Soaring TO THE ICE LEVEL

by Robert M. Stanley

Seldom does nature present us with a more magnificent spectacle than in the formation of a cumulo-nimbus cloud. A towering monolith of simmering white vapor, its exquisite beauty and symmetry of form seem far indeed removed from the extravagant and vicious expenditure of power upon which its growth depends. Viewed from the safety of a distant perspective, its massive beauty moves us to mute admiration of one of nature's masterpieces. From below, however, our mood changes, for its crashing thunder, jagged, flickering lightning flashes, and torrential rain dampen quite effectively our enthusiasm for such violent extravaganza.

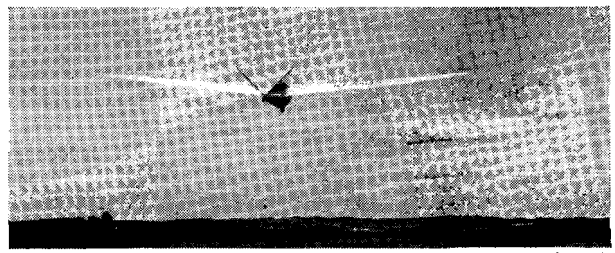
Before the days in which instrument flying came of age many airmen of misguided faith and enthusiasm ventured within these atmospheric niagaras, returning to tell wild tales of terror, frequently substantiated by craft riddled by hail and violent turbulence. Throughout the years, a tradition of fear became built up, so that even with the advent of instrument flying as a matter of routine, it is still common folklore that the thunderstorm is practically suicide, a condition not at all commensurate with the facts of the case. With competent training and good instruments, thunderstorm soaring is not unduly hazardous, and does not do justice to its vicious reputation.

The entire life cycle of the thunderstorm is still a bit of an enigma, even to the meteorologists. Hampered by the tradition of fear, few airmen care to collect those data needed for complete analysis of thunderstorm genesis. As a result, our knowledge is confined principally to deductions from secondary manifestations and calculations of probable weather conditions existing within.

Of those equipped for scientific thunderstorm observation, none has such an uniquely adaptable vantage point as the soaring pilot. His craft is light, climbs literally with the wind, has no internal energy to affect accuracy of meteorological data, no vibration, noise, or heavy electrically charged metallic masses to adversely influence accurate observation. So it is to the soaring pilot we must look for a blow-by-blow description of thunderstorm genesis.

July 4, 1939, dawned bright and clear, giving adequate prophecy of the hot day to follow. Meteorological data, from airplane observation locally, and teletype information, disclosed thermal instability and moderately high moisture-laden content. Gentle southwesterly breezes were carrying moisture laden air into our previously cold polar mass. With a moisture content of about 10 g/kilogram and a predicted wind aloft of 20 m.p.h., our forecast was for a moderately good soaring day, with possible cumulo-nimbus formation by late afternoon.

By 9:00 A. M., scattered clouds began to appear, then to dissipate, repeating the cycle with slowly increasing frequency. I took off by airplane tow at 10:54, flew 1,000 feet above Harris Hill, released, and found nothing but stable air in the lower levels until landing at the airport. Trying again at 12:50, I found turbulence quite bad, but of small diameter and good intensity, varying from 5 feet per second down. Clouds had by this time generously dotted the horizon, and the haze had cut visibility down to perhaps ten miles. Landing again, I again launched, this time from a winch tow at the American Airlines Airport, Big Flats, New York, climbed to 600 feet on the