had used.

## SIGNAL CORPS

In 1890, Congress gave the Signal Corps the mission of collecting and transmitting information from the Army. Brig. Gen. Adolphus Greely, the chief signal officer, thought that observation balloons would be useful in carrying out that assignment. He requested approval of a balloon “section,” which was established within the Signal Corps in 1892.

“His goal was to convert the balloon into a dependable vehicle for gathering and transmitting battlefield intelligence by combining it with the telegraph to ensure the rapid transmission of information,” said historians Alfred Hurley and William Heimdahl.

One of Greely’s balloons was used with some success at the Battle of San Juan Hill in Cuba during the Spanish-American War, until enemy riflemen riddled it with holes and brought it down.

“As balloons became more popular with the military, the graceful spherical shape that had characterized them through their first century was recognized as a liability,” said Donald Dale Jackson in “The Aeronauts.” “The traditional globular balloon was ideal for free flight, but it could rotate wildly when anchored to the ground; a violent gust could easily flip its lightweight basket parallel to the earth. To solve these problems, the military aeronauts of the late 19th century developed an egg-shaped craft designed to nose diagonally into the wind—in effect, a tethered dirigible without an engine.”

Public opinion toward the airplane was poisoned by the disaster of Samuel Pierpont Langley’s “Great Aerodrome” on Dec. 8, 1903, nine days before the Wright brothers’ flight at Kitty Hawk.

The Aerodrome was an oversized, ill-designed flying machine 52 feet long with a wingspan of 48 feet. It had two huge pusher propellers between the two sets of tandem wings and was said to look like a giant dragonfly. Langley figured to launch it from a houseboat in the Potomac River with help from a catapult, but it promptly crashed and sank.

Unlike the host of promoters and publicity seekers marketing their aeronautical inventions, the Wright brothers avoided public exhibition of the Kitty Hawk Flyer. Their achievement

on the remote Outer Banks of North Carolina went almost unnoticed, as ridicule of the Langley Aerodrome spread to tarnish—by association—all airplane developments.

Brig. Gen. James Allen, no admirer of the Wright brothers, succeeded Greely as chief signal officer in 1906. The Army had accumulated nine balloons, most of them small and operated from a line tethered to the ground. None of them were powered, and could be steered only in a rudimentary fashion. The lifting agent for all was hydrogen.

In 1907, the Army decided to buy three big “war balloons,” twice the size of any airship then in service and large enough to carry bombs. The new balloons would be able to use either hydrogen or coal gas to lift.

## FOREFATHERS

The theory and practice of aeronautics was a marginal effort for the Army. Individuals who were interested explored research and opinion in non-military publications and looked for inspiration to Europe, where the ballooning tradition was stronger.

Two young Signal Corps officers, Lt. Frank P. Lahm and Capt. Charles DeForest Chandler, were becoming well-known in the balloonist community. Their activities led to renewed attention to the Army balloon program.

Lahm made his first balloon flight in France in 1904 while visiting his father, the Paris representative for an American corporation. The elder Lahm had qualified as a balloon pilot in 1902 and was an active promoter of aeronautics.

Lieutenant Lahm gained public notice when he won an international air race in Europe in 1906. The participants took off in free balloons from Paris. A favorable breeze to the north swept Lahm and his copilot across the English Channel. They might have continued on to Scotland, but an east wind sprang up to carry them back seaward, so they made their descent at Fylingdales, England. They had covered 475 miles to win the race. An Italian crew, which traveled 370 miles, finished second.

Chandler studied the British balloon facilities at Farnborough while on leave in London in 1905 and made his first balloon flight in 1906. In the spring of 1907, he was the lead pilot in testing the Army's big new war balloons. In April—taking along carrier pigeons to send back messages—his crew set out from St. Louis, hoping to land in Washington. Instead, the wind pushed them backward. They crossed the Mississippi River three times, drifted for 19 hours, and finally came down in Goloncona, Ill., only 130 miles from St. Louis.

A subsequent flight in June, with Chandler as observer, took off from Washington. The balloon was inflated from the local gas works. The prevailing winds took them north. “Harrisburg [Pa.], was the first place that was recognized after leaving Washington,” Chandler said. “We passed over a city which we later knew to be York, but we could not get our bearings until we were near Harrisburg.” They set down in a farmer’s field.

