

Charles E. Taylor: The Man Aviation History Almost Forgot

by Bob Taylor

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Three men were involved in the invention and development of the first powered airplane—that's right three. Everyone knows about the Wright brothers, but that third man was Charles E. "Charlie" Taylor, a quiet genius who loved cigars and the sound of machinery. Although he contributed to one of man's greatest achievements, "Powered Flight," his name was almost lost in aviation history—until now—and if it hadn't been for Charlie that first powered airplane would never have gotten off the ground.

Charlie Taylor was born on a little farm in Cerro Gordo, IL, on May 24, 1868. As a boy Charlie moved to Lincoln, NE, with his family. Charlie quit school at the age of 12 and went to work as an errand boy for the *Nebraska State Journal*. However, Charlie was mechanically inclined so later, when he began working with machinery in the *Journal's* bindery, it came easy for him.

When Charlie was in his twenties he moved to Kearney, NE, where he went into a business of making metal house numbers. While in Kearney, Charlie met a young lady named Herietia Webbert in 1892 and married her two years later. In 1896 the Taylors moved to Dayton, OH, where Charlie worked for a Stoddard Manufacture which made farm equipment and later bicycles. It was in Dayton where Charlie met the Wrights. Mrs. Taylor's uncle rented the building on West Third Street to the Wright brothers for their bicycle business. This was a convenient connection, because, in 1898 when Charlie started his own machine shop, Orville and Wilbur Wright brought him special jobs, including a bicycle coaster brake they had invented but later dropped.

Charlie eventually sold his tool shop for a profit and went to work for the Dayton Electric Co. However, he didn't like his job so he accepted, when the Wright brothers asked him to work for them at \$18.00 per week. This was a good decision for several reasons: The Wright brothers' shop was only six blocks from where Charlie lived, he could ride a bike home for lunch every day, he was making eight dollars a week more, and he liked the Wright brothers a lot.

Charlie started to work for the Wright brothers on June 15, 1901, doing routine repairs on bicycles. This let the Wright brothers pursue their experiments with gliders which included many trips to Kitty Hawk. After one of these trips, the brothers decided they needed more accurate information than was available and decided to build a small wind tunnel with delicate force balance. With this, they would measure the amount and direction of air pressures on plane and curved surfaces operating at various angles and improve their theories based on their gliding experiences.



Building the wind tunnel was the first job that Charlie Taylor did for the Wright brothers that had any connection with aeronautics. The wind tunnel was a rectangular box with a fan at one end driven by a natural gas engine. Charlie ground hacksaw blades and used them for balance in the tunnel. The Wright brothers did many experiments in their wind tunnel and from this data they began to make their 1902 glider with Charlie machining many of the parts.

On August 13, 1902, the brothers shipped the glider to Kitty Hawk. They did several flights with the glider and on October 31, 1902, the Wrights returned to Dayton to make plans for a powered airplane. Through their experiments, the Wrights were able to accurately predict the horsepower--eight--which was needed to produce and achieve powered flight. The next problem was where to get a light engine that would produce eight horsepower. The Wrights knew that a steam engine might suit their purpose, but a gasoline engine would be safer and more efficient.

On December 3, 1902, the Wrights sent letters to almost a dozen automobile companies and gasoline engine manufacturers asking if they could produce or modify an engine that would develop eight to nine brake horsepower, weigh no more than 180 pounds, and be free from vibration. Most companies replied that they were too busy to undertake building such a special engine.

Falling back on their own mechanical experience, the Wright brothers decided to design and build their own engine. They estimated they could build a four cylinders engine with four inch stroke and four inch bore, weighing no more than 200 pounds with accessories included. By their calculation, it would develop the horsepower necessary to power the glider in flight. Now the problem was who was going to build the engine, but it was easily solved. The brothers decided that they would give the task to Charlie and they would build the airframe. Charlie was excited about this new challenge. From his knowledge of mechanics and design he knew that the engine design was basic, straight forward, simple, and capable of being successful. Charlie had very limited knowledge about gasoline engines, but he used his craftsmanship, genius, enthusiasm, and efficiency to tackle the task.

Charlie started building the engine in the winter of 1902-03. Without any formal drawings available, it was necessary for each part to be crudely sketched out by the Wrights or Charlie on a piece of paper. After a thorough discussion about it, Taylor would pin the drawing above his workbench and go to work to complete it. Using these sketches and specifications, he finished the engine in six weeks--an amazing accomplishment.

