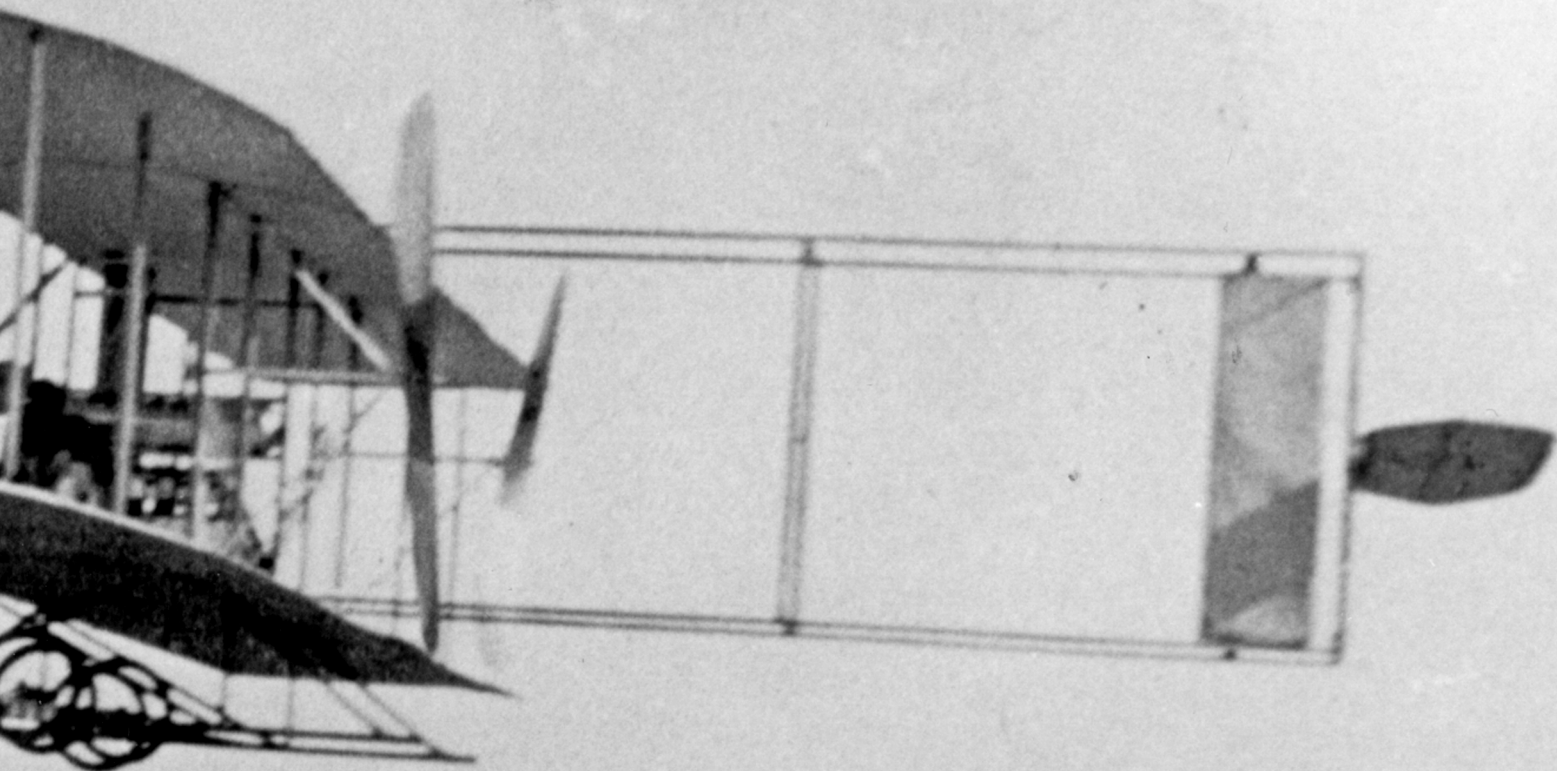


“Kept Alive by the Postman”:  
The Wright Brothers  
and 1st Lt. Benjamin D.  
Foulois at Fort Sam  
Houston in 1910





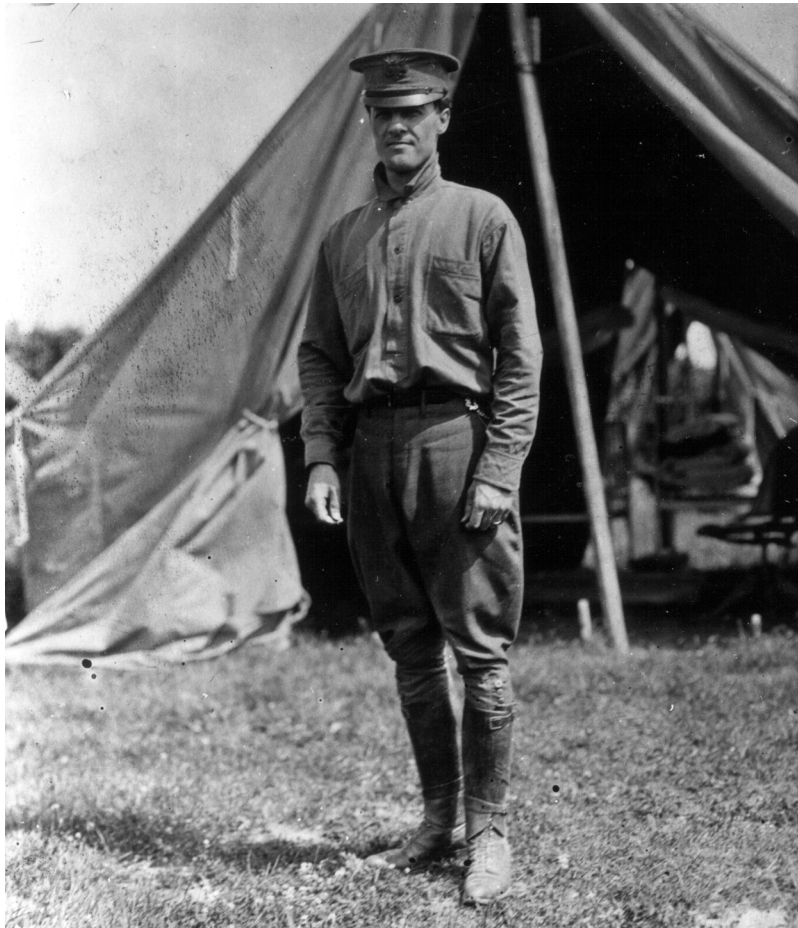
Roger G. Miller

(Overleaf) 1st Lt. Benjamin D. Foulois and Philip Parmalee land the Collier-Wright Model B. (Photo courtesy of Vernon L. Burge Collection, Airman Memorial Museum, Wash., D.C.)

(Below) 2d Lt. Foulois, c. 1906, was a former enlisted man who earned a commission while stationed in the Philippine Islands.

**W**ilbur and Orville Wright were not physically at Fort Sam Houston in 1910, of course. But if the Wrights were absent in body from that venerable army post located on the outskirts of San Antonio, Texas, they were certainly present in spirit as 1st Lt. Benjamin D. Foulois experimented with the U.S. Army's first airplane. And thereby hangs a tale, for Benny Foulois always claimed that he was a "mail-order pilot" who had learned to fly through his correspondence with the Wright brothers. His 1968 autobiography, *From the Wright Brothers to the Astronauts*, suggests a continuous stream of letters between south central Texas and Dayton, Ohio:

*Much of my time at San Antonio's storied Fort Sam Houston that spring was spent writing to Orville Wright, asking him how to execute basic maneuvers, how to avoid basic disasters—in short, how to fly an airplane.<sup>1</sup>.... The advice [I received] on sev-*



*eral occasions probably saved my life and the airplane as well. I profited by their mistakes and incorporated their design improvements on old No. 1. Thus, I was the first, and only, pilot in history to learn to fly by mail. From some of the near misses I had, I guess I was the first person who was literally kept alive by the postman.<sup>2</sup>*

Like most memoirs, however, Foulois's autobiography is not always as reliable as historians would wish, and the question of how much he really learned by letter from the Wrights is thus worth examination. Further, beyond that immediate question, the saga of the U.S. Army's first flyer and his experiences with "Old No. 1" at San Antonio is a dramatic one and makes the episode of special interest in its own right.

It is clear that U.S. Army leaders were never as backward about accepting aviation as many aviation historians have traditionally claimed. Some army leaders, in fact, had maintained a long interest in the military application of lighter-than-air and heavier-than-air craft. Military men at the turn of the last century, however, tended to be practical individuals held to strict accountability for how they spent the public's money. Accordingly, any involvement in flying had to be preceded by evidence that an aerial vehicle really worked and that it had some military utility. In this regard, then, perhaps one of the more important developments in early aviation history was the flight of an unmanned, steam-powered "aerodrome" on May 6, 1896, by a team working for Professor Samuel P. Langley, Secretary of the Smithsonian Institution. His success convinced Langley that the problem of heavier-than-air flight had been solved and suggested to others—including some in the War Department—that, if the problem was not solved, the solution was at least within reach. Thus, when the professor offered to build a full-sized aerodrome on the eve of the Spanish-American War, the War Department welcomed his overture. Beginning in late 1898, the U.S. Army's Board of Ordnance and Fortification made \$50,000 available for the project.<sup>3</sup>

Unfortunately, subsequent events foreshadowed future military experience with the procurement of far-too-many aviation systems. Langley insisted on working in secret, thus, inspection and oversight were inadequate. The professor misspent most of the funds on the design and construction of a 60-foot houseboat, 15-ton turntable, and 85-foot catapult for launching the aerodrome. During construction, the aircraft underwent frequent, time-

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Lt. Foulois and Orville Wright during the airplane tests at Ft. Myer, Virginia, in 1908. Orville wrote Wilbur that he liked Foulois "very much."

