# A Second Look

Analyzing the photo-within-a-photo alleged to show Gustave Whitehead in flight

By Nick Engler

Earlier this year, John Brown, an employee of an obscure aeronautical company trying to develop a roadable airplane, published a "forensic analysis" of a photo that appeared at the 1906 Exhibition of Aeronautical Apparatus at the 69th Regiment Armory in New York City. Actually, it was an analysis of a photo within a photo. A photo of the exhibition shows the back wall covered with images and a sign saying "Collection of Pictures loaned by W.J. Hammer." According to Brown, one of Mr. Hammer's pictures shows Gustave Whitehead's aircraft, the *No. 21*, in flight in 1901, two years before the Wright brothers first made powered flights.
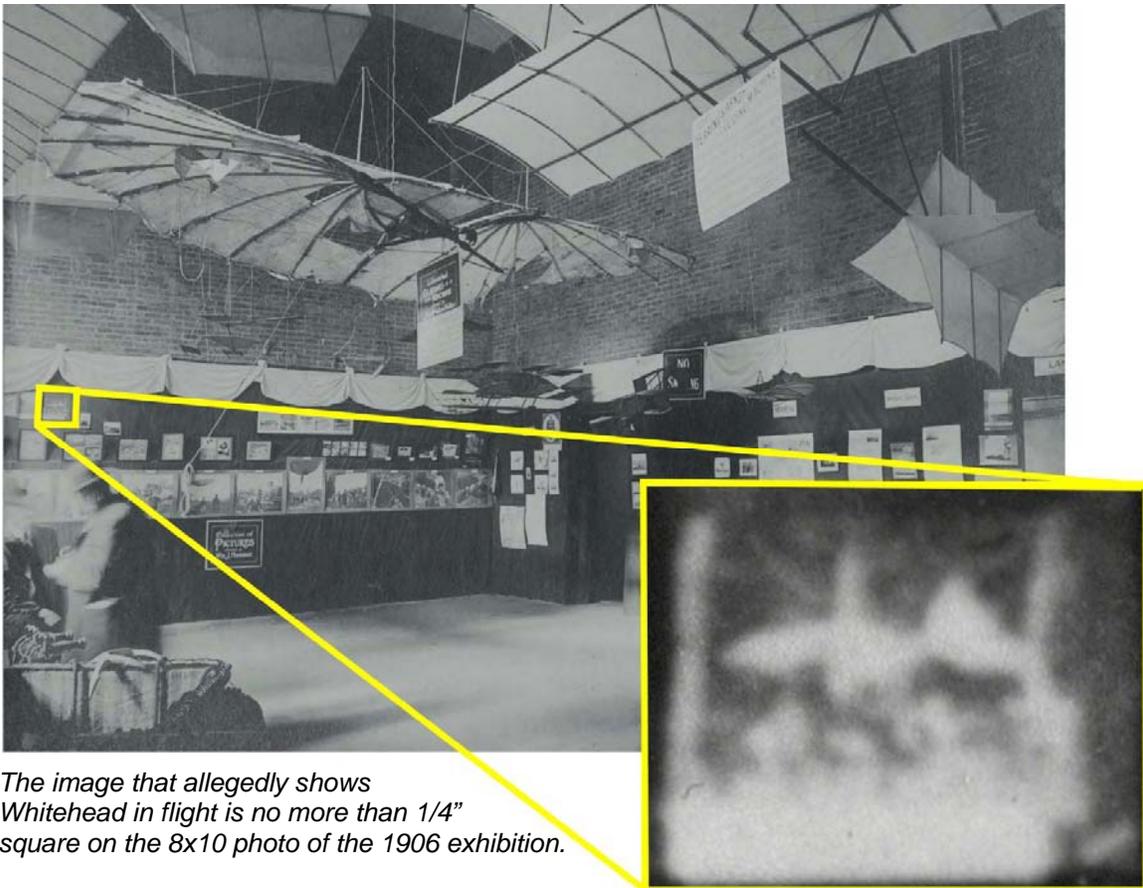
The image that allegedly shows Whitehead in flight is no more than 1/4" square on the 8x10 photo of the 1906 exhibition.

I have analyzed a few photos myself, beginning with photos taken from Robin Falling Weather Balloons in the 1960s. I applied the analytical techniques I learned on that job in my long career as a craftsman and author, developing architectural drawings of classical buildings and furniture from old photos. I used this skill again when I joined a team who, between the years of 1999 and 2005, reproduced and flew all of the Wright brother's experimental aircraft. Still today people send me obscure aviation pictures, asking me to identify pioneer aircraft

and the circumstances in which they were photographed. So I was fascinated to read how Brown, analyzing a blur that was no more than 1/4-inch square on a 100-year-old photo, enlarged it an estimated 3200% and proved that this was an image of a Whitehead airplane in flight. Not only that, he determined that it was taken at the moment the wings collapse and the aircraft begins to fall from the sky – an unbelievably specific conclusion from such blurry data.

