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The First Witness: Amos Root at Huffman Prairie

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Samuel Langley, the third secretary of the Smithsonian Institution and one of the most distinguished scientists in the United States at the end of the nineteenth century, designed and successfully launched the first powered, heavier-than-air flying machines in 1896. These machines flew without a pilot; nonetheless, Langley's achievement was a milestone in aeronautics. Shortly afterward, he published an account of his experiments in *McClure's* magazine. In conclusion he said: "We may live to see airships a common sight, but habit has not dulled the edge of wonder, and I wish that the reader could have witnessed the actual spectacle."

For us, of course, "the edge of wonder" has been dulled by a century of powered flight. It's especially hard to project ourselves back into the early 20th century and imagine what it would have been like to see the first flights. Even the films of the Wrights flying, however fascinating, fail to generate the feelings in us that the first witnesses would have had, simply because we are so accustomed to seeing airplanes fly. We look at those films, or at a replica, and say to ourselves, in effect: "Ah. An old airplane." The first witnesses, by contrast, were seeing a thing for which they had no frame of reference, something no one had seen before, a machine that seemed to defy physical laws and to bring ancient myths and longings to life. These witnesses also were conditioned by a popular culture that considered human flight to be impossible and flight experimenters to be fools. As the historian Roger Bilstein has written: "For all the evidence [of flight] . . . that accumulated in published reports before 1908 and after, most Americans had to see it to believe it."

Of the gaps in the Wright records, few are more regrettable than the scarcity of accurate eyewitness accounts at Kitty Hawk and Huffman Prairie. One wishes especially that Katharine Wright, an acute observer, had written more about her brothers at their work. But there is one account, at least, that can help us to imagine what it was like to see the Wrights at Huffman Prairie in 1904.

It was written by Amos Ives Root, a successful and wealthy businessman - a manufacturer of beekeeping equipment at a time when beekeeping was a more important part of American agriculture than it is today. In that field he was among the best known figures in the world. He invented equipment that made beekeeping practical on a commercial basis. He was also a publisher, a writer, a temperance crusader and promoter of the Sunday school movement, a philanthropist, an inventor, a technology enthusiast, and the leading citizen of Medina, Ohio, a prosperous farm town about 20 miles southwest of Cleveland.

It's hard to be precise about Root's contribution to the history of the Wright brothers. Others saw them in flight before Root, but did not write detailed accounts. Accounts were published before Root's, but they were second-hand and inaccurate. Nick Engler has it right on his website when he says Root wrote "the first eyewitness account of a sustained, controlled, powered flight."

The story hints at how it felt to watch the first airplane in flight. And it was the first to recognize that these men were, so to speak, the Wright brothers . . . as we think of them - that they were makers of history. To use today's parlance, Amos Root got it, and he was the first to do so. The Wrights' invention, he said, "may outrank the electric car, the automobile, and all other methods of travel, and one which may fairly take a place beside the telephone and

wireless telegraphy." His judgment was not only correct but way out in front. It would be nearly four more years before mainstream journalists and engineers reached the conclusion that Root reached at the end of 1904.

When Root died in 1923, a local editorialist said: "Amos I. Root was one of the most remarkable men of the past two generations, remarkable not in one way, but in many ways." He was born near Medina in December 1839; thus he was 64 when he met the Wrights. He was small and sickly from childhood onward, so instead of helping his father with farm duties he helped his mother in the truck garden and became an expert gardener. He was intensely curious about the natural world and about science. He was the sort of person who, when he takes an interest in a field, feels compelled to learn everything there is to know about it. As a teenager he took up chemistry and electricity as hobbies. For his trade he learned how to repair jewelry and then manufacture it, which eventually made him a good deal of money. He married a local girl, with whom he had several children.

In 1865, at the age of 26, he took up beekeeping as a hobby. His correspondence led him to start a beekeeping trade journal which he called *Gleanings in Bee Culture*. Gradually he shifted his business from jewelry to beekeeping equipment. By 1880 he was selling his equipment to 150,000 customers and sending *Gleanings in Bee Culture* to roughly 4,000 subscribers-not very many, but enough to make Root feel that he addressed a significant audience. In the 1880s he turned the business over to his sons. He had plenty of money and could devote himself to his other interests, which were many, and which he continued to write about at length in *Gleanings in Bee Culture*.