I want to describe in some detail of how Charles Taylor made the engine so you can appreciate the craftsman he was. The first problem that Charlie and the Wrights faced was the crankcase. The case had to be light and strong. Aluminum was still a rare metal in those days and it was difficult to get a good sound casting. John Hoban, foreman of Buckeye Iron and Brass Foundry in Dayton, took on the job of making the crankcase using the strongest aluminum he had. The cylinders were turned from fine-grain gray cast iron and had a bore of four inches. The top and bottom of the cylinders were threaded so they could be threaded into the crankcase and a water jacket could be threaded on them.

The next major task for Charlie was making the crankshaft. Being a mechanic most of my life, I would never even attempt taking on a project of making a crankshaft with the equipment that Charles Taylor had--a drill press, a lathe (both run by a natural gas engine), and hand tools. Charlie secured a plate of high carbon tool steel that measured 1-5/8 inches thick, six inches wide, and 31 inches long. On the plate he traced an outline of the crankshaft and carefully, painstakingly drilled hundreds of holes along the outline of the crankshaft. This weakened the plate enough so he could knock the excess material away with a hammer and metal chisel. Once this was done, he had the rough cut crankshaft ready for the lathe and the finish cut. With the small natural gas engine chugging away at full power driving the large wide leather belts that turned the lathe, Charlie turned out a near perfect crankshaft to the thousandth of an inch. The next part that Charlie worked on was a fly wheel from a solid block of cast iron.

The connecting rods, intake valves, exhaust valves, pistons, valve guides, rocker arm, and numerous other parts that made up the complete engine were carefully thought out by Charlie and tailored to fit the operation of the engine. Charlie painstakingly assembled the engine part by part, fitting and refitting each piece with the meticulous care of a jeweler making a watch. He scrutinized every detail. He assembled and disassembled the parts, time and time again, making sure of their operation until all the parts were working in harmony.

It took a lot of genius and ingenuity and the engine was finally complete and assembled in February 1903. It was mounted on a test stand and ran well, producing eight horsepower at 670 rpm and 11 hp. at 1000 rpm. Charles E. Taylor had successfully built the first aircraft engine.

As a result of the engine producing 12 horsepower at full rpm, the Wright brothers were able to add another 150 pounds to the aircraft which allowed them to strengthen the wings and framework. The engine with its dull propeller drive drove two counter rotating pusher propellers by means of chains. The Wright brothers designed and tested propellers in the wind tunnel and built several propellers that would be used for the first successful flight. Charlie also made all of the metal parts such as all of the metal fittings where the wooden struts joined and spruce spars and Roebling truss wires were attached.

On September 23, 1903, the Wright brothers left Dayton for Kitty Hawk to start preparation for man's first powered flight and the *Flyer* followed on September 25. The *Flyer* was assembled and the engine was installed on November 2. To reduce the danger of the engine ever

falling on the pilot in case of a wreck, it was placed on the lower wing to the right of center. When the engine was started, the vibration from the irregular firing caused failure of the prop shaft extensions. Charlie made new shafts out of solid steel which held up during the first flights.

On December 17, 1903, in the mid morning after a run of about 40 feet at a rate of approximately seven to eight mph, the first successful powered aircraft lifted off and flew 120 feet in 12 seconds thus introducing a new era of transportation. Although the first flight wasn't publicized that much, Charlie and the Wright brothers were very excited.

The Wright brothers decided to build another flying machine, but decided against going again to Kitty Hawk. They looked near Dayton for a level place for flying. After a few days of searching the Wrights found a suitable ninety-acres pasture, often called "Huffman Prairie," belonged to Torrence Huffman, a Dayton bank president. He allowed them to use it free--provided they didn't run over his cows. Charlie and the Wrights built a hangar to house the airplane and moved into the new facility on April 20, 1904. Charlie took care of the field and facility while the Wrights were going around the country and world. **He was the first airport manager.**

In a 1948 interview Charlie said that he had "always wanted to learn to fly, but I never did. The Wrights refused to teach me and tried to discourage the idea. **They said they needed me in the shop and to service their machines, and if I learned to fly I'd be gadding about the country and maybe become an exhibition pilot, and then they'd never see me again.** How prophetic those last words were!

