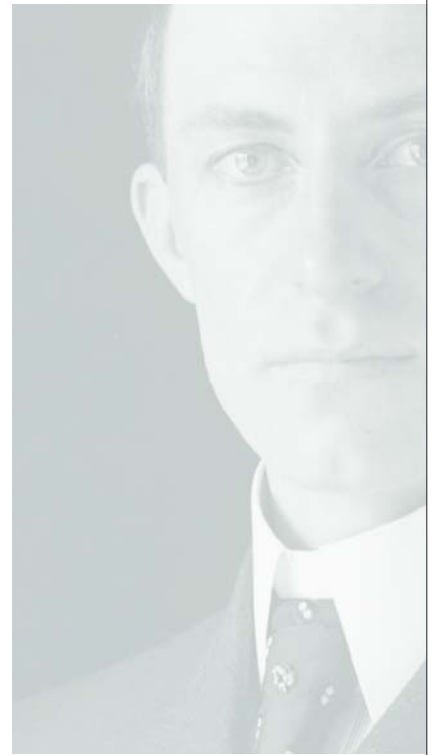




Wings of fate

the wright brothers' drive for the sky

by david andrews



Above left: Wright glider takes flight over the North Carolina dunes; Center: Reconstruction of the 1903 motor that powered the airplane; Right: Wilbur Wright, age 38.

*The bird wafted on the wind, eye to eye with a solitary figure on the crest of the dune. Sleeves rippling, the man felt the sting of the sand on the side of his face. He was here for the wind, but the wind usually had its way. Gnarled oaks hugged the hollows. Roads went under with the march of the sand. Drifts plugged one inlet, storms pried open another. Big blows left the shore a litter of wrecks, bleached hulls a testament to the caprice of this sometimes sorcerous place. **Then, as now, the Outer Banks** were an open window on the sea's malevolence. Yet this was where the man and his brother, aboard a frail craft of wood, muslin, and wire, came to test their mettle.*



Left: Orville Wright.

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Above: A view down Hawthorne Street, where the Wrights lived in Dayton, Ohio.

Wilbur Wright was transfixed as the bird hung nearly motionless on the headwind. The man could shutter the world with his uncanny focus. In a flash, he would glean a gem of insight for the next glider run.

In an age of machines, Will was their kin, honed efficiency his stock in trade. There is no evidence that he ever strolled the surf or stood in awe of azure skies. “The prettiest I have ever seen,” Orville said of the sunsets, with “deep blue clouds of various shapes fringed with gold,” yet Will was often lights out in his bed by that time, and likely up with the sun. Perhaps he was driven by a premonition of early death, haunted by a teenage injury and its emotional aftermath.

Next morning he put a formidable mind to work in the garb of the professional—coat, tie, and hat. Will was not the bootstraps-rustic, Capra-esque soundbite of today. He was a successful businessman, enough to spend summer and fall in pursuit of a dream. Later in life he played tête-a-tête with European royalty—perhaps the first international celebrity, his reversed cap a craze on the continent.

When he turned his inward outward (not often beyond his family), he could charm a tire off a rim. He regaled his nieces and nephews with a wry humor.

Neither brother married. Will, always shy with women, said he didn’t have time for a wife and an airplane. He lived at home, like Orv, seeing older brothers struggle through the economically troubled times.

He skipped the ceremonies at high school graduation, and college passed him by due to a chain of events. A hockey stick across the face—a seemingly minor sports injury—brought dental work, digestive problems, and heart palpitations. The event “drew a line across Will’s life,” says James Tobin, author of *To Conquer the Air: The Wright Brothers and the Great Race for Flight*, inducing the close-lipped smile of later renown. He stayed at home, assuming care of his tubercular mother and devouring the library his father, a bishop in the United Brethren Church, had built. “*The Encyclopaedia Britannica* and *Chamber’s Cyclopaedia* were at his fingertips,” says Tom Crouch, author of *The Bishop’s Boys: A Life of Wilbur and Orville Wright*, “as were those classics of history and biography which the bishop cherished—Plutarch’s *Lives*, Gibbon’s *Decline and Fall of the Roman Empire*, Guizot on the history of France, Greene on the history of England, and Boswell’s *Life of Samuel Johnson*. There were sets of Hawthorne and Sir Walter Scott, and popular science alongside theological works.”

