

cruised at constant altitude. I have frequently seen the airspeed vary from 10 miles an hour below normal, to 10 miles an hour above, while flying across the Alleghenies between Harrisburg and Pittsburgh. Of course, normally there is no net gain, since there are as many downdrafts as updrafts, but for a pilot whose destination lies along these ridges, there is an updraft a good part of the time that would decrease his time enroute by ten to twenty per cent. It is interesting to note that when there is a layer of stratus clouds lying over the ridges, with a top of from five to ten thousand feet, and a fair northwest wind blowing, the top of the stratus deck will often conform with the terrain below, and the up and downdrafts will be in the same relative position to the ridges of clouds as they are found on the ridges themselves. I am convinced that a glider pilot who could once reach the top of the overcast could probably soar these "cloud ridges" for a hundred miles. On one recent trip, I estimated the lift to be approximately five or six feet per second, at an altitude of 2500 feet above the highest "cloud ridge." The ceilings on the ground at the time were reported as being approximately twenty-five hundred feet, the wind from the north 20 miles an hour and between the altitudes of four and twelve thousand feet the winds were north northwest from thirty to forty miles an hour.

On another flight from New York to Pittsburgh, while flying at night at an altitude of 8000 feet, we encountered a large area of subsiding air between Newark and Harrisburg, which was approximately 18 miles wide measured east-west. The air was absolutely smooth, with no clouds and visibility of some 40 miles. A cold front had passed within the preceding twenty-four hours, and the wind was strong from the northwest,—at 8000 feet we had a loss of 50 miles an hour. At a point approximately 25 miles east of Harrisburg our airspeed began to drop until at the end of a couple of minutes it had reached 120 miles an hour, at which point it remained constant for eight or nine minutes. This would indicate a downdraft of about eight feet per second. After passing Harrisburg and coming up on the ridges to the west, we encountered the same type of alternate lift and downdrafts which I spoke of a moment ago. In this case, however, the variations were of much greater magnitude, and our airspeed was varying from 120 to better than 180, how much higher I don't know, since we reduced power to hold altitude without reaching excessive speeds. The unusual feature of this flight was the extent of the downdraft to the east of Harrisburg, and the absolute lack of any turbulence in the air. Apparently the air following the front was very stable, and was flowing over the ridges from an elevation of about 1000 feet in eastern Ohio, and lifting in a layer over the Alleghenies with a maximum height of 3100 feet, and again

settling in the flat lowlands of the east coast. It was through this area of subsiding air that we experienced the eight minute downdraft.

Recently another pilot was telling me of a flight from Kansas City to Chicago. There was a cold front lying along the course, which is east northeast, and the flight was conducted ahead of the front proper, in the area of convergence. Here again the air was smooth, but with sufficient lift to make it necessary to reduce power to keep from reaching excessive speeds. The lift was steady for about 17 minutes or a distance of 55 miles, and would have been equivalent to about 12 feet per second. Then the power was increased slightly, and the lift continued for another 15 minutes at about 8 feet per second. So in all, the lift along a definite predetermined course was used for a distance of over a hundred miles. Had the flight been one of a glider pilot, with the option of flying whatever course seemed desirable from a point of performance and distance, it seems likely that an excellent distance flight could easily have been made.

One afternoon last week while flying between Pittsburgh and Columbus, Ohio, I experienced another case of pre-frontal lift, quite similar to the one just mentioned. There was a cold front approaching from the northwest, with one continuous and severe thunderstorm in progress all along the course. We were flying at four thousand feet, and in order to avoid going through the storm, we altered our course to the south, and proceeded at a distance of about 200 yards ahead of the roll cloud. The air was smooth unless the roll cloud was approached too closely, and there was a steady updraft of considerable strength. After a very few minutes, we found it necessary to reduce power to 10 inches of manifold pressure or to approximately idling position, and without increasing power we proceeded for ten minutes at an indicated airspeed of 170 miles an hour, meanwhile gaining 500 feet of altitude. It would have been entirely possible to have feathered both engines and soared this frontal lift for over an hour. Again the opportunities for a glider pilot are obvious.

These examples are only a very few of the thousands that have been experienced by the pilots of all the airlines over a period of many years, but serve to show the similarity between the interests of these seemingly different piloting groups, and to show that glider technique embodies the fine points of commercial flying,—the polishing and refinements which justify the term "Precision." I feel sure that a close interchange of ideas and techniques between the Soaring Society and the airlines will put more sport into soaring, and more efficiency into air transport.