The Wrights were trying to sell the aircraft to the military and started to do demonstration flights on September 3, 1908. Orville flew and Charlie kept the aircraft in good flying condition. On September 17, Charlie was slated to fly with Orville, but before the flight, larger propellers were installed to compensate for the heavier weight of the two men. At the last minute Charlie was replaced by Lieutenant Thomas Selfridge, a 20 year old West Point graduate from San Francisco. During the flight Orville heard a strange noise. He looked around, but didn't see anything. However, he decided to shut the engine down and land. Suddenly, there were two large thumps and the aircraft shook violently, as Orville tried to control aircraft to the ground. About 20 feet from the ground the aircraft started to correct itself, but it was too late. The aircraft hit the ground, killing Lieutenant Selfridge and badly injuring Orville Wright. Lieutenant Thomas Selfridge became the first passenger casualty in a powered aircraft.

After the accident, Charlie investigated the crash scene and found the new propellers that they put on before the flight had delaminated. Charlie reported his findings to Orville, who was in the hospital recovering from his injuries. **Charles was the first person to investigate a powered fatal accident flight.**

Charles Taylor continued to work with the Wright brothers until 1911. At this time an adventurer and a pilot, Calbraith Perry Rodgers, wanted to make the first continental flight across the United States. He purchased an aircraft from the Wright brothers and enough parts to build two more aircraft. Orville realized that the aircraft would not last more than 1,000 miles without proper maintained, so he lent Charlie to Rodgers knowing that he would be the only one that could keep the plane flying for that distance successfully. Charlie sent his family ahead to California and got on the three car train that was to accompany the flight. One car of the train was a repair car where the aircraft parts would be stored and the aircraft repaired. It took Cal Rodgers 49 days to cross the United States. Three days, ten hours of that was actual flying time. His longest single flight was 133 miles. **He had 16 crashes and the aircraft was repaired so many times that at journey's end only the vertical rudder, the engine drip pan, and a single strut of the original plane remained--a test to the skill which Charlie used in keeping the aircraft flying.**

This was the last of Charlie's big adventures. Charlie returned to Dayton and worked for the Wright-Martin Company until 1920. Charlie eventually moved to California and lost touch with Orville Wright, but things turned bad for Charlie. The Depression hit and Charlie's machine shop failed. He lost his life's savings in a real estate venture and his wife died. Charlie Taylor's contribution to aviation was forgotten until 1937 when Henry Ford was reconstructing the old Wright bicycle shop in Dearborn, MI. Detectives found Charlie working at North American Aviation in Los Angeles for 37 cents an hour. None of his co-workers realized he had built the first aircraft engine. Charlie worked for Ford until 1941 when he returned to California and worked 60 hours a week in a defense factory. However, in 1945 Charlie suffered a heart attack and was never able to work again.

In November 1955, a reporter discovered Charlie in Los Angeles General Hospital's charity ward--he was almost destitute. His income was his Social Security and an \$800 a year annuity fund belatedly established by Orville Wright before his death in 1948. The aviation industry immediately started a campaign to raise funds for Charlie. He was moved to a private sanitarium where he died a few months later on January 30, 1956, at the age of 88. Having no close relatives, Charles E. Taylor was buried in the Portal of Folded Wings Mausoleum dedicated to aviation pioneers, located in Valhalla Memorial Park, Los Angeles.

Charles E. Taylor was the last of the three that shrunk the world by building the first successful powered airplane--the mechanic who made the flight possible

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**A JOINT RESOLUTION WITH THE FEDERAL AVIATION
ADMINISTRATION'S NORTHWEST MOUNTAIN REGION
HONORING THE LIFE AND MEMORY OF CHARLES
EDWARD TAYLOR, THE WORLD'S FIRST AIRPLANE
MECHANIC, AND URGING THE CITIZENS OF MONTANA
TO RECOGNIZE MAY 24th OF EACH YEAR AS
AVIATION MAINTENANCE TECHNICIAN DAY IN HONOR
OF CHARLES EDWARD TAYLOR.**

Whereas, Charles Edward Taylor was born on May 24, 1868; and

Whereas, in 1901, Charles Edward Taylor began working as a machinist for Orville and Wilbur Wright at the Wright Cycle Company in Dayton, Ohio; and

Whereas, within six weeks, Charles Edward Taylor, using only a lathe, drill press, and hand tools, designed and built the first engine used to power the Wright Flyer; and

Whereas, Charles Edward Taylor's craftsmanship, enthusiasm, and quiet genius earned him a place in aviation history when the Wright Brothers successfully flew their airplane, the Kitty Hawk, on December 17, 1903; and

Whereas, after this historic event, Charles Edward Taylor continued to design engines for the Wright Brothers and later taught them to build aircraft engines; and

