

THE U.S. ARMY'S FIRST HELICOPTER

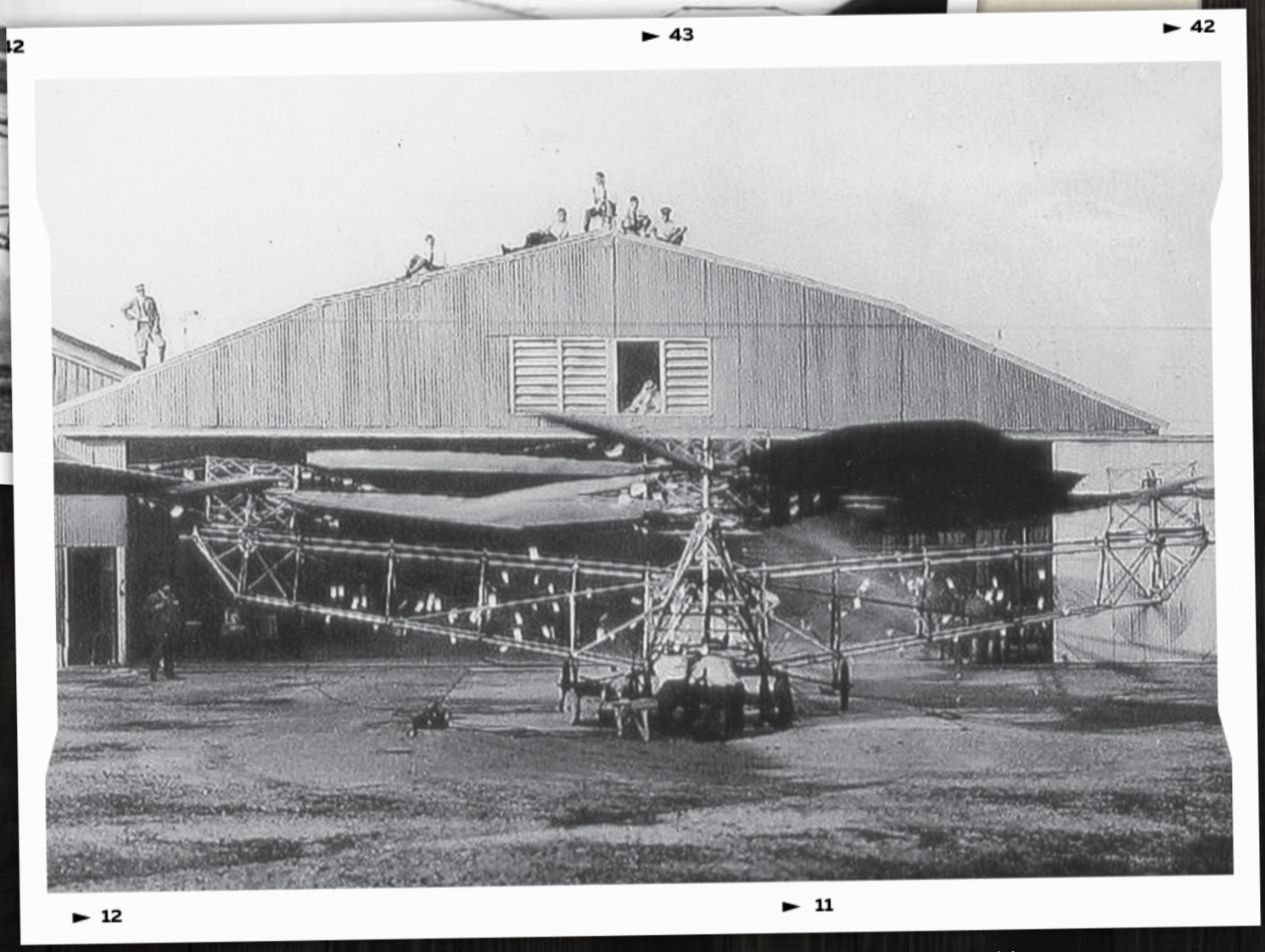
The de Bothezat helicopter was a landmark aircraft for many reasons — not least because it was the U.S. Army's first attempt at bringing rotary-wing flight into its arsenal.

