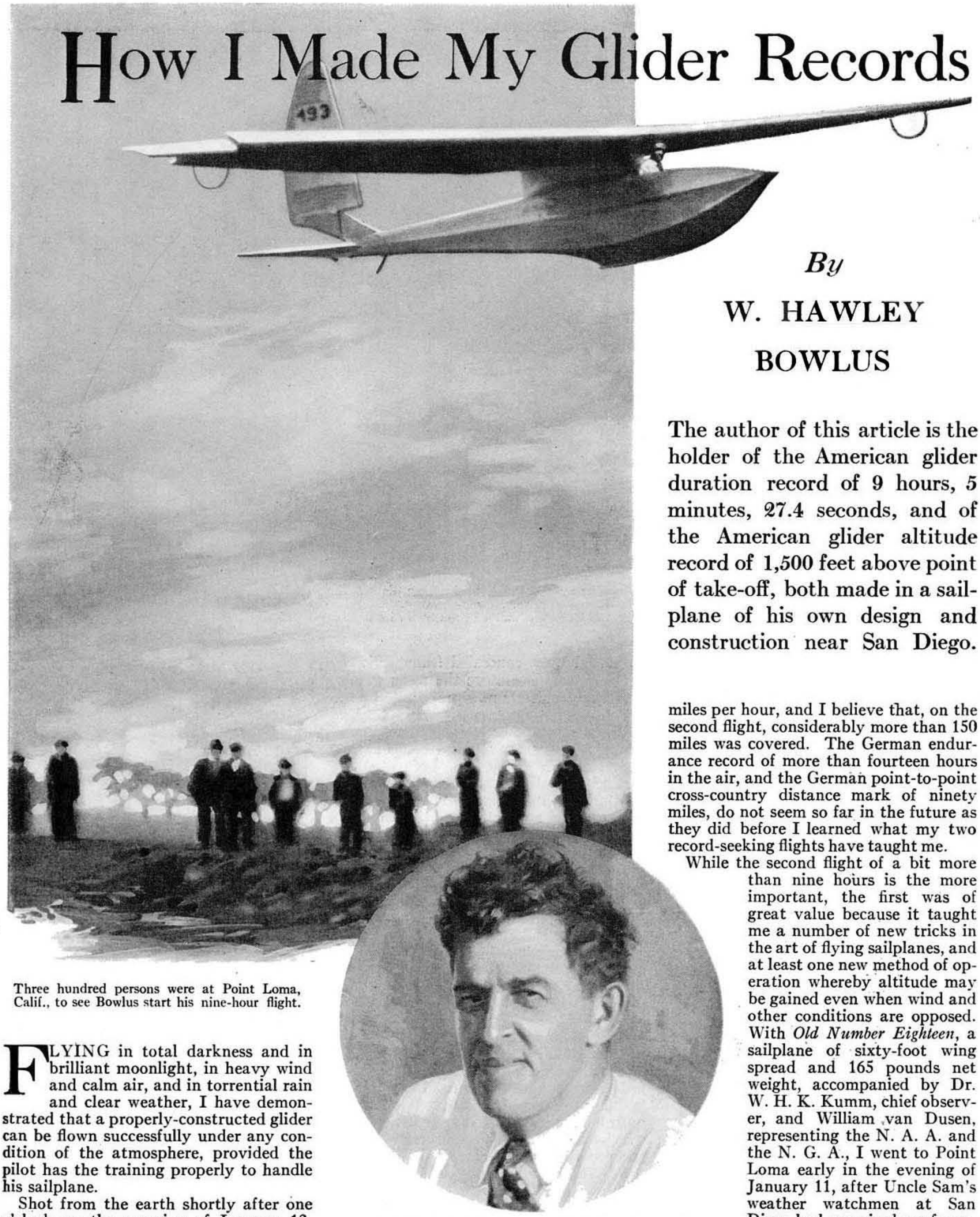
How I Made My Glider Records



By

W. HAWLEY BOWLUS

The author of this article is the holder of the American glider duration record of 9 hours, 5 minutes, 27.4 seconds, and of the American glider altitude record of 1,500 feet above point of take-off, both made in a sailplane of his own design and construction near San Diego.