Whereas, in 1908, Charles Edward Taylor accompanied Orville Wright to Fort Myer, Virginia for test flights by the United States government, and in 1909, accompanied Wilbur Wright to New York for the Hudson-Fulton flights; and

Whereas, Charles Edward Taylor served as lead mechanic for Calbraith (Cal) Rodgers, who made the first transcontinental flight in 1911; and

Whereas, Charles Edward Taylor had a successful career in aviation maintenance for more than 60 years; and

Whereas, Charles Edward Taylor was honored by the Federal Aviation Administration with the establishment of the Charles Edward Taylor Master Mechanic Award, which recognizes persons with 50 years or more of aviation maintenance experience; and

Whereas, Charles Edward Taylor died in 1956; Now, therefore,
Be it resolved by the Senate, the House of Representatives concurring:

SECTION 1. The General Assembly honors the life and memory of Charles Edward Taylor and expresses its appreciation for the invaluable contributions he made to aviation.

SECTION 2. The General Assembly urges the citizens of the State of Montana to recognize May 24 of each year as Aviation Maintenance Technician Day in honor of Charles Edward Taylor. The General Assembly further urges the Federal Aviation Administration's Northwest Mountain Region to participate in activities commemorating the 102nd anniversary of the Wright Brothers Flight.

SECTION 3. This resolution is effective upon ratification.

AMT Day

A day to honor and celebrate

By Emily Refermat

Is your calendar marked on May 24th for Charles Taylor's birthday — AMT Day in 23 states?

"The importance of this day being Charles Taylor's birthday is to honor the birth of the first powered aircraft mechanic, the birth of controlled flight (not able to be accomplished without him), and to honor the past (ensuring the future)," says Richard Dilbeck, A.K.A. 'Dilly' an FAA inspector with a personal interest in seeing every state have an AMT Day, as well as May 24th becoming National AMT Day, already introduced as a house resolution in Congress.

A copy is available at <http://thomas.loc.gov>, Bill number: HRES 586.

"Mechanics have always been in the background, the 'red-headed child of aviation.' Everyone knows Amelia Earhart, Charles Lindbergh but who worked on their planes?"

Passed, pending, and contact

The mechanics in the 23 states that have passed the resolution should be very proud. They are colored purple on the map on page 36 and listed in order of when they passed their resolutions.

The states in tan are in the process of recognizing AMT Day.

If you are a mechanic in: Alabama, District of Columbia, Kentucky, Maryland, Massachusetts, Montana, New Hampshire, North Dakota, Oregon, Puerto Rico, Rhode Island, Vermont, Virginia, or Wyoming, we need you as a point of contact. We need a mechanic "...who has the enthusiasm to take the wrench so to speak," says Dilbeck.

Are you willing to start the process and see it through to the end? If so see this month's online feature "AMT Day Passed: the process start to finish."

"My usual points of contact are the airworthiness safety managers and also some

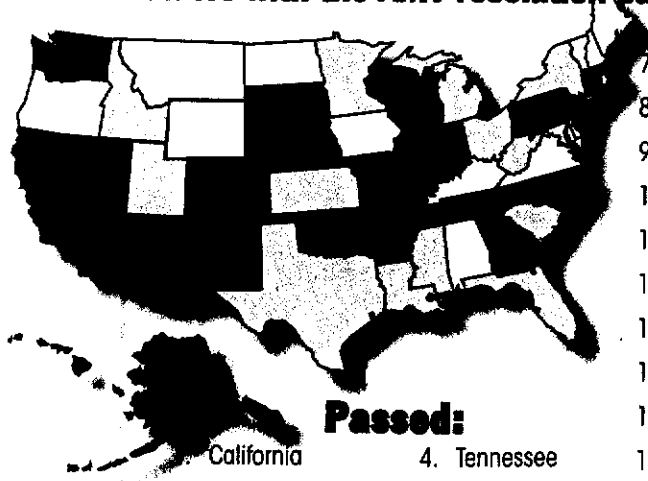
NASEO (National Aviation State Education Organization) people. I also got some directors of maintenance who caught the governor in the hangar and pushed some papers into his hands," adds Dilbeck.

AMT Day vision

To Dilbeck AMT Day in every state and national recognition of the aircraft mechanic is just the beginning. He wants to see every A&P school display their state's AMT Day

May 24 is Charles Taylor's birthday, a day to honor the first powered aircraft mechanic.