BY BOB PETITE





BACK TO CONTENTS



The de Bothezat helicopter is brought out of the hangar at McCook Field. The program was considered top secret in 1922. **Jeff Evans Collection Photo**

ON OCT. 18, 1917, JUST OVER SIX MONTHS AFTER THE U.S. ENTERED the First World War, McCook Field (later renamed Wright Field) was established in Dayton, Ohio. It would become the center of military research and development for the nascent technology of aviation for the next decade.

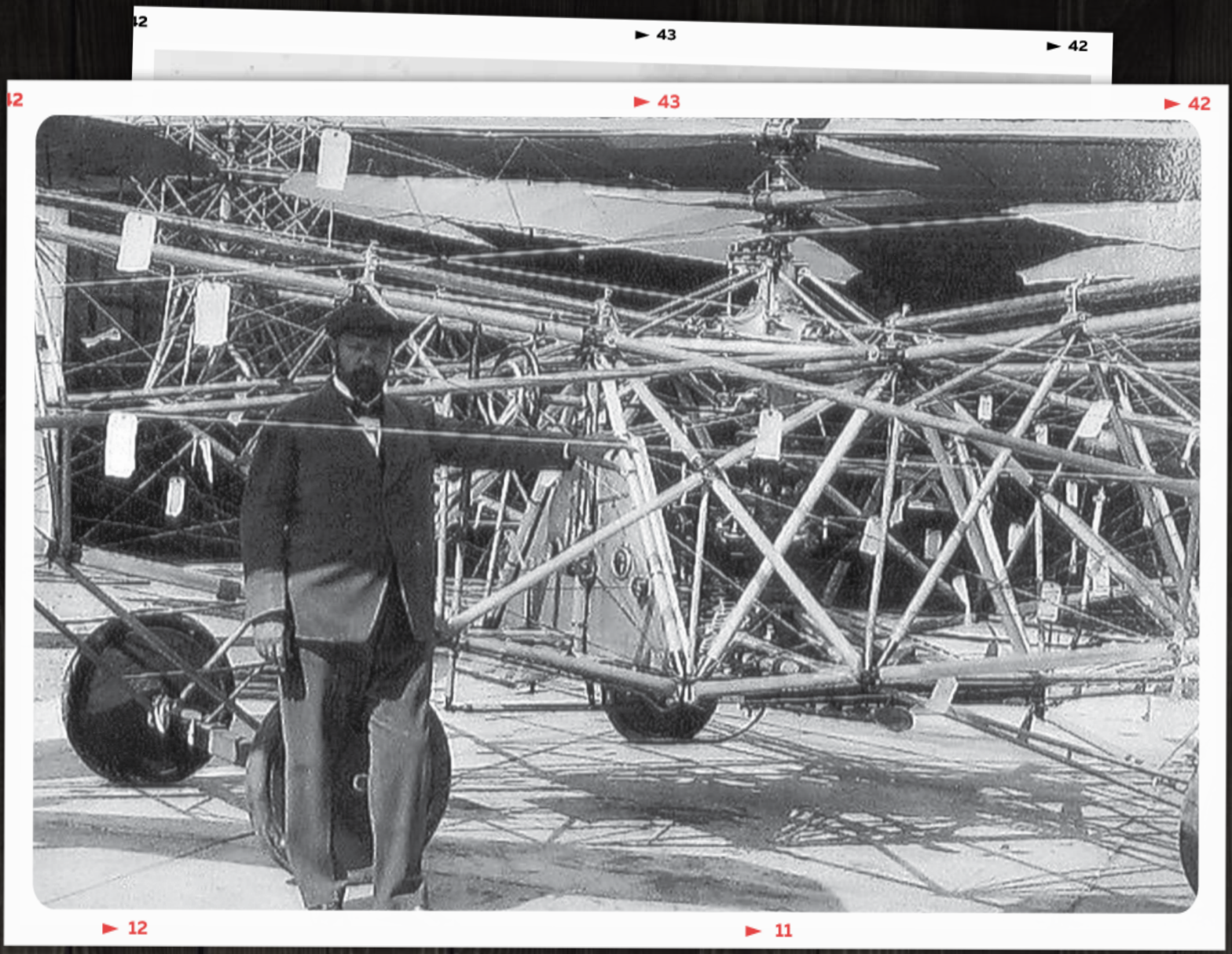
Those working there — some of the most experienced engineers from across the U.S. — were tasked with designing, developing and producing the best new aircraft for the fledgling Air Service. This work included new and advanced helicopter development.