## A WAVE OF INTEREST IN AVIATION WAS SWEEPING ACROSS THE UNITED STATES AND EUROPE

consuming, and expensive modifications that delayed completion. And a subcontractor, Stephen M. Balzer, failed to deliver a satisfactory engine on schedule, forcing Langley to place motor development in the hands of his talented assistant, Charles Manley. The result of all of this was predictable: Langley failed to meet the contract delivery date, and what future generations would call "cost overruns" led him to dip into Smithsonian funds to complete the project. The denouement came in late 1903, when the aerodrome, showing no affinity for flight, crashed twice.<sup>4</sup>

Ultimately, not only did the U.S. Army fail to receive practical benefits from its investment, it suffered severe criticism. Alienated by Langley's insistence on secrecy, the press pilloried the professor for his impractical scheme, while congressmen denounced the War Department for wasting public funds. Further, when word spread that the Army had money to spend, an assortment of inventors, visionaries, and crackpots besieged the service, seeking a share of the largesse. Chastened Army leaders backed away from aviation as quickly as they could. All things considered, when two obscure bicycle manufacturers from Dayton, Ohio, rather clumsily approached the War Department in 1905 with a proposal to deliver a flyable airplane, it seems unsurprising that they received little encouragement.<sup>5</sup>

Meanwhile, a wave of interest in aviation was sweeping across the United States and Europe, inspired by the activities of Wilbur and Orville Wright, news of which was disseminated by that ubiquitous aviation enthusiast and experimenter, Octave Chanute. Organized in October 1905, the Aero Club of America advertised aviation developments widely, sponsored prizes, and inspired inventors to greater efforts. Approval of the Wright brothers's patent for their system of control in May 1906 and formal recognition of their success by the Aero Club helped reduce skepticism about their flights. In Europe, the Wrights's work inspired extraordinary activity that led to the first public flight of an airplane by Alberto Santos-Dumont in the fall of 1906. By the end of that year, then, it was apparent to many, including some important U.S. Army officers, that the world was on the threshold of practical heavier-than-air flight.<sup>6</sup>

In early 1907, members of the Aero Club interested President Theodore Roosevelt in the work of the Wright brothers. Ordered to investigate, Secretary of War William Howard Taft passed the responsibility to the Board of Ordnance and Fortification for action. Correspondence with the brothers opened in May 1907, and negotiations followed. In November, Wilbur met with Brig. Gens. William Crozier of the Ordnance Department and James Allen of the Signal Corps, and on December 5, he appeared before the Board of Ordnance and Fortification. The result was Specification No. 486, setting requirements for a military aircraft and requesting proposals. The Army accepted the Wright's bid, and trials began at Fort Myer, Virginia, in late 1908. A crash on September 17 seriously injured Orville, killed his passenger, Lt. Thomas E. Selfridge, and put a halt to the tests. Despite that setback, however, by late 1909 the brothers had met the contract requirements and were ready to train two army officers as "operators"—they were not yet called "pilots."<sup>7</sup>

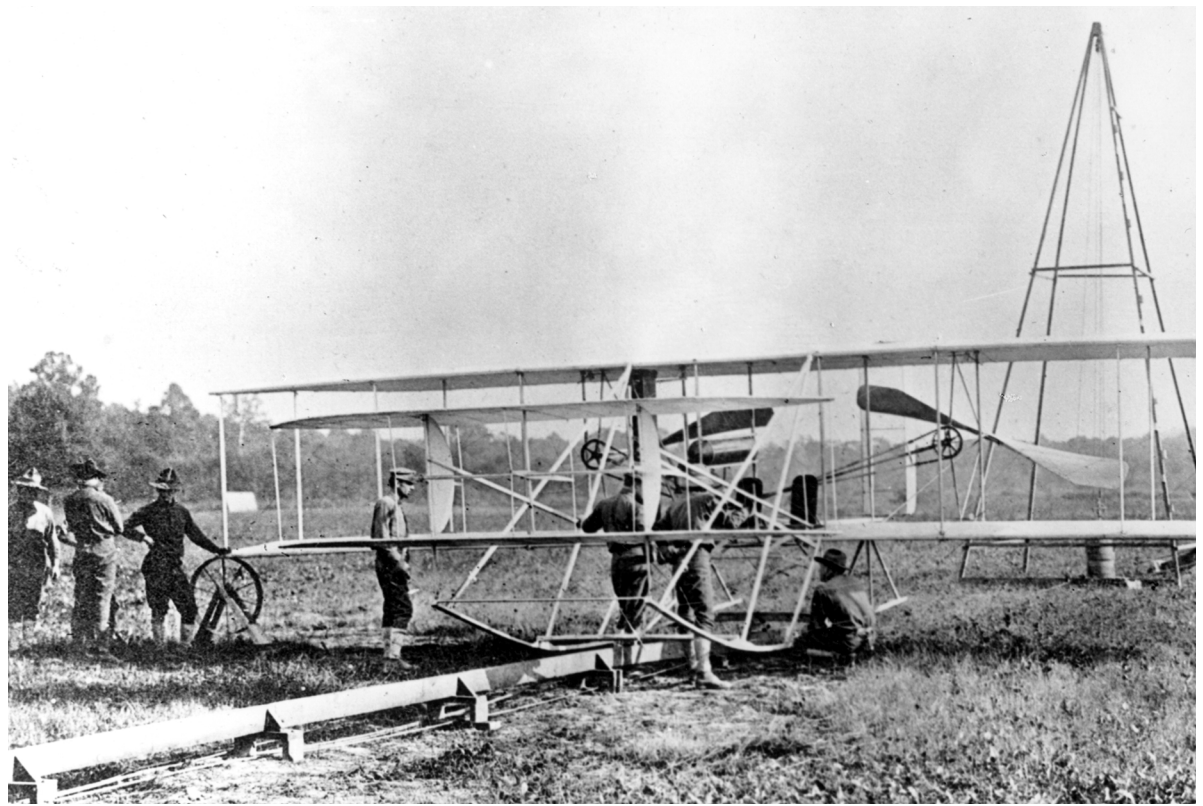
The U.S. Army selected Lts. Foulois and Frank D. Lahm to receive instruction, but then sent Foulois to Europe to attend the International Congress of Aeronautics, replacing him with 2d Lt. Frederic E. Humphreys. Instruction began at College Park, Maryland, on October 8, 1909, and both officers had soloed by the end of the month. In the meantime, Foulois returned from France and began training, but Humphreys and Lahm, flying together, crashed on November 5. The accident necessitated major repairs to the aircraft—which required a new cylinder, piston, magneto, and lower wing—and ended Army flying for the year.<sup>8</sup>

In the meantime, Army leaders recognized that the winter weather at College Park was unsuitable for flying and ordered the airplane and its aviation detachment to Fort Sam Houston, where better conditions could be found. However, the U.S. Army—which up to this point had acted in a generally commendable manner—now attempted to "shoot itself in the foot." Orders returned Lahm and Humphreys to their respective branches of the service and placed the Army's only airplane—now

Signal Corps No. 1 in its original configuration as purchased from the Wright brothers. This photograph was taken at College Park, Maryland, in October 1909.

**FOULOIS WAS A TOUGH, HARD-NOSED, PRACTICAL-MINDED, FORMER ENLISTED MAN**

**FOULOIS PESTERED ORVILLE WITH SO MANY QUESTIONS THAT WRIGHT FINALLY PUT THE LIEUTENANT TO WORK ON THE AIRPLANE**



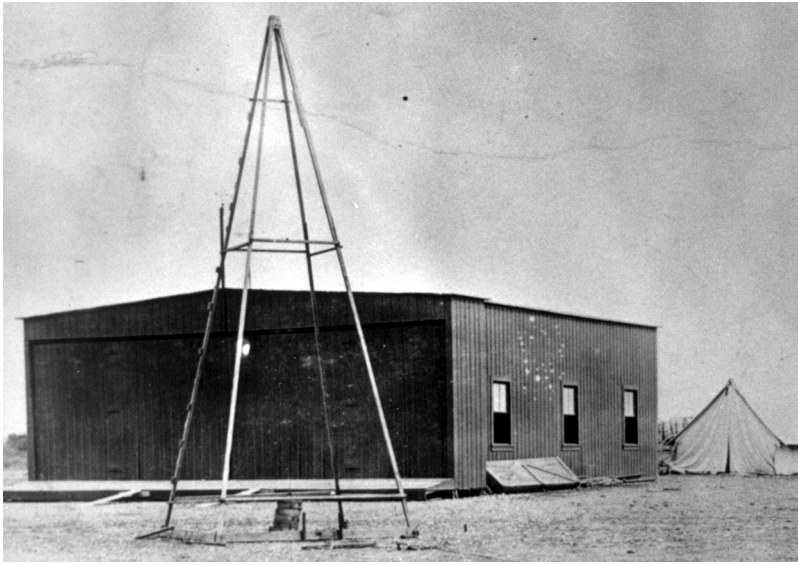
designated Signal Corps (S.C.) No. 1—in the hands of its least experienced operator. Benny Foulois had about fifty-four minutes of instruction from Wilbur and two hours as a passenger with Humphreys, but had yet to solo.<sup>9</sup> Surprisingly, this thoughtless decision failed to derail the Army's aviation program, primarily because of the background, talent, and character of the officer now in charge of S.C. No. 1.

