

WRIGHT BROTHERS NATIONAL MEMORIAL



NORTH CAROLINA



WRIGHT BROTHERS

NATIONAL MEMORIAL

Here two brothers made the first power-driven airplane flight in history.

ON DECEMBER 17, 1903, from level ground at the base of Kill Devil Hill, Wilbur and Orville Wright took off on the first flights ever made by man in a powered machine heavier than air. It was here, too, on the slopes of this sand hill that they carried on their gliding experiments from 1900 to 1902.

In Europe, experimenters had turned from heavier-than-air machines to dirigible balloons. Most people did not distinguish between a flying machine and a gas bag equipped with propellers, and to those who had read of dirigibles flying over Paris, the first reports of what the Wrights had done, all quite inaccurate, seemed trivial. Only two or three newspapers in the United States printed anything the next morning about the epochal event of December 17.

Wilbur and Orville Wright

Wilbur and Orville Wright were sons of Milton Wright, a Bishop of the United Brethren Church. Wilbur was born April 16, 1867, not far from New Castle, Ind.; and Orville, on August 19, 1871, in Dayton, Ohio. At the time they first thought of trying to fly, they were running the Wright Cycle Co., in Dayton, selling, repairing, and manufacturing bicycles.

Always interested in whatever they read about scientific affairs, they were much impressed by the gliding experiments in Germany of Otto Lilienthal, the father of gliding and the first to explain scientifically why curved surfaces in a flying machine are superior to flat surfaces. The Wrights always considered Lilienthal their greatest inspiration.

The National Park System, of which this area is a unit, is dedicated to conserving the scenic, scientific, and historic heritage of the United States for the benefit and inspiration of its people.

They believed that a glider should be built in a way that the right and left wings could be presented at different angles to the wind for sidewise balance, and they determined to do this by warping or twisting the wings. To try their scheme for control, they built a 5-foot model of a glider and, one day in 1899, tested it. Then they started thinking of a place for testing a man-carrying glider. After a study of wind records obtained from the Weather Bureau at Washington, they picked Kitty Hawk. During their first stay there in September 1900, they camped in a tent. Returning the next year with a larger glider, they built a camp a few hundred feet north of Kill Devil Hill. In their gliding experiments of 1900 and 1901 they got less lifting power from the wings than existing tables of air pressures on curved surfaces had led them to expect. This led them to believe that all of these tables must be wrong.

After their return to Dayton, they made experiments which gave them knowledge no one had ever gained before: they set up a small wind tunnel and tested more than 200 types of miniature wing surfaces. Among other things, these experiments proved the fallacy of a sharp front edge of an airplane wing and the inefficiency of deeply cambered wings, then generally advocated by others.

In a few weeks they accomplished work of almost incalculable importance. Not only were they the first to test miniature wings accurately, they were the first in the world to compile tables of figures from which one might design an airplane that could fly. The Wright brothers' wind-tunnel experiments marked a turning point in the efforts of man to conquer the air.

PHOTOS COURTESY U.S. NATIONAL MUSEUM.



Orville Wright



Wilbur Wright

FROM CYCLING TO SOARING

- 1892 Wright brothers organize the Wright Cycle Company in Dayton, Ohio.
- 1899 Wrights conduct their first experiment in aileron control, Dayton.
- 1900 Kill Devil Hills, Kitty Hawk, N.C., is selected for glider tests.
- 1901 Wright glider flights take place at Kill Devil Hills, and successful wind tunnel tests are made on airfoils at Dayton.
- 1902 Glider experiments in North Carolina solve basic problems for powered flight.
- 1903 December 17, Kill Devil Hills: Man makes his first powered flight.

The brothers returned to Kill Devil Hills in 1902 with a glider having a wingspan of 32 feet, built according to their own figures on wind pressure.

It was soon evident that this 1902 glider showed a great advance over any other ever built. In it, they made many glides of more than 600 feet against a 36-mile-an-hour wind. No previous experimenter had ever dared try to glide in so stiff a wind.

With the 1902 glider the Wrights solved most of the problem of equilibrium. Now they felt sure they could build a successful power machine.

The next year they built *The Flyer*, a craft with a wingspan of more than 40 feet. They also built the power plant, a 12-horsepower engine, weighing 170 pounds. Its two propellers were designed according to their own calculations—the first propellers ever built for which performance could be predicted. Machine and pilot weighed about 750 pounds.

