

Contributions of Gliding and Soaring To Aviation

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SAILBOAT enthusiasts are often confronted with the question: Why continue sailing in an era of ocean liners and motor boats? Similarly the glider fraternity frequently is asked by the uninitiated to motorless flight: What good is it in this day and age? We used to have a triple answer to it. (1) It is a wonderful sport; (2) It is marvelous training, and (3) It is a means to advance the sciences of aircraft construction, flight and meteorology. Now while we are at war, obviously sport and pleasure enjoy no priority and have to be held in abeyance until the job is done, in this field no less than in so many others (except to keep up morale). Now that the war has progressed to its present stage the need for training more airmen in the finer points of flying has probably passed its peak. And as to the advancement of the aeronautical sciences, have they not reached the stage where the experts know all there is to know? And what can we possibly glean from further studies with motorless gliders when we are approaching ultrasonic speeds with power plants of marvelous compactness?

Instead of debating this question with predictions and visions into the future, it has been suggested to look back into the history of flight and recollect what contributions to aviation have actually been made by gliders and let everybody venture a little extrapolation for himself. In undertaking to place before you a list of such contributions, it is done with a bit of trepidation because a goodly number of these "glider first" items are quoted from memory as there was no time to make a thorough search of the literature and check meticulously whether it might not have been tried on a powered aircraft earlier than on a glider, unbeknown to the author. Let this then be a challenge. If someone is in a position to correct, amplify or verify some of these claims we shall all be grateful to have this bold sketch eventually completed into a real picture.

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(1) It is of course well known that man's age old dream of flying with wings, heavier than air, was first realized with gliders, not because no prime movers were yet available; in fact the event was quite contemporary to the first attempts to power the flying machines with steam engines, during the last decade of the 19th century. The first hang glider club of whose activities some evidence has been recorded operated in the fifties or sixties near Florence, Italy, and the painter Arnold Boecklin was a member. (2) O. Lilienthal in Germany during the nineties was probably the first who really learned to fly by means of his gliders and (3) it was he who discovered the higher wing loading capacity of cambered profile wings.

From here the Wright brothers took over. (4) They gained their first real flying experience in gliders and it was thus that they became impressed with the importance of lateral (roll) control. (5) Thus warped wings were born and ailerons came into being. (6) It was there too that a bird-like prone pilot posture was first tried, again just before World War II, to increase the pilot's acceleration tolerance in combat maneuvers.

That many other devices related to stability and control were first discovered or introduced with gliders is not merely a coincidence but it is to some extent an outgrowth of fact that in motorless craft stability and control problems appear unadulterated by torque reaction and slipstream.

(7) Washed-out swept-back wing tips were the lateral, yaw and longitudinal stability device of the early (8) tailless gliders notably the Etrich-Wels in the first years of the present century. (9) Conversely how lateral stability can be achieved even with swept-forward wings was demonstrated by (Russian) gliders. Lachmann type slotted ailerons were used successfully by the writer on a Canard type glider in 1923.

Of the problems associated with rudders and yaw stability many were studied on gliders because their designers were intrigued by the observation that the birds