Major T.H. Bane, chief of the Army Air Service's engineering division, sent his team across the country to find out all they could about helicopter design and the principles of operating rotary-wing aircraft, but they had little initial success. However, an encounter with Russian engineer George de Bothezat led to a change in fortune.

Born on June 7, 1882, in Saint Petersburg, Russia, de Bothezat's studies into aircraft stability, flight theory and propellers had taken him across Europe. He had then joined the Russian flight research facility in Saint Petersburg, where he designed a single-engine airplane, which was tested successfully during 1917.

The same year saw the overthrow of the Tsar and the start of the Russian Revolution, causing de Bothezat to flee Russia and move to the U.S. In June 1918, he was hired by the National Advisory Committee for Aeronautics (NACA), and he also often lectured at the Massachusetts Institute of Technology and Columbia University.

It was there that Bane first met de Bothezat. After several meetings, Bane asked de Bothezat to help the Air Service develop helicopters, and the engineer moved to Dayton.



George de Bothezat stands next to his helicopter. **Jeff Evans Collection Photo**



An early hover flight of the de Bothezat helicopter, which took it about two feet above the ground. Note the rope attached to the helicopter. **Jeff Evans Collection Photo**

Bane asked Major General Mason M. Patrick, chief of the Air Service, for permission to set up a contract with de Bothezat to build an experimental helicopter at McCook Field. Bane believed that de Bothezat's rotary-wing ideas were way ahead of anyone else at the time.

The contract to design, construct and fly the U.S. Army's first helicopter was awarded on June 1, 1921, to de Bothezat and his partner, Ivan Jerome. de Bothezat agreed to supply data and drawings, manufacture, and supervise the flight testing of the helicopter. The Air Service would provide all equipment and supplies, work people and the construction facilities. Time, however, was short: the project was to be completed by Jan. 1, 1922.

The program was to be supervised by the Special Research Section at McCook Field, and it was considered top secret. The only people allowed on the site were those who had been specially selected by the engineering division. Aeronautical engineer Franklin O. Carrol was assigned as the Air Service project manager.

de Bothezat was to receive $5,000 when the first drawings and sketches were complete, $4,800 when the final design and construction was finished, and $2,500 if the machine rose up into the air on its own power — a total of $12,300 if all those targets were met. An additional $7,500 was available if the helicopter reached 300 feet and was able to land safely with the engine completely throttled.



de Bothezat (left) stands alongside Major T. H. Bane (right), chief of the Army Air Service's engineering division.
Jeff Evans Collection Photo

BUILDING THE FLYING OCTOPUS

Work started on the experimental prototype helicopter in a small hangar and then moved outside, where a canvas tarp was placed around the rotorcraft to maintain secrecy. Only selected workers were allowed inside the blocked-off canvas walls around it as it was being built. de Bothezat would chase away anyone that tried to view the aircraft.

The aircraft had a quadrotor structure, with six-bladed rotors at the end of each of its four arms (leading to the aircraft soon gaining the nickname of the "flying octopus"). Each of the rotors was 33 feet (6.7 meters) in diameter. The helicopter had two horizontal propellers (for steering), plus two small airscrews placed above the gear box. There was room for a single pilot towards the aft of the helicopter, with a sheet metal covering helping to protect them from engine fumes and gases. Underneath was a four-wheeled undercarriage.

