Air and Space this Week

Item of the Week

GLENN HAMMOND CURTISS

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KEY WORDS: Glenn Hammond Curtiss Hammondsport Motorcycle June Bug Seaplane Jenny *JN-4*

"From Aboard a Curtiss Jenny, Oh, You See Things Differently"
Al Stewart, The Immelmann Turn

INTRODUCTION

I grew up in the Finger Lakes region of western New York. It was a great place to be a kid, and its interesting terrain helped spur my interest in Geology. Two of the lakes are bigger than the others: Senaca, with Watkins Glen at its southern end, and Cayuga, with gorge-ous Ithaca and stately Cornell far above her waters. It's an area steeped in (aviation) history, and no more so than at the southern end of yet another Finger Lake, my favorite of them all, Keuka Lake, and the town of Hammondsport. Her most famous son, Glenn Hammond Curtis, is the focus of this particular Item of the Week.

MOTORCYCLE GUY

Glenn Curtiss was born in Hammondsport on May 21, 1878. His grandparents had settled there, and his father was a local harness maker. His formal education went only through the 8th grade, but he had an unusual aptitude for all things mechanical. Still in his teens, he took a job with the precursor company of Eastman Kodak, in nearby Rochester, working to produce photographic film and other products. He invented an improved machine for use in the plant while still new there, a portent of his engineering skills to come.

Curtiss married at 19, and had a son two years later, but he died in infancy. Curtiss would have another child in 1912.

In spite of becoming a family man at a young age, Curtiss also seemed to feel an intense "need for speed." The job with Eastman wasn't a career thing, and he took a number of jobs to support his family: bicycle messenger, bicycle racer, and then, bicycle shop owner. In the latter he was just like two other airplane pioneers, the Wrights! But his legs, though powerful, could not supply the speed he loved, so he began building motorcycles. The internal combustion engine was undergoing rapid technological development at the time, and young Glenn started

putting engines on bikes for sale in 1902. His first efforts were primitive; the "carburetor" on his first motorcycle model was built from a tomato can! The development of his cycle was rapid, too, and by 1903 he set a motorcycle land speed record (64 MPH). But it wasn't just Curtiss' motorcycles that were improving rapidly, Curtiss' skills as a rider were improving just as fast. In 1904, he beat the head of the company that made Indian Motorcycles in an endurance race from New York to Maryland, earning the nickname "Hell Rider" Curtiss. Take that, Johnny Blaze! Not bad for a guy with a tiny shop in the back of his bicycle store and a shoestring budget.

The high point of his motorcycle career came in 1907. He fit a state-of- the-art V-8 engine on a heavy bicycle, took it down to Ormand Beach in Florida, and on **January 24**, 1907, 116 years ago this week, he set a new motorcycle land speed record of 138.36 MPH! The bike had virtually no brakes; it had a scrubber that could be pushed against the rear wheel, but at top speed the tire would have burst if he tried. The "transmission" was primitive, too, and it included a set of bevel gears out in the open, adjacent to his ankles. The slightest misplacement of his foot while underway would have ripped it clean off his leg. The motorcycle was extremely primitive and extremely dangerous, but he ran it as fast as it could go anyway. You can see a picture of Curtiss aboard this motorcycle here; the low handlebars and bevel gears are clearly visible. See the Coda of this Item for more on the motorcycle.

SEAPLANE INVENTOR

Doing crazy things on motorcycles was only part of Curtiss' activities in the first decade of the Twentieth Century. His work with internal combustion engines was paying off, and he began selling engines for use in dirigibles. His engines and his exploits caught the attention of Alexander Graham Bell, who was deeply impressed by Curtiss and invited him to join his Canadian/USA aeronautical research, the Aerial Experiment Association. The AEA would last only two years, during which time four aircraft were built under AEA management. Curtiss supplied the engines, and he designed the third aircraft in the AEA series. His *Aerodrome #3* became well known later as the *June Bug*, and Curtiss flew it to win the Scientific American Trophy (and $2500) by flying a 1 km closed course. The Aero Club of America began issuing Pilot Licenses at the time. The first batch were done simultaneously and ordered alphabetically, meaning that Curtiss received License #1 and Wilbur got #5! The June Bug became the first of what would be a series of pusher-type aircraft models Curtiss developed.