States with the AMT resolution passed (in the order they passed them)



Passed:

- | | |
|-------------------|--------------|
| 1. California | 4. Tennessee |
| 2. North Carolina | 5. Hawaii |
| 3. Nebraska | 6. Georgia |

- | | | |
|-----------------|------------------|-------------|
| 7. Arizona | 18. South Dakota | Kansas |
| 8. Colorado | 19. Wisconsin | Louisiana |
| 9. Alaska | 20. Illinois | Michigan |
| 10. Connecticut | 21. Indiana | Minnesota |
| 11. Missouri | 22. New Mexico | Mississippi |
| 12. Maine | 23. Washington | New York |
| 13. Oklahoma | | Ohio |

Pending:

- | | | |
|------------------|----------|----------------|
| 14. Nevada | Delaware | South Carolina |
| 15. Pennsylvania | Florida | Texas |
| 16. New Jersey | Idaho | Utah |
| 17. Arkansas | | West Virginia |

resolution, "so the sons and daughters can see that there is a day to recognize their careers." He believes an excerpt of each resolution should be included in the diplomas of graduating students (which is already happening in many cases).

Dilbeck imagines resolutions hanging in repair stations and maintenance hangars throughout the country and every calendar marked with May 24th as AMT Day.

At the Wright University Charles Taylor exhibit where his shop equipment is located, Dilbeck envisions all the resolutions framed and hung on the walls. If the national one goes through, it will be crowned by the regional ones.

Plus Dilbeck wants to educate the public about mechanics. He plans to appear on an upcoming Oprah show. And the AMCC (Aviation Maintenance Career Commission) is still accepting sponsorships for the Charles Taylor Memorial to be built on the Wright University Campus, in front of Dunbar Library. (Find out more at www.amccommission.com).

Celebration

An event leading up to May 24th is Charles Taylor II speaking at the Aviation Industry Week trade show in Las Vegas, Nevada, May 19, 2004, about his great, great grandfather – Charles Taylor, the aviation mechanic.

Here are some other events planned to celebrate AMT Day.

"The Hartford-Springfield PAMA Chapter, along with the FAA Windsor Locks Flight Standards Office, United Technologies, Pratt and Whitney, and PrivatAir are sponsoring, on Saturday, May 15th, an all-day Aviation Safety and Maintenance Program. This annual program offers pilots, technicians, and anyone interested in aviation an opportunity to participate in seminars, static displays, and vendor exhibits. This event is a major fundraiser for the local PAMA Chapter's student scholarship program. Additional, a competitive on against one maintenance Olympic event is scheduled," reports Bob Gould, chapter president.

"Our company is trying to schedule an awards event on May 24th where our FAA FSDO would present us with the AMT Diamond Award (we have had 100% participation by all our eligible AMT's for the past four years). We hope to have our state

legislators and our U.S. Representative Rick Larson (Transportation and Infrastructure Committee) here for the presentation. We also hope to have local print media here, including Seattle Times. These plans are still in the making, and we are hopeful that we can increase public awareness of AMT Day here in the State of Washington," says Fred Zimelman of the Soundair Repair Group LLC.

Goodrich Corporation's Aviation Technical Services in Everett, Washington, is planning an event to honor AMT's on May 24, 2004. The plans started when it contacted the State Representatives and asked them to sponsor a bill to make May 24th Aviation Maintenance Technician Day.

"Representatives Sullivan and Pearson generously sponsored the bill and Washington State will now recognize May 24, 2004 as AMT Day". The Representatives will come to Aviation Technical Services on May 24 to present the AMT's with the resolution.

"Along with this presentation, we will be honoring Charles Taylor and all of the AMT's that work at Aviation Technical Services and across the State of Washington. The FAA will also attend to present Aviation Technical Services with our FAA Aviation Maintenance Technician Award Program Diamond Employer Award. The 289 technicians that met the criteria for this award will be recognized and the 49 technicians who have met the criteria five years in a row will receive special recognition". Aviation Technical Services is proud of its highly trained workforce and the fact that 2003 marked the fifth year in a row that it earned the Diamond Award.

"Included in the festivities will be drawings for prizes and Aviation Technical Services will be providing a free lunch for all of its employees," reports Denise Anderson, marketing communications manager, Goodrich Aviation Technical Services.

In 2004, we can only hope that Charles Taylor would be proud to see the achievement of the men and women in aviation maintenance who have taken up his birthday as a day to celebrate and honor him, powered flight, and themselves. Let's all raise our glasses on May 24th in celebration –cheers **AMT**