



*Semper Volanis!  
Semper Vigilans!*

# The Coastwatcher

The Periodic Newsletter of the Thames River Composite Squadron  
GON  
Connecticut Wing  
Civil Air Patrol

Vol. I No. 2

31 August, 2007

## SCHEDULE OF UPCOMING SPECIAL ACTIVITIES

### *The Coming Week*

01 SEP Rifle Safety and Marksmanship Training  
04 SEP Regular Meeting Night (PT)  
05 SEP Field Day

11 SEP Regular Meeting Night (BDU/testing)  
15 SEP Field Day/ACUT Training/O Flight  
18 SEP Regular Meeting Night (Blues/ML)  
19 SEP National Aviation Day  
22 SEP Rocket Launching  
25 SEP Regular Meeting Night (BDU)

## REDCAP MISSION

On 26 August, as Maj Keith Neilson was taxiing in N9573X after a 3.8 hour Long Island Sound Patrol, Groton Tower relayed a message from Capt Gerald Sledge, Wing Ground Operations Officer. Information had been received that an aircraft had gone missing. Information was sparse and Neilson and his crew, Capt Rocketto and Capt Wholean were tasked to fly along the coast from Groton to New Haven and search for signs of the missing aircraft. Night was fast falling and the mission was flown with negative results.

Upon landing, the crew was informed that the missing aircraft was a maroon and white Piper PA-32 Cherokee-6. Armed with its "N-number,

we conducted a ramp search, again with negative results.

Information received later state that the sole occupant, Kennworth Eaton, was conducting a test flight from Spadaro Airport in East Moriches to Francis S. Gabreski Airport in Westhampton.

## GROUND OBSERVER CORPS REDUX

The mystery aircraft seen in the last edition was the Dornier 328J. This aircraft is a clever adaption of the Pratt and Whitney (Canada) PW306 turbofan to the turboprop powered Dornier 328. A minimum number of modifications were necessary and the first flight took place in 1998 followed by a production run of 110 aircraft. Ramp chatter says that these aircraft are used to run charter flights to the casinos.

This edition's aircraft was seen with its mate for a month this summer when Warbird Adventures of Kissimmee, Florida stationed them on the south ramp and offered flights to the public.



## MEMORIES OF SEPTEMBERS PAST

### *Highlights in the History of Aviation*

07 SEP 1909-United States Army establishes first aerodrome at College Park, MD.

10 SEP 1960-Capt Rocketto's first solo, Piper J-3 Cub, N42592, Waterford Airport.

14 SEP 1944-First scientific data collection flight into eye of hurricane made in Douglas A-20 Havoc. Col Floyd Wood, LtCol Harry Wexler, and Lt Frank Reckord manned the aircraft.

17 SEP 1908-First powered aircraft fatality when Lt Thomas Selfridge is killed and Orville Wright severely injured in crash at Ft. Meyers, VA.

17 SEP, 1911-Calbraith P. Rogers in Wright Flyer, *Vin Fiz*, starts first successful transcontinental flight, Sheepshead Bay, Brooklyn to Long Beach, CA. The flight covers 4231 mi in 84 days, 70 hops, and 82 hr 14 min flying time with a final landing on 10 December, 1911.

17 SEP, 1959-A. Scott Crossfield, legendary test pilot and CAP icon, pilots North American X-15 on the first of its 199 flights at Edwards AFB.

19 SEP 1871-Orville Wright is born.

18 SEP 1947-The National Security Act of 1947 establishes the USAF as an independent service.

21 SEP 1956-Off the south coast of Long Island, Grumman test pilot Thomas W. Attridge is testing the 20 mm cannons of an F11F-1 Tiger. While diving at 13,000 ft, he fired a short burst, went to afterburner, and increased the dive angle and speed. At 7,000 ft, the aircraft flew into its own bullets, which had been slowed by air resistance, and suffered severe damage. Attridge nursed the crippled plane back to Calverton but the engine failed about a half mile short of the runway so he was forced to deadstick the Tiger into the woods, escaping with serious injuries.

22 SEP 1950-Two Republic F-84E Thunderjets engage in three in-flight refuelings to complete the first jet non-stop trans-Atlantic flight. Col David C. Schilling is awarded the Harmon International Trophy. Strong headwinds cause wingman LtCol William D. Ritchie to run out of fuel but successfully ejects over Labrador.

23 SEP 1910-Peruvian Jorge Chavez makes the first successful flight over the Alps. He is fatally injured upon landing. His last words were "Higher, always higher!", the motto of the Peruvian Air Force

23 SEP 1913-Roland Garros, eminent French aviator, makes the first successful crossing of the Mediterranean Sea flying 470 miles in 7 hr and 53 min. He violates non-existent *CAPR 60-1, para. 2-19, subsection a. 1*, when he lands with only 7 minutes of fuel on board. In World War I, he invents deflector plates which enable him to fire his nose mounted machine gun through the propeller arc. After a forced landing, he was captured but later escaped only to die in aerial combat in October of 1918, one month before the war's end.