If you read Brown's long and convoluted "analysis" – and very few people do; I am sure he is counting on this – he uses confusing technical jargon which obfuscates more than it illuminates. He skips steps that professionals consider of primary importance and spends pages tracing shapes in the blurs which, because we don't know the background against which this photo was taken, could be anything – people, trees, clouds, or flying saucers. This is nothing more than junk science, designed to impress rather than inform.

My first clue was Brown's continuous misuse of the word "forensic." In the vernacular, forensic describes the sciences and technologies used to establish facts to be presented in a court of law. Although I have analyzed hundreds of photos, I have never done a forensic analysis – and neither has Mr. Brown. What I am about to present here is just a simple analysis involving a little math, the laws of physics, and common sense.

The first thing you must consider in analyzing a photo is lighting. In the case of an outdoor photo, which this blur is supposed to be, you have to ask yourself where is the sun and what shadows is it casting? When photographing an airplane against the sky, the answer is simple. Light from the sun scatters as it enters the atmosphere, making the entire sky luminous. When an aircraft crosses the sky, it blocks that light so that even a white aircraft appears darker than the surrounding space. Photograph that aircraft and what you see is its shadow against the incandescence. The objects in the blur that Brown identifies as the fuselage and tail of Whitehead's airplane appear light against a darker background. Because of this, it is highly unlikely that the blur represents an aircraft in flight.
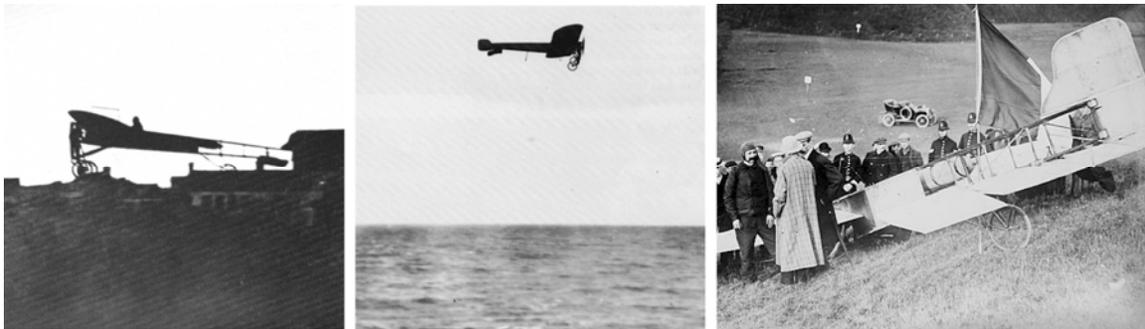
These famous photographs show aviator Louis Bleriot crossing the English Channel in 1909. Note that his aircraft appears dark against a light sky, even during a pre-dawn take-off. Once he had landed, however, the same aircraft appears light against the grassy fields of Dover.

The next thing to consider is the position of the camera relative to the object. This is crucial not only for identifying the object, but also determining its size, shape, condition, and the circumstances in which it was photographed. I start by looking for vanishing points – imaginary points on the horizon into which an object would vanish if it were receding from you. The classic example is train tracks that seem to grow narrower and vanish into a spot in the distance. Find that spot and you know where the camera was in relation to the tracks.