Three hundred persons were at Point Loma, Calif., to see Bowlus start his nine-hour flight.

FLYING in total darkness and in brilliant moonlight, in heavy wind and calm air, and in torrential rain and clear weather, I have demonstrated that a properly-constructed glider can be flown successfully under any condition of the atmosphere, provided the pilot has the training properly to handle his sailplane.

Shot from the earth shortly after one o'clock on the morning of January 12, 1930, I reached an altitude of 1,500 feet above sea level, or nearly 800 feet above my starting point. Launched from a near-by spot on Point Loma, Calif., at the Silver Gate entrance to San Diego Bay, at 5:37:03 on the afternoon of February 23, in the same sailplane, I reached and held for some time an altitude of nearly 1,500 feet above the take-off—an American glider record.

W. Hawley Bowlus, who holds the American glider record for continuous flight and also for altitude. Bowlus designs and constructs his own sailplanes.

On the first flight, I remained in the air six hours, nineteen minutes, and three seconds; on the second, I stayed up nine hours, five minutes, and twenty-seven and four-tenths seconds. The distance flown on either flight was not measured, but the average speed was approximately twenty miles per hour, and I believe that, on the second flight, considerably more than 150 miles was covered. The German endurance record of more than fourteen hours in the air, and the German point-to-point cross-country distance mark of ninety miles, do not seem so far in the future as they did before I learned what my two record-seeking flights have taught me.

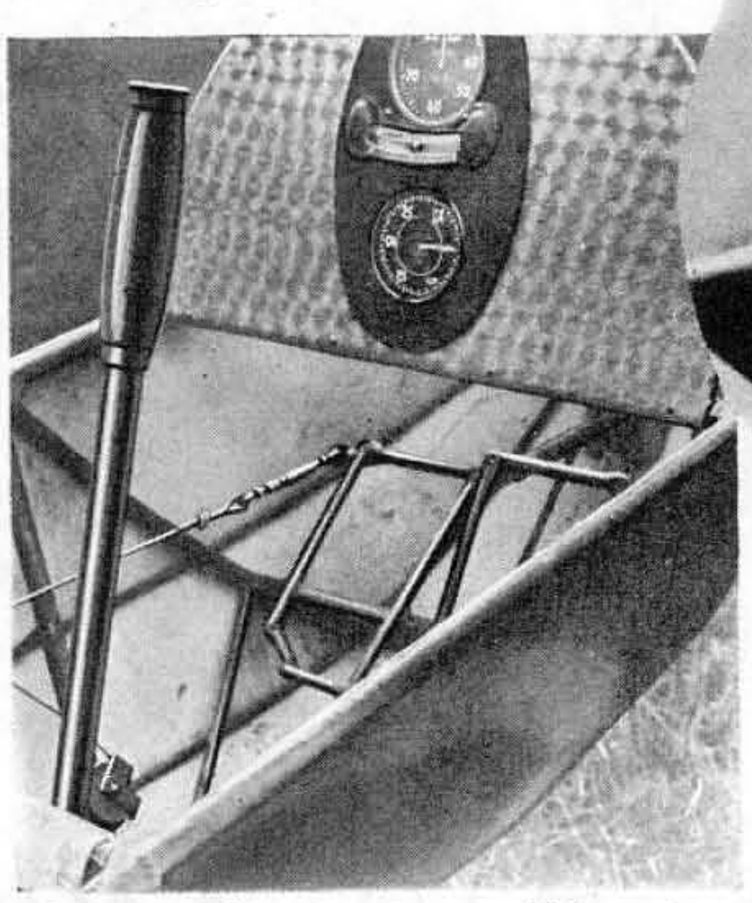
While the second flight of a bit more than nine hours is the more important, the first was of great value because it taught me a number of new tricks in the art of flying sailplanes, and at least one new method of operation whereby altitude may be gained even when wind and other conditions are opposed. With *Old Number Eighteen*, a sailplane of sixty-foot wing spread and 165 pounds net weight, accompanied by Dr. W. H. K. Kumm, chief observer, and William van Dusen, representing the N. A. A. and the N. G. A., I went to Point Loma early in the evening of January 11, after Uncle Sam's weather watchmen at San Diego had promised me favorable gliding conditions. Point Loma is a southward-pointing peninsula, forming the western side of the entrance to San Diego Bay, rising some 750 feet from a narrow, rocky beach on the Pacific side and dropping with almost equal abruptness to the waters of San Diego Bay on the east.

