



Missions for  
America  
*Semper vigilans!*  
*Semper volans!*

## The Coastwatcher

Publication of the Thames River Composite Squadron  
Connecticut Wing  
Civil Air Patrol

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*December 17, 2016 is the 113th anniversary of  
First Flight, Kitty Hawk, North Carolina*

**ANNUAL PARTY**  
*13 December, 2016*

Approximately 28 members attended. The food was pot-luck. After eating, games such as charades and Pictionary were played.

### **TRAINING FLIGHT**

Lt Col Larry Bright completed the scanner qualification requirements on Sunday last. Maj Scott Farley commanded the training flight, Lt Col Bright's second, and signed-off the last tasks which needed to be demonstrated, locating sites using the CAP grid and keeping a log. Landing were made at Tweed-New Haven and Chester.

### **FRUIT**

The citrus fruit will be delivered to Grasso Tech on Friday morning. TRCS will muster at 1400 to transfer our share to the trailers. The evolution will take about three hours. Volunteers should report to assist between 1400 and 1500. Meet at either the trailers or on the southeast side of Grasso Tech.

### **Brendan Flynn Performs** *14 December, 2016*

Former TRCS Cadet Commander, Brendan Flynn, now a First Class-man at the Coast Guard Academy, played his original musical composition, *Evergreen*, at Connecticut College. Flynn is majoring in marine and environmental science but is studying music composition class at Conn.



Flynn has been playing the piano since he was six but this is his first piece written for a piano trio. Flynn was accompanied by Theodore Arm, violin, and Christine Coyle, cello.



October 2016						
SUN	MON	TUE	WED	THU	FRI	SAT
1/2 Traex Month	3 Cl	4	5	6	7	8 Groton Fair Rifle
9	10 Col Day	11 CC CALL	12	13	14	15
16	17	18	19	20	21	22 ST WD
23 OFlight	24	25	26	27	28	29
30	31 Hlwn	<b>Sell Sell Fruit Sale</b>				

November 2016						
SUN	MON	TUE	WED	THU	FRI	SAT
Fruit Sale		1 Fruit Sale	2	3	4	5 Cadet Ball Rifle
6	7	8 Election CC CALL	9	10	11 Veterans ELKS	12 Traex
13	14	15	16	17	18	19 CLC
20 OFlight CLC	21	22 No Mtg	23	24 Thksgvg	25	26
27	28	29	30			

December 2016						
SUN	MON	TUE	WED	THU	FRI	SAT
Fruit Sale Delivery around Dec 12				1	2	3
4	5	6 CC CALL	7	8	9	10
11	12	13 Holiday Party	14	15	16 Expected Fruit delivery	17 Oflight
18	19	20 No Meeting	21	22	23	24
25	26	27 No Meeting	28	29	30/31	April OpsEval SLS Mar 11/12

New Year- New possibilities						
SUN	MON	TUE	WED	THU	FRI	SAT
New Improved Calendar online and in this publication				1	2	3
4	5	6	7	8	9	10
11	12	13 CC CALL	14	15	16	17
18 Oflight	19	20	21	22	23	24
25	26	27	28	29	30	

**Excellence**

Date	Senior	Cadets
1	Traex Startford	
4	Staff Mtg	Staff Mtg, Program Development (civ)
8		Groton Fair POC Richards
11	Commanders Call/Pilot Mtg	Drill, CD, Flight Time, Promotions (Blue)
18	AE - AEO Rocketto	PT, DDR, Guest Speaker (PT)
25	ES - AP	Drill, leadership, guest speaker (BDU)

**Integrity**

Date	Senior	Cadets
1	Staff Mtg	Staff Mtg
11		Elks
5	Pilot	Cadet Ball- Formal
8	Commanders Call	No School; No Cadet Meeting
19/20		CLC Class Hartford
15	ES - Winter Ops	Drill, Guest Speaker, Promotions (blue)
22		No Mtg
29	Open training	PT, DDR, Flight Time (PT)

**Volunteer Service**

Date	Senior	Cadets
3/4	UCC cancel move to feb	
6	Commanders Call	Drill, CD, PT, admin, flight time (PT)
13		Holiday Party 1800 Civie (bring a dish)
20	Staff Conference Call (2000)	Staff conference Call (1900)
17		Oflights

**Respect**

Date	Senior	Cadets
3		
6		
10		
13		
17		
18		
18		
20		
24		
27		

## **CAP RADIO PROMOTION**

On Tuesday morning, Major Scott Farley and Lt Col Stephen Rocketto were interviewed about the Civil Air Patrol on the Lee Elci Show, 94.4 MHz. The interviewer was SM Adam Spreca, filling in for Elci.

