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Bristol Wings

Newsletter of the LAA Bristol Wing

April 2012

Inside this issue:

NEXT MEETING - Rolls Royce Engines

Wed 4th April meeting—7.30 pm in room 7

This month Chris Bigg is coming back to talk to us about "The history of Rolls Royce Engines". Those of you who saw his excellent talk on the Brabazon will remember the research and depth of knowledge he puts into his presentation material.

It was his mention of Charlton village that inspired us to use it as ammunition in our letter to South Gloucestershire Council apposing Filton's closure. Alas like all other opposition it was brushed aside and Filton will close at the end of the year. As a result you may have heard our good friends at Bristol Aero Club have decided to relocate to Kemble. This won't affect our joint meeting though so we will still be getting together at BAWA as usual to share our experiences."

Rolls-Royce

LAST MEETING

The members of LAA Bristol wing and BAC were willing guinea pigs for the evening. Graham Clark practised his 'Flying in the UK' presentation in advance of his trip to the USA when he would be telling the Scottsdale/ Arizona Chapter of the EAA later that month all about our kind of flying. There were very few criticisms and we all appreciated what a privilege it is be able to fly here. Best of luck Graham next month, we're sure they'll love it.

Contact Information

Wing Co-ordinator:
Steve Neale
01454 202216
E-mail:
srneale@yahoo co uk

Treasurer/Membership Sec:
Gordon Pritt
01934 622795
e-mail:
gordon pritt@talktalk net

Newsletter distribution:
Mary Leader
01275 541572
e-mail: mary@bristol-wing co uk
Editorial address:
7 Cantell Grove
Stockwood, BRISTOL
BS14 8TP

Where to go...

Free landing vouchers for April in:

Flyer Magazine: Ballarena (N Ireland); Henstridge, Panshanger; Wolverhampton (Halfpenny Green)

Pilot Magazine: Chiltern Park, Headcorn, Longside, Perth

For those who like to plan ahead the vouchers for **May** are:

Flyer: Bodmin; Causeway (N Ireland); City Airport (Barton); Holmbeck

Pilot: ..(**Valid 16 Apr - 13 May**): Brimpton, Cromer, Elstree, Exeter.

It's easy to make a small fortune in aviation.

You start with a large fortune.

RAeS Bristol branch

Date: Thursday 26th April 2012

AGM at 18:00 followed at 18:30 by

Subject: Virtual testing of high-lift devices

Speakers: Thomas Krueger, R&T Programme Manager, Flight & Integration Test Centre, Airbus; Tobias Ulmer, High-Lift System Virtual Testing Project Leader

Venue: Concorde Room, BAWA Leisure Centre, 589 Southmead Road, Filton, Bristol, BS34 7RG

Future flying events

7th April: Henstridge fly-in www.henstridgeairfield.com. All visiting planes being kept to the South. There are two excellent PDFs available. Check the website or contact the Editor for a copy.

Sat 5th May Devon Strut Fly-in (Twinned with Compton Abbas) Evening meal and overnight camping available Contact Pete White for PPR 01752 406660

14th-15th July : Devon Strut Aero-Rally Dunkeswell

Future Wing meetings

Wed 2nd May Follow up on David Joyce's very successful 2011 *Dawn to Dusk Challenge*.

Wed 6th June Bristol ATC advising us on *'Olympic Airspace and it's impact on us'* plus information on *'Flying in the Bristol area.'*

Thursday 6th September AGM in Rooms 5/6

Snippets

EASA NEWS

This makes interesting reading. Is the house of cards about to collapse?

http://www.aopa.co.uk/index.php?option=com_content&view=article&id=600:aopa-reports-easa-changes-are-in-the-air&catid=1:latest-news

CAA News

Postponement of the withdrawal of CAP 766 and CAP 767 Light Aircraft Maintenance Programme (LAMP)

.....the CAA has decided it would be in the best interest of the owners and operators of aircraft maintained using the LAMP to delay its withdrawal for the moment. Therefore, there is no immediate need to develop replacement maintenance programmes. Click here for the full information

Mode S update

Air Navigation Order (CAP 393) SCHEDULE 5 'Radio Communication and Radio Navigation Equipment to be carried in Aircraft, Gliders and SLMG from 6 April 2012. Read the full document here.

On-line Flying guide

There's a new website available which is effectively a replacement for Lockyer's airfield guide. Unlike other publications found in paper form this site has used modern technology. All the airfield information can be downloaded in various easily printable formats: basic card, phone size and Bar Mit size or directly onto your All runway elevation have been taken from google earth and if the runway slopes from one end to the other they have taken an average of both. Click on the following: http://airfieldcards.com/ to see for yourself.