The AEA dissolved in 1909, as planned from the beginning. Curtiss then partnered with another aviation pioneer, A.M. Herring, to form the Herring-Curtiss Company, based in Hammondsport. Aerial demonstrations and competitions were becoming all the rage, and Curtiss used them to promote his aircraft, hiring a number of (soon-to-be) famous aviators. One in particular has graced these pages before, Eugene Ely, who played a key role in the development of naval carrier air (here).

Curtiss and Ely made a big impression on the Navy, which moved to expand experimentation with flying on and off a ship. They also realized that having a cadre of trained pilots would be a

good idea for the future, and had Curtiss come to San Diego and begin training the Navy's first pilots. Not all of the students were American; Chikuhei Nakajima, who would become the founder of Japan's Nakajima Aircraft Company, was a 1912 graduate. His company produced many military aircraft models, notably the "Kate" torpedo bomber for the Japanese Navy and the "Oscar" fighter for the Army.

Curtiss also operated a flying school in Hammondsport. One of his more successful students was Blanche Stuart "Betty" Scott, who ended up flying with his exhibition team in 1910 and ended up becoming the first American woman to fly in a jet aircraft (a TF-80C), piloted by Chuck Yeager, in 1948. See more about her here.

While at San Diego in the winter of 1910-11, Curtiss began to develop the idea for a plane that didn't need a ship to land/take off from, rather, it would be able to land and take off from the water by itself. He designed and tested pontoons that could replace the normal landing gear, then built a prototype that he flew off/on the water for the first time on **January 26, 1911**, 112 years ago this week. Between the school and the seaplane, the site of Curtiss' work is now known as the "Birthplace of Naval Aviation."

Curtiss returned home to New York after his successful demonstration to work on his amphibious aircraft designs. I have described Keuka Lake in another Item of the Week (here) and how suitable it is for skipping stones. When the wind is down, its surface is millpond-smooth, and Curtiss found it ideal, and handy, for experimenting. Six months later, Curtiss made his first sale to the Navy, a plane he called the A-1 *Triad*. It was equipped with both pontoons and retractable wheels, the first true amphibious aircraft, a design that would win him the Coller Trophy for 1911. Curtiss' reputation soared; it was then he became known, as he is still today, the "Father of Naval Aviation." Our Navy wasn't his only customer. Curtiss' company sold the A-1 to Russia, Japan, Britain, and Germany.

Curtiss' Collier was the very first one issued by the National Aeronautic Association for the greatest achievement of the year in aeronautics or astronautics in America. He won the second Collier, too, in 1912, for the development of other flying boat designs. The Trophy has since become very prestigious. Orville Wright won the third, the Sperrys the fourth and sixth. Glenn Martin, Howard Hughes, Hap Arnold, William Lear, Kelly Johnson, and the Apollo 11 crew were among many illustrious winners of the Trophy. Most recently, the NASA/JPL *Ingenuity* team won in 2021 for their first powered, controlled flight of an aircraft on another planet!

SEE YOU IN COURT!

The Wright Brothers had patented their wing-warping technique and other aspects of their Wright Flyer, and vigorously defended them in court, and they usually won. Their biggest antagonist was Glenn Curtiss. The problem for the Wrights, and to a lesser extent for Curtiss, the legal wrangling was getting in the way of aircraft design and production. The Americans were in the air first, but ten years later, the new designs being developed in Europe were clearly better than those in the U.S. The Wrights and Curtiss were the two largest

manufacturers of airplanes, and smaller new-start companies were suppressed because of fears of legal action against them.

Another issue was in play here, too. Not everyone believed that the Wrights were actually the first to fly. Most prominent amongst the deniers was Samuel P. Langley, an astronomer/heliophysicist of considerable skill and renown. He shifted academic gears in mid-career and became very interested in aerodynamics and flight. Not long thereafter, he became the third Secretary of the Smithsonian Institution. In the decade preceding Kitty Hawk, he built a series of progressively-advanced "aerodromes," and twice attempted to fly the most recent model in mid-1903, just before the Wright's success. Alas, Langley was a better astronomer than aviator. His "aircraft" was aerodynamically incapable of flight, and on each of the final tests, the Aerodrome was slung from a launching barge, followed a ballistic trajectory, and ignominiously crashed into the Potomac. Nonetheless, Langley claimed success.