Cost of the series of experiments from 1899 through 1903 and of the powered flights was only about \$1,000.

The first flight

It was late in September when the Wrights reached their camp at Kill Devil Hills in 1903. Because of delays from mechanical problems and bad weather, not until December 14 were they ready to fly the powered machine. The first trial was not quite successful. Without enough wind to start from level ground, they took the machine to the slope of the hill where they placed the sledlike skids on a "truck"—a plank about 6 feet long, with runners—which

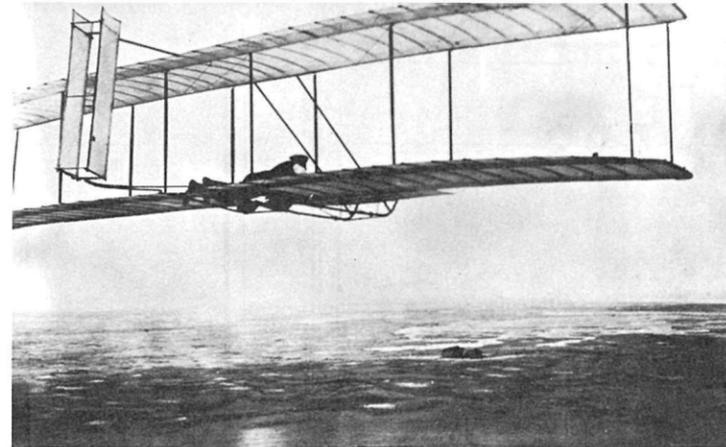


PHOTO COURTESY LIBRARY OF CONGRESS.

One of the successful glides made in October 1903 with 1902 glider; camp buildings in distance.

rested on a monorail track. Wilbur won the toss of a coin for what he called the "first whack." When the *Flyer* left the track and before it had gained enough speed, Wilbur turned it upward too suddenly. It climbed a few feet, stalled, and settled to the ground near the foot of the hill after being in the air just 3½ seconds. One of the skids and several other parts were broken. Two days were needed for making repairs.

On the morning of December 17, the wind blew at 22 to 27 miles an hour. Hoping it would die down, the Wrights waited. When it continued, they decided to go ahead and attempt a flight. On a smooth stretch of level ground just west of their camp, they laid a 60-foot track, pointing directly into the wind. (The takeoff spot is now marked by a granite boulder.)

By the time all was ready, three men from the Kill Devil Hills Lifesaving Station and two others had arrived.

It was Orville's turn. Before climbing aboard the machine, he put his camera on a tripod and asked John T. Daniels of the lifesaving crew to press the button when the machine had risen directly in front of the camera.

Nestled in the control mechanism on the lower wing, Orville started the machine down the track, traveling slowly into an 8-mile-an-hour headwind. After running 40 feet on the track, the plane took off, climbed about 10 feet in the air, darted erratically up and down several times, and dipped suddenly to earth about 120 feet from the takeoff point.

In the words of Orville Wright: "This flight lasted only 12 seconds, but it was nevertheless the first in history in which a machine carrying a man had raised itself by its own power into the air in full flight, had sailed forward without reduction of speed, and finally landed at a point as high as that from which it started."

The brothers alternated in making three more flights that morning, each longer than the previous one; on the fourth flight, Wilbur flew 852 feet in 59 seconds.

As it seemed imprudent to fly at much height at first, it was sometimes impossible to correct the up and down motion of the machine before it struck the ground. This accounts for the flights being so short. While the Wrights and on-lookers were discussing the flights, a gust of wind struck the machine, turning it over and over, and damaging it badly. It could not be repaired in time for any more flights that year; in fact it was never flown again.

The airplane exhibited

Wilbur Wright died in 1912. Orville always thought the National Museum in Washington, administered by the Smithsonian Institution, was the logical place for the first successful airplane. However, for a long time he was unwilling to entrust the machine to the Smithsonian because of a controversy with them over the invention of the airplane. In 1928 Orville lent the plane to the Science Museum at South Kensington, near London, England, with the understanding that it would stay there unless he requested its return. Finally, in 1942, the dispute with the Smithsonian was settled to Orville's satisfaction, and the next year he asked the Science Museum to return the machine to this country after World War II.