View GASIL on line

Don't forget to have a look at the latest GASIL by clicking here and if you wish to view the Occurrences listing this is the place to do so.

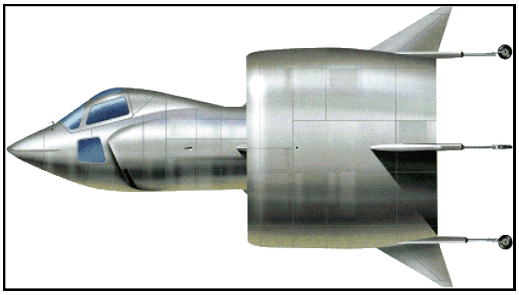
UL91

Gloucester Airport have announced a £5 pound landing fee for anyone buying UL91 which they're selling at £1.79 per litre.

Picture Quiz

Last month's picture : SNECMA C.450-01 Coléoptère.

Last Month's picture....



As Graham said: Two extra points for correct inclusion of the accents!

Pat Harrison got it correct with the following:
The annular ring aircraft is a SNECMA C.450-01 Coléoptère which first flew on 6th May 1959 at Melun-Villaroche

Tony Niblett also replied with: This month's picture puzzle is, I think, the SNECMA C.450-01 Coléoptère. It was one of a few attempts to develop an annular wing aircraft. I believe that it did fly but was found to be not very stable in flight. What is not clear to me is why it was attempted bearing in mind that the annular wing probably has a Lift/Drag ratio which is much worse than the cruciform wing arrangement used in the early attempts to develop vertical take off aircraft in the USA.

Trevor Wilcock, as expected, also gave the correct answer.

Trevor and Graham are battling this out, and neither has been defeated yet. Is there anyone else willing to join the fray and challenge these two? Come on you spotters.....

Another Non-picture puzzle.....

Thanks again to Tom Geake for the following:

How well do readers know the Air Navigation Order and the rules under it?

- 1 Is it possible to fly without the aircraft's wheels leaving the ground?
- 2 If this can be done, when might it be advantageous?
- 3 Is it possible for an aircraft to become airborne by deliberate action of its pilot without actually flying?

Last month's non-picture puzzle

This was the puzzle set by Tom last month"For maximum range one should fly at the minimum total drag speed. For the Chipmunks which I used to fly, the Book said 1900 rpm = 90kt. For maximum endurance, the Book said 1700 rpm = 70kt. As 70kt is slower than 90kt, the aircraft's drag must be greater than it is at 90kt, requiring greater thrust from the propeller to maintain steady flight. As the propeller is a fixed pitch one, one cannot get this extra thrust by increasing the pitch. From where does the extra thrust come?"

As expected Tom's question last month generated a couple of very complete answers so those are reproduced following on from Tom's definitive answer.

Firstly, who spotted the untruth in the question? The maximum range airspeed in still air is faster than the minimum total drag speed. The reason is that the drag curve (graph of total drag vs airspeed) has a gently rounded minmum, so fly a little faster and one gets extra speed for little extra drag.

The angle of attack (α to those in the trade) of a fixed pitch propeller blade reduces as the aircraft accelerates. One can test this readily by being a penny pincher (as I am) and leaving the full power check until take-off. Open the throttle fully and one gets about 2200 rpm in my creaky old Cherokee. That's enough, so let go the brakes, and the tacho reading climbs steadily because the angle of attack of the propeller blades reduces and so does the torque required to spin the propeller. The engine responds with faster rotation and more shaft power.

When loitering in the sky (maximum endurance), one reduces the airspeed and gets an increased angle of attack for the blades and hence extra thrust from the propeller. More shaft torque is not needed because the propeller is slowed. For those who like analysis, I suggest a plan view of the nose and vector drawings of the propeller blade section and the relative velocities. For those who want experimental evidence, fly, but it will cost you! Flying for long enough at the maximum endurance and range speeds to get useful fuel consumption figures from an ordinary aircraft fuel gauge is expensive.

Trevor Wilcock has answered Tom's original questions with: *(continued on next page)*

The angle of attack of the propeller blade is the pitch of the blade and the direction of the airflow at the blade, the latter being a function of rpm and forward speed. As forward speed is reduced at a given rpm, the angle of attack of the blade increases. For the cases in question, the rpm is not constant, but 70kt/1700rpm is 13% less than 90kt/1900rpm, so the angle of attack of the blade is greater at the lower speed, which will contribute to an increase in thrust.

But .....