About younger brother Orville, his father said, “Enthusiasm always made him a leader among boys.” He had memory to spare. Orv amused officials in the second grade by racing through a reading passage with the book upside down. He had his own path through the puzzle.

Together the boys combusted, forging a mental space greater than the sum of their synapses, smithing ideas in the fire of discourse. It went beyond gray matter. Orville’s enthusiasm parried Wilbur’s doubt. Often Orville was the motor that made it go.



Near right: Front view of the Wright home; Far right: The Wrights' sister Katharine boards a carriage outside the house.

They were right brain and left brain, sculptors and statisticians.

Genius? Will had an answer in reply to a friend. "To me, it seems that a thousand other factors, each rather insignificant in itself, in the aggregate influence the event 10 times more than mere mental ability or inventiveness . . . If the wheels of time could be turned back . . . it is not at all probable that we would do again what we have done . . . It was due to a peculiar combination of circumstances which might never occur again."

Riding a Craze

Dayton, Ohio, was founded in 1805 where three creeks flowed into the Miami River. The "city of a thousand factories" teemed with machinists and carpenters, carriage-makers and wood-benders, artisans and engineers, engravers and glass-makers, says Tobin. The stuff of the 19th century was made in Dayton, he says. Motors and medicine and metal castings. Steam pumps and stoves and farm machinery. Particularly cash registers, the main export. By 1900, the city had more patents per capita than any other. "Its 60,000 people knew machines," Tobin says. "They were perhaps particularly susceptible to the charms of the bicycle." And so was the rest of 1890s America. Says Crouch, "The sheer exhilaration of cycling captured a generation of Americans accustomed to the restraint of high, tight collars, ankle-length skirts, and corsets. Nothing in their experience could compare with the thrill of racing down a steep hill into the wind, and the newfound sense of personal independence was irresistible."

" . . . If the wheels of time could be turned back . . . it is not at all probable that we would do again what we have done . . . It was due to a peculiar combination of circumstances which might never occur again."

—Wilbur Wright

The brothers rode the craze from mechanics to makers of their own line—fleet-wheeled BMWs of their day—crafted in a machine shop complete with drill press, turret lathe, and tube cutter driven by a one-cylinder engine of Wright design. “They had no intention of mass-producing bicycles after the fashion of the large manufacturers,” says Crouch. “Each of their machines was a hand-built original, made to order.”

This secured their financial future.

The Wrights had the business sense to see a niche and fill it. But money didn’t drive Wilbur. He glimpsed a new niche to fill. “Up to that point, he probably thought his life was insignificant,” says Darrell Collins, historian at Wright Brothers National Memorial, in the documentary *Kitty Hawk: The Wright Brothers’ Journey of Invention*. “I think Wilbur knew that if they could add to [the discourse] or even invent the airplane, they would achieve immortality.” In a letter to his father Will said: “It is my belief that flight is possible, and, while I am taking up the investigation for pleasure rather than profit, I think there is a slight possibility of achieving fame and fortune from it. It is almost the only great problem which has not been pursued by a multitude of investigators . . .”

“For some years I have been afflicted with the belief that flight is possible to man . . . My disease has increased in severity and I feel that it will soon cost me an increased amount of money, if not my life . . .” —Wilbur Wright in a letter to aviation pioneer Octave Chanute

Multitudes, no, but a formidable rival, Samuel Pierpoint Langley, head of the Smithsonian and informal chief scientist of the United States. Born in Roxbury, Massachusetts, in 1834, Langley—a renowned astrophysicist—was, like Will, an autodidact sans college degree. As a young man he read his way through the Boston libraries, absorbing through apprenticeships with engineers and architects.

Langley was bitten with the flight bug. In 1896, he grabbed global headlines when his small unpowered craft, powered by steam engine, took to the air over the Potomac. President McKinley, seeing a weapon in the brewing war with Spain, approved \$50,000 in funds for the project from the War Department. The Smithsonian’s resources at his command, Langley saw success just over the horizon. “Everything connected with the work was expedited as much as possible,” he wrote, “with the expectation of being able to have the first trial flight before the close of 1899.”