Benjamin Delahauf Foulois was a tough, hard-nosed, practical-minded, former enlisted man whose ability to work with his hands and interest in technical subjects led him first into the Signal Corps and then into aviation. Son of an immigrant who became a successful Connecticut plumber, Foulois had apprenticed with his father until the adventure called. He enlisted during the Spanish-American War, made the Army a career, and earned a field promotion to lieutenant while in the Philippines. He became interested in aviation in 1907, while studying at the Signal Corps school at Fort Leavenworth, Kansas, where he wrote his thesis on "The Tactical and Strategical Value of Dirigible Balloons and Aerodynamical Flying Machines." Appointed a member of the aeronautical board that conducted the lighter-than-air and heavier-than-air trials at Fort Myer in 1908, Foulois was one of three officers taught to fly the Army's first dirigible. But the Wright aircraft attracted him like a magnet. Foulois pestered Orville with so many questions that Wright finally put the lieutenant to work on the airplane.<sup>10</sup> Orville was impressed with the officer "whom I like very much," he wrote Wilbur. "He is a little fellow, only weighing 130 lbs."<sup>11</sup> A reporter of the time noted Foulois's wide military experience, describ-

ing him as "an all-around man [who] can ride, blow up a redoubt, pass a brigade over a river on pontoons, swim, charge at the head of an infantry company, and is now learning to fly at from forty to fifty miles an hour."<sup>12</sup> And still another newsman assured readers that Foulois "has a cool, clear gray eye, is quick and active and his reputation is for coolness and daring under all circumstances."<sup>13</sup> Beyond the hyperbole, Benny Foulois was a mechanically adept officer who combined courage, energy, and initiative with formidable ambition. He eventually became commander of the U.S. Army Air Corps in 1931 as a major general.<sup>14</sup>

Foulois first took S.C. No. 1 to Chicago, where it was the featured attraction at the fifth annual Electrical Show from January 15 to 29, 1910. The lieutenant and his men hung the aircraft from the ceiling of the coliseum, rigged it with a radio so that messages could be exchanged with a station on the ground, and added an electric motor to turn the propellers. It was the hit of the show.<sup>15</sup> Foulois wrote his first letter to the Wright brothers—addressed to "My Dear Friends"—while in Chicago. The machine was scheduled to be sent to San Antonio on January 31, he told the brothers, "where I hope we will be left alone long enough for me to learn how to properly handle it."<sup>16</sup> And Foulois added that he had been summoned to testify in the Wright's court case against French flyer Louis Paulhan: "As regards all of your suits against infringement," he assured them, "I am thoroughly prejudiced in your favor, and will be glad to do what I can, legitimately, to assist you in defending your rights."<sup>17</sup>

S.C. No. 1 and part of the Army's aviation detachment reached San Antonio on February 3,



The shed or "hangar" and the launching derrick for Signal Corps No. 1 at Fort Sam Houston, Texas.

**HE BEGAN HIS SOLO FLYING CAREER IN SPECTACULAR FASHION WITH FOUR FLIGHTS, SPENDING TWENTY-ONE MINUTES IN THE AIR DURING THE LONGEST**

**"WE WERE ASTONISHED TO SEE YOU DO SO WELL WITHOUT ANY PREVIOUS EXPERIENCE IN FLYING ALONE ESPECIALLY WITHOUT EXPERIENCE IN LANDING"**

1910. Foulois arrived two days later, followed by the remainder of the men on the 10th. The detachment included Sgts. Stephen J. Idzorek and Herbert Marcus; Cpls. Vernon Burge and Glen R. Madole; Pvts. William C. Abolin, R. W. Brown, and Felix Cooke; and a civilian mechanic, Oliver G. Simmons. Foulois selected a site for the aircraft shed on February 5, and a local construction company completed the structure on February 23. Over the next three days, Foulois and his men assembled the aircraft, moved it into the hangar, and set up the launching tower and track. Signal Corps No. 1 had not been overhauled since its acceptance by the government, Foulois reported to Chief Signal Officer General Allen on March 1. The machine needed considerable repairs, and he appended to his report a requisition for parts to be purchased from the Wrights.<sup>18</sup>

But Foulois did not wait for a reply. On March 2, he began his solo flying career in spectacular fashion with four flights, spending twenty-one minutes in the air during the longest. He damaged the aircraft on the last flight, however, and did not return to the air until March 12, when he made five flights, one of which lasted over forty minutes. Two days later, he followed with a single flight twenty-two minutes and twenty-five seconds long.<sup>19</sup>

On the next day, March 15, Foulois reported to the Wright brothers. "If you have been reading the newspaper articles about my work here in Texas," the lieutenant began modestly, "you have probably arrived at the conclusion that I am not a very apt pupil, but perhaps your experience with inaccurate newspaper articles has been sufficiently great to allow some room for doubt in what you read."<sup>20</sup> His letter went on to detail the accident that had ended the last flight on March 2 and the repairs required. Foulois acknowledged that he had introduced too much "up" in the "horizontal rudder" and landed on the back of the skids. It was a soft landing, he recounted, but he had broken two wooden uprights next to the engine, the front and rear strainers on the lower center plane, and the sup-

ports underneath the engine. An inspection revealed that when the aircraft hit, the solder joints on the wires bracing the center section had failed under the sudden stress, allowing the structure to break. By March 10, Foulois and his crew had replaced the broken parts and rewired the center section, making certain that the solder joints were solid. In addition to this incident, Foulois also reported a continuous problem with the short chain that connected the engine and right-hand propeller. Six rollers were missing and a seventh had broken during the flight on March 14.<sup>21</sup> Despite the accident and the concern over the power chain, however, the lieutenant's letter exuded confidence: "I hope that this will clear up any apprehension on your part as to my work with the machine, as I do not want you to think that all of your valuable time was wasted in teaching me how to handle the machine."<sup>22</sup>

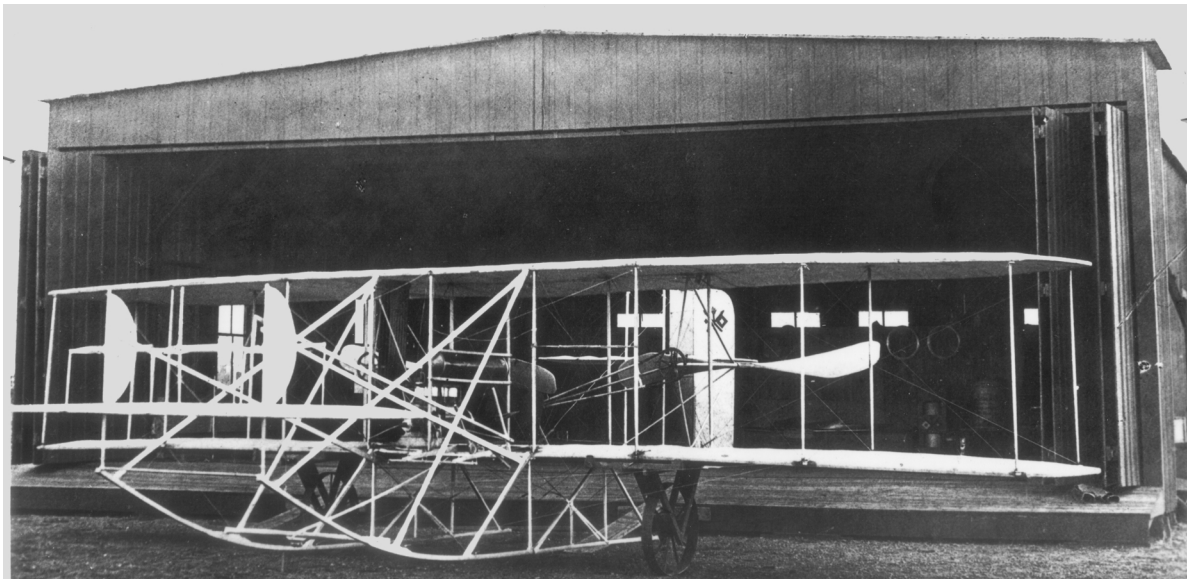
The Wrights answered on March 24. "Accept our congratulations on your successful flights," the letter began. "We were astonished to see you do so well without any previous experience in flying alone especially without experience in landing."<sup>23</sup> The brothers went on to outline some basic instructions on setting the aircraft down. If the engine quits when high in the air, Foulois must point the machine downward: The words "*Do it Immediately!*" are underlined in the letter. Velocity was the key to control. They cautioned Foulois to maintain plenty of speed until within one foot of the ground. As Foulois neared the ground, the brothers explained, he should fly parallel to it, allowing the decreasing forward movement to settle the aircraft gently. The lieutenant must make certain that the aircraft moved over the ground in line with the skids, keep the wings level, and not allow it to rise as the aircraft will want to do. "With a little practice," the letter summarized, "you will get on to the trick of skimming across the last forty or fifty feet before touching and then the landings will be very easy."<sup>24</sup>

The Wrights also provided technical advice concerning the chain, which, they admonished, must not be allowed to become tight at any point. The broken rollers were such a serious concern that the writer even abandoned the plural personal pronouns that characterized their letters and resorted to the first person singular: "I am rather surprised at the number of broken rollers you report."<sup>25</sup> These, the writer admonished, must be replaced immediately and the chain should never be used with broken rollers located adjacent to each other. The Wright brothers ended by encouraging further correspondence:

*It will please us very much to receive information regarding any troubles you may have with either the construction or the operation of the machine you have. We may sometime be able to furnish information which will save you time and trouble. In any event we are always pleased to hear from you and hope you will [have] the best of success.<sup>26</sup>*

Signal Corps No. 1 in front of its hangar at Fort Sam Houston in 1910. The first modifications have already been made. The top elevator in the front has been removed and the fixed stabilizer added to the rear in front of the rudder.