The three-man Aeronautical Division was created Aug. 1 with Chandler in command, assisted by Cpl. Edward Ward and Pvt. Joseph E. Barrett. Ward was commissioned during WWI and earned his certificate as a balloon pilot in 1921.

Barrett, failing to appreciate the special spot in history that had fallen into his hands, soon deserted. He later joined the Navy, from which he retired honorably



Capt. Charles Chandler in civilian clothes holding balloon instruments prior to free-balloon flight in 1907.

USAF



Charles deForest Chandler made his first balloon flight in 1906.



Maj. Gen. Benjamin Foulois learned to fly the first military planes purchased from the Wright brothers.

Aero. Division, U.S. Signal Corps

USAF

after 20 years of service.

Lahm and Chandler wrote a joint memoir of the early years, “How Our Army Grew Wings,” published in 1941.

## THE BALDWIN DIRIGIBLE

Urged on by Chief Signal Officer Allen, the Army in January 1908 advertised for bids for a dirigible that could sustain an average speed of 20 mph. The contract was awarded on competitive bid in February to balloon exhibitionist Thomas S. Baldwin.

On the basis of a thesis written at the Signal Corps School analyzing the value of dirigibles, Lt. Benjamin D. Foulois was brought to Washington as member of the board to evaluate the Baldwin Dirigible. Lahm was on the board as well.

On its test flight from Fort Myer in August 1908, the Baldwin Dirigible failed to meet the speed specification, achieving an average of 19.61 percent instead. The Army accepted the dirigible as “Signal Corps No. 1” but deducted 15 percent from the bid price because of the speed.

The sausage-shaped dirigible was 93 feet long and lifted by hydrogen. The car for the two-man crew was slung underneath and ran for approximately the length of the balloon. The engine drove a propeller extending from the front of the car. The forward pilot was positioned behind the engine. The rear pilot rode in back to operate the rudder.

In 1909, Baldwin trained three Army pilots, including Foulois and Lahm, to fly the dirigible. It was the biggest and best balloon the Signal Corps ever had, but its day was almost done before it started. The superiority of the airplane over the balloon was increasingly obvious.

Subsequently, Foulois was an observer in tests of the Wright Flyer, and recommended that the Army concentrate its interest in heavier-than-air vehicles. That put him at odds with Allen and the Signal Corps staff.

Signal Corps No. 1 was scrapped in 1912. The Army did not buy another dirigible until after WWI.

## THE WRIGHT STUFF

Upon their return from Kitty Hawk, Wilbur and Orville Wright made modifications to their airplane and flew it at Huffman Prairie near their home in Dayton. An offer on their behalf to the Army Board of Ordnance and Fortification in 1905 was rejected with the insulting comment that the aircraft had “not yet been brought to the stage of practical operation.”

Reviews from abroad were little better. In 1907, with interest finally developing in the Wright Flyer, Major von Gross, head of the dirigible section of the German army, told the *New York Times* that “it was not doubted that the Wrights had flown, but what they effected was not an aeronautic achievement but mere acrobatics.”

“The military uses of a flying machine of any type will be only for purposes of observation or reconnaissance, or as an offensive weapon, to drop explosives on the enemy,” said Chief Signal Officer Allen. “For the purpose of dropping explosives on the enemy, a high-speed airplane is hardly suitable.”

The Wright Flyer made its spectacular public debut in 1908 in Europe and the United States. Wilbur took one of the aircraft to France, where it was under consideration by a syndicate, and Orville prepared another one for U.S. Army evaluation at Fort Myer. Wilbur flew first, on April 8 at Le Mans, France.

As recounted by military analyst Rebecca Grant, “The Flyer leapt into the air and headed straight for a grove of trees. Then with perfect ease, Wilbur executed the first tight, controlled banking turns the world had ever seen. Over the next several days, he continued to amaze France and the world with figure eights and flights at 75 feet and above, far higher than anything ever seen. The ease, control, and consistence of the Wright Flyer put it head and shoulders above any other aircraft.”

Orville’s demonstration flights for the Army at Fort Myer had similar success. On the final test in July 1909—with Benny Foulois as navigator—the Wright Flyer set world records for distance, altitude, and speed. In fact, the speed was calculated at 42.5 mph. That exceeded the specification of 40 mph, earning the Wrights a bonus over the base price.