After a letter from Will, the Smithsonian sent pamphlets and a list of reading matter. The brothers hit the books, immersed in a methodical course of study. They digested Langley’s *Experiments in Aerodynamics* and *Story of Experiments in Mechanical Flight Progress*. They read *Progress in Flying Machines* by Octave Chanute, the grand old man of aeronautics. And they were inspired by the zesty accounts of gliding in *The Problem of Flying* and *Practical Experiments in Soaring*, whose author, noted aerialist Otto Lilienthal, had plunged to his death a few years before. *The Empire of the Air*, by French flight enthusiast Louis Pierre Mouillard, sounded a cautionary note: “If there be a domineering, tyrant thought, it is the conception that the problem of flight may be solved by man. When once this idea has invaded the brain it possesses it exclusively.”

The more the Wrights read, the more they saw how little was known. Will concluded that there was no flying art, “only a flying problem.” It was an open playing field.

Sometimes Will pedaled to a place called the Pinnacles, eerie outcrops where buzzards and hawks dove and darted in the heights above the Miami River. Now, thanks to a growing aeronautic vocabulary, his observations took on a new cast. Birds distributed their weight on a “center of gravity,” upward forces focused on a “center of pressure,” balance controlled by keeping the two roughly in line.

Will saw that, hit by a gust, birds reasserted their balance with a slight twist of the wingtips. One day in late July 1899, a customer came in to buy an inner tube. As they chatted, Will idly twisted the long, empty inner tube box. When the customer left, he tore the ends off. He saw a pair of wings.



Above: Wilbur at work in the bicycle shop; Opposite: The Pinnacles, where Wilbur Wright observed buzzards and hawks working the air currents.





That night Will was aflutter with ideas for twisting the wings with pulleys and ropes. Orv got it instantly. They immediately set to work on an airplane.

The Wrights determined to dodge Lilienthal's fate, testing a kite first. It had biplane wings (an idea from Chanute), each five feet long by thirteen inches wide, plus a horizontal tail to stabilize front and rear. Will took it for a spin in a field just outside Dayton, letting it out with cords attached to the wings—a set per side—which let him twist the tips in the wind. It was an immediate success.

Emboldened, Will wrote to Chanute. "For some years I have been afflicted with the belief that flight is possible to man," he said. "My disease has increased in severity and I feel that it will soon cost me an increased amount of money, if not my life. I have been trying to arrange my affairs in such a way that I can devote my entire time for a few months to experiment in this field."

Will sought advice on "a suitable locality where I could depend on winds of about 15 miles per hour without rain or too inclement weather." Chanute embraced his fellow enthusiast with a prompt response. He said he "preferred preliminary learning on a sand hill and trying ambitious feats over water." A spot on the South Carolina or Georgia coast might have the right mix of wind and sand, he wrote.

Gliding the Wild Places

Kitty Hawk, North Carolina, was the country's sixth windiest area, according to the tables Will got from the chief of the U.S. Weather Bureau. It had other pluses too—hills and seclusion. No one had ever heard of the place.

Mercurial winds greeted Wilbur Wright when he arrived on the Outer Banks in September 1900. Instead of a steady breeze, he got gust—and sometimes gale—and then calm. It was good luck disguised as bad. Their plane would have to tough its way through the wind. "This was a rough environment," says Collins in *Kitty Hawk: The Wright Brothers' Journey of Invention*. In fall and winter, some of the life saving stations could average a shipwreck a week, he says.

Control was the key to the air, the Wrights believed. You needed wings, a motor, and a way to steer. Gliders and automobiles had the first two on the run. Steering was the missing piece. "When this one feature has been worked out," said Will, "the age of flying machines will have arrived." He aimed to control the machine along every axis, a natural notion for a cyclist. To Will, banking an airplane and leaning a bike into a curve were likely close cousins.

They unfurled the first glider—spars, ribs, and white French sateen to clothe the wings—in a makeshift canvas lean-to. Each part was meticulously remeasured and retested before assembly.

It looked like the kite but three times larger, dimensions guided by lift tables from the ill-fated Lilienthal's writings—still the best data on the subject. The arched wings spanned 17 feet.

High winds forced the brothers to test the controls from the ground. They launched the glider unmanned, like the kite, guided by tethers. After one trial, the wind grabbed the craft and rammed it into the sand 20 feet away. The brothers almost packed it in, but set to reassembling the shattered hulk the next day.