With a west wind blowing about twenty miles an hour, the sky cleared and bril-

Mrs. W. H. Bowlus in the cockpit of a sailplane. Members of the Anne Lindbergh Glider Club, San Diego, hold the shock cord ready to send her into the air.

liant moonlight showed a foam-covered sea pounding on the stones far below. It was a dangerous place for flight. If I fell into the sea, or onto the rocks, I would never fly again. But at 1:17:03.5 A.M. I took off. The cockpit, covered with water-tight canvas closed longitudinally with "zipper" fasteners so that I could release myself instantly, contained a sealed barograph, an altimeter, a clock, and four sandwiches. Nothing but my head and neck appeared above the cockpit covering, and the sailplane, completely loaded and with me in the cockpit, weighed 333 pounds. It was the same plane in which Colonel and Mrs. Charles Lindbergh had learned glider flying the week before.

I knew that it would be necessary to



Gliders now have instruments. This one has altimeter and air speed and bank indicators similar to the ones used on motored planes.

"Peaches" Wallace, trained by Bowlus, was one of the first American girl glider pilots. She is shown in the cockpit of a sailplane.

Bowlus measures the force and direction of prevailing winds before longest glider flight.

risk flying out over the sea to gain altitude, so that the air currents would bear me back, higher and higher at each return toward the land. The take-off into the west wind was comparatively easy. Moving toward the ocean, and then back, weaving across sea and land, I soon gained an altitude of 1,500 feet above sea level, where I sailed to and fro for two hours, flying north and south along the point and the coast, inland and out again, with comparatively smooth air and steady, though occasionally "jumpy," wind.

THEN, suddenly, rising out of the west like a cloud of black smoke, a heavy squall appeared. Soon the moon was covered and the sky became totally black. About 3:30 A.M. the wind increased, nearly doubling its velocity, and torrential rain began to fall. I could see nothing, neither ground nor sea beneath, nor the sky above. Even the nose of the sailplane was invisible. I was suspended in the midst of a storm—with nothing but my own training and coördination of muscles and machine to keep me up or bring me safely down. By four o'clock I was in the center of the storm, though still maintaining altitude. Then the wind fell to six or eight miles an hour, and I was forced to come down, catch an air current, rise again, descend, catch another current, and so on, dipping and rising in much the same manner as a bird does when battling a strong head-on wind.

All the time, of course, I was losing altitude a little at a time, until at last I had dropped so far that I could hear, but not see, the tops of the bushes on Point Loma brushing the keel of the sailplane. Though I probably was not more than ten feet above the earth, I could see nothing until I pulled out a small flashlight and was thus able to pick out, fitfully and in deep shadow, bits of the terrain, large white rocks, and dark clumps of bushes at the sides of and beneath my path of flight. Light as was the wind, the sailplane was moving majestically forward in a world of darkness, through which pin points of light from the "coffee fires" of the watchers glowed fitfully.

THE wind continued to drop; the rain seemed to increase in volume; it appeared that I must land. I struggled to gain altitude—fought to prevent the involuntary ending of the flight. I brought to use every trick of glider flying that I knew—and then, all at once and quite out of the air as it were, there came to me a new movement in manipulation of the plane, a new "wrinkle," by which I immediately began to gain altitude.

I found that if I kept my windward wing down as I flew to and fro in a comparatively straight line, I would not drift, and would lose less altitude than if I kept the wings level. It then occurred to me that if I kept the leeward wing down, I would get additional benefit from the air current, no matter how slight, and would gain altitude. I tried this, and immediately began to "crab" upward. In other words, by sliding sideways, instead of straight ahead, the light wind would give me greater lift.

By this trick, (*Continued on page 130*)

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which I believe had not been used before, I got up into the higher air. There I made a turn around Point Loma, gaining more altitude, and keeping what I gained by that same sideways slip with the leeward wing down. I rose, in a few minutes, to nearly 1,500 feet. There I stayed until dawn broke over the eastern mountain wall—the most welcome day I ever have seen. I have since found that I can perform this altitude-gaining trick with any sailplane, and I used it again and again on my second flight.