There's a V2 term in the lift equation, so the thrust generated by the prop is dependent on the square of the velocity of the airflow at the prop as well as on the angle of attack, and (neglecting the effect of forward speed): (70/90)2 = 0.6 ie the thrust for a given angle of attack of the blade is 40% lower at the lower speed.

We don't have enough information in the question to know whether the effect of increased angle of attack is sufficient to overcome the effect of reduced V2.

But that's not all!

There are several other effects, amongst them being:

- ✈ as angle of attack of the aircraft increases, the engine thrust provides a component that assists lift, reducing the amount of lift (and resulting drag) of the wing.
- ✈ the prop slipstream flows over the wing, also affecting both lift and drag.

So the minimum drag point may change as power is varied.

- ✈ Thirdly, the fuel usage is a function of the efficiency of the engine as a function of rpm and of the prop as a function of its angle of attack (the prop blade has its own "minimum drag" condition where L/D of the blade is a maximum).

Maximum range or endurance depends on the efficient use of fuel by the engine as well as the efficiency of the propeller and airframe aerodynamics. So the question might be flawed in assuming that maximum range occurs at minimum drag.

All of these above factors will have an influence on max range and max endurance. I suspect the answer as to why the condition for max endurance is at 1700rpm/70kt is simply because that's what test flying showed!

And **Tony Niblett** says: The non picture puzzle is not easy to explain without a diagram but I will try as follows:-

Whereas the rotational speed of the propeller is reduced by just over 10% from 1900rpm to 1700rpm, the forward speed of the propeller has reduced by over 22% from 90 kt to 70 kt. This results in the airflow striking the propeller blades at a shallower angle (relative to the propeller disc) at 70 kt and 1700rpm than at 90kt and 1900rpm. The angle of attack of the aerodynamic section of the fixed pitch propeller blade is therefore increased and this is similar to the effect of increasing the pitch of the propeller at constant rpm and produces more thrust in this case.

To further illustrate the the situation with more numbers, I offer the following:-

The tangential velocity in the plane of rotation "Vr" of any point at a radius "r" (ft) on the propeller blades rotating at "w" (rpm) is given by:-

Vr=2 x Pi x r x w / 60 (ft/sec).

For example, at a point at a radius of 2ft on the propeller blade the tangential velocity in the plane of the propeller disc at 1900rpm is:-

2 x Pi x 2 x 1900 / 60 = 398 ft/sec. The forward velocity "Vf" of 90kt (in ft/sec) is 90 x 6080 / 3600 = 152 ft/sec.

These two velocities combine to produce a velocity relative to the propeller blade which is at an angle to the plane of the propeller disc having a Tangent of Vf / Vr = 0.382 That is an angle of 20.9 degrees.

Repeating the calculations for 1700rpm and 70 kt we have Vr = 356 ft/sec, Vf = 118 ft/sec, and an angle of 18.37 degrees.

Therefore at the lower speed, the angle of attack of the propeller blade has been increased by 20.9 - 18.37 = 2.53 degrees.

WHO ARE WE?

A column dedicated to finding out more about who belongs to the Bristol Wing.
This month we talk to : **Dave Hall**

Current Day Job/Past Career

I'm enjoying retirement after teaching physics/science at secondary level, but am still involved with youngsters, encouraging them to develop an interest in aviation through the LAA Youth & Education Support Strut, and as a volunteer at the Bristol Aero Collection Museum at Kemble, where there's a great Kid's Activity Zone, which will hopefully be moving to Filton at some time.

Why Aviation?

My father was a wartime RAF pilot, and moved into BOAC towards the end of the war, so we've been immersed in aviation as a family. Since retiring I've had the time and enough inheritance(!) to learn to fly. Though my father has been dead some 25 years, flying is also a way for me to feel closer to him.

The trigger for re-awakening my interest was visiting the G-VFWE at Wroughton, and being fascinated by all the happy-looking aircraft, particularly G-LUSI, a beautiful maroon and cream Luscombe Silvaire. Imagine finding out the next day at school that Mary Leader, a colleague at Wellsway, owned an aircraft, and had been there that day with Ian and G-DENS.

First Flight – in What, Where and When?

First aeroplane flight was in a DH Comet 4 G-APDN to Johannesburg in 1962 to visit relatives. Staff travel can be an uncertain affair, and for the sector from Nairobi to Salisbury the only spare seats for my brother and me were up front in the cockpit – the best way to travel by far.

First light aircraft flight was with Ian in Smaragd G-DENS, from Garston Farm, on Sat 19th May 2001. Brilliant! There are quite a few old VW bits in this German-built Emeraude, and a sunburst orange paint very similar to my camper's orange that made me feel at home. *(It is actually WV Orange paint! Mary)*

How long in the Bristol Strut/Wing? :

I started coming to Strut soon after my first flight with Ian, and joined up in November 2001.