To get a feel for manned flight they loaded the glider with chains to approximate a person's weight. Finally satisfied with the results, they hauled the craft to Kill Devil Hills, about four miles south, ascending 80 feet up a summit of shifting sand. With Will prone—at first unsure that this was safe—Orv and a couple of the Outer Bankers took hold of the wings and ran the machine downslope until the wind grabbed it. Soon the glider was skimming through the air at 30 miles per hour for the length of a football field.

Ecstatic, the Wrights broke camp on October 23. "Wilbur was real charged up," says Collins. "They felt that the 1900 glider was very successful." The wing warping

Two agencies with very different missions have joined to celebrate the anniversary of flight—the U.S. Air Force, which wrote much of the history, and the National Park Service, whose task it is to preserve it. Using a theme study—a tool to identify places tied to a specific historical topic—a host of areas are being evaluated as potential National Historic Landmarks or listings on the National Register of Historic Places. So far, a trove of information has yielded a pair of spinoffs, designed to both educate and share the thrill of flight.

From Sand Dunes to Sonic Booms

"From Sand Dunes to Sonic Booms," a new online travel itinerary (the latest in a series of 29), lets site visitors follow the story through a series of essays, maps, and historic photographs. They can visit over 100 National Register properties online, from Orville Wright's house to a Nike missile site intended to ward off a potential Cold War attack on Chicago. The itinerary is also for those who want to see these places in person.

"From Sand Dunes to Sonic Booms" was produced in cooperation with the Air Force, the U.S. Centennial of Flight Commission, Dayton Aviation Heritage National Historical Park, and the National Conference of State Historic Preservation Officers.

Go to www.cr.nps.gov/nr/travel/aviation/ to see the itinerary and others in the series.

Wright Lessons

A new online lesson from Teaching with Historic Places offers an instructional tour through the history of flight—with physics, geography, and practical thinking thrown in—the central point of reference being the Wright Brothers National Memorial.

Students get a feel for the time via historic photographs, maps, excerpts from Orville Wright's diary, and selected readings. Activities like designing and testing a glider immerse them in the Wright world. Or they can learn through group discussions of what flight has meant for warfare, commerce, and transportation. Links to related sites supplement the lesson.

The Organization of American Historians assisted with the plan—co-sponsored by the Air Force—developed to meet the standards of learning for U.S. history. Staff from the Wright Brothers National Memorial contributed to the production.

There are over 100 lesson plans in the series. Go to www.cr.nps.gov/nr/twhp.

Opposite top: Life saving station at Kill Devil Hills; Opposite bottom: The Wright's camp near Kitty Hawk.



made the difference. So did the elevator on the front of the craft. “Because they had designed their elevator in the front instead of the back of the airplane,” Collins says, “instead of crashing to the ground it would kind of pancake to the ground with a soft landing.” The lift was less than expected, but maybe Lilienthal’s tables were in error. More likely the wings needed more curve.

After a brisk exchange with Chanute, the Wrights realized that they were nearer to the secret than anyone. Spurred to single-mindedness, they set to work in the shop—advancing their return from September to July—and hired a skilled mechanic, Charlie Taylor, to run the store.

A Stir in the Aviation World

By the time they hit the sands in 1901, the Wrights were creating a stir in the aviation world, thanks to Chanute.

The brothers quickly assembled a spacious shed from lumber pre-cut to size. Then they paid the price for the early arrival, as enervating heat and a sky black with mosquitoes took it out of their hide. “They chewed us clear through our underwear and socks,” Orv wrote to his sister Katharine. “Lumps began swelling up all over my body like hens’ eggs.”

“They said, ‘Misery, misery . . . this is unbelievable,’” Collins says. “They weren’t used to this. They were city boys. The mosquitoes were tearing them up.”

But the ship was set to go on July 27.

No one had ever flown a glider as big or heavy as this year’s model. But for the size, it was a virtual twin of the last one, except that the wing curvature was nearly double.

Unfortunately the new machine did not duplicate the old performance. It had a habit of nose diving, or sharply climbing and then threatening to slip back (nowadays called a stall). Only Will’s hand on the controls saved him from Lilienthal’s fate.

With improvised adjustments in the field, the Wrights reduced the wing camber. Soon, they were riding the wind again. Will wrote, “The control of the machine seemed so good that we then felt no apprehension in sailing boldly forth.” Chanute, just arrived, was impressed.