If the object in the blur is the fuselage and horizontal tail of the Whitehead *No. 21*, then the tail will point us toward the vanishing point. The tail was triangular in shape and the triangle will be skewed toward that spot. To locate this vanishing point with some precision, I made a 3D drawing of the *No. 21* that I could manipulate to match the shapes in the blur. If the camera was below the aircraft looking up – as it would have to be if the aircraft was in flight – the far
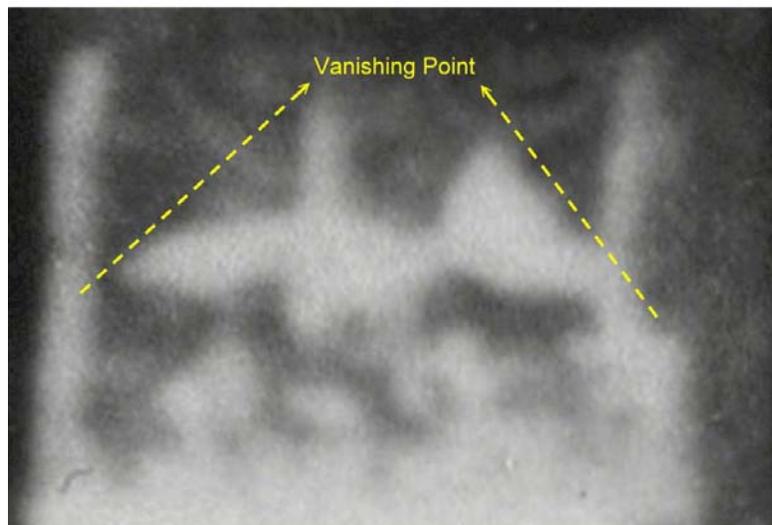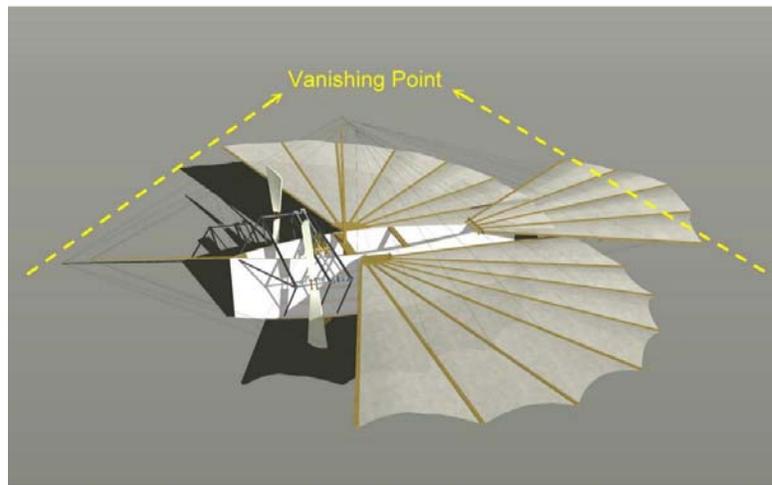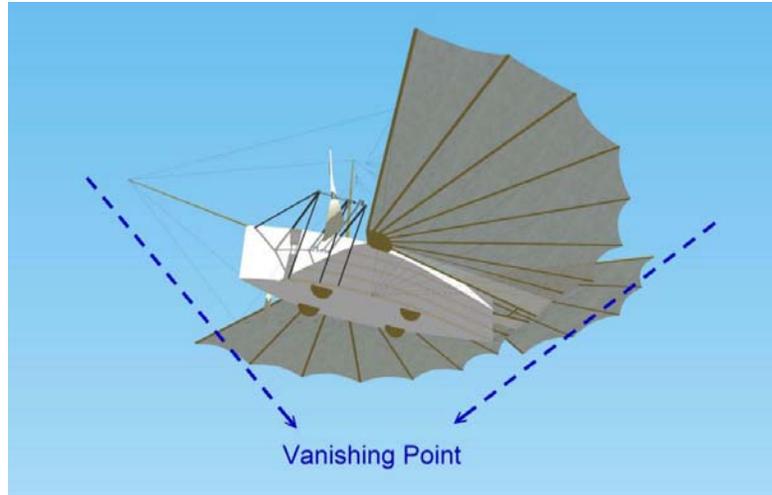

The vanishing point (VP) is always a point on the horizon. In the top illustration, the VP is below the aircraft, as is the horizon. In the middle one, it's above the aircraft. In the blurry photo, it appears to be above the objects in the image.

corner of the triangular tail would have to be skewed down and toward the center of the photo. But it wasn't. It was plainly skewed up, meaning the camera was more likely above the aircraft, looking down. This isn't an opinion or interpretation; it is a plain, unvarnished fact proved by the mathematics that governs perspective (and the graphic software with which I was working). If the triangular shape was the *No 21* tail, the camera had to be above the aircraft.

Unfortunately, not all scientific facts lead us to the truth, as later events plainly showed. About the same time I was spinning the virtual *No. 21* on my computer screen, Craig Harwood, co-author of *Quest for Flight: John J. Montgomery and the Dawn of Aviation in the West*, sent historian Carroll Gray a photo of a Montgomery glider, the *California,* and suggested it might be the true source of the photo-within-the-photo. The glider was on exhibit in San Jose in 1905, suspended in front of a dense wall of trees and leaves. The wings, rudder, and elevator of the glider appeared light against the darker vegetation. The trunks of three nearby trees match the vertical shapes in the blur; the shape of the *California* vertical rudder matches what Brown had promoted as the *No. 21* tail. It was not a complete match, however; the wings did not form the same cigar shape that Brown had determined was the *No. 21* fuselage.