## THE U.S. ARMY RECOGNIZED THE AIRCRAFT'S PRIMARY DEFICIENCY AS A PRACTICAL MILITARY MACHINE



High winds grounded S.C. No. 1 over the next few days. During that period, Foulois discovered that a loose connection in the oil pipe was preventing proper lubrication of the engine cylinders. Taking advantage of the poor flying conditions, he and his crew removed the motor and gave it a thorough overhaul. On April 14, Foulois again flew over the lower post and accomplished several figure eights. Gusting winds, however, scrubbed two attempts to take a passenger up.<sup>27</sup>

On April 16, Foulois reported to the Wright brothers that he had experienced his first major trouble on the previous day. While in flight, he had heard a “sharp report” different from normal engine detonations. He immediately cut the engine and landed. The mechanics found that the exhaust valve on the No. 4 cylinder had separated from the stem, punching a hole in the piston head and cracking the cylinder. He was shipping the valve and stem to Dayton, he wrote, and also would send the piston and cylinder if the Wrights wanted to examine them.<sup>28</sup>

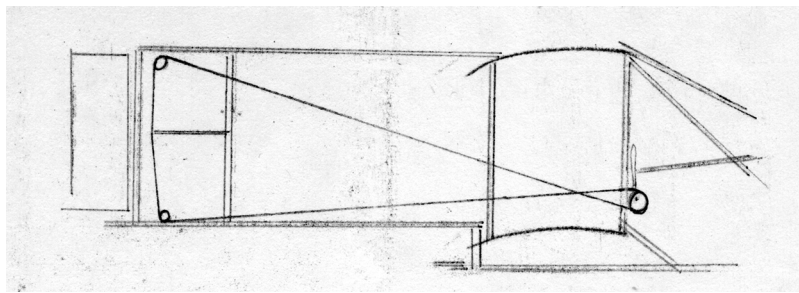
The body of the April 16 letter, however, addressed another topic. The U.S. Army had barely accepted S.C. No. 1, when it recognized the aircraft's primary deficiency as a practical military machine: the airplane lacked wheels. On December 11, 1909, the Chief Signal Officer, General Allen, had written the Wrights that “wheels for starting in addition to the skids for landing will increase efficiency...” and asked that the brothers submit a proposal for these improvements.<sup>29</sup> The Wrights responded that their new 1910 machines would have any combination of wheels and skids that the customer desired and that they would be happy to retrofit the government aircraft. The army seems to have done nothing more about the matter for the time being, but during the rainy, gusty weather that grounded S.C. No. 1 for much of early April, Foulois and Oliver Simmons, the civilian mechanic, drew blueprints for a landing gear. The design called for a tricycle gear consisting of one pair of 18-inch diameter wheels

mounted on each skid with clamps under the wing at the point the aircraft balanced, and a single, 14-inch diameter wheel attached to the center of the crossbar near the front of the aircraft. Foulois asked the Wrights to comment on the design. No reply to this letter appears in either the Wright or Foulois Papers.<sup>30</sup>

Replacement parts for the engine finally reached San Antonio on April 23, and on April 26 Foulois returned to the air with two short flights. During the last of three flights on the following day, April 27, he took one of the detachment's enlisted men up as a passenger. The one-minute flight, however, ended with a rough landing and damage to the skids that took two days to repair. On May 5, Foulois and his men began building a new rear “horizontal plane” for experimental work, installing the new surface on S.C. No. 1 on May 11. On the following day, Foulois accomplished a three-minute-forty-five-second flight made with both front horizontal rudders in their original positions and the new curved plane in the rear. Foulois reported that the machine in its new configuration appeared to be faster, but the continuous misfiring of the engine hampered his tests. The mechanics found that cylinders No. 2 and No. 3 were cracked from the spark plug to the exhaust valve and that No. 3 also had a crack in the water jacket. Replacement parts from the Wright factory soon arrived, and the men had completed repairs by May 23.<sup>31</sup>

Two days later, Foulois wrote the Wrights about a serious anomaly that he had not experienced previously. During his most recent flights, the machine refused to generate as much lift as it had at College Park. It failed to climb properly, and when flying low, the “machine has a tendency to sink to [the] ground.”<sup>32</sup> Foulois had to manipulate the front control excessively to maintain altitude. The engine was still putting out the same power as before, he reported, but he was getting the same performance with one operator at Fort Sam Houston as had been attained with an operator

## FOULOIS AND OLIVER SIMMONS, THE CIVILIAN MECHANIC, DREW BLUEPRINTS FOR A LANDING GEAR



Sketch sent by the Wright brothers to Foulois of a modified control system for Signal Corps No. 1 allowing the rear-mounted stabilizer to become an elevator moved in conjunction with the front elevator.

**THE WAR DEPARTMENT REMINDED FOULOIS THAT HE WAS A SIGNAL CORPS OFFICER ON DETACHED DUTY "AND THAT FLYING AN EXPERIMENTAL MACHINE— SINCE IT COULD NOT BE FLOWN VERY OFTEN—WAS 'IN ADDITION TO YOUR OTHER DUTIES.' "**

and a passenger at College Park. During the April 27 flight mentioned above, he and the smallest enlisted man in the detachment—their combined weight was just 260 pounds—could barely stay in the air. It was a constant fight to keep the aircraft flying in a straight line, Foulois complained, and when they tried a long, gentle turn, the aircraft slipped off sideways and hit the ground, damaging the skids and propellers. Further, this problem affected other airplanes as well. In late April, Wright rival Glenn Curtiss and pilots Charles K. Hamilton and Charles Willard arrived in San Antonio with two eight-cylinder machines that Foulois estimated produced 60 h.p. and one four-cylinder machine of 40 h.p. The more powerful aircraft performed satisfactorily, Foulois observed, but the four-cylinder machine was unable to make a circular flight.<sup>33</sup> Foulois concluded that the difference in density, pressure, and humidity of the air in the atmosphere at San Antonio accounted for the problems with performance, and he grumbled at length about local conditions:

*Since I started to work here March 1, there have been but twenty good flying days in three months! And I have made some flights in winds up to 14 miles per hour. This month has been very bad, having but 2 good days since May 1. From data obtained from the weather bureau at San Antonio, it appears that they have strong winds almost the entire year, particularly through the spring and summer months. The air is always hot and dry, and the temperature gets up to 107 F. in the summer, so you can see that this is not much of a country for flying machine[s] at the present stage of the art.<sup>34</sup>*

The Wrights responded, and it is clear that the brother who wrote was puzzled by Foulois's report. The Wrights had flown at higher altitudes than San Antonio and in higher temperatures, he told the lieutenant, and had little difficulty with lift. However, there was a condition under which the "air is full of upward trends and down trends." Perhaps, he suggested, Foulois may be getting into down trends, and if so, keeping the nose of the aircraft up to compensate would have the effect of causing the machine to sink faster. Perhaps the solution was mechanical. He suggested that "the 'horizontal plane' may have too much negative angle" and recommended that Foulois lower its rear edge about one inch. Additionally, he explained that he and his brother were now operating the front and rear "horizontal rudders" of

their aircraft together and appended a sketch showing how Foulois could modify his control system. It should be noted that even before this advice arrived, Foulois was still able to coax satisfactory performance out of S.C. No. 1. On May 30, he attained a maximum speed of 45.38 m.p.h. over a quarter-mile course.<sup>35</sup>

Then, in the middle of these adventures, the War Department reminded Lieutenant Foulois that he was a Signal Corps officer on detached duty "and that flying an experimental machine—since it could not be flown very often—was 'in addition to your other duties.'"<sup>36</sup> Consequently, on June 15, Foulois led his detachment to the Army training area near Leon Springs, west of San Antonio, where they spent the next month installing an "electric buzzer annunciator system" at the target range "so that the range personnel would not have to use semaphore flags to signal scores back and forth."<sup>37</sup> He left Simmons and Madole behind to manufacture the landing gear for S.C. No. 1. On July 16, after a month of digging ditches and stringing wire, Foulois and his men returned to Fort Sam Houston, and four days later he resumed his aviation activities, accomplishing three successful flights, the longest one of three minutes and fifty seconds. Foulois and his men spent the next two weeks modifying the skids and frames and installing the wheels. These were ground tested by August 9, and by the 16th, the detachment had mounted new propellers that they had constructed. The first flight with wheels took place on August 18, the aircraft taking off in 111 feet and landing in 125 feet. The steel springs proved too weak to support the weight of the aircraft during landing, however, so the mechanics mounted stronger ones, and on August 22, Foulois made two successful flights.<sup>38</sup> He was immensely pleased with the new landing gear: "In both flights the starting and landing was accomplished without the slightest difficulty," he recorded in S.C. No. 1's logbook.<sup>39</sup> And he reported to General Allen that:

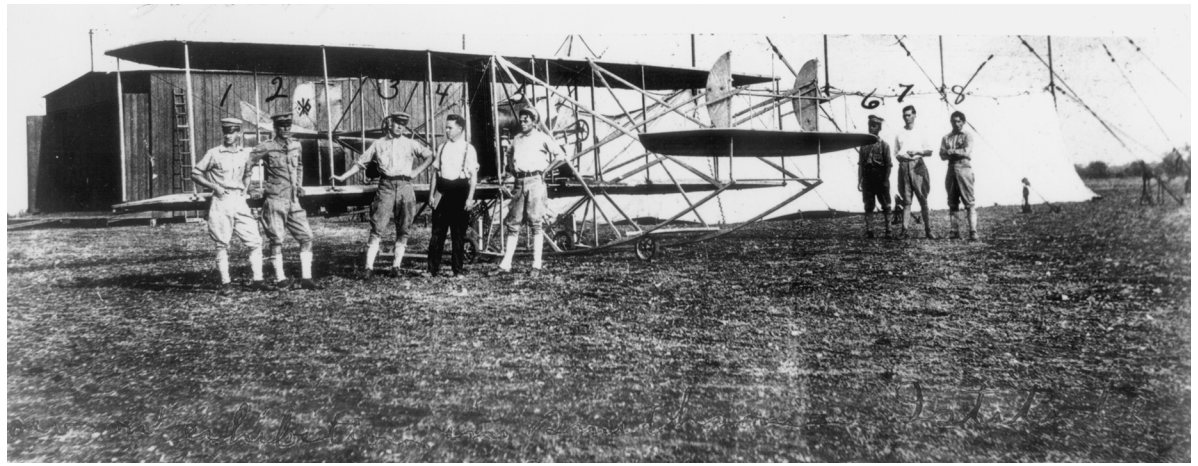
*The addition of wheels to the machine not only does away with the use of the monorail, tower, and weights, but also means a larger saving in the wear and tear on the skids incident to rough landings. Since the wheels have been in use, I have made landings in the roughe [sic] parts of the field without doing the slightest damage to the machine.<sup>40</sup>*

Foulois and his crew were not much behind the Wright brothers, who had made their first experimental flights with a wheeled machine on July 21.<sup>41</sup>

Despite his successes, however, the problem with lift that Foulois had reported in May continued to plague S.C. No. 1. On August 25, he made three aborted flights of thirty seconds each. Two days later, the thoroughly frustrated lieutenant complained that the atmosphere made it difficult to make the aircraft climb. The absence of lift was significant, and in the air the aircraft flew with a



Signal Corps No. 1 at Fort Sam Houston in the late summer of 1910. The tricycle landing gear designed by Foulois and his crew is just visible.



## FOULOIS SENT ORVILLE A LIST OF QUESTIONS

## ORVILLE FAILED TO REPLY

pronounced tilt to the rear. The engine was not the problem. The propeller was turning at 1,452 rpm, only two less than its maximum performance.<sup>42</sup> “In all flights,” Foulois wrote in the flight log (accepting the Wrights’s explanation and terminology), “there seemed to be a downward trend to the air, as the machine seemed to be drawn down when passing over depressions.”<sup>43</sup> This problem continued for the next few days, compounded by a period of gusty winds. Then, on September 8, a phenomenon known in the Southwest as a “dust devil” caused what might have been a major crash had the lieutenant not kept his head:

*In this flight the machine refused to respond quickly to its later[al] controls due to atmospheric conditions. The flight terminated very quickly, as a sudden whirlwind struck the machine, tossing it vertically in the air about 30 ft. and tipping it sideways, at an angle of about 45 degrees. In order to prevent the machine from tipping completely over it was necessary to descend at a very steep angle to gain the necessary lifting effect on the wingtips. There was not sufficient space between the machine and the ground to fully recover the balance of the machine before one wingtip struck the ground damaging the skids and one lower wingtip.*<sup>44</sup>

The aviation detachment repaired the machine, but high winds and rain kept it on the ground until September 29, when Foulois accomplished one short flight of twenty-five seconds. On the following day, he made the last flight of the year, lasting one minute and ten seconds.<sup>45</sup>

In October, Foulois attended the international aviation gathering at Belmont Park, New York, where several of the new Wright Model “B” aircraft were entered in the competition. Foulois was especially impressed by Wright flyers Ralph Johnstone and Arch Hoxey, who, performing in high winds that grounded other competitors, broke the world altitude record. With the Model “B” flyer, Foulois found, the Wrights had discarded the front elevators. He and Orville discussed how to modify S.C. No. 1 to make it as stable as the newer aircraft.<sup>46</sup>

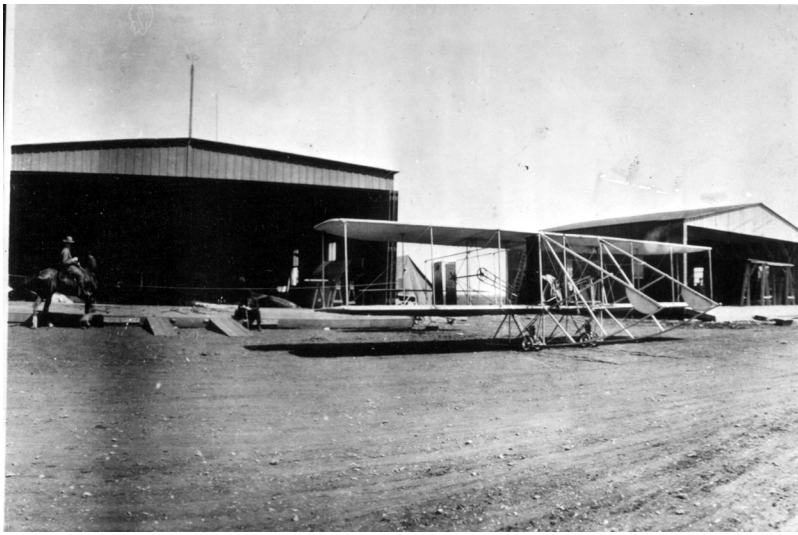
Following his return to San Antonio, Foulois sent Orville a list of questions on November 8 ask-

ing for information about the theoretical nature of flight and the practical movements of the control levers. “I have had numerous theories of my own on the theoretical operation of the planes, but since talking with you at Belmont Park, I found that I was off the track on a great many things. And I do want to be put right.”<sup>47</sup> Orville failed to reply, and on December 23, Foulois sent the same list of questions to Wilbur. The older brother wrote back on December 27, but did not respond to the theoretical questions that the lieutenant had posed. Instead, he returned to the problem with the engine chains that the officer had reported in March, telling Foulois that the Wright Company was now using 5/8 inch diameter rollers on the engine chains in place of the 9/16 inch diameter on the older chains. This more robust roller had eliminated the breakage. Wilbur further advised Foulois to boil the engine chains in “thick cup grease,” with a little graphite and tallow added, and reminded him to inspect the chains frequently and keep them well oiled.<sup>48</sup>

With flying ended for the year, the aviation detachment devoted its efforts to renovating and remodeling the battered and worn machine. Among these changes, the men installed the new Wright Model “B” control system, removing the front “horizontal rudder” completely. Foulois first flew the modified S.C. No. 1 on February 6, 1911, making two flights—one of twelve minutes and the other of thirteen minutes, nine seconds—without incident. He reached an altitude of 900 feet on the second flight. The lieutenant followed this performance two days later with another pair of flights, one of eight minutes, thirty-five seconds, the other of thirteen minutes, fifty seconds. During the second flight, however, a piston jammed in a cylinder while the aircraft was directly over the only suitable field for landing within range. Foulois cut the engine and spiraled tightly onto the field, which was about 100 feet wide with trees and buildings on three sides.<sup>49</sup> This safe emergency landing ended flying as a period of cold, blustery weather grounded the aircraft.

In the meantime, a major change was in the offing. Despite the best efforts of the aviation detachment at Fort Sam Houston, S.C. No 1 was worn

## WILBUR ... WROTE BACK ... BUT DID NOT RESPOND TO THE THEORETICAL QUESTIONS THAT THE LIEUTENANT HAD POSED



Signal Corps No. 1 in its final configuration, with three front braces on each skid, rather than the original two. The elevators have been removed entirely from the front of the aircraft, which no longer sports the tricycle landing gear.