Instead they sailed backwards. When banking into a turn, Will sometimes sensed a tremor on the dipping wings; the upper wings whipped around, sending him into a spin, which they called “well digging.” In one test, the craft slammed into the sand.

Dismayed, the Wrights headed home early. Wilbur was ready to give up.

Chanute arrested his descent with an invitation to address the prestigious Western Society of Engineers in Chicago. Will wowed them with a generously revealing treatise on the art of flying, punctuated with a thrilling lantern-lit slide show—and near-heresy. Will announced that the lift tables of the German pioneer Lilienthal were wrong.

He started to doubt himself as soon as he got home. There was only one way to be sure. They had to test the table data.

“He analyzed a problem, and took it apart piece by piece, then solved it one piece at a time,” says biographer Tobin in *Kitty Hawk: The Wright Brothers’ Journey of Invention*. “That was different from many experimenters, who were attempting to do all things at once.” Crouch, in *The Bishop’s Boys*, says that “by the time the Wrights entered the field, so many studies had been conducted that it was no longer easy to differentiate between accurate data and the faulty product of flawed experiments.”

The brothers tread carefully. “No truth is without some mixture of error,” Will wrote later, “and no error so false but that it possesses some elements of truth.”

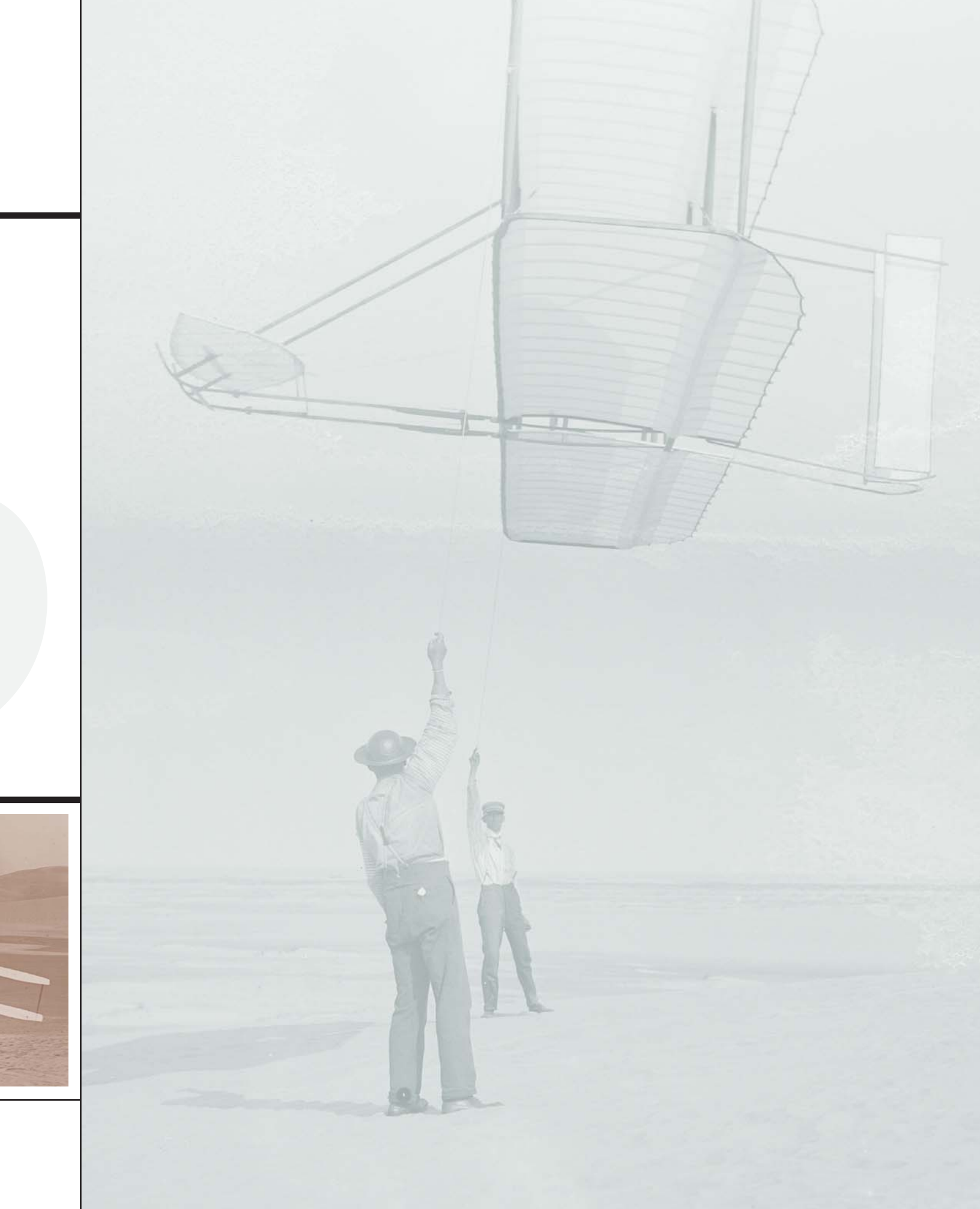
The Wrights proceeded to reshape aeronautics with a few shards of metal and a small wooden box—a primitive wind tunnel. The idea was not new, but in their hands it took off. They sculpted tiny airfoils from slivers of sheet steel, in the wing shapes used by Lilienthal, Langley, and other experimenters. “They discovered that Lilienthal had flown with a very inefficient wing,” Crouch says. “They identified a much better surface—a parabolic curve.” The brothers were intoxicated. Orv said later, “Wilbur and I could hardly wait for morning to come, to get at something that interested us. *That’s happiness!*”

