PATTER OF A SHORT FLIGHT

by BILL HARRIS

This story is about a short flight in a sailplane. It is about the kind of flight that occurs on a poor flying day when you have laid on the ground putting in wing bolts, lifted wing tips, chased the tow rope, run wing tips and finally got into the ship. After a 20-minute flight you are on the ground rolling up the tow rope, walking the wing tip back to the hangar and again laying on the ground, this time trying to get the wing bolts out and asking yourself if it was worth it. The story of our short flight is not being written for the "Old Buzzards" of the soaring movement, for I have never known one who would ask himself that question. They have proven by years of persistive effort how they feel about gliding and sailplaning and have learned long ago the things I'm going to speak of. Rather it is for some of the newcomers who are asking themselves if the work and trouble they go to is worth what they get out of soaring. It is written for the persons who have joined a soaring group and then quit or drifted into an inactive status. There are hundreds of such people and it is my sincere belief that the individuals don't properly appreciate soaring because they do not know how. No one has ever, at the risk of being called sentimental or foolish, ever told them.

I think soaring is worth the effort and I am going to try to explain why. If anyone who reads this story was about to quit soaring and take up golf, women or any other sport, or has about decided flying powered planes is much cheaper and easier, if reading this story changes his mind, then I think the writing of it was worth the effort.

Come along with me while I make a short flight. There is a lot I do not know about this soaring game, but I sure love it. I'll tell you some of the reasons I will never tire of it, why it excites me and, if you like, I'll tell you some things I have figured out about flying a sailplane that are a little hard for a beginner to find in a book, or to understand if he found such a book.

Let's strap on this Laister Kauffman and take a short flight. We close the hatches and give the signal for wings level. The tow pilot takes up the slack in the line and fans his rudder. We answer his signal and watch the smoke roll from the wornout engine as he pours on the coal.

A few minutes before, the sailplane had been setting in the grass with one wing laying on the ground —a jump sack on the tip to hold it down. It was a graceful streamlined thing of beauty, but it was lifeless. Now, as we gather speed on the takeoff roll, it progressively comes to life. The ship is moving and there are slight vibrations caused by forces of tension, torsion compression, bending and shear. The instruments are just starting to talk and before the flight is over they could well tell us many stories. The air that is flowing over the ship, although now just a whisper, could at some later time whistle or scream or become deathly quiet. The controls, too, have begun to come alive. Where a few minutes before they were one part of a lifeless object, they now are its nerve centers. They now have live pressures when they are forced against the relative wind and these pressures are never the same because they change as the speed changes. Through the pilot's kinesthesian feel they transmit the feel of the ship to the pilot making him part of it and not just a passenger. He is the brain and as he thinks, his thoughts are transmitted to his muscles which, in turn, apply pressures to the controls and against the wind. As the ship responds, the pilot feels its response and his brain decides if the response is what he desires.

These are some of the reasons I am inclined to use the expression "we" even though describing a solo flight. In a way, the ship is just as alive as the pilot. Neither the ship nor the pilot can fly without the others.

The birth of the sailplane is complete when it lifts its weight as well as the pilot into the air. When it is in its realm, it develops sense, which we think of as stability, and this stability is three dimensional. It is longitudinaly stable about its lateral axis. For example, if the nose gets down, the speed builds up and as the speed increases so does the lift. Because of the longitudinal dihedral (combination of positive lift on the wings and negative lift on the tail) the nose starts to rise and continues to do so until the speed is below that for which the ship was trimmed. Then the reverse takes place and after several of these phugoid oscillations, the ship is again longitudinally level. It is laterally stable about its longitudinal axis. If a wing gets down, the low wing has a greater vertical component of lift due to the dihedral of the wings, and the low wing will rise until the lift forces are equalized. It is directionally stable about its vertical axis. If the ship skids sideways, the side area of the fuselage and vertical tail are forced back to their original heading by the relative wind, much like a weather vane heads into the wind. This is true because the vertical tail surfaces and fuselage side area are of greater area and farther behind the center of gravity than the nose and thus have a greater moment arm. To my way of thinking, this sailplane we are flying has sense. If a man falls, he will get up on one plane. Our ship can right itself on three planes, without our help. It has but one fault; it has no spiral stability. The ship can't right itself from a spiral; in fact, its stability tends to tighten the spiral, making it worse. If he can't see horizon or ground, the pilot is of no help unless he has a gyroscopic instrument. However, we shouldn't feel too badly about this because a bird can't fly in clouds or when he can't see. With instruments, we can fly when the birds are walking.

As our ship lifts itself into the air and becomes filled with life, a lot of wonderful things happen. Air that we can't see nor touch, which weighs only 1.22 ounces per cubic foot at sea level has made our ship fly. This air has applied positive and negative pressures all over the ship to its fabric. The fabric has transmitted this load to little $\frac{1}{4}$-inch square cap strips that are glued together and which any one of us could break between our fingers. In turn, each cap strip transmits its small load to the wooden spar, which is the backbone of our wing and carries the total load. When

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