Total Number of Aircraft and Hours Flown :

Being a relatively new pilot, I've only flown 16 light aircraft, of 10 different types, for a total of about 170 hours.

Favourite and Worse Type Flown :

Just for the style, my favourite was in DH60 Moth G-ABAG, once owned by W.O. Bentley – a leisurely flight from White Waltham, around Henley, with Stewart Luck. He had been display flying it at Brooklands very impressively in blustery conditions. Luckily the wind had eased later in the day. I managed to recall my tail-dragger training, and he didn't take control at all – I don't expect his hands/feet were far from them though!
I can't single-out any to describe as a 'worst type'. Some are simply more individual than others. I do recall a 'bag of nuts' PA28 at Kemble that was transformed into a very pleasant aircraft to fly after its annual servicing, so I can't hold that against it.

Current Aeroplane(s) :

Piper PA22 Tri-Pacer G-BUVA, built 1953 with uprated (160hp) engine, shared with 8 other group members at Oaksey Park. It's got a real 'vintage' feel, though officially it counts as a 'Classic' aircraft, and is on Annex II, but CofA not permit.

Best Aviation Moment and Flight :

My first solo on St George's day 2004 has to be the most memorable, but the flight up front in the Comet 4 runs it a close second.

Any Aviation Heroes - if so who and why?

I'm not really a hero-worshipper, but my father must qualify for that honour. I've copies of many of the letters he wrote to his parents as a young RAF pilot training and flying operationally in Hampdens, Manchesters and Lancasters. They give an insight into life at the time, and are a wonderful record of his bravery in facing such risks, and the dedication he showed to getting the job done. Like most wartime flyers, he didn't say much about it, but the letters speak volumes*. Being contemporary with the events, rather than written as reminiscences, brings out the flavour of the time rather well. I must get the rest of them put on soon.

Any 'Hairy' Aviation Moments - if so – any lessons learnt? :

Just starting the climb-out from Oaksey, the Tri-Pacer engine began to lose power, so I levelled the nose, looked for a suitable field, went to change tanks and as soon as I touched the fuel selector, it smoothed out and began to climb again. Somehow it wasn't fully in the detent position – just enough to do the power checks OK, until the nose came up and reduced the pressure head. **Lesson learned** – ignore where the tank selector marking is, make sure, on the ground, where the lever actually fully opens it!

Aircraft Wish List – to fly or own

I'd love to build a wooden aircraft from plans, but I'd also want to finish it and fly it, so I don't regard that as a realistic ambition now. Owning Tri-Pacer G-HALL would be a good alternative, especially as my father's name is Geoffrey! Maybe I will get to fly it sometime, as I'm too careful with money (or rather, I wouldn't get Anne to agree) to own a whole aircraft. It would be good to get it in the logbook though.
Like many others, I would have loved a flight in Concorde, but priorities dictated otherwise at the time.

Any Advice For All Pilots

Watch your airspeed!

Ambition :

To stay happy and healthy to a good age and enjoy my grandchild(ren) growing up.

- Some are transcribed on the web at http://www.hallvw.clara.net/flying/GHall.htm .
- Bristol Strut (as it was then) ran the series in our Newsletter from **January 2002** Click here to read the first letter reproduced on the last page. In fact all our past newsletters (dating back to 1999) are available on our website thanks to Steve's hard work. Here's the link to the list which makes interesting nostalgic reading.

Here's an extract from that letter:

I suppose the weather your end of the country is just as bad as ours. We have had a heavy fall of snow since last night, and have had to clear runways on the aerodrome. I managed to get a trip in on Sunday – a very bad one. We flew in cloud most of the time, and could scarcely see anything. Added to this we got badly iced up, and, at one point, both engines cut out for about ten seconds, due to ice forming in the carburettors. We were perilously near the ground when they recovered. Altogether, it was a shaky trip, and I wasn't sorry to be back on the ground again after seven and a quarter hours of it. When we had landed I broke a thick coating of ice from the tail plane and rudders.

One quite harmless, but none the less scaring thing was the static electricity encountered in most of the cloud. The whole aircraft is lit by a most brilliant blue light – seems as though the aeroplane is on fire – and sparks fly from all parts of the fuselage. I had sparks jump off my nose onto the oxygen mask, and a rainbow halo formed around the airscrews. At the same time as this was going on, while over the target area, it was accompanied by blinding flashes from the ground below, so that I was very glad to emerge from the clouds into a more healthy atmosphere over the sea – although it looked much too rough to be pleasant.

