

engineering are too manifold to enumerate here. In retrospect it seems odd that gliding and soaring should not have been invented centuries before light motors became available to make powered flight possible. The skilled artisans of old would have been able to fashion wooden sailplanes of respectable performance had only a keen observation of the flight of soaring birds led to an earlier understanding of the scientific principles of aerodynamics. As it was, gliders were flown and the rudimentary skills of piloting were thus acquired during the decade which preceded the first successful motor-driven airplanes. Thus the early pioneers learned with gliders about the need for efficient elevators and ailerons, the merits of cambered wings, dihedral, sweep-back, and wing tip washout.

"World War I brought about remarkable engineering developments in the powered airplane and a great increase in performance, yet it was the sailplanes of the twenties which demonstrated the value of high aspect ratio, elimination of wing-cut-out and wing-fuselage interference, streamlined and eventually retractable landing gears, the possibilities of monospar construction, of catapult take-off, and of air towing. Ultrasensitive variometers which measure the rate of climb or descent with extremely fast response were perfected for the sailplane; they proved very useful in exploring the intricacies of the atmosphere.

"Meteorology was indeed enriched in succession by the development of the various modes of soaring flight. The first to be learned was slope soaring on the windward side of mountains and coastal ranges, where a glider is borne aloft when its still-air rate of sink is less than the rising velocity component of the upward-deflected wind. Next came daring exploits of probing into cloud formations, fronts, and thunderstorms, where powerful, even violent, updrafts were encountered. Then began the discovery and exploitation of thermals and vertical movements of air over variously isolated terrain, flat as well as hilly; they turned out to be much more wide-spread than had ever been suspected before, and actually enabled sailplanes to be flown over great stretches of flat country as has been demonstrated convincingly in Texas, Poland, South Africa, and



Photo by Smithsonian Institution National Air Museum

Dr. Wolfgang B. Klemperer making the principal address and presentation of the plaques on behalf of SSA. On the left is the plaque for Gold Badge pilots and on the right is the one for Diamond Badge pilots.

elsewhere. Even wind shear regions were found to give rise to good soaring conditions. Last came the discovery and exploration of lofty standing lee waves which form in the atmosphere downwind from the crest of mountain ranges under favorable meteorological conditions, or detach themselves and become traveling waves, sometimes in connection with wind jet streams. Soaring in the upsweep part of a wave, which may reveal itself by the formation of tiers of typical lenticular clouds, can truly be likened to surf-board riding. The motion pictures of the fantastic world of cloud structures taken by the soaring explorers over the High Sierras in California have thrilled fliers and scientists alike.

"But future explorers and adventurers will still find problems to solve. The commotion in the atmosphere is now known to extend well into the higher reaches of the stratosphere as manifested by the mother-of-pearl clouds which have been observed at heights on the order of 80,000 feet. Specially designed pressure cabin sailplanes should be able to penetrate up to them. Not yet reduced to practice to any extent are the various modes of dynamic soaring; that is, the exploitation of the irregularities of the wind which were already recognized as a potential source of energy for flight by that visionary pioneer of aviation and science, Professor Samuel Pierpont Langley, director of this Smithsonian Institution three-quarters of a century ago. The thought that future manned spacecraft are to be brought back to earth as dynamo gliders opens up new vistas into realms hardly envisaged by the early

proponents of motorless flight. It makes it the more worth while for the new generation of pilots and designers to remember how it all came about.

"Organized soaring flight endeavors, after Orville Wright's dune slope flight of 9 minutes in 1911, received a new impetus in 1920 through the first soaring flight enthusiasts' rally in Germany, whence it quickly spread to many other countries. In the United States private initiative has led to an almost continuous series of national contests ever since 1930. These were started by what was then the National Glider Association. This preliminary organization was soon succeeded by the Soaring Society of America, founded in 1932 by the unforgettable Warren Eaton, and subsequently stewarded by such devoted men as Ralph Barnaby, Richard duPont, Earl Southee, Lewin Barringer, Parker Leonard, E. J. Reeves, Jon Carsey, Paul Schweizer, Floyd Sweet, Harner Selvidge, and Paul Bikle, all of whom I have been privileged to count as my dear friends.

"The Soaring Society of America is a division of the National Aeronautic Association and a voting member body of the OSTIV, the International Organization for the Scientific and Technical Aspects of

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