**IT WAS IMPORTANT FOR THE WRIGHTS TO HELP FOULOIS SUCCEED...IF THE FIRST ARMY AIRPLANE WAS A PRACTICAL SUCCESS, THEY HAD THE OPPORTUNITY TO SELL MANY MORE**

out, and the government had yet to make funds available for the purchase of new machines. However, aviation enthusiast Robert F. Collier, owner of *Collier's Weekly* magazine and sponsor of the Collier Trophy, had purchased a 1910 Wright Model "B" for his personal use. Pending Congressional action, the U.S. Army leased the Collier machine for the nominal fee of one dollar and sent it to Fort Sam Houston.<sup>50</sup>

On February 10, Wilbur wrote Foulois that he had heard that the lieutenant and his detachment might be sent to the Mexican border. "Inasmuch as you have never been given decent facilities for practice under reasonable conditions," he opined, "I think it would be rather cheeky for those in command to send you on such a difficult job on short notice."<sup>51</sup> At any rate, he reported that Collier had asked the Wrights to allow Wright Company flyer Philip O. Parmalee to accompany the new Model "B" to San Antonio. Wilbur had agreed, especially since the Model "B" had a different control system, and Foulois would need instruction. Although a civilian, Parmalee would act under Foulois's orders. "You will find him a first class mechanic, a remarkably good operator, and a most lovable man," Wilbur assured the lieutenant. "We regard him as the best all around man we have ever had. He has good judgement as to what is safe and what is unsafe, and is easy to work with. You will like him very much."<sup>52</sup>

Foulois thanked Wilbur for his thoughtfulness on February 15. He also reported that his flights with the remodeled S.C. No. 1 had shown a remarkable improvement in control, enabling him to fly higher and in stronger winds than before, and proudly claimed that despite the engine failure, he had made a perfect landing. "The newspaper men made a lot of fuss over it," he told Wilbur, "as they had never seen a machine cut circles like it."<sup>53</sup> The engine lost power and jammed, he noted, because the cylinders were not getting oil. The aviation detachment had switched from Vacuum, Mobiloil Oil "A", which had been highly satisfactory, to Vacuum, Mobiloil Oil "B", which thickened in cold weather and flowed poorly.<sup>54</sup>

On February 18, Phillip Parmalee arrived, followed three days later by the Collier-Wright. On February 23, Parmalee took Foulois up in the new airplane. He also gave a ride to the civilian mechanic, Simmons, and, on the following day, the enlisted crew of S.C. No. 1 received flights as well, a fitting reward for months of arduous effort. On February 27, 1911, the Signal Corps aviation detachment left Fort Sam Houston for Fort McIntosh on the Mexican border to begin operational tests of the Collier-Wright during field maneuvers. Benny Foulois's year of experience at Fort Sam Houston thus ended. Counting the four in February 1911, Foulois recorded 66 flights in S.C. No. 1, totaling some 10 hours, 25 minutes, and 54 seconds in the air. Aviation activity would resume at the post at the end of April, with the arrival of the next generation of army aircraft, S.C. No. 2, a Curtiss IV Model D, and S.C. No. 3, a Wright Model B.<sup>55</sup>

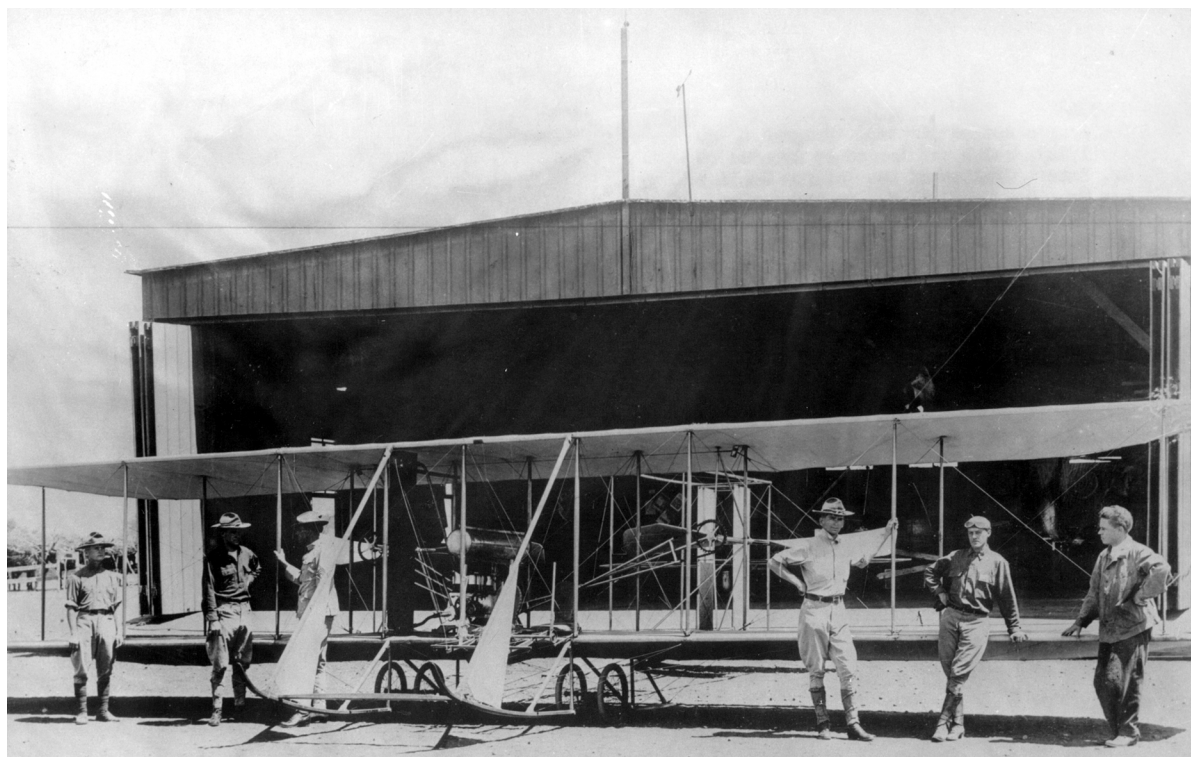
Foulois's autobiography suggests an extensive correspondence with the Wrights, and, logically, extended, detailed communications should exist. It would have been natural for Foulois to seek the Wright brothers's advice at every stage of his experimentation with S.C. No. 1. They had invented practical flight and were the most experienced, knowledgeable aviators in the world. More to the point, they had designed, built, and flown S.C. No. 1 and, thus, knew the machine better than anyone. Likewise, it was logical for the Wrights to provide the lieutenant with every degree of assistance possible. The brothers and the lieutenant had established an association while at Fort Myers, although the degree of that relationship can be overstated. Foulois did begin his first two letters with the salutation "My dear friends," but used more formal salutations in subsequent correspondence. But, beyond bonds of friendship, it was important for the Wrights to help Foulois succeed. If the first Army airplane was a practical success, they had the opportunity to sell many more. If Foulois's experiments were unsuccessful, however, they stood to lose heavily in what was one of the potentially most lucrative markets available. Had Foulois destroyed S.C. No. 1 during his experiments and killed himself in the process, the impact on the progress of military aviation in the United States during its embryonic stage can only be imagined.

Despite logic, however, the Wilbur and Orville Wright papers in the Library of Congress contain only nine letters from Foulois to the Wrights during the period—six in 1910, two in 1911, and one in 1912—and six letters from the brothers to the lieutenant—three in 1910, two in 1911, and one in 1912.<sup>56</sup> Of these, only seven from Foulois and three from the brothers actually discuss the operation of S.C. No. 1. Based on the extant correspondence, it must be concluded that Foulois overstated the level of communication between him and the Wrights during 1910.

And there were reasons that correspondence during that period should be limited. By 1910, the

The U.S. Army leased a Wright Model B from publisher Robert Collier in early 1911. Note the standard Wright wheels compared with those on Signal Corps No. 1 shown previously.

**DESPITE THE SEVERE DEMANDS ON THEIR TIME, HOWEVER, THE WRIGHT BROTHERS DO APPEAR TO HAVE DONE THEIR BEST FOR FOULOIS**



Wrights were international stars, lionized around the world. The demands on their time were enormous. They were also extremely busy trying to profit from their invention. In January, the Wright Company broke ground in Dayton for a new manufacturing facility, which began operation in November. Meanwhile, the brothers established a flying field in Montgomery, Alabama, and from March 24 through May 7, trained pilots for an aerial demonstration team, thus joining what Wilbur termed “the mountebank game.” The team staged its first exhibition in June and capped the year in October by competing in the aerial competition at Belmont Park. Problems also erupted overseas, and Orville spent November and December in France and Germany dealing with the companies licensed to produce Wright aircraft. Perhaps most important, the brothers, and especially Wilbur, were heavily involved in litigation with the Herring-Curtiss Company, aviators Louis Paulhan and Claude Grahame-White, and six aircraft companies in France. In biographer Tom Crouch’s words, “The patent suits absolutely consumed Wilbur and Orville’s time and energy during the period 1910–12.”<sup>57</sup>

Despite the severe demands on their time, however, the Wright brothers do appear to have done their best for Foulois, and one should not minimize the significance of their letters, limited as they were in number. The information on landing techniques and maintenance in the letter of March 24 was especially valuable to a neophyte, and the subsequent letters contained additional useful information. Further, the Wright brothers continued to dispense their knowledge even after Foulois left Fort Sam Houston. The two letters from Wilbur on December 2, 1911, and January 25, 1912, were

sent to Foulois just before he reported to Fort Riley, Kansas, to fly the Wright Model “C,” and both included considerable information on handling the new aircraft.<sup>58</sup>

