

"Bird Flight as a Basis for the Art of Flying"

So reads the title of a paper prepared by Otto Lilienthal, the quiet and persistent German, who devoted his entire life to the pursuit of an apparatus that would be safe and efficient for man to fly.

Two years before being launched on his first gliding flight Lilienthal published a book as part of his twenty years of preparation for his first gliding flight—in a monoplane "hang"-type glider.

First launchings were by running and leaping into the air. This method was soon abandoned for a "spring-board" and finally launchings were made from a series of low hills with resultant gliding flights of 65 to 80 feet. As Lilienthal became more adept at handling his fragile and fractious craft he made flights of 1000 feet and ultimately soared. An indication of the determination of Lilienthal is the story of the man-made "hill" at Licherfeld, Germany, because as Lilienthal declared: "Man must serve an apprenticeship to the birds." Lilienthal's "hang" type monoplane glider left much to be desired as to stability, as the only control was the result of violent contortions and acrobatics on the part of the pilot. Then came the first biplane glider with much less wear and tear on the pilot, Lilienthal. With meticulous care Lilienthal made permanent recordings of each and every flight or attempted flight. No item was too small to be catalogued! If data similar to what Lilienthal stored away for future reference had been written down by our own glider pilots, with their thousands of flights made in gliders, what a vast store of worthwhile data now would be available to younger pilots!

Convinced that he, Lilienthal, had exhausted the possibilities of gliding the next step taken was to consider the installation of a power plant in a biplane glider. Before Lilienthal could get around to installing such

a unit, and while in one of his information-seeking gliding flights, a wing of the glider collapsed and so was passed on to the United States the privilege of completing the work started by Lilienthal. With over 2000 gliding flights launched from the man-made "hill" in an 86-square-foot surface and later a 172-square-foot surface, both being "hang"-type gliders, Lilienthal had attracted world-wide attention. In the United States several individuals were vitally interested because they had either worked with Lilienthal, watched him at work or had perused his writings.

One such person was Charles P. Steinmetz who had spent much time watching Lilienthal conducting his experiments. So was born the "Mohawk Aerial Navigation Company" of Schenectady, New York, with Mr. Steinmetz as president of an organization that has become known as the first gliding club. Another was Octave Chanute, by profession a bridge builder, who had written, among other works, "Progress in Flying Machines." Chanute, along with A. M. Herring, a former student of Lilienthal, established, so far as we know, the first gliding camp, on the sand dunes of Lake Michigan "to study the art of navigating an airplane without motive power." Chanute's glider was the first such craft to be equipped with a seat; the biplane glider which later was to influence greatly the Wright Brothers.

Later, Herring came to Elmira, New York, for further help. An interested listener was found in the person of Matthias C. Arnot and together these two men designed a glider. Furthermore, history tells us that Mr. Arnot passed on and Charles Teasdale, a former Elmiran, obtained the Arnot glider plans and built and flew said glider. "Scientific American" magazine recognized the Arnot glider as practical and devoted space to a well-illustrated story which had been prepared by Chanute and Herring.

Finally, the Wright Brothers evinced interest in gliders as a means

toward perfecting a power-driven, man-carrying airplane.

First they flew kites, proved bird habits, perfected a crude wind tunnel, tested airfoils by attaching same to a bicycle. Finally, using Chanute's biplane glider design as a guide, they went to work. For the first time the glider had controls, as the Wrights were physically unfit to go through the contortions of either the pilots of "hang" gliders or the earlier biplane gliders. They experimented with arched surfaces and an adjustable rudder in front. The pilot was to lie on the lower wing surface. The craft had a skid landing gear and was test flown at Kitty Hawk, North Carolina, making free flights for periods of over a minute and gliding for distances of over 600 feet.

A second glider then was built by the Dayton, Ohio, bicycle shop owners, taken to Kitty Hawk, and made many gliding flights. Later a third glider was built and flown at Kitty Hawk and by this time the Wrights had made nearly a thousand flights. And so we come to the epocal year of 1903 when glider pilot Wright became airplane pilot Number One.

As soon as the Wrights demonstrated their ability to fly with power and control their craft in flight practically (note the use of word practically), all other experimental glider pilots forsook their gliders and concentrated upon powered airplanes. One who believed the glider could reveal many more secrets of the science of aerodynamics was Professor John James Montgomery of Otay Mesa and Santa Clara, California. Montgomery's glider was equipped with complete control surfaces. The launching method most used was a hot air balloon which lifted the glider aloft. Earnings from glider exhibitions enabled Montgomery to use the glider in making further studies of aerodynamics. Montgomery made many glider releases from the balloon from altitudes up to 2500 feet. After one release Pilot Maloney glided 8 miles with resultant publicity that put the glider back into the limelight.

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