Root was an eccentric and contrarian-deliberately so. He liked to be the first to try new machines. That same editor wrote: "No amount of scoffing or ridicule-and he endured it many times-could swerve him from his belief or purpose, and he went straight to his work without faltering or swerving from the path he had chosen." Until it began to pay, people thought Root's beekeeping was odd. In the 1870s he became the first man in northern Ohio to own a bicycle. He powered his machinery with a windmill of his own design. According to one Medina resident, in Root's early career, "Everyone thought he was a nut, and he did his best to prove them true."

In the 1870s Root became what evangelicals call a professing Christian, and he seems to have professed his faith to practically everyone he spoke to, including his employees, who were expected to attend daily prayer meetings on the job. He embraced many of the Christian reform movements of his day. He became a temperance activist, an anti-tobacco man and a strict sabbatarian. He was one of the founding benefactors of the Anti-Saloon League. He became a leader in the Sunday school movement.

All these enthusiasms-gardening, science, beekeeping, technology, Christian reform-were grist for Root's column in *Gleanings in Bee Culture*, which he wrote every two weeks for some fifty years. These columns were lay sermons, each based on a biblical text. The column ran under the title "Our Homes" and developed a following; many subscribers apparently took *Gleanings* chiefly to read Root's offering. It was a blend of personal anecdote, useful information, travelogue, news and advice, all delivered to animate Root's core evangelical message.

One of his persistent themes was that Christians ought to welcome the technological change washing over American society-the telephone, electric power, the phonograph, and especially the automobile. Root bought his first car, an Olds Runabout, in the spring of 1903, and it became, as his wife said, "his pet." He drove it and tinkered with it constantly and wrote about it often.

At the time, of course, most people outside the cities depended on horses for local transportation, and the problem of automobiles frightening horses was a lively controversy, especially among farmers. Class distinctions also came into play. In the country, automobiles were seen to be playthings of the rich. Thus they often stirred resentments among working people and farmers, who rolled out whatever scriptural artillery they could muster to denounce the new technology.

In this context, Root appointed himself the defender of the automobile and took on the task of forging a reconciliation between the new technology and rural Christians. Root believed in the gospel of social betterment through technological progress—a faith that he easily reconciled with his Christianity. He frequently told his readers that technology was as much a gift from God as the natural world. "If God is a creator," he wrote, "and man is made in his own image, then man must be a creator also; and one who sees what man is doing just now many well stand . . . lost in wonder . . . following in the footsteps of God as a creator . . ."

The automobile's place in American society was very much on Root's mind when he learned about the Wright brothers.

Root first mentioned the Wrights in his "Our Homes" column of February 14, 1904, two months after the first powered flights at Kitty Hawk. He told his readers how he had gotten the attention of unruly boys in his Sunday school class by describing "two Ohio boys . . . [who] have outstripped the world in demonstrating that a flying-machine can be constructed without the use of a balloon. . ." From the details he included, some of which are inaccurate, it's clear that Root had read one or more of the newspaper stories published in late 1903 and early 1904, and that he had followed developments in aviation closely enough to recognize the significance of the Wrights' claims.

He wrote no more about them for several months. From his column, we know that from July 28 to August 13, 1904, he took a 400-mile automobile trip through central and southwestern Ohio. In evidence of Root's fascination with all things, general and specific, he told his readers that "this trip was taken with the view of studying humanity, and also of considering the question of automobiles on our public roads." He visited several towns and cities, including Dayton. Probably he first contacted the Wrights on this trip, asking to meet them or possibly asking merely for bibliographic advice on aeronautics. He may have met with them on that trip, in August. But we know for sure that he spent time with the Wrights the following month and again in November. We don't know how many days Root spent at Huffman Prairie. He said it was "many days that summer and fall." In Arthur Renstrom's chronology of the Wrights' flights, based on their own diaries, Root is noted as being present on only two days. But one of those days was September 20th, 1904, the day when Wilbur Wright first flew in a complete circle—a milestone in the achievement of three-axis control.