It is noteworthy that the Wrights failed to respond to many of Foulois’s questions about the theories of operating the airplane and, in some cases, those regarding mechanical improvements to its structure. In the former case, given their willingness to correspond with others about the theoretical nature of flight, one suspects that they were simply too busy. By the time Foulois’s letter of November 8 reached Dayton, Orville was on his way to Europe, and Wilbur was deeply involved in the patent case against Curtiss. In the case of mechanical improvements, it may be that at times Foulois was treading on trade secrets. Most notably, the Wrights failed to answer Foulois’s request for comments on his design for a wheeled undercarriage. Since the brothers probably expected to sell their own design to the Army, they may not have viewed advising Foulois on his efforts to mount a landing gear on S.C. No. 1 as in their best financial interest.<sup>59</sup>

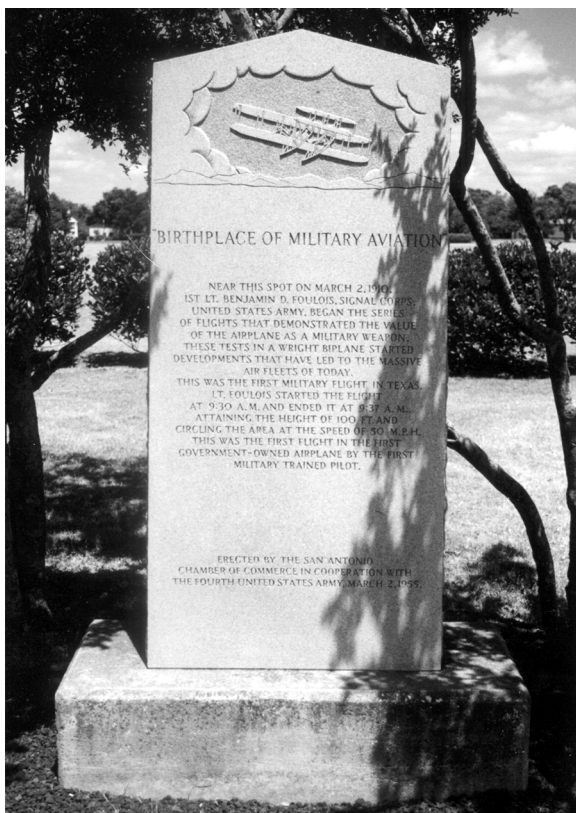
The letters between the Wright brothers and Foulois, along with other primary documentation from 1910, raise other questions. For one, according to Foulois’s autobiography, during the long flight of March 14 he was nearly thrown from the aircraft when it hit a sharp downdraft. Recognizing the need for more safety, he obtained a leather strap from the saddlery shop and tied himself into the seat during later flights. Based upon this experience, Foulois claimed credit for inventing the seat belt.<sup>60</sup> This development, however, appears to have gone completely unrecorded at the time. Neither S.C. No. 1’s flight log nor his monthly

Foulois and Wright pilot Philip Parmalee aboard the Collier-Wright Model B.



**HE MAY NOT HAVE WANTED HIGHER AUTHORITIES TO KNOW THAT HE WAS OPERATING OUTSIDE REGULATIONS**

Located on the parade ground, this marker commemorates Foulois's first flights at Fort Sam Houston on March 2, 1910. (Photo courtesy of Megan Chamberlin.)



**FOULLOIS CLAIMED CREDIT FOR INVENTING THE SEAT BELT**

report to General Allen mention the incident, and Foulois's March 15 letter to the brothers asserted

that no serious incidents occurred during the flight. A handwritten note in the log book entry for March 14 mentions a seat belt, but it is clear from the handwriting that Foulois added it later, perhaps many years later. It is thus inconclusive. On the other hand, it seems almost certain that Foulois was using some device to keep himself in the aircraft. It is unlikely that he could have remained in the seat and in control of the airplane during the September 8 accident when the dust devil threw it into an extreme position. Under the Wright system, the operator perched in the open on a seat positioned on the leading edge of the lower wing with both hands on the control sticks. He had no way to keep himself in the seat, and if he attempted to cling to the control sticks, he lost control over the craft. It seems logical to conclude, then, that Foulois's story told later is true, but why it fails to appear in the records of the time is curious. One possible answer is that Foulois, who had been sent to Fort Sam Houston with almost no operational funds, had arranged for material and supply support informally with various shops on Fort Sam Houston. He may not have wanted higher authorities to know that he was operating outside regulations.<sup>61</sup>

Another conundrum also pops out of the primary documents. Foulois's autobiography never mentions the problem of "lift" that looms so large in the lieutenant's correspondence with the Wrights. However, little in the advice from the

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CHOLOGICAL**

Wrights about flying techniques and the actions that Foulois took at the time appears to have addressed the question of lift directly. The autobiography, instead, goes into detailed complaint about the “bucking” habits of S.C. No. 1, which suggests that the aircraft with its twin “horizontal rudders” located in front of the wings was too sensitive and subject to overcontrol by the operator, a condition with which the Wrights were extremely familiar. The changes that Foulois documented at the time—mounting a “horizontal plane” on the rear of the aircraft in addition to “horizontal rudders” on the front, then eliminating the front “horizontal rudders” entirely and replacing them with a rear “horizontal rudder”—are measures that would address the problem of overcontrol, even though Foulois’s contemporary letters and records fail to document such a condition.<sup>62</sup>

Finally, did the postman really save Foulois’s life? One must conclude that if the lieutenant was not the first mail-order pilot, as his memoirs claim, he did receive useful advice from the Wrights. But, perhaps the most important assistance from the brothers was psychological. Their letters contain

sufficient praise and encouragement from the fathers of manned, powered flight to help give the lieutenant the confidence he needed during his dangerous efforts to develop a practical flying machine for the U.S. Army. He really was not alone at Fort Sam Houston, even though the Wright brothers were far away. It seems logical to contend that having the brothers looking over his shoulder—figuratively speaking—played a significant role in the lieutenant’s success. Foulois, may have overstated the extent of his correspondence with the Wrights many years later, but the letters he received from the Wilbur and Orville were an important factor in his successful experiments with the army’s first aircraft.

As for the machine, it had done its job and flew no more after February 8, 1911. The U.S. Army returned the aircraft to the Wright factory where it was restored to its original configuration and then donated it to the Smithsonian Institution in Washington, D.C. Signal Corps No. 1 now hangs on display in the National Air and Space Museum’s gallery of early flight, permanently flown by a life-like mannequin of its primary operator, Benjamin D. Foulois. ■

## NOTES

1. Benjamin D. Foulois, with Col. C. V. Glines, *From the Wright Brothers to the Astronauts: The Memoirs of Major General Benjamin D. Foulois* (New York: McGraw-Hill Book Company, 1968), p. 2.

2. *Ibid.*, p. 75.

3. Tom D. Crouch, *A Dream of Wings: Americans and the Airplane, 1875-1905* (Washington, D.C.: Smithsonian Institution Press, 1989), pp. 46-67, 127-56, 255-93; J. Gordon Vaeth, *Langley: Man of Science and Flight* (New York: The Ronald Press Co., 1966), pp. 44-48, 256-58; Wayne Biddle, *Barons of the Sky* (New York: Simon & Schuster, 1991), pp. 32-33.

4. Crouch, *A Dream of Wings*, pp. 255-93; Vaeth, *Langley*, pp. 66-97, *passim*; Biddle, *Barons of the Sky*, pp. 32-

33; Tom D. Crouch, *The Bishop’s Boys: A Life of Wilbur and Orville Wright* (New York: W.W. Norton & Co., 1989), pp. 261-63.

5. Crouch, *A Dream of Wings*, pp. 291-93; Vaeth, *Langley*, p. 97; Stephen F. Tillman, *Man Unafraid: The Miracle of Military Aviation* (Washington, D.C.: Army Times Publishing Company 1958), p. 9.

6. See especially Crouch, *The Bishop’s Boys*, pp. 242-52, 316-26.

7. Juliette Hennessy, *The United States Army Air Arm, April 1861 to April 1917*, new imprint (Washington, D.C.: Office of Air Force History, 1985), pp. 25-34, *passim*. In 1907, the army agreed to Alexander Graham Bell’s request that Lieutenant Selfridge, who had shown considerable interest in aeronautics, join his Aerial Experiment Association at Beinn Breagh, Nova Scotia. Selfridge designed the first AEA airplane, known as *Red Wing*, in early 1908, but returned to the Signal Corps before it flew in March. Orville Wright distrusted Selfridge because of his association with Bell and rival Glenn Curtiss, but asked him to fly because he was a member of the aeronautical board that supervised the heavier-than-air tests. Selfridge was the first military man killed in an airplane accident. Crouch, *The Bishop’s Boys*, pp. 351, 372-76.

8. Telegram, Big. Gen. James Allen, Chief Signal Officer, to Wright brothers, Nov 6, 1909; Telegram, Allen to Wright brothers, Dec 6, 1909; Ltr, Wright brothers to Allen, Dec 6, 1909; Ltr, Wright brothers to Allen, Dec 13, 1909; Ltr, Wright brothers to Allen, Dec 29, 1909, all in Box 8, General Correspondence, The Papers of Wilbur and Orville Wright, Library of Congress (LC), hereafter cited as Wright Papers. The Wrights forwarded the replacement parts quickly, charging the government only \$5.80, the cost of shipping them express.