The Wright Flyer was accepted for service in August 1909, becoming the first U.S. military airplane. Foulois completed his qualification as an aircraft pilot by his own ingenuity and what he could learn through mail correspondence with Orville Wright.

## ON THE WESTERN FRONT

World War I brought a brief reprise of attention for balloons. Thirty-five U.S. Army balloon companies deployed to France with the American Expeditionary Force. Seventeen of them served at the front, making 1,642 tethered combat ascensions for observation. The air arm remained under Signal Corps control until May 1918, when it became the Army Air Service.

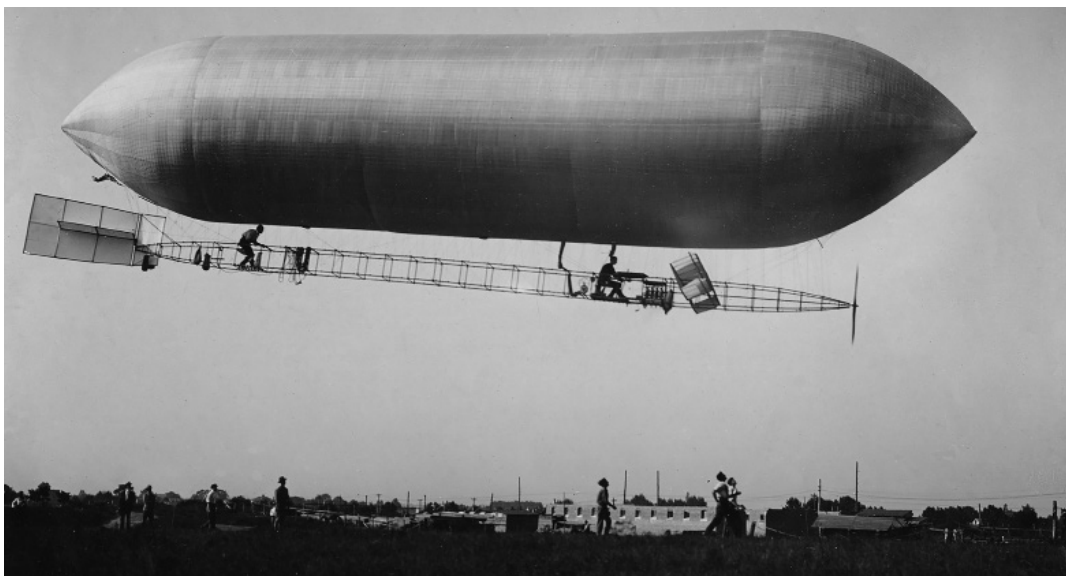
The Germans made greater use of balloons, including the barn-sized Zeppelin. The Zeppelins made 51 long-range bombing raids on Britain, 26 of them targeted against London, but their cost was figured to be about five times that of the damage they inflicted.

In the U.S. scheme of things, balloons were regarded mostly as targets. During two-and-a-half weeks in September 1918, American ace Lt. Frank Luke shot down 14 German balloons and four German airplanes. The balloonists managed to hang on for some time after the war ended, but no mission of any significance could be found for them.

However, there was a final technological advancement to come. In the 1920s, the preference of lifting medium shifted to helium, the second lightest of known elements. Helium had less lifting power than hydrogen, but it was cheaper, had less danger of explosion, and was easy to obtain.

It fell to the old balloon pilot and Chief of the Army Air Corps Maj. Gen. Benny Foulois, to pull the plug. With Congress seeking to reduce funding for military air power in 1935, Foulois recommended that balloon activities be terminated. In 1937, the Army airship program was officially ended. ❖

**John T. Correll** was editor in chief of *Air Force Magazine* for 18 years and is a frequent contributor. His most recent article, “The Air Force Enters the Vietnam War,” appeared in the October issue.



National Archives

The Baldwin Dirigible was the first powered aircraft ordered by the Aeronautical Division. The Signal Corps had long urged the U.S. Army to buy a dirigible, and many European armies had them by the turn of the century. Lts. Frank Lahm, Thomas Selfridge, and Benjamin Foulois were taught to fly it.