“No truth is without some mixture of error, and no error so false but that it possesses some elements of truth.”

—Wilbur Wright



Above: Wilbur takes a turn in the glider; Opposite: Testing the 1902 glider as a kite.





“There are two ways of learning to ride a fractious horse. One is to get on him and learn by actual practice how each motion and trick may be best met; the other is to sit on a fence and watch the beast a while, and then retire to the house and at leisure figure out the best way of overcoming his jumps and kicks . . . ” —Wilbur Wright

The 1902 model looked familiar, but in the details it was transformed. The wind tunnel showed the superiority of longer, narrower wings. And now there was a tail, a pair of vertical fins.

The first tests proved deceptive. On September 19, Orv wrote in his diary: “We are convinced that the trouble with the 1901 machine is overcome by the vertical tail.” The next few days saw the return of the hair-raising spins. With Orville at the controls, the glider was almost destroyed.

After a late nighter of coffee and conversation, Orv was rolling in bed. He hit on the answer—a movable tail. The problem was, as the spin commenced the fixed fin advanced almost broadside to the wind, aggravating the problem by slowing down the airspeed. Angling the tail would reduce the wind’s resistance. The next day Will added the idea of tying the tail controls into the wing warping mechanism, to simplify operation.

They spent the rest of 1902 topping each others’ records. “In 1901, they’re pretty much like most of the other experimenters around the world,” says Tobin in *Kitty Hawk: The Wright Brothers’ Journey of Invention*. “They’ve had some success, they really don’t know where they’re going. In 1902, they’ve become the Wright brothers as we think of them.”

Riding a Fractious Horse

A sense of urgency set in. The Wrights had started with little hope of gain, but now fame and fortune stared them in the face. Meanwhile, Will’s talk—published in the journal of the Western Society of Engineers—was spreading apace in the global aeronautics community. Someone might beat them into the air.

Langley wrote inquiring about their “special curved surfaces,” all but inviting himself down for a look. The Wrights politely rebuffed him, along with an offer of a paid trip to Washington.

The Smithsonian chief had taken his own road. He put his chips on developing a light engine with enough oomph to toss his plane into the sky. The powerplant would overcome any aerodynamic deficiencies. His model flew, didn’t it? That’s all that mattered. The drama of a man aloft would impress his backers—and the newspapers. He’d solve any control nuances later.

The engine proved easier said than done, but now it was nearly ready.

Langley’s *Aerodrome* took shape in the lab—guided by state of the art theory, built by top craftsmen—while Will and Orv were out

on the dunes. The brothers had their own method. “There are two ways of learning to ride a fractious horse,” Will said. “One is to get on him and learn by actual practice how each motion and trick may be best met; the other is to sit on a fence and watch the beast a while, then retire to the house and at leisure figure out the best way of overcoming his jumps and kicks. The latter system is the safest; but the former, on the whole, turns out the larger proportion of good riders.”