24 SEP 1929-Lt James H. Doolittle, flying a Consolidated NY-2, performed the first instrument take-off, flight, and landing at Mitchel Field, Long Island, NY.

25 SEP,1903-The Wright Brothers arrive at Kitty Hawk, NC to commence testing of their first powered aircraft.

29 SEP 1946-Cmdr Thomas D. Davis and his crew fly a Lockheed P2V Neptune, *The Truculent Turtle*. non-stop from Perth, Australia to Columbus, OH, a distance of 11,235.6 mi in a time of 22 hr and 25 min. They land on 1 October.

29 SEP 1954-The McDonnell F-101A Voodoo makes its first flight. Enthralled by this aircraft, a young lad, Larry Kinch, decides on a career in the USAF.

**CADET MEETING MINUTES**  
**28 August, 2007**

The new schedule has been instituted. C/TSgt Molinari led the opening ceremonies and drill

Captain Bourque's emergency services lesson centered on heat related injuries and their mitigation.

Captain Rocketto's aerospace lesson was in three parts. First the cadets constructed paper helicopters and tested them. They discussed the characteristics which controlled the rate of descent of their aircraft. A contest was announced for next week. Each cadet was to construct another helicopter from a paper-like material. At the next meeting, they will be tested and the craft with the slowest rate of descent will be declared winner. Additionally, the craft must display sufficient stability to land within a designated circle.

The second part of the aerospace session was a discussion of lunar eclipses. Captain Rocketto demonstrated models which illustrate how solar and lunar eclipses occur and why they are not monthly occurrences. The full moon was observed and a meteor estimated at magnitude -1.5 was seen in the west falling from south to north at about a 30 degree angle. The meteor broke into two fragments approximately 30 degrees above the horizon.

Hurricane safety was discussed and cadets were issued a printout of an American Red Cross brochure describing hurricane preparedness in advance of the storm and appropriate actions during and after the event.

A promotion ceremony was held. C/AB Ryan Montgomery and C/AB Abigail Wojtcuk were both promoted to A/Amn and awarded Curry Achievement Ribbons.



*Cadet Ryan Receives Curry Award from LtCol Kinch While Capt Bourque Looks On*



*Cadet Abigail Wojtcuk has striped pinned on by Capt. Bourque*

## AEROSPACE FEATURE ARTICLE

### An Odd Solution

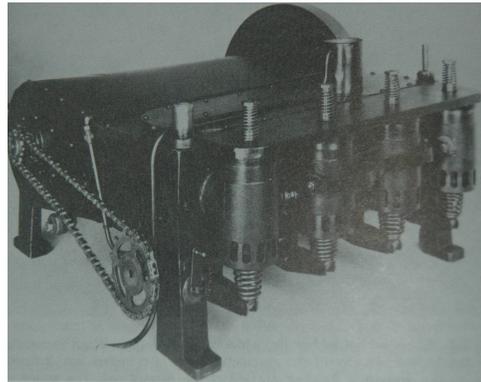
by  
Stephen M. Rocketto

Recently, a friend and former employer, Ed Reeves, passed away. Ed had been recognized by the Federal Aviation Administration as an outstanding mechanic. The honor which he received is named after Charlie Taylor, the mechanic of the Wright Brothers who built the engine which on 17 December, 1903, propelled the first aircraft to accomplish the feat of manned and controlled heavier-than-air flight. This award reminded me of a promise which I had made some time ago to a group of physics teachers, and since, as Robert Service said, "a promise made is a debt unpaid," I fired up the word processor and started typing.

Some while ago, a group of Connecticut Association of Physics Teachers visited the New England Air Museum at Bradley Field. As an *aficionado* of aviation museums, I recommend it as one of the best with much to offer in educational value to physics students. We spent some time looking at the various kinds of power plants on display. They ranged from a classic Gnome rotary engine to modern turbines. One of our members remarked that every bank of cylinders on radial engines contained an odd number of cylinders. For those of you who are unfamiliar with aircraft power plants, I will digress and offer some information about these amazing mechanisms.

The engine which Charlie Taylor constructed in accord with a Wright Brothers design was a four cycle internal combustion, gasoline fueled, air cooled, four cylinder in-line design. Fueled and ready for flight, it weighed in at about 200 pounds and developed around 12 horsepower at a little more than 1000 revolutions per minute. Using rough sketches, hand tools, a lathe, and drill press,

Taylor completed the project in six weeks!