The Wrights—who, of course, were anxious to keep their secrets from competitors—asked Root not to write about what he had seen until they were finished with their experiments for the 1904 season. Root could not resist dropping a couple of hints in his column that fall, but he withheld his full account until the Wrights advised him in December to go ahead and publish. He did so in the issue of *Gleanings* of January 1, 1905. The next issue contained a short follow-up article, with a photograph of the 1902 glider, and over the next several years he published occasional brief updates about the Wrights' activities.

(An aside: Fred Kelly, in his authorized biography, reported that Root sent his article to *Scientific American* and offered to let the magazine reprint it, but was turned down.)

Root's column on January 1, 1905 runs about 3,500 words. It's rambling and idiosyncratic, not at all a conventional piece of journalism. I hope you'll read it for yourself. You may see things in it that I've missed. I want to make several points about it.

The Wrights were anxious to keep their secrets and they were not easy nuts to crack. Their first instinct with strangers was to distrust them, especially when it came to the flying machine. Yet they welcomed Root into their small circle and trusted him. Why?

Surely they did not regard *Gleanings in Bee Culture* as the perfect medium for publicizing their successes. It's possible that when they got to know Root, they considered him to be a possible future investor. Wilbur mentions this possibility in a 1908 letter to Octave Chanute. They did not ultimately invite Root or any other American to invest. But in 1904, when their plans for developing the machine were in flux, Root may have struck them as a man worth cultivating—a wealthy man with more than a purely commercial interest in their work, like Chanute himself.

Another explanation strikes me as more likely. Much has been written about the early failure of the press to understand the significance of the Wrights' work. Of course, the Wrights' own preference for secrecy had much to do with that. Still, we ought to consider how it felt to the Wrights in 1904 to be almost universally unrecognized. They were notoriously patient. Yet even for them, it must have been hard, at times, not to crow. And here, by accident, was a good fellow to crow to. Root had much in common with the Wrights—his intense curiosity; his enthusiasm for technology, including bicycling; his go-against-the-flow nature. He was the antithesis of a hurried reporter looking for a superficial scoop. He was also openly pious, like their father, and thus he was of a certain type whom the Wrights knew well—a churchman of the old school—and though they did not trust a churchman simply because he was a churchman, they were comfortable with men of Root's type and more inclined to trust than to distrust them.

Most important, Root already had some inkling of the significance of what they were doing. Few people in 1904 knew enough about aeronautics to recognize the import of a powered machine that could fly without a balloon. Root was one who did. So it is not hard to imagine the Wrights feeling some relief, even exhilaration, in sharing their news with someone who really could appreciate it and wonder at it. Nor is it hard to imagine, knowing their particular sense of humor, that they enjoyed the prospect of seeing *Gleanings in Bee Culture* scoop the world.

What was it like to watch the Wrights at Huffman Prairie—and to watch them with turn-of-the-century eyes, not knowing the future of flight?

The historian John Kasson tells us that 19th-century Americans actually sought and celebrated experiences of awe and dread in the presence of machinery. The mood of such experiences is a mood of the sublime, of aesthetic appreciation of transcendent power and strength, not unlike the appreciation of a great natural spectacle such as Niagara Falls or the Grand Canyon. Root's account is very much in this tradition. Here's the key passage from the January 1st article:

"The machine is held until ready to start by a sort of trap to be sprung when all is ready; then with a tremendous flapping and snapping of the four-cylinder engine, the huge machine springs aloft. When it first turned that circle, and came near the starting-point, I was right in front [of] it; and I said then, and I believe still, it was one of the grandest sights, if not the grandest sight, of my life. [Here it's interesting to see Root grope for a comparison to help his readers.] Imagine a locomotive that has left its track, and is climbing up in the air right toward you—a locomotive without any wheels we will say, but with white

wings instead . . . Well, now imagine this white locomotive, with wings that spread 20 feet each way, coming right toward you with a tremendous flap of its propellers, and you will have something like what I saw. The younger brother bade me move to one side for fear it might come down suddenly; but I tell you, friends, the sensation that one feels in such a crisis is something hard to describe. The attendant at one time [probably Charles Taylor], when the rope came off that started it, said he was shaking from head to foot as if he had a fit of ague."