An engine would be there when they needed it, the brothers believed, given the advancing auto industry. Now they didn’t have time to wait. They designed their own, built by their mechanic Charlie Taylor.

The propellers were a challenge. The brothers thought they could borrow from nautical theory, but there wasn’t much when it came to ship props. They reasoned that a propeller was a wing moving in a circular direction. After months of torturous testing and calculations, two delicately contoured blades—smoothly glued spruce shaped with hatchets and drawknives—emerged from the shop.

“Isn’t it astonishing that all these secrets have been preserved for so many years just so we could discover them!” said Orv.

Throwing Caution to the Wind

The camp was a shambles when they arrived on September 25, 1903. “The rain has descended in such torrents as to make a lake for miles about our camp,” Orv said in a letter to his sister Katharine. “The mosquitoes were so thick that they turned day into night, and the lightning so terrible it turned night into day.” The shed, ripped from its foundation, had been tossed toward the ocean, the 1902 glider unscathed inside. Waiting for parts to arrive, they built a new hangar and set a slew of gliding records.

Then a storm brought walls of surf and howling wind, tearing tarpaper off the hangar roof and welling water around the newly arrived crates. As gales hit 75 miles an hour, the Wrights braced the structure. After a weekend of whipping wind, the storm exhausted. Winter was on the way; time was short.

Langley fared no better. On October 7, the *Aerodrome*—launched from a houseboat on the lower Potomac—went into the drink, a dart board for the press. Undaunted, he went to the well for more funds, faulting the catapult launch mechanism. It looked like he was on for another go—soon.

Opposite top: 1903 machine on the launching track at Kill Devil Hills; Bottom: History being made, the first powered flight.



The Wrights abandoned caution, skipping plans to test the new plane as a glider first. From the start there was trouble. In stationary runs the motor kicked and backfired, and the props jerked loose, damage necessitating their return to Dayton for repair.

Small ponds were freezing up in the morning; their washbasin was too. Some days their numbed hands couldn't do the work. On November 20, they got the props back, but they wouldn't rotate; the drive chains from the engine were too loose. "Day closes in deep gloom," says Orv's diary entry.

Glue to the rescue—in the form of the stuff used to fasten bike tires to rims. "Thanks to Arnstein's hard cement, which will fix anything from a stop watch to a thrashing machine, we stuck those sprockets so tight I doubt whether they will ever come loose again," said Orv in a letter. The engine and props hummed with purpose.

On the 25th, they were about to trundle the plane out for tests, when a biting wind and drizzle set in. The brothers huddled around a stove for two days as the temperature dipped and flurries blanketed the beach, an ominous sign. The weather warmed for a few days, but they found a crack in one of the propeller shafts.

The brothers sensed disaster. Orville left for Dayton, hoping to return in haste with spring steel shafts.

A Changed World

Ice bobbed in the Potomac on December 8. Not a good day for a launch, but the sky was clear, and Langley was out of money, out of time, and out of weather. His crew had been on overtime for weeks. To speed the test, the houseboat was moved from its mooring downstream to the Anacostia River's confluence with the Potomac, in full view of Washington.

The catapult hurled the *Aerodrome* into the dusk at 4:45 pm. Even before the end of the ramp it shot skyward, tail crumpled, then slid backwards into the frigid water. Charles Manly, Langley's pilot and chief engineer, struggled to get free of the wreck before his lungs filled with the icy Anacostia. He dove, swam clear, and rammed his head on the ice before he was hauled onto the houseboat, unhurt.

The New York Times called the affair "a ridiculous fiasco." Langley's flying days were done, success cruelly withheld. The cost of his enterprise approached \$70,000, according to the official books. The Wrights had spent just under \$1,000.

Orv arrived with the shafts on December 11, reading about the debacle on the train. With a clear day and wind, they had a shot.

Will won the coin toss, but—unfamiliar with the touch of the new plane—nosed up into a stall. They set to repairing the damage. On December 17 it was Orv's turn. Collins says it was a frosty day for flying. "To give you an example of how cold it was that morning, it had

rained the night before, so a number of the fresh water puddles that had accumulated around the campsite may have been frozen over."

Will ran alongside, steadying the wingtip, as Orv charged down the launch ramp, then took off. He alighted about 100 feet away after 12 seconds in the air. Will and a band of onlookers dashed to where he skidded to a halt, history written in the sand.