9. Foulois, *From the Wright Brothers to the Astronauts*, p. 70.

10. Crouch, *The Bishop’s Boys*, p. 373.

11. Ltr, Orville to Wilbur Wright, Aug 23, 1908, in Marvin W. McFarland, Ed., *The Papers of Wilbur and Orville Wright, Volume Two: 1906-1948* (McGraw-Hill Book Company, Ltd., 1953), p. 915.

12. Clipping, “Foulois is First U.S. Air Captain,” Scrapbook, 1909, Foulois Papers, LC, hereafter cited as Foulois Papers.

13. Clipping, “Feed Pipe Breaks: Aeroplane Drops, Wrecking Rudder,” *The Daily Express* (San Antonio), Mar 5, 1910, File AV DY 2-E, Box 25, Foulois Papers.

14. The best source on Foulois’s later career is John F. Shiner, *Foulois and the U.S. Army Air Corps, 1931-1935* (Washington, D.C.: Office of Air Force History, 1983).

15. Foulois, *From the Wright Brothers to the Astronauts*, pp. 70-73.

16. Handwritten ltr, Foulois to Wright brothers, Jan 30, 1910, Box 24, General Correspondence, Wright Papers.

17. *Ibid.* The Wrights filed an injunction against Paulhan on January 4, 1910, restraining him from performing exhibitions in the United States. A ruling on February 17 required him to post a bond of \$25,000 (later reduced to \$6,000) if he wished to continue flying pending resolution of the case. Paulhan, who had already earned some \$20,000, returned to France instead. Crouch, *The Bishop’s Boys*, pp. 413-14.

18. “Log Book of Old No. 1” Box 25, Subject File, Foulois Papers; Clipping, “Foulois is on Ground,” *The Daily*

- Express* (San Antonio), Feb 8, 1910, File AV DY 2-E; Rpt, Foulois to Chief Signal Officer, March 1, 1910, File AF DT 2-C, all in Box 25, Foulois Papers; Hennessy, *The United States Army Air Arm*, p. 39. The shed cost the U.S. Army \$1,450.
19. "Log Book of Old No. 1," Box 25, Subject File, Foulois Papers.
  20. Ltr, Foulois to Wright Brothers, Mar 15, 1910, Box 24, General Correspondence, Wright Papers.
  21. *Ibid.*
  22. *Ibid.*
  23. Ltr, Wright Brothers to Foulois, Mar 24, 1910, *ibid.*
  24. *Ibid.*
  25. *Ibid.*
  26. *Ibid.*
  27. "Log Book of Old No. 1," Box 25, Subject File, Foulois Papers.
  28. Ltr, Foulois to Wright brothers, Apr 16, 1910, Box 24, General Correspondence, Wright Papers.
  29. Ltr, Allen to Wright brothers, Dec 11, 1909, Box 8, General Correspondence, *ibid.*
  30. Ltr, Wright brothers to Allen, Dec 22, 1909, *ibid.*; Ltr, Foulois to Wright Brothers, Apr 16, 1910, Box 24, General Correspondence, Wright papers; "Log Book of Old No. 1," Box 25, Subject File, Foulois Papers.
  31. "Log Book of Old No. 1," Box 25, Subject File, Foulois Papers.
  32. Ltr, Foulois to Wright brothers, May 25, 1910, Box 24, General Correspondence, Wright Papers.
  33. *Ibid.*
  34. *Ibid.*
  35. Ltr, Wright brothers to Foulois, May 31, 1910, *ibid.*; "Log Book of Old No. 1," Box 25, Subject File, Foulois Papers. The Wright brothers had extensive experience with "thermals," rising currents of warm air formed by the difference in temperature between different surfaces of the ground. Thermals provide "lift," enabling birds, balloons, and gliders to soar, often for hours. Outside the thermal, areas of cooler air provide "sink" that causes flying objects to descend rapidly. Dave Thornburg, *Old Buzzard's Soaring Book* (Albuquerque, N.M.: Pony X Press, 1993), pp. 1-8.
  36. Foulois, *From the Wright Brothers to the Astronauts*, p. 75.
  37. *Ibid.*, p. 76.
  38. "Log Book of Old No. 1," Box 25, Subject File, Foulois Papers.
  39. *Ibid.*
  40. Rpt, Foulois to Chief Signal Officer, Sep 1, 1910, File AF DT 2-C, *ibid.*
  41. Crouch, *The Bishop's Boys*, p. 428.
  42. "Log Book of Old No. 1," Box 25, Subject File, Foulois Papers.
  43. *Ibid.*
  44. *Ibid.* Dust devils are, in effect, small areas of swirling air shaped much like tornados that act as feeder columns delivering hot area to thermals above them. The general shape is that of a mushroom and its stem. Thornburg, *Old Buzzard's Soaring Book*, p. 8.
  45. "Log Book of Old No. 1," Box 25, Subject File, Foulois Papers.
  46. Foulois, *From the Wright Brothers to the Astronauts*, pp. 77-78.
  47. Ltr, Foulois to Orville Wright, Nov 8, 1910, Box 24, General Correspondence, Wright Papers. The questions were detached from the letter and not found.
  48. Ltr, Foulois to Wilbur Wright, Dec 23, 1910; Ltr, Wilbur Wright to Foulois, Dec 27, 1910, both in *ibid.* The middle portion of Foulois's letter with most of his questions is missing. The question that survives states that Orville had told Foulois while at Belmont that the machine should be trussed straight from tip to tip. Foulois asks for clarification. Did Orville's statement refer to the rear edge of the main plane?
  49. "Log Book of Old No. 1"; Rpt, Foulois to Chief Signal Officer, Mar 1, 1911, File AF DT 2-C, both in Box 25, Foulois Papers. Foulois wrote that modifications included placing the vertical rudder in the rear of the aircraft and giving the machine one elevator in the front and one in the rear. He appears to have added this information to the log book many years later, possibly as an explanation to C. V. Glines, who was helping write his autobiography, and it does not fit the available evidence. It is clear from the contemporary correspondence discussed above that the aircraft was in the configuration with fore-and-aft elevators much earlier than December. Following the Belmont meet and the discussions with Orville, Foulois would be more likely to have removed the rudders and elevators from the front of S.C. No. 1 completely, and a photograph of S.C. No. 1 shows the airplane in this configuration. It seems a logical deduction that Foulois's memory failed him and that the four 1911 flights were made without any control surfaces forward of the wings.
  50. Foulois, *From the Wright Brothers to the Astronauts*, p. 82; Hennessy, *The United States Army Air Arm*, p. 40. Congress made its first appropriation for Army aeronautics on March 3, 1911, providing \$125,00 for fiscal year 1912. The U.S. Army purchased five aircraft with this money, two Wrights, two Curtiss, and one Burgess-Wright.
  51. Ltr, Wilbur Wright to Foulois, Feb 10, 1911, Box 24, General Correspondence, Wright Papers.
  52. *Ibid.* Against their better judgement, the Wright Brothers entered the exhibition business in early 1910, and Parmalee was one of several young daredevils, including Walter Brookins, Frank Coffyn, Ralph Johnstone, J. Clifford Turpin, Howard Gill, and Leonard Bonney, recruited for the team. Orville taught these men to fly. Parmalee was killed in a crash in 1912. Crouch, *The Bishop's Boys*, pp. 427-28.
  53. Ltr, Foulois to Wilbur Wright, Feb 15, 1911, Box 24, General Correspondence, Wright Papers.
  54. *Ibid.*
  55. Rpt, Foulois to Chief Signal Officer, Mar 1, 1911, File AF DT 2-C, Box 25, Foulois Papers; Hennessy, *The United States Army Air Arm*, p. 42.
  56. Efforts to locate additional correspondence between the Wright Brothers and Foulois in other collections of Wright Papers proved unsuccessful. Much of Foulois's correspondence prior to 1917 is missing from the Benjamin D. Foulois Papers in the Library of Congress. A note added by Foulois to the "Log Book of Old No. 1" years after the log book was compiled states that his correspondence with the Wright Brothers was lost during World War I.
  57. Crouch, *The Bishop's Boys*, p. 417.
  58. Ltr, Wilbur Wright to Foulois, Dec 2, 1911; Ltr, Wilbur Wright to Foulois, Jan 25, 1912, both in Box 24, General Correspondence, Wright Papers.
  59. According to Hennessy, the tricycle landing gear mounted on S.C. No. 1 proved unsatisfactory, and the army replaced it with the standard gear developed by the Wrights. Hennessy, *The United States Army Air Arm*, p. 7. No photograph of the aircraft with the standard Wright gear has been found, however, and Foulois's letters to the Wrights, his reports to the Chief Signal Officer, and the "Log Book of Old No. 1" fail to record such a change.
  60. Foulois, *From the Wright Brothers to the Astronauts*, pp. 73-74.
  61. Dr. Ed Raines from the U.S. Army's Center for Military History, suggested this possibility. For information on supply and maintenance support, see Roger G. Miller, "Signal Corps No. 1: Purchasing and Supporting the Army's First Airplane," *Air Power History* (Fall, 1994), pp. 14-21.
  62. Foulois, *From the Wright Brothers to the Astronauts*, pp. 76-77.