The half hour program consisted of a series of question and responses about CAP history, missions, organization, and membership requirements.

## **CURRENT EVENTS**

### *Boeing and Lockheed-Martin Shaken*

Boeing officials and stockholders are disconcerted by the President-Elect who trumpeted that he will reconsider the contracts for the new Air Force One Boeing 747s and the and the Lockheed-Martin F-35 Lightning II. President-Elect Trump is troubled by the high costs of both programs. Pundits predict that possibilities might be cut-back in the orders or renegotiation of the contracts. Contract cancellations are not expected.

## **AEROSPACE HISTORY**

### ***THE WRIGHT BROTHERS***

*by*  
*Stephen M. Rocketto*

Some dozen years ago, I got involved in a project tentatively titled "From Kites to the Wrights," a proposed interdisciplinary curriculum package for celebrating the centennial of flight in 2003. My involvement in this effort started in typical fashion. Gordon Schimmel, the Superintendent of Schools in Mansfield, CT called Ralph Yulo, Professor Emeritus of Education at Eastern

Connecticut State University. He asked Ralph if he might recommend anyone and Ralph mentioned me.

I have always liked projects like this one. Even if they do not fulfill their expectations, enough good material can be developed to make it all worthwhile. Besides, the collegiality and fellowship of the other participants buoyed my spirit and brightened my dour disposition. But this project was a real bonus. My earliest memories are entwined with things aeronautical. Flying, model building, and studying the history of aviation has diverted me from the mundane, emptied my pockets, and enriched my soul. So I eagerly seized the opportunity to minimize my sleep and complicate my life. Some people just cannot say "NO!"

One meeting led to another and the project has focused on developing a set of interdisciplinary modules centered on some sort of laboratory exercises or construction activities which is directly related to the experiences which Wilbur and Orville Wright underwent between 1895, when the first heard about the gliding experiments of Otto Lilienthal and 1905, when they produced the improved model of their 1903 Flyer.



*The Lilienthal glider, the first successful aircraft to receive a U.S. patent (1895).*

Emulating the Wright Brothers, I entered into a bibliographical search of the literature which might assist me in producing one or two useful segments for the project. I was especially interested in the convergence of talents, social conditions, and technology which contributed to the Wright's success in controlled, powered, manned, heavier than air flight; a goal which was eluding many notable scientists and experimenters. Five books proved especially helpful.

The first two were Tom Crouch's biography of the brothers, *The Bishop's Boy's* (A Life of Wilbur and Orville Wright) and David McCullough's *The Wright Brothers*. The third and fourth were

Octave Chanute's *Progress in Flying Machines* and Orville Wright's *How We Invented the Airplane* (An Illustrated History). Both of these volumes were readily available in Dover Publications editions. As an aside, Dover should be commended for their consistent policy of producing inexpensive reprints of seminal writings in science, mathematics, and technology. The fifth book which I considered was Peter L. Jakab's *Visions of a Flying Machine* (The Wright Brother and the Process of Invention). This is another of the fine Smithsonian History of Aviation Series. The two historical reprints would serve as a "reality check" as I considered the theses offered by Crouch and Jakab.

Crouch and McCullough both develop a detailed and coherent narrative of the unusually close relationships among the Wrights; the father Milton, the sister Katharine, and of course, the younger brothers, Wilbur and Orville. These books are most valuable for the biographical description of the Wright's lives, both independently and as a family.

