

AN APPRENTICESHIP TO THE BIRDS

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In any progressive endeavor, such as soaring, it is often helpful to pause and survey our overall effort. In this connection we might do well to ask: Where do we now stand in the field of soaring technology? To answer this question we must consider not only what has already been accomplished but also to what realistic goals we may ultimately hope to aspire. To evaluate what has been done requires only a review of soaring history. But the establishment of future goals will require imagination and intensive research.

Our immediate problem in the advancement of soaring technology is the determination of these realistic goals. Once they have been established, concentrated and directed, research can bring them to reality.

Modern soaring technology began about 1920 as a result of the Versailles Treaty which indirectly but effectively forced extensive German research and development of gliders and sailplanes. From 1920 to 1932 rapid technical advances were made in Germany and records previously considered impossible were established. At no time, before or since, has so much basic research and development been concentrated on soaring. With the Rhon Contests, soaring was first established as a general sport and a true science. However, technical progress slowed rapidly after 1932 when research in low power aerodynamics in Germany and elsewhere ceased due to war preparations.

Today's most advanced sailplanes embody the same principles and basic designs evolved during this period, with but few minor improvements. The major progress in soaring since 1932 has been primarily the result of a better understanding and use of meteorological phenomena by soaring pilots and not of aerodynamic improvements. We are tempted then to say, as has been very often done, that we have already reached the ultimate in sailplanes and use of atmospheric phenomena for further

progress. However, it is dangerous to say that we have already reached the ultimate in anything unless we are certain of what that ultimate is. It would be much wiser to attribute our slow technical advance of the past 25 years to the almost complete absence of basic soaring research. This

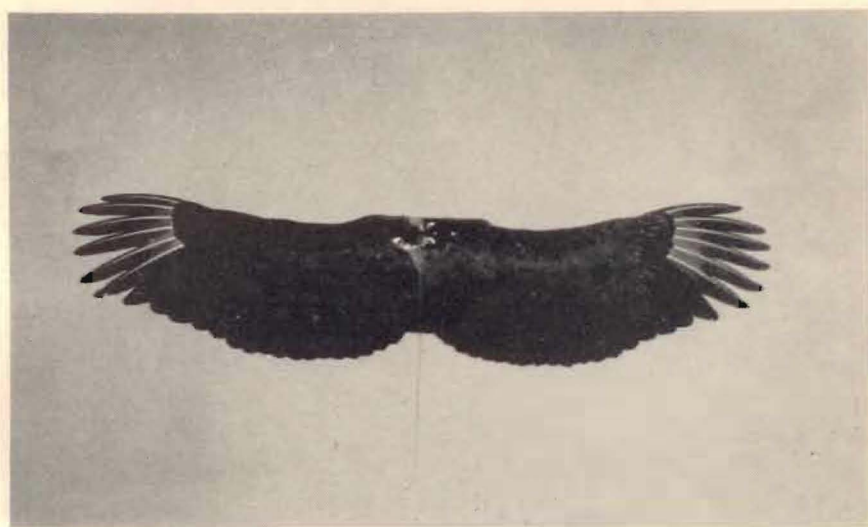


Fig. 1 — Mounted wing of a Black Vulture in still air.

leaves much hope for future progress, and without this hope, soaring as a sport and science must surely decline. Technical progress may ultimately determine the survival of popular soaring.

We have thus far been unable to accomplish dynamic soaring (use of horizontal wind energies to maintain flight), despite a number of sound theoretical possibilities. We do not even possess factual evidence that such flight is actually practiced in nature. The aspect of flight by human power is still as much a dream as it was in Leonardo da Vinci's time.

The soaring bird exhibits daily the ideals of flight we desire to attain. To establish realistic goals for soaring progress we could ask for no better guide than the natural soarer.

Though we live in an age of Mach 2 aircraft, the bird is still master in the field of soaring flight. In planning our research we must not overlook this important fact. Even after nearly a hundred years of soaring history we still look up at the soaring bird and marvel at its powers of flight. Although the bird has been the idol and model of all the great pioneers of gliding—Montgomery, Lilienthal, Pilcher, Chanute, Langley, and the Wright brothers—we still today possess but little proven knowledge of the aerodynamics of birdflight, and most especially soaring birdflight. The field is still one of mingled fact, fiction, and mythology. While natural flight studies were an integral part of the early researches, they were

concerned primarily with distant observations and did not deal with attempts to quantitatively measure the bird's true performance or to learn its aerodynamic functions. Thus, many facts about natural flight were discovered only after years of trial and error with man-made machines which revealed the basic principles.

Otto Lilienthal, the "Father of Gliding," based his entire work on principles he derived from birdflight studies, and met with exceptional success. With the advent of powered flight, however, ideas based on natural flight were quickly discarded and forgotten. Thus the realm of natural flight has hardly been touched and still offers a promising area for research efforts in our particular field of aeronautical interest, soaring flight.

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