The de Bothezat helicopter weighed 3,585 pounds (1,624 kilograms), and was powered by a nine-cylinder 180-horsepower Le Rhone engine (later replaced by a 220-horsepower Bentley BR-2). Foot pedals and a stick changed the pitch of the fabric-covered rotor blades. There was a steering wheel — similar to that in a car — that controlled the pitch of the three-bladed rotor above the engine.

As work progressed, the deadline for completion was extended to May 31, 1922. However, there was a good degree of skepticism as to whether the de Bothezat helicopter would ever be able to get off the ground.

The de Bothezat helicopter was finally ready for its first flight on Dec. 18, 1922 — only seven months behind schedule. Bane was to be the pilot for the initial flight. All seven of the workers that had helped build the helicopter were present, including de Bothezat. The weather was perfect, with little wind.



A side view of the hovering de Bothezat helicopter in flight. **Jeff Evans Collection Photo**

The helicopter was wheeled out to the middle of a small field, and made ready for the flight at about 9 a.m. As Bane throttled up the engine, he signaled the helpers to move away from the helicopter. The four propellors sped up and the helicopter slowly started to move. It strained and shook as it gently lifted into the calm air, rising up to about six feet (2.9 meters), and it stayed hovering for about two minutes. It was the first ever flight of an Army helicopter, and it was uncannily steady in the air. It drifted along in the light winds for about 300 feet. As he was coming close to a fence, Bane brought the helicopter down, keeping it under control. This final act marked the first successful landing of a helicopter in the U.S.

A LANDMARK FLIGHT

Test flights continued for some time, but the rotorcraft never achieved enough height (reaching up to 15 feet/4.6 meters) for the pilot to have full control. It did, however, complete over 200 flights. Through these, it was found to be underpowered, very mechanically complex, had reliability concerns, and could be unresponsive at times. The pilot's workload was too high when hovering to attempt lateral motion.

Bane taught Carrol how to fly the de Bothezat helicopter by the end of 1922 (Carrol had to sit next to Bane on the metal cross-member structure). In early January 1923, Bane lifted two passengers off the ground for the first time, up to a height of four feet (1.2 meters). He later taught Art Smith, a civilian pilot, to fly the helicopter — he found the helicopter way more complicated than a fixed-wing aircraft to control. In 1923, the helicopter was flown in the air for about three minutes.

By April, the de Bothezat helicopter was used in weight-lifting trials carrying, at one point, four passengers who were hanging on to the aircraft's rear arm.

With the trials complete, another contract was given to de Bothezat to make improvements to the helicopter. This included a redesign of the central part of the helicopter, and a reduction in the size while increasing the stiffness of the propellers. Unfortunately, this didn't improve the helicopter's performance.

While the de Bothezat helicopter was a clear step forward in the progress of helicopter design, it was deemed a failure by Air Service engineers. They believed future rotary-wing aircraft should have a single main rotor blade, but that a lot more money was needed for research and engineering before the technology could be considered practical for military use. Military rotary-wing aviation's time had not yet arrived, and the Chief of the Air Service terminated the de Bothezat helicopter program. The aircraft was moved to a hangar, where it sat for some time before it was eventually disassembled.

Disappointed, de Bothezat started a new company — de Bothezat Impeller Company — in New York, which designed and manufactured industrial fans.

By 1938, he was back to helicopter design, forming the Air Screw Research Syndicate (later changed to the Helicopter Corporation of America). His new helicopter was a coaxial design called the SV-2, with an engine located between the two rotors. de Bothezat eventually rebuilt it into a heavier model called the SV-5. He was also looking at building a one-man personal helicopter for the military. Sadly, he would never get to see the SV-5 fly. He died on Feb. 1, 1940, in Boston, Massachusetts.



BOB PETITE

Bob is a member of the Twirly Birds, The Vertical Flight Society, the Canadian Aviation Historical Society, the American Aviation Historical Society and the Bell 47 Helicopter Association, Inc. He is the author of *The Bell 47 Helicopter Story.*



Another hovering flight of the de Bothezat helicopter. A man standing on the ground helps the pilot keep the helicopter stable. **Jeff Evans Collection Photo**



BACK TO CONTENTS