The other evening we gave a dinner for the ground crews – I found that I could carry three plates of soup without spilling any, or putting my thumb in it! However after the party had been disbanded, we found we were 147 bottles short! The fellows had slipped out to their billets with them under their coats, and they still can't be traced – no wonder we ran short of beer halfway through the evening!

Well, I must go to bed now – it's 11.25 or should I say 2325 hours? …..

Goodnight, and best love
from Geoffrey.

P.S. Am becoming the Squadron authority on ice accretion, having had more experience in ice-flying than anyone else!

P.P.S. 128 hours (*on operations).*

The Man Aviation History Almost Forgot

Charles E. Taylor by Bob Taylor

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. Aluminium 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 aluminium he had. The cylinders were turned from fine-grain grey 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 jeweller 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 centre. 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.

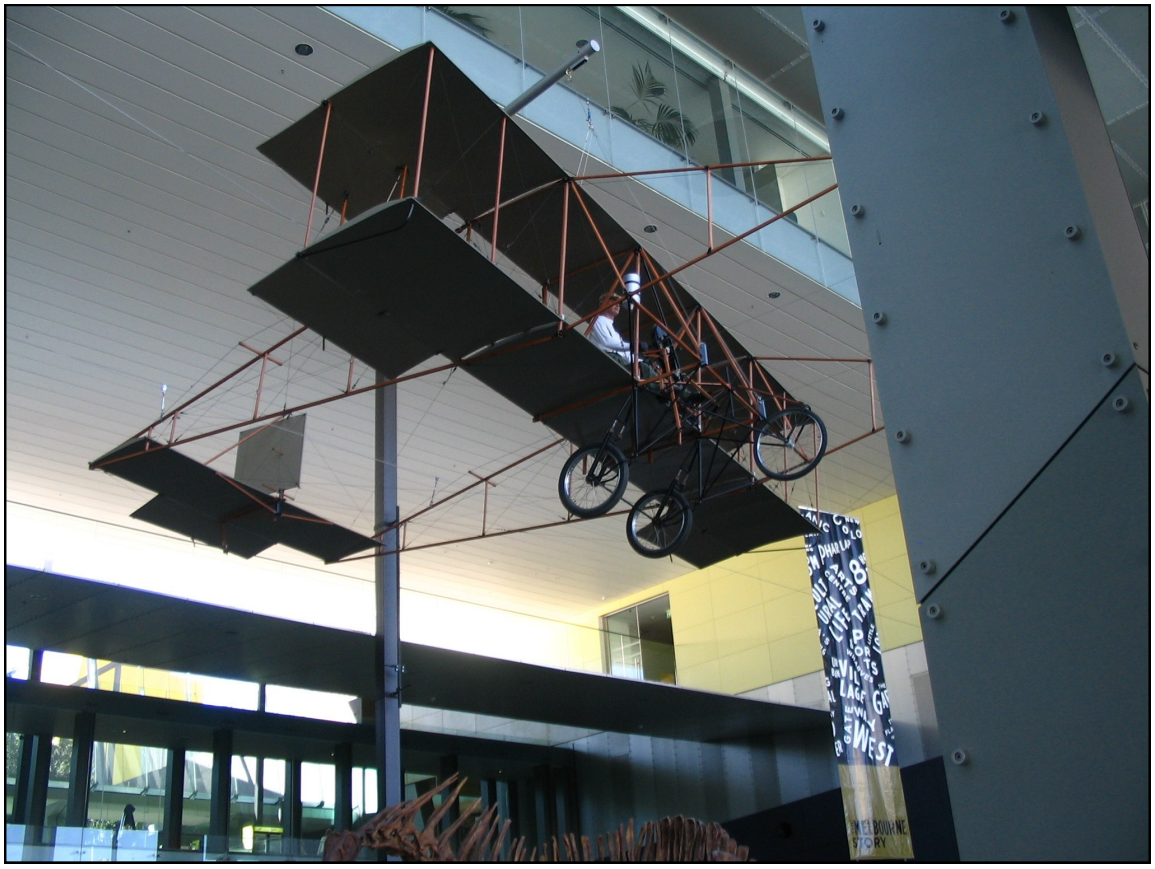
Charlie sent his family ahead to California and got on the three car train that was to accompany the flight. One car of the train was a repair car where the aircraft parts would be stored and the aircraft repaired. It took Cal Rodgers 49 days to cross the United States. Three days, ten hours of that 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 defence 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 Angles 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.



Any suggestions where this replica of the Wright Flyer is hanging?