By the end of the day, Will had the record—59 seconds aloft for a distance of 852 feet.

At first most papers refused to carry the auspicious event; later some picked up an exaggerated account.

Legends of a New Age

The Wrights knew that a minute in the air would not impress a skeptical world. They gave up bicycle making for an isolated cow pasture near Dayton—Huffman Prairie—where over the next two years they built the world's first practical airplane.

They held their secret close to the vest, which almost proved their undoing. They refused to make flights or show pictures until a potential buyer signed on the dotted line, contingent on delivery as promised. Enough had already leaked to their competitors, the Wrights reasoned. They were out of the sky for three years. The French called them "Les Bluffeurs."

Maybe secrecy was a good gambit early on, but now the product demanded a dramatic demonstration.

In 1908, to cinch a deal with France, Will gave a triumphal performance at Le Mans; shortly after, Orville, in pursuit of a contract, astounded U.S. Army officials at Fort Myer, Virginia.

Buoyed by success, they were soon dragged down by lawsuits over infringement of their patent. Even before the French flight, their competitors had thrown crude versions into the air—thanks in good measure to Will's article—though none approached the finesse of the *Wright Flyer*. Now, with the machine an open book, the competition took the technology to new heights.

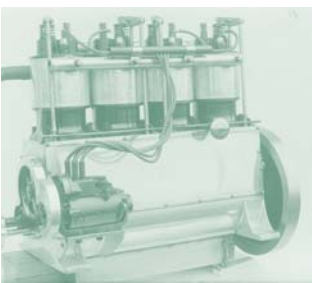
The Wrights' days as innovators were over, yet other legends of the air arose to nearly define the century—Charles Lindbergh, Amelia Earhart, Chuck Yeager, John Glenn, and many more.

In the end, perhaps Will's premonition proved out. He died in 1912 at age 45. His death was attributed to typhoid, but his sister said it was stress over the patent wars. Financially secure, Orv lived until 1948.

The good die young, and dreams do come true.

For additional information, go to the National Park Service website for the Wright Brothers National Memorial at www.nps.gov/wrbr/index.htm or the Dayton Aviation Heritage National Historical Park website at www.nps.gov/daav/index.htm.

Opposite: Orville at the controls over Huffman Prairie near Dayton; Below left: A model with seats for passenger and pilot; Below right: The Wright brothers with their machine at Huffman Prairie in Ohio.



Above: The four-cylinder engine used in the 1911 airplane.

on flight The National Parks

A Lift for the Wright Memorial

Anticipating throngs of visitors to the Outer Banks, the National Park Service has joined with the First Flight Centennial Foundation to enhance the experience of visiting Wright Brothers National Memorial. A temporary 20,000 square-foot pavilion will feature exhibits, speakers, and a host of celebrations. For more information, contact Julie Ketner Rigby, First Flight Centennial Foundation, (919) 840-2003, www.firstflightcentennial.com. Or visit the Wright Brothers National Memorial online at www.nps.gov/wrbr/index.htm.

Field of Dreams

Much of the Wrights' work was closer to home. An 80-acre cow pasture, Huffman Prairie, gave them flying room and privacy from the prying eyes of competitors. The world's first flying field—now part of Dayton Aviation Heritage National Historical Park—was where the Wrights perfected their plane.

After the Wrights' day, the field was untouched and out of sight for 74 years within the confines of Wright-Patterson Air Force Base. Its 1991 entrance into the National Park System has yielded "From

Pasture to Runway: Huffman Prairie Flying Field," an interpretive plan and report produced by the park with the National Park Service Midwest Regional Office and Olmsted Center for Landscape Preservation, co-sponsored by the the U.S. Air Force.

The report spells out the field's heritage from prehistoric times to the dawn of flight, looking to strike a balance among preserving the field's historic character, providing an educational experience, and accommodating visitors.

The interpretive plan calls for a visitor center telling the Wright story through an array of media. The thrust will be how their work in the pasture, through "inspiration, trial, and error," revealed unknown aeronautical technology—and changed history.

The plan is to maintain the field's peaceful, pastoral character as a way of maintaining a connection to the place where the Wright brothers worked their magic.

For more information, contact Dayton Aviation Heritage National Historical Park, 22 South Williams St., Dayton, OH 45407, (937) 225-7705, www.nps.gov/daav/index.htm.