The brothers displayed an early interest in things mechanical. One of their favorite toys was a Penaud helicopter, a variation of the familiar rotor on a stick, which soars aloft when twirled by a sidewise motion of the hands or by the stored energy of a twisted rubber band. The 11 year old Wilbur tried, with little success, to scale up this clever mechanism and exhibited a lifetime interest in building variations of this classic child's toy.

The earliest business ventures of the brothers first involved the construction and utilization of printing presses and for a number of years, they were involved in the dual business of publishing and press manufacture.

But in 1892, the bicycle craze swept into Dayton and they swiftly transitioned from riders to sellers, repairers, designers, and manufacturers of the safety bicycle. They outfitted a machine shop, designed their own gas operated power plant, and engaged in the production of high quality machines.



*One of the Wright Cycle Shops at 22 South Williams St., Dayton. Their printing business was on the second floor. The Wrights invented the self lubricating hub and were also the first to machine left hand threads on the pedal crank arm to keep the arm from unscrewing.*

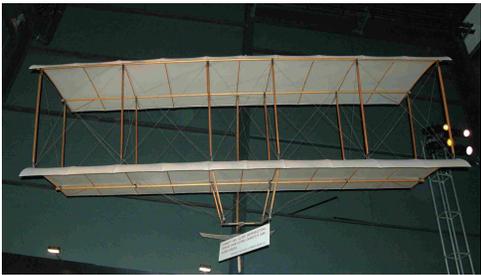
As the last five years of the century played out, Wilbur started to exhibit an interest in heavier-than-air flying machines, initiated by reading about the experiments in gliding which Otto Lilienthal had been carrying out in Germany. Wilbur read Marey's *Animal Mechanisms* and started to consider the problems inherent in building a flying machine. Both brothers were keen observers of animal flight and Orville stated that "If the bird's wing can sustain it in the air without the use of any muscular effort, we did not see why man could not be sustained by the same means." The use of the verb "sustain" indicates thinking beyond short glides, such as practiced by Lilienthal, to flights in which altitude is not constantly lost. They observed the wide variety of flying creatures and could not see any reason why, in principle, why many could not accomplish the same feat.

In 1899, the physicist Samuel Pierpont Langley was the leading experimenter in aerial enterprises in the United States. Langley, Secretary of the Smithsonian Institution and a scientist noted for his work in stellar astronomy, had in 1896, first flown a steam powered model and two years later, received a \$50,000 grant from the U.S. Army for the development of a man-carrying version of his Aerodrome. Wilbur wrote a letter to Richard Rathbun, Langley's assistant, requesting information on the current status of aeronautical science. Rathbun sent Wilbur a collection of pamphlets and a suggested reading list which included Octave Chanute's *Progress in Flying Machines*.

Chanute was a remarkable man with a national reputation as a surveyor of railroad lines, bridge builder and inventor. In 1888, Chanute retired and concentrated all of his attentions on a 30 year

advocacy, aeronautics. He compiled all of the experimental reports which he had collected during that time and published a series of articles which became the book *Progress in Flying Machines*.

A perusal of this text reveals that the book is a comprehensive study of the research from Chinese kites and Leonardo da Vinci's ornithopter in 1500 to the 1890's trials of Hiram Maxim, Lawrence Hargrave, and Lilienthal. But Chanute was not merely a researcher and archivist. He and his assistant, Augustus Herring, conducted over 2000 gliding experiments on the shores of Lake Michigan. Research and experiment led Chanute to the conclusion that the development of a method for aircraft control was the key to practical flight. The Wright Brothers concurred.



*A Chanute Glider at the Museum of the USAF*

However, the eminent Langley and the inventive Maxim were convinced that the evolution of a suitable power plant was the major problem to be solved. Furthermore, since most of the practitioners were doing their research with models, stability was a highly prized characteristic of any design. The Wrights, taking their cue from Chanute and Lilienthal, eschewed stability in favor of controllability.

This difference in design philosophy foreshadowed the arguments in the manned space flight program over automatic systems or pilot controlled vehicles. The U.S. astronaut corps forced the engineers away from the "SPAM in a can" model favored by our designers and adopted by the Soviet program. The Wrights opened up a correspondence and a friendship with Chanute which was to continue until his death in 1910. Chanute personally visited their camp at Kill

Devil Hill in 1901, 1902, and 1903 and served as their unofficial spokesman. Within several years, with Chanute's encouragement and assistance, the Wrights surpassed their mentor's achievements and Chanute saw the dream of practical flight achieved.