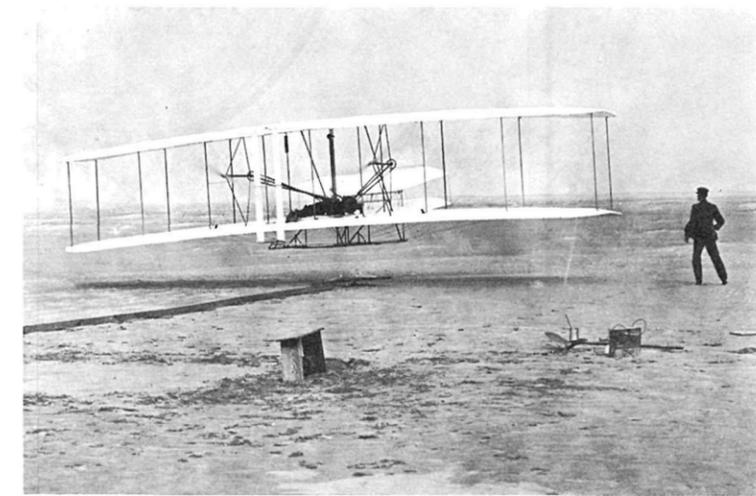
After Orville Wright's death on January 30, 1948, his executors deposited the machine in the National Air Museum, managed by the Smithsonian. It was formally placed on exhibition on December 17, 1948, the 45th anniversary of the first flights.