This image shows the Montgomery glider California *suspended between three light-trunked trees at Agriculture Park in San Jose, California in the late spring of 1905. If you reduce the photo by 3200% to 1/4" tall, then re-enlarge it, the shapes blur. The trees and the tail of the glider match shapes in the blurry image that was extracted from the photo of the 1906 exhibition. But there is no cigar-shaped "fuselage."*

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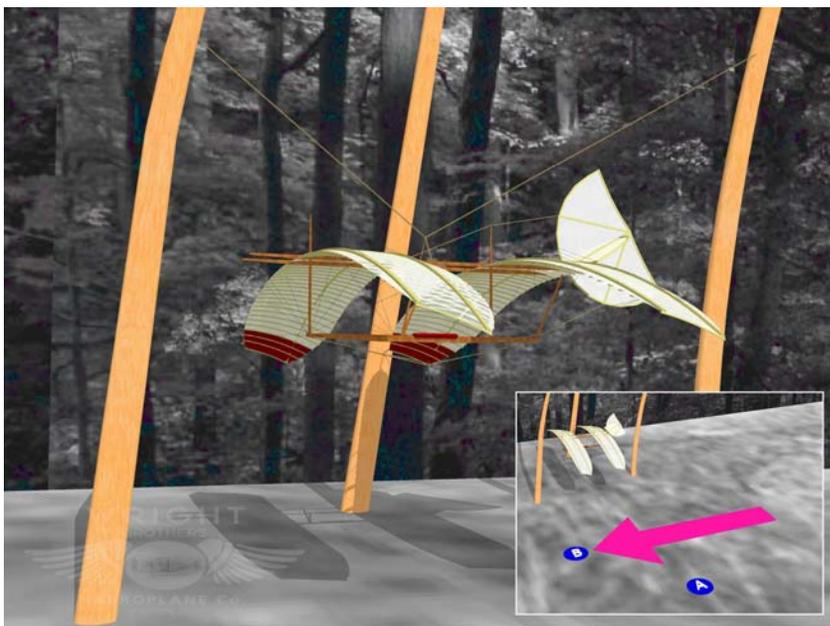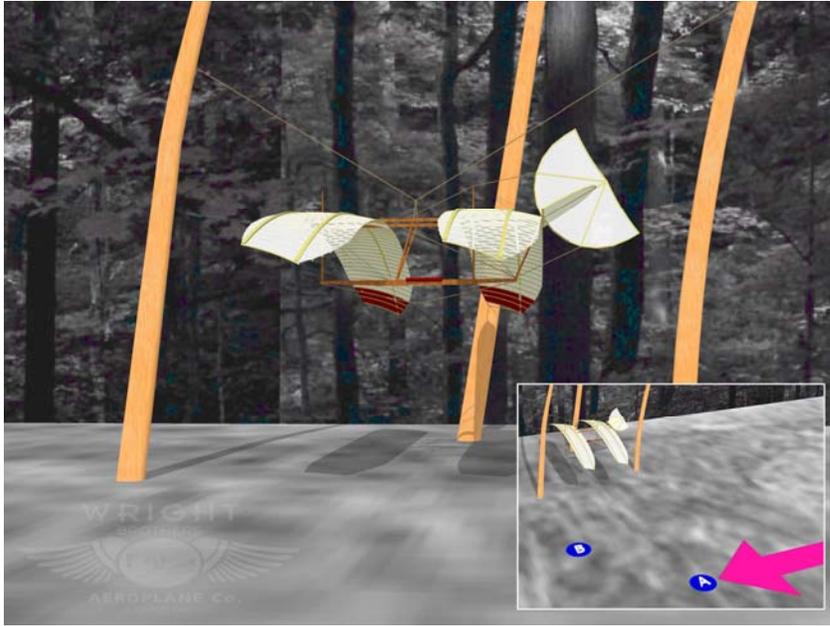
The illustrations show the California *suspended between three trees. The camera position (A) for the top image is almost perpendicular to the longitudinal access of the aircraft. This matches the 1905 photo taken in San Jose. The bottom image was generated with the camera position (B) closer and to the left of the first. The overlapping wings form an oval shape close to the "fuselage" shape in the blurry image from the 1906 exhibition photo.*

Harwood and Gray had a reasonable hypothesis to explain this. The photo of the *California* was taken from a different position than the blurry image in the 1906 exhibition photo – two different camera locations. I decided to test this hypothesis the same way I had tested Brown's conclusion. I drew a virtual *California* that I could view from any angle on screen. Using a little trigonometry, I determined the relative positions of the three trees in the Montgomery photo and suspended the *California* between them. I rotated this tableau and adjusted the distance between the camera and the glider until the virtual image echoed the Montgomery photo. I marked the camera position, then moved it again looking for a match to the shapes in the blur. I found what I was looking for about forty degrees to the left and five feet closer to the glider than the camera position for the Montgomery photo.