DAWN found me still close to 1,500 feet in the air, but very tired from a full day of work and a night of flying, most of the latter spent in the hard and nerve-trying effort to maintain altitude. The sun showed me the white sea pounding on the rocks, the tireless observers and officials still watching me from places of slight vantage in the rain which covered Point Loma like a blanket. Shortly after daybreak, there came a material lull in the wind, while the volume of rain fell off. I lost a little altitude, but, by the new trick of operation, regained it, sailed about awhile, and then came down, in a smooth and easy landing, on the road that runs parallel to Point Loma and only a short distance from the starting point. Official watches showed that I had been in the air six hours, nineteen minutes, and three seconds, then the longest flight ever made in America in a glider of any type.

One of the several remarkable features of this flight is that it demonstrates clearly the ability of a sailplane to remain aloft in wind, rain, and darkness, and that none of these elements are to be feared by the trained glider pilot. Air currents of almost any character, direction, and speed can be made to carry the sailplane, if the pilot is well trained. The flight proved, too, that it is possible to land a large glider on its keel, without wheels, with no damage to machine or pilot, in brush and on uneven ground—a matter of great difficulty and no little danger with a power-driven plane. I myself was astonished at the ease with which I piloted the sailplane back virtually to the point of take-off. For much of the time during the later hours of this flight, the air was "bumpy" and the currents uncertain, so that it was necessary for me to "feel" my way through the darkness and to find and take advantage of the varying air currents into which my sailplane drifted.

This must be much the manner in which a large bird finds its way through darkness, rain, and inimical air movements. Thus, glider flying approaches as nearly to the flight of a bird as man is likely to attain unless and until he sprouts wings.

ON MY second flight of a little more than nine hours, I made the easiest and quickest take-off I ever saw. From a spot on Point Loma near the starting point of the previous flight, the men on the shock cord ran only about fifteen feet before the sailplane took the air, caught the current, and began to rise. I sailed about 100 feet in a practically horizontal position, and then climbed easily on an updraft to nearly 1,500 feet above the take-off. This was in the same sailplane used on the flight above described, and the total weight was approximately the same—333 pounds.

The start was made at 5:37:03 P.M., and the wind, blowing steadily from the west, remained at about thirty-five miles an hour for nine hours of the flight. This was a stiffer wind than before, and I had no trouble in maintaining altitude and in cruising back and forth over the point and up and down the coast. There was no rain and few "bumps" in the air, but about two A.M., the wind shifted to the northwest, then to the north, and decreased in power, falling to almost nothing, so that I was compelled to come down. The wind had been cold, and, unprotected as I was in the open cockpit, I was thoroughly chilled and quite willing to land, which I did, within about 100 feet of the point of take-off. In spite of the darkness, the sailplane made a perfect landing in the center of a hillside road.

Had the wind maintained its velocity, or dropped to no less than eight or ten miles an hour, I could have remained aloft indefinitely. If I could have stayed up fifty-five minutes more, I should have won the E. S. Evans prize for remaining aloft ten hours. Next time I may be able to do it. If favoring air currents can be found, there seems ample opportunity, especially in this section of the United States, to break the fourteen-hour durance record made in Germany. The widespread interest in glider flying was well shown by the fact that more than fifty persons made the trip to Point Loma, in the stormy night, to see the first flight, while more than 300 came to see the start and remained to view the late afternoon flying on the nine-hour attempt to shatter the world's record.

MY EXPERIENCE in glider and sailplane building and flying covers nearly twenty years. I built the first model in 1910, at Los Angeles. Then I built other models, including both land and seaplanes, all of which flew; but they were too small to carry passengers. Among my other successful models was one which was propelled by the explosion of a ten-cent skyrocket, on the same principle as the "rocket car" and "rocket boat" built recently in Germany.

Spurred on by the flights of these models, I built my first "man-size" glider in 1911. It was a monoplane, fearfully and wonderfully made as compared with the Bowlus sailplane of today. It had wings, fore and aft, hinged to the "body," as we then called the fuselage, and the flyer was strapped in. The landing gear consisted of two rockers from an old rocking-chair. The glider was built of redwood, except the ribs, which were spruce. The tail was built like a bird's tail, or rather like a fan, which could be spread out or retracted at the will of the pilot.