To watch the Wrights in 1904 may have been exhilarating, but it was also downright unnerving, whether out of fear for the pilot or sheer shock at the sight, or both. We also get a sense of how utterly strange the Wrights' machine seemed to turn-of-the-century eyes. After all, the 1904 flyer looked nothing like a locomotive, yet the locomotive was what came to Root's mind as he tried to convey what he had seen. Possibly he had in mind not so much of the actual appearance of the flyer as its emotional impact. Like a locomotive, the flyer was technological power in motion. Though both machines obeyed their pilots, they could do things their pilots could not do. Both were creatures of man, yet far more powerful than man. Root's response is like that of the historian Henry Adams when he confronted the giant electrical generators on display at the Great Paris Exposition of 1900. Writing in the third person, he said that "to Adams the dynamo became a symbol of infinity. As he grew accustomed to the great gallery of machines, he began to feel the forty-foot dynamos as a moral force, much as the early Christians felt the Cross. The planet itself seemed less impressive. . . than this huge wheel. . . [O]ne began to pray to it; inherited instinct taught the natural expression of man before silent and infinite force."

In the next issue of *Gleanings*, on January 15th, Root published a photo of Wilbur in the 1902 glider at Kitty Hawk and told a bit more about his experience. In the January 1st piece he had expressed a sense of awe or dread. Here he introduced a new comparison, and his remarks were more clearly aesthetic, with an emphasis on the airplane's grace and beauty:

"It has often been remarked that one of the most beautiful sights in the world is a ship under full sail, especially a new sailing vessel with clean white canvas. There is something especially exhilarating about the way in which the canvas catches the wind and sends the ship scudding through the waves. But to me the sight of a machine like the one I have pictured, with its white canvas planes and rudders subject to human control, is one of the grandest and most inspiring sights I have ever seen on earth; and when you see one of these graceful crafts sailing over your head, and possibly over your home, as I expect you will in the near future, see if you don't agree with me that the flying machine is one of God's most gracious and precious gifts."

In the Wright literature, Root's article is most often mentioned not for its contents but for the apparent strangeness of the fact that the first eyewitness account was published in an obscure trade journal, not in a big newspaper or magazine. This critique of journalists of the day began with Fred Kelly, who devoted an entire chapter of his authorized biography to the point.

In fact, the journalists' silence is not so strange. Skepticism about the possibility of flight is only part of the explanation. The other is the difficulty of distinguishing the Wrights' claims from many others. They were only two among many flight experimenters-both legitimate ones and cranks-whose experiments attracted coverage in the press. Reports of the flights at Kitty Hawk were lost in the noise of other news about flying machines-especially, of course, Langley's much-publicized failures just a few days earlier. The journalists who failed to cover the Wrights weren't stupid. In their shoes we likely would have committed the same oversight. In an era of rapid technological change-whether in 1903 or in 2001-it's difficult to know which events are truly significant.

Even a comparatively well-informed layman like Root was ignorant of basic aeronautical principles. He had to ask the Wrights whether their propellers, if placed horizontally-that is, like a helicopter blade-would lift the flyer. The Wrights said no-in that position the propeller would lift only one-quarter of the machine's weight. Root asked why. "The answer involves a strange point in the wonderful discovery of air navigation. When some large bird or butterfly is soaring with motionless wings, a very little power from behind will keep it moving . . . [I]f this motion is kept up, a very little incline of the wings will keep it from falling. . . I was astonished at the wonderful lifting power of this comparatively small apparatus." In other words, public understanding of flight was in its infancy when Root wrote those words. Given this state of understanding, it's hardly surprising that years would pass before the nature of the Wrights' accomplishment penetrated public consciousness.

One more thing about Root: The dream of wings, to use Tom Crouch's phrase, is not the dream merely of witnessing another human flying, but a dream of flying oneself. This was as true of Amos Root as it was of the Wrights. In *Gleanings in Bee Culture* of April 1, 1905, three months after his historic article, Root included this short note: "From a letter just received from the Wright Brothers we are pleased to learn they are planning a machine for 1905 that will carry a passenger besides the operator. They did not say the passenger might possibly be A.I. Root (for, say, 'one trip'), but my imagination caught on to it nevertheless."