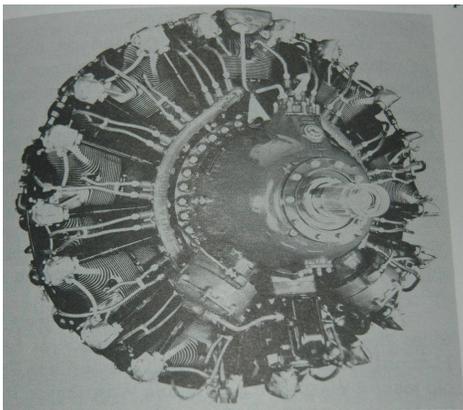


*The Taylor Engine*

Engineering is a series of compromises. In aircraft engines, weight, frontal area, and cooling capacity are interrelated design factors that had to be balanced against each other. As more and more cylinders were added, various geometries were used to improve cooling. These included arranging the cylinders in opposition, in vee's and even cruciform arrangements resembling the letter x. Liquid cooled in-line engines decreased frontal area, but paid a penalty in a more complex cooling system and increased weight and decreased reliability. An alternate geometry was to arrange the cylinders in a circle around the crank, the radial design. The excess frontal area increases form drag and reduces pilot visibility but eases cooling and reduces weight.

Weight reduction is obviously crucial. Excess weight reduces useful payload and increases induced drag. The Wright engine had a weight to horsepower ratio of about 17:1. For many years, the "holy grail" of engine designers was a 1:1 ratio. George Jackson Mead led the design teams at Pratt and Whitney in East Hartford which produced the innovative Wasp and Hornet series of radial engines. These engines reduced weight by eschewing liquid cooling in favor of air cooling. Additionally, the long crankshaft was eliminated. Since the pistons are coplanar, each of their connecting rods can be connected

together in a web-like arrangement at the center. The 1:1 power loading was finally achieved during World War II with advanced models of Pratt and Whitney's classic R-2800 Double Wasp, just over a ton of engine consisting of two banks of nine cylinders each operating at 2400 rpm.



*The P&W R-2800 Double Wasp*

At this juncture in the narrative, let us return to the original issue: the observation that all of the radial engines had odd numbers of cylinders. To understand the reason, recall that these engines require four strokes: a compression stroke to condition the fuel-air mixture, a power stroke in which the mixture is ignited and the increase in pressure forces the piston down, an exhaust stroke in which the burned products of combustion are scavenged, and the intake stroke in which the fuel and air are admitted to the cylinder. This requires that the piston make two passages up and down the cylinder for each power stroke so the crankshaft must make two cycles. Here is a way to visualize what is happening.

Consider a radial engine of five cylinders. Draw a circle to represent the engine. Make five small tick marks, 72 degrees apart to indicate the position of each cylinder and number them one through five. Start the firing of the engine with cylinder number one. Draw a line from number one to number three. This line represents cylinder number one's power stroke. Now draw a line from number three to number five. This

represents cylinder number one's exhaust stroke. Continue from number five to number two. This line represents cylinder number one's intake stroke. Now draw the line from number two to number four. This represents cylinder number one's compression stroke. The next line will go from number four to number one, a power stroke for cylinder one. As this is occurring, each of the other cylinders is going through a similar cycle. If you continue to follow this pattern, you will find that the pattern yields 10 power strokes for the five cylinder arrangement. This means that there is one power stroke for each two cycles of the crankshaft, exactly as it should be for a four cycle engine and furthermore indicates a continuous impulse on the crankshaft. Each cylinder is fired once in two revolutions of the crankshaft. If you attempt to do the same thing for an even number of cylinders, say four or six, you will find that it is impossible to lay out a symmetrical firing order in which each cylinder fires once per two revolutions.

The idea for this explanation was found in the book *Internal-Combustion Engines, Their Principles and Applications* by the Officers of the Department of Marine Engineering, U. S. Naval Academy, Annapolis, Md. It has a 1937 publication date and was once the property of the U. S. Maritime Service Training Station in St. Petersburg, Florida. The book is one of those gems which you can pick up for a dollar at a library sale and is the kind of literature which should be in the collection of any devotee of aerospace science and technology.

**Illustrations for this article were digitally reproduced from *A History of Aircraft Piston Engines* by Herschel Smith. The Taylor illustration is courtesy of NASM-Smithsonian and the Double Wasp is courtesy of Pratt and Whitney Division, UTC Corporation.**

*"...the sound of four reciprocating engines in formation was thunderously loud, and pouring an avalanche of vibration rattled windows and rippled through the air. And after landing, the four machines idled blap, blap, blap off the runway. I had time-traveled to my favorite part of aviation history."*

*Richard S. Drury  
My Secret War*

\_\_\_\_\_