In this now primitive powerless plane, I actually flew 200 feet, and cracked up only because I did not know how to handle the controls. To launch this glider, I strapped myself in, stood up, ran downhill, and, when the air lifted me, tried to control it with wings and tail and thus gain altitude. Being only fourteen years old, and without previous training in flying, my "flight" of 200 feet was much more than a "nine days' wonder."

AFTER the crash, I rebuilt this glider by dashing home from school at noon, doing without lunch, and working until one o'clock. When I had completed it and had it anchored with rocks, a whirlwind picked it up one afternoon while I was at school, carried it about 300 yards, and demolished it. My next effort was more ambitious. I felt that I needed more surface on the wings, so I built a biplane, with full controls. It had a wing spread of thirty-five feet with chord of four feet, and was large enough to carry a motor. The wings were not tapered, as at that time we had not heard of tapered wings. There were twelve struts, and the turnbuckles were made by myself from the wire spokes of bicycle wheels. For landing gear, I attached three bicycle wheels. The pilot's position was lying down, with a real steering wheel in front of him with which he controlled rudder and wings. His feet were in stirrups, by which he operated the tail and could also handle the rudder. It was a far more complicated machine than the Bowlus sailplane of today, but no one

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could have remained aloft nine hours in it.

I was invited to bring my glider to the annual track meet of the San Fernando High School—the local Olympic Games. There I went, with goggles, an arm band telling the world that I was an "aviator," and a multi-colored stocking-cap. On the first "flight" I could not get off the ground because of the short tow, due to lack of length of field. On the second trial, I gained an "altitude" of eight feet, and remained in the air for 800 feet, but the landing gear broke and I was thrown out when I came down.

When my brother and I tried this glider again, we tied it to a stake on the windy San Fernando hills, preparatory to "taking off." My brother got into the glider and I went back to the wagon for a piece of equipment. When I returned, the wind had picked up the glider like a kite, and there was my brother, "sitting pretty," or rather lying so, with his anchored glider some fifty feet off the ground, but unable to go backward or forward owing to the tie rope. I released the rope, and he flew several hundred feet to a more or less successful landing.

PRIOR to designing the present sailplane, in which I made the American altitude and duration records, I built fifteen different gliders. Since then I have designed and built six others, including the newest "Anne Lindbergh" sailplane, flown recently by Col. Charles A. Lindbergh. As demonstrating the value of glider training, I may say that, in 1917, I soloed in a power plane *with thirty-five minutes instruction*. Glider training gives the prospective aviator the "feel" of the air, balance, knowledge of controls, and quick thinking, while it also takes from him whatever fear he may have when he first takes off. Not only do gliders furnish opportunity to students to learn *actual* flying, but they can teach us all we want to know about air currents, how to maintain altitude and motion without power, and also open a virtually unlimited field for the development of new ideas in construction and method of flight, both powerless and powered—all at very low cost.

Undoubtedly, glider flying stimulates interest in aviation. The sailplane is the airplane of the boy or girl who wishes to "get into the air." Nothing will develop an interest in aviation in our youth so rapidly and so soundly as glider building and flying. As a sport, gliding provides all the thrills of actual bird flight and is in addition educational and constructive.

Germany today has almost as many glider clubs as there are golf clubs in the United States. Gliders and sailplanes, in the hands of youths as well as older men, are being flown all over Germany, with the result that the German people are more airminded than any other nation, not even excepting the Americans. Yet some idea of the spread of the "glider idea" may be gained from the fact that of eleven pilots who have obtained first-class glider licenses in the United States, ten were trained by the writer of this article. Within a short time, so large are the classes of boys and girls, the issuing of licenses at San Diego alone will reach five or more a week. This, it should be remembered, is in a limited area of one section of the United States, virtually all of whose territory is suitable for sailplane flying.

Next month: The clearest and most complete popular explanation ever presented of the principles of gliding. How does a glider operate? How is it controlled? How does it stay aloft? Where does the glider's "power" come from? These and many other questions uppermost in the minds of motorless-flight enthusiasts will be answered in this absorbing and authoritative article.