I love the Smithsonian. I worked there for 15 years. The only episode where the Institution behaved inappropriately that I am aware off came next. Langley exerted a lot of pressure with the Institution to take his side against the Wrights, until he left that post due to age in 1907. His successor, Charles Walcott, knew that Langley's *Aerodrome* didn't actually fly, but hired Glenn Curtiss to surreptitiously make some modifications to it to make it more air-worthy. With the changes, the *Aerodrome* could come close to actual flight. Walcott oversaw a quick test, claimed Langley was right and did deserve the credit for first flight, and then had Curtiss quickly restore the *Aerodrome* to its 1903 configuration. Dishonesty all around. The SI Regents finally acknowledged the primacy of the Wrights' accomplishment in 1928. Wilbur had died years before, and Orville had taken the *Flyer* to England for display. It wasn't until his death that the heirs relented and allowed the most important museum in the world for aviation and Space exploration to have the very first airplane. A whole gallery at NASM is devoted to the Wrights, their successes, and the impact aviation has had on society.

As WWI loomed, the U.S. military became increasingly concerned with the sluggishness in the nascent aviation industry due to ongoing legal action. The problem became increasingly acute in 1917, when both Army and Navy needed planes most. The new National Advisory Committee for Aeronautics, created in part for situations such as this, recommended that the aircraft industry be compelled to form a cross-licensing manufacturers organization, where all members had to pay a blanket fee on each plane made, from which a licensing fee would be paid to the major patent holders. The Manufacturers Aircraft Association was created, and airplane production increased significantly. The design process got a shot-in-the-arm, too, because a number of innovators previously denied the marketplace for threat of lawsuit and/or excessive costs could now participate.

THE CURTISS JENNY AND BEYOND

Building amphibious airplanes and flying boats was not the only interest of Curtiss or his aircraft company. He not only supplied pilot training in the early days, he also supplied their training planes for both services. His Model J trainer was sold to the Army, and his Model N trainer was

sold to the Navy. But these were only training planes, they were not combat fighters. Curtiss took the best features of both, and created a series of JN aircraft in the mid-1910s. "J" and "N" together became "Jenny." The first two models in the series were unsatisfactory, difficult to fly and dangerous to operate. Few JN-1s were built, but an Army Signal Corps squadron were equipped with JN-2s in July, 1915. The design and construction of the aircraft were not up to Curtiss' usual standards, a fatal crash occurred, and the squadron grounded them until the JN-3 was available. A few were sent to the New Mexico Territory to perform aerial reconnaissance duties during an unsuccessful mission to quell the activities of Pancho Villa. The only bright spot for the JN-3 here was that they made the first aerial bombardments in history. Nobody got hurt; the "bombing" was a few pilot-tossed hand grenades.

The Curtiss JN-4 was the airplane military officers were looking for. It became the basic trainer aircraft for both the AASC and the Canadian Royal Flying Corps in 1916. It also was modified for other duties, including flying supplies, wounded soldiers, and all-weather all-season operations. More than 6800 of them were built for WWI. The supply lines and subsidiary manufacturers continued to produce the Jenny long after the War, and used for a variety of purposes. Lindbergh got one, and they were a favorite of barnstormers during their salad days.

The Navy asked Curtiss to design and build an extra-large seaplane, capable of long-distance flight and having a crew of five. Curtiss called the resulting four seaplanes "NC." They were as much test platforms as operational search aircraft. They were to demonstrate their range capabilities by attempting the first trans-Atlantic flight, in 1919. Three of the four made the attempt, but only NC-4 made the journey successfully. The good publicity was brief, however, because the first non-stop Atlantic flight came soon thereafter.

Although the War to End All Wars was over, combat flying was not. A heavily-modified Marine Corps JN-4 supporting the U.S. occupation of Haiti in 1919 is credited with making the first successful dive-bombing attack.

Airplane orders dropped off significantly after the War. Air combat had ceased, and surplus aircraft were abundantly available for civilian and other purposes. The Curtiss Aeroplane and Motor Company had a major reorganization in 1920, and Curtiss cashed out and left Hammondsport and moved his family to southern Florida. After a number of acquisitions and other corporate maneuvers, the Wright organization merged with the Curtiss company and became Curtiss-Wright. Both Orville and Glenn lived to see it.

Derivatives of the Curtiss Aeroplane and Motor Company continued to build aircraft through the 1930s and well into WWII, producing planes like the P-40 Warhawk fighter, the SB2C-5 Helldiver dive bomber, and more.