Orville's text, *How We Invented the Airplane*, is a succinct and profusely illustrated account of their adventure in invention. As might be expected, they were amateur photographers and carefully documented each step in the process of invention. The stark landscape of Kitty Hawk forms a dramatic backdrop. The poised figures at launch and the clean images of flight are a delight to the eye. Commentary is supplied by a Wright biographer, Fred C. Kelly. Their first personal account to the public, a 1908 article from *Century Magazine* is included as an appendix.

This brings us back to the question of why the Wright Brothers were so successful when so many other people failed. After all, neither of them had completed high school, they were not part of the elite scientific establishment, and they lived in the Midwestern backwater of Dayton, Ohio. Jakab's *Visions of a Flying Machine* subtitled "The Wright Brother and the Process of Invention" successfully explains their achievement by examining how Wilbur and Orville were guided by their mechanical skills, scientific skepticism, "Yankee" pragmatism, and the technical spirit of the time in which they lived.

Whereas Crouch is somewhat diffident in analyzing their engineering aptitudes, Jakab's spares no ink in a close analysis of the technical issues which confronted them and how they mastered each of them in turn. As a result, Jakab's book is more a philosophy of engineering rather than a discursive history of the process by which Wilbur and Orville built their Flyer. One can understand the Brothers as prototypical engineers and in their career, mark those qualities which are the hallmarks of good engineering practice.

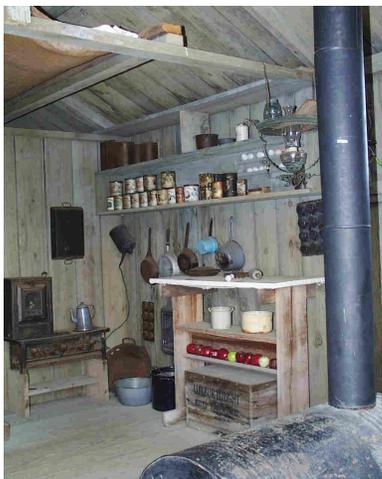
They could clearly define a problem. In the case of their aircraft, they quickly understood, from their experiences with kites and bicycles and their

technical readings, that control was the key to success. In order to produce an airplane one had to experiment with models and manned craft and if the craft were to be manned, they had to be controllable. In a clear vision of priorities, unlike many competitors, they postponed considerations of engines until they resolved the more fundamental issues. Basically, controllability and airfoil optimization could only be done by flying. This realization led to a series of experiments, starting in 1900, with kites and gliders.



*Wright Kite at the USAFM*

Operating at the remote site of Kitty Hawk, North Carolina, selected for its favorable winds, added logistical difficulties to their technical burdens. The first lived on a tent and later, a rude hut. The food supply was always a problem and they sustained themselves on canned tomatoes and biscuits.



*The Wright's Kitty Hawk Kitchen and Pantry.*

They developed the "wing-warping" technique for control but disagreements between the experimental values of lift measured and the

theoretical values calculated from the standard tables of their precursors revealed that the traditional data regarding what we now call lift and drag were in error. They also encountered the problem of adverse yaw, a phenomena which caused an aircraft when banked in one direction to point its nose in the opposite direction.

By 1901, they were somewhat discouraged but Chanute visited with them for several weeks and convinced them that, for all their difficulties, they were far in advance of the field. They did not quit and they modified their program to meet the difficulties which arose. Although the Wrights claim to have entered aviation as a sport, the "reluctantly entered upon the scientific side of it" and established a rigorous program for investigating the myriad variations of fluid mechanics such as airfoil geometries and pressure distributions. They then constructed simple devices for airfoil studies which culminated in their wind tunnel and by late 1901, had rectified the lift and drag tables and could find a rational relationship between their theoretical values and their experimental values.



