

the ensuing down-draft in that area becomes rather great immediately after the thermal has ceased to rise. A pilot knows when flying low to avoid the turbulence on the lea side of mountains or hills, whereas, he knows that he can depend on there being a good and relatively smooth slope wind on the windward side of the mountain so long as it is of sufficient height and length.

He knows he can frequently safely fly over vast stretches of tightly wooded country under certain good cloud street or thermal conditions without running the slightest risk of being forced down, when, at other times, he will turn back or avoid such areas, since experience has taught him to expect adverse conditions. Pilots generally tend to avoid approaching large bodies of water, as they know they can expect little or no help from thermal activity near and over such areas.\*

These are but examples of the many things a pilot may know in developing his flying technique. In addition, he learns the importance of handling his controls smoothly, never moving them more than is necessary to obtain a desired result. He has no doubt observed, during his early soaring days, when flying in the same thermal with a plane of approximately the same performance as his, that when moving his controls excessively, his competitor can invariably gain altitude on him.

In my own opinion over-control in a sailplane is one of the most serious mistakes a sailplane pilot can make, particularly over-control of the ailerons. These surfaces on sailplanes are generally a much larger proportion of the total wing area than is generally found on airplanes, and I have observed, when flying with planes of types comparable or similar to mine, that by moving the ailerons unnecessarily, my competitor can immediately and distinctly improve his altitude relative to mine.

I have come to feel that by neglecting the smooth handling of the controls for only a few seconds to adjust my chute harness, or safety belt, or to snap a photograph, I am, in so doing, giving my fellow contestants a definite advantage.

A sailplane pilot knows that he should be able to use all of his flight instruments to utmost advantage, the most important of these instruments being the variometer, the instrument which to a sailplane pilot becomes nearly as important as the engine to a power plane pilot. He is watching this instrument during probably more than 90% of a cross-country soaring flight, since the rise and fall of the plane, as indicated by this instrument, tells him not only is he flying his plane efficiently but also tells when and how much advantage he is getting from his weather conditions. It is the instrument that immediately warns him when he is making a mistake or when he is entering an area of bad down-current. It can, in fact, probably be said that this instrument is what made cross-country soaring possible.

In addition to this, the pilot should learn to fly his plane blind and make efficient smooth turns thru the use of his blind flying instruments.

The need for the development of special blind flying instruments for use in sailplanes has long been apparent, since it is desirable to execute extreme maneuvers in a sailplane that are not possible thru the use of the present conventional type of blind flying instruments for power planes.

The conventional type bank and turn indicator proves inadequate for making banked turns much beyond 45°. Also, because of the extreme cleanness of sail plane design and the bumpy air conditions in which a sail plane is flown, it is indicated that some special

\*Read "Soaring Over the Open Sea," by Alfred Woodcock, Page 1, Soaring, Nov.-Dec., 1942.