To check my work, I generated an image of the *California* from this new position. I stripped the image of color and added contrast to mimic the effects of old black-and-white photographic film. I reduced the image by 3200% so it was the same size as it appeared in the original photo of the 1906 exhibition, then re-enlarged it to fill the screen. As a control I did the same with a virtual image of the *No. 21*, first rotating it so the outlines of the tail and fuselage matched the shapes in the blur as well as possible. I also adjusted the lighting in both images. The positions of the shadows in the *California* rendering match those in the Montgomery photo. The position of the sun in the *No. 21* drawing is adjusted for early morning in mid-August when the photo was alleged to have been taken.
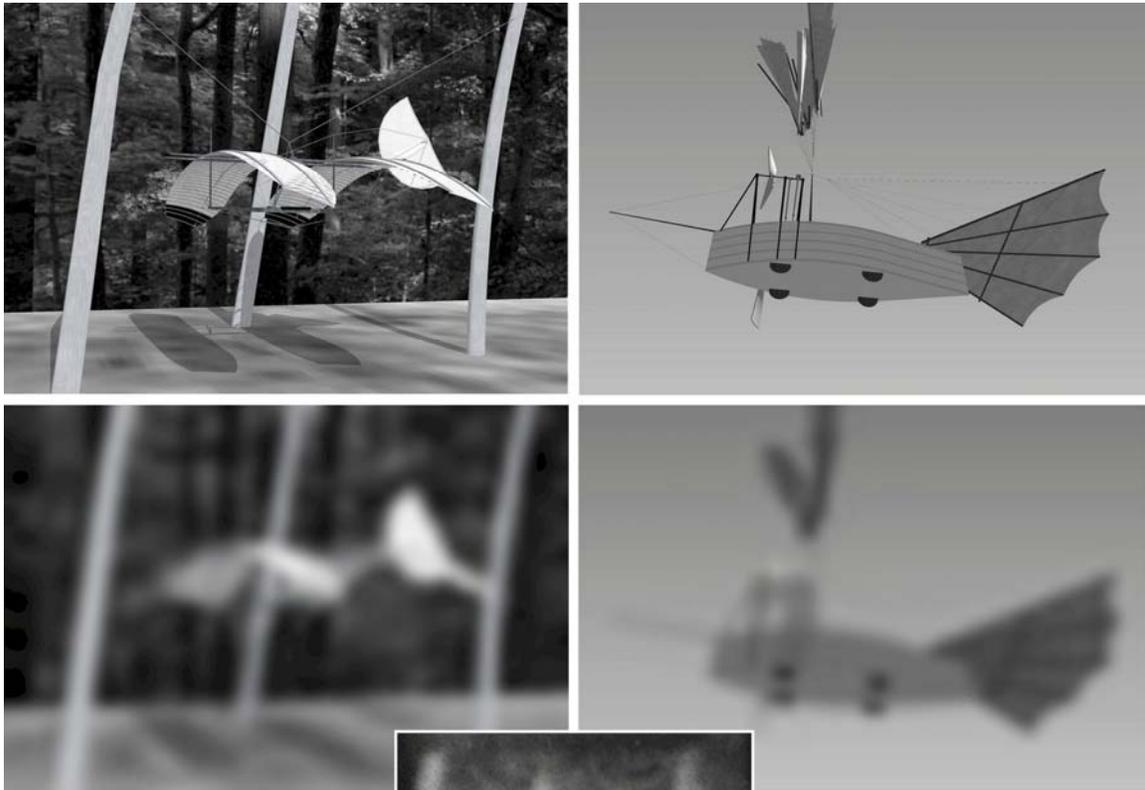
The top illustration shows the California in black and white *from camera position "B." The blurry image below it was generated from it. The image to the right is the blurry 1906 photo-in-a-photo.*

The illustrations above show the No. 21 *twenty feet above the ground. The wings have ripped away and are fluttering above as the aircraft plummets – all per Brown's complex analysis.*

There are two conclusions to be drawn from this second analysis. The first is that the Gray/Harwood hypothesis is most likely the correct interpretation of the blur, pending new data. Truth in science grows and evolves, always making it impossible to pin down with one hundred percent certainty. The second is that Brown's analysis is junk science, ignoring laws of physics and logic. By the same token, the changes in aviation history that he proposes are likely junk history.