*A bicycle modified with a force balance and used by the Wrights to test airfoils.*

*A replica of a Wright wind tunnel on display at the General Thomas Stafford Aerospace Museum*





*A reproduction of the Wright workshop in Dayton.*

Of paramount importance in their progress was their ability to visualize solutions. The "visions" in the title of Jakab's book refers not to some dream of a flying machine but to the specific mental constructs which allowed them to analogize between the abstract concepts of theory and the concrete products of the artisan's craft. It was once said of Kelly Johnson, the engineering genius of Lockheed's Skunk Works, that "he could see air." Likewise, Orville and Wilbur Wright could see, in their mind's eye, the relationships of forces and mechanisms which they turned into a wind tunnel, qualitative and quantitative measuring instruments, and ultimately, a practical airplane. Jakab argues that a facility for nonverbal thought was a key element in the Wright's success and my experiences with first class engineers supports this conclusion.

Much of their equipment was made from off-the-shelf supplies as their facile imaginations saw new possibilities in old things. The addition of a rudder, whose movements could be coordinated with the warping of the wings, corrected the problem of adverse yaw. During this period another engineering asset, their skill with tools and their sensitivity for the materials of construction served them well since constant repairs were necessary to keep their delicate machines airworthy.

Consequently, during the next year, they completed around 1000 glider flights and started to acquire the aviator skills and experience which are needed to maintain the equilibrium of the aircraft in flight.



*1902 Wright Glider*

Now they attacked the issue of motive power and did so in typical Wright fashion. They calculated how much power they required and then designed and built, with the assistance of their mechanic, Charlie Taylor, a 12 horsepower engine. Their past work with airfoils, and the ability to visualize that an "airscrew" was just an airfoil which rotated and followed a helical path allowed them to design and construct the first practical propellers. And so, on December 17th, 1903, Orville made the initial takeoff, flying a distance of 120 feet in 12 seconds. Three more flights were made that day, the final one piloted by Wilbur logged 852 feet in 59 seconds and the age of aviation was launched.



*The famous "First Flight" photograph. The photo was taken by John T. Daniels, Kill Devil Hills Lifeguard Station.*



*The track of the first flights. The Kill Devil Hill Monument is visible in the background.*



*The author at the monument erected by the National Aeronautics Association (NAA). The NAA is the national authority for all aviation record setting activity.*

Within two years, they had perfected the original machine and, in 1908, Wilbur captivated Europe with his flying demonstrations and personality. The period of time during which the Wrights grew up was a time of great technological and cultural change. The railroads opened up the west and telegraphy and telephony opened new possibilities in communication. Automobiles and bicycles gave people a new individual mobility. Everything seemed possible. High school educations were not common and neither of the brothers completed high school. But they were voracious readers, deeply curious, and possessed finely honed intellects.

The Wright Brothers Collection at Wright State University in Dayton and the list of books which they took to Kitty Hawk indicates wide reading in the mathematics and sciences including technical publications in French and German. Their biographers indicate that their readings extended into literature, history, and philosophy.

The Wright brothers were brought up to be confident and self-reliant and lived in an age when such characteristics were prized. They entered into heated debates with each other over technical issues in which the give and take of the dialectic would lead to a solution to the problem under discussion. Yet their close personal relationship did not allow for the rancor which might have developed otherwise. These cultural and personal circumstances, melded to their methodical approach to problem solving contributed to their efficacy as engineers and makes them worth studying as a model of what engineering is all about.

### *L'envoi*

#### *The Wrights First Flight*

The term “First Flight” when used to describe the event at Kitty Hawk in 1903 must be qualified. The “First Flight” was the first flight of a manned, heavier-than-air, controllable, powered aircraft with proof of success accepted by aviation historians.

Men had flown before the Wrights. The Montgolfier Brothers made a public demonstration of their hot air balloon in 1783. A number of aviation pioneers flew gliders. In 1853, George Cayley built a manned glider. In the last decade of the 19<sup>th</sup> century, Otto Lilienthal constructed a succession of glider which he piloted himself. Alberto Santos-Dumont flew a powered lighter-than-air ship around the Eiffel Tower. All of these events met the stringent standards demanded by historians, evidence needed to establish the veracity of the event.