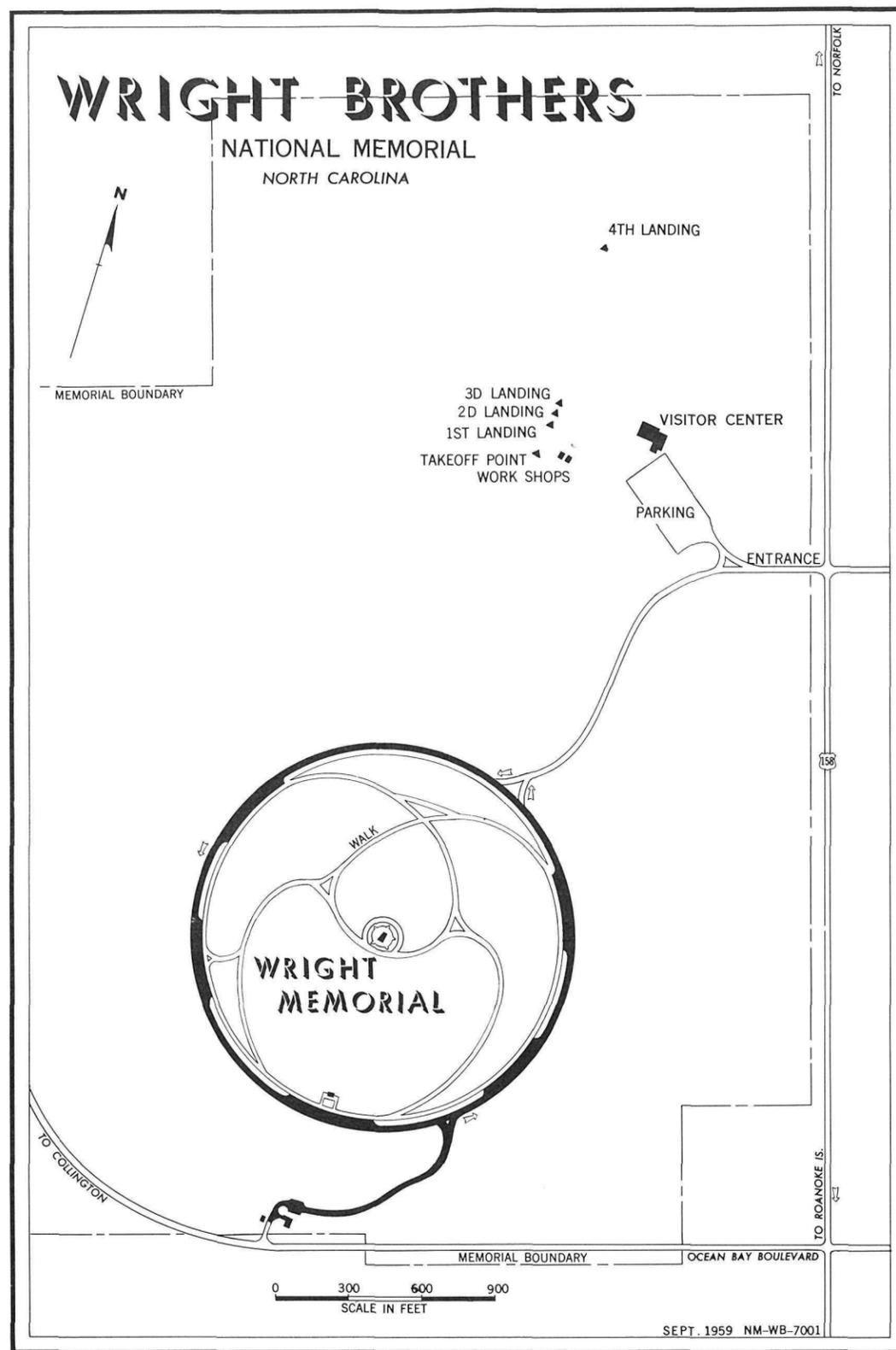
The National Memorial

On March 2, 1927, Congress authorized Kill Devil Hill Monument National Memorial. In 1953 the name was changed to Wright Brothers National Memorial. The area contains 425 acres.

The First Flight.

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The Wright Memorial Shaft is a 60-foot triangular pylon of gray granite from Mount Airy, N.C. Its steel doors and a metal world map inside depict events associated with man's efforts to fly and the first 25 years of aviation history. Stairs lead to an observation platform where there is a beacon capable of throwing a beam many miles. Before the memorial shaft was built, Kill Devil Hill was a shifting dune of sand; now it is anchored with grasses adapted to sandy soil.

The two wooden structures just north of Kill Devil Hill were built in 1953 on the 50th anniversary of the first flight. They are reconstructions of the Wright brothers' 1903 camp, based on historical research and photographs of originals.

About your visit

The memorial at Kill Devil Hill, N.C., is 75 miles south of Norfolk, Va. You can reach it via U.S. 17 or 158 to Elizabeth City, N.C., and then via U.S. 158 to Kill Devil Hill. A more direct route from Norfolk is via Va. and N.C. 170 and U.S. 158. There is bus service to the memorial.

Visiting hours are from 8:30 a.m. to 5 p.m. Please go to the visitor center first, and then visit other points of interest. For special service, groups can make advance arrangements with the superintendent, whose address is Manteo, N.C.

A 64-page illustrated handbook covering the Wrights' achievements in greater scope can be purchased at the visitor center or from the Superintendent of Documents, Washington 25, D.C., for 30 cents.

Other nearby areas

This region of wind, sand, and sun, as the pioneer aviators learned, offers excellent outdoor recreation. While on the Outer Banks you will enjoy visiting two other areas in the National Park System:

At FORT RALEIGH NATIONAL HISTORIC SITE on Roanoke Island Sir Walter Raleigh in 1585 planted the first English colony in North America. During July and August the story of the ill-fated settlers is retold in Paul Green's colorful pageant, *The Lost Colony*, staged nightly at 8:15 p.m., except Sundays, at the Waterside Theater.

CAPE HATTERAS NATIONAL SEASHORE, lying in a sand-swept stretch of the North Carolina coast, is located on 3 slender islands—Bodie, Hatteras, and Ocracoke, extending nearly 75 miles from Whalebone Junction (near Roanoke Island) to Ocracoke Inlet. Among the many outdoor activities the area offers are swimming, fishing, camping, hunting, and nature study. To learn the best ways to explore the natural and human history of the Nation's first National Seashore, stop at the Bodie Island Visitor Center, 5 miles south of Whalebone Junction.



PHOTO COURTESY AYCOCK BROWN.

Near the takeoff point for the First Flight is the modern visitor center.

Administration

WRIGHT BROTHERS NATIONAL MEMORIAL is administered by the National Park Service, U.S. Department of the Interior. Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

Mission 66

This 10-year program is designed to develop and protect the areas of the National Park System and to assure proper use and enjoyment for present and future generations. Through MISSION 66 at Wright Brothers National Memorial, new approach roads and parking areas have been built, as well as the visitor center, whose sweeping design hints at the miracle of flight.



UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE



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