Curtiss was only in his mid-40s when he got to Florida, and was still full of ideas and energy. He founded a number of companies, served on the boards of others, and more-than-dabbled in real estate. He developed the cities of Opa-Locka and Miami Springs, and co-developed the city of Hialeah. He built a family mansion in Miami Springs. That may not have been enough to keep him busy, because he made many hunting trips to the Everglades. To allow himself to be off the beaten path and still be comfortable, he and his brother, Carl Adams, designed and built

the Adams Motor Bungalo, one of the first RVs. Curtiss would later build and market a travel trailer called the "Aerocar."

The legal wrangling Curtiss had in the past were never over. He was embroiled in a lawsuit with a former business partner, and had to go to Buffalo, New York, for the hearing in the summer of 1930. He was in court when he was felled by severe appendicitis, and died on July 23. He was buried in Hammondsport.

Honors and accolades came down like a heavy rain. He'd already been on the cover of *Time*, had an airmail postage stamp with his picture on it, and a major city's airport (now LaGuardia) named after him. After death, Curtiss was awarded the DFC, one of the few civilians so honored, and was named to six major Halls of Fame. Schools and roads were named for him. His mansion in Florida would fall into near ruin, but it's been restored and is now an elegant venue for community events, corporate events, and weddings. A final tribute came from his home town when they established …

THE CURTISS MUSUEM IN HAMMONDSPORT, NEW YORK

The GHC Museum has a number of Curtiss-related aircraft on display, including seven actual Curtiss aircraft, including a C-46 Commando; nine restored Curtiss aircraft, including a P-40; nine reproductions, including a 1908 June Bug; and a gaggle of cars dating from 1909 to 1931. They also host a variety of programs, including their annual "Wings and Wheels: Seaplane and Car Show" in September. Their website contains two excellent summaries, "Who was Glenn Curtiss?" and "Teaching the World to Fly." The Museum's Keuka Lake setting is beautiful, and Hammondsport is in the heart of the New York wine country. Corning, home of the famous Museum of Glass is just down the road, and a little farther is Harris Hill, home of the National Soaring Museum and arguably the "Soaring Capitol of America." On a good summer's day, I could see a dozen or more sailplanes aloft. [My father took me on a soaring flight for my tenth birthday. The trip was very cool, but the tight bank climbing in a thermal was the only time I ever got even a little close to airsick!]

CODA: THE CHINESE VIP VISITS THE NATIONAL AIR AND SPACE MUSEUM

I've told this story once before on these pages, so long-time readers of Air and Space this Week, please enjoy it again or skip it, but I'm going to tell it again, anyway.

VIPs frequently visit the National Air and Space Museum, and the NASM team always tries to have them accompanied by a member of the staff. When I was (rotating) Chair of the Education Division, I was pretty far down on the list of staff to call when there was an immediate need for a staff-level guide. One Friday afternoon, I got the call from the Director's Office. A VIP contingent had just requested a tour, but hadn't made prior arrangements. Could I handle it? Of course, the only correct answer is, "Of Course. I'm on my way."

This was no little dog-and-pony show. A number of people were waiting for me by the Front Desk. Apparently a very high-level Chinese minister wanted to see the Museum. He was there

with a translator and several staff members, including a fellow who kept to the back; I assumed his role was flag lieutenant, responsible for keeping everything on schedule and the boss happy, even though he had no authority to move things along. Tough job!

Representatives from both country's State Departments were there. We had a translator, too. I knew from past experience that there were at least 8 security guards present (and I suspect there were more), but I knew that I would only be able to spot the two "body men." One of them looked me in the eye, said they were on a tight schedule, and that I could not overrun my allotted 20 minutes of time.

Twenty minutes is nowhere near enough time for even a cursory look at the NASM collection. I led the entourage up the main escalator to where we could overlook the "all-star" main atrium gallery and its satellite display area. In one sweep we could see the *Apollo 11* capsule, the *Glamorous Glennis*, and the *Spirit of St. Louis*, and if we looked around the corner, and we did, we could see the *Wright Flyer*. A few brief words on each, and my time was drawing near an end. We headed back down the main escalator, myself in front, the minister and guards and staff in the middle, and the flag secretary bringing up the rear.

On the way down the escalator, I was in the lead, followed by the Chinese entourage, our folks, with the flag secretary bringing up the rear. The Minister had been mostly impassive during the visit; he said nothing but a few short questions to his interpreter, who could explain my sometimes-odd turns of phrase.

To this day I don't know what got into me. As we descended, I turned to the Chinese interpreter and asked him to ask the Minister if he was interested in motorcycles. Without missing a beat, the Minister said "Yes, I do," in perfect English! The two body men glared menacingly at me, knowing I just blew the schedule. And I thought the flag secretary was going to faint.

I told our body men where we'd be going, and I told them I'd set up the motorcycle visit in the main rotunda, so the security team could sweep the gallery before we went in. The briefing was indeed brief, we entered the "Early Flight" gallery, and in the back was Glenn Curtiss' 1907 record-breaker. When I explained that Curtiss took it to over 200 km/hour, the Minister became even more engaged. The questions from the Minister were coming thick and fast, and both interpreters were working in tandem to relay more technical detail. The body men were really scowling at me now, and the poor flag secretary put his hand to his head in a comical pre-faint pose.

We overran the schedule by at most 15 minutes, but I hope the Minister enjoyed his visit. And I hope the flag secretary survived. Strangely, I don't recall being asked to tour VIPs after that…

DIDJA KNOW?

I love the song *Immelmann Turn* by Al Stewart (you remember him and *The Year of the Cat*, don't you?). But there is nothing particularly dangerous about the Immelmann turn itself, so I don't know what the fuss was about. I even asked the head of NASM's Aeronautics

Department (an Al fan, too) about the lyrics, but he was as perplexed as I. An Immelmann Turn was merely a half-loop with a half-roll at the top. A good pilot in a Japanese Oscar fighter could pull two in a row (the only WWII plane that could accomplish the feat, even though it was pretty useless in combat). Al Stewart's *Immelmann Turn*: Lyrics here, YouTube here.

Glenn Hammond Curtiss had made such a good reputation for inventing and flying by 1909 that Tom Swift, the hero of what would become a long series of books for young people, boys mostly, ***was modeled after him***. The first two books, *Tom Swift and His Motorcycle* and *Tom Swift and His Airship*, and the Hammondsport-like setting in upstate New York of the books make the link obvious!

REFERENCES

Thank Goodness that the wonderful *Centennial of Flight* website is still available! See: https://www.centennialofflight.net/essay/Explorers_Record_Setters_and_Daredevils/Curtiss/EX3.htm

Curtiss, G.H. and A. Post, 1912, *The Curtiss Aviation Book*, originally in print by Stokes Company; on-line version here: https://invention.psychology.msstate.edu/i/Curtiss/CurtissAviation.html An autobiography in third person!

The Smithsonian National Air and Space Museum has numerous Curtiss items:

THE Motorcycle: https://airandspace.si.edu/collection-objects/motorcycle-curtiss-v-8/nasm_A19520060000

Curtiss D-III Headless Pusher: https://airandspace.si.edu/collection-objects/curtiss-d-iii-headless-pusher/nasm_A19280009000

Curtiss JN-D4 Jenny: https://airandspace.si.edu/collection-objects/curtiss-jn-4d-jenny/nasm_A19190006000

Curtiss P-40E "Lope's Hope": https://airandspace.si.edu/collection-objects/curtiss-p-40e-warhawk-kittyhawk-ia/nasm_A19650242000

Curtiss Helldiver: https://airandspace.si.edu/collection-objects/curtiss-sb2c-5-helldiver/nasm_A19610118000

Curtiss-Wright CW-1 Junior: https://airandspace.si.edu/collection-objects/curtiss-wright-cw-1-junior/nasm_A19590100000

There are many, many more Curtiss-related items in the (on-line) collection!

Curtiss/Wright Patent War: https://en.wikipedia.org/wiki/Wright_brothers_patent_war

Aviation-history.com: http://www.aviation-history.com/early/curtiss.htm

National Aviation Hall of Fame: https://nationalaviation.org/curtiss-glenn

Wikipedia: https://en.wikipedia.org/wiki/Glenn_Curtiss#cite_note-Dizer_p.35-24

About the Bungalo and Aerocar here.

Curtiss JN Jenny: https://en.wikipedia.org/wiki/Curtiss_JN_Jenny

Glenn Curtiss House: https://www.nps.gov/articles/glenn-curtiss-house.htm and https://www.miamisprings-fl.gov/community/glenn-h-curtiss-mansion-and-gardens

Smithsonian: Samuel P. Langley: Aviation Pioneer: https://www.sil.si.edu/ondisplay/langley/intro.htm

Secretaries of the Smithsonian: https://siarchives.si.edu/history/secretaries-smithsonian

The Jenny (GHC Museum): https://glennhcurtissmuseum.org/exhibits-on-display/the-jenny

Glenn Hammond Curtiss Museum: https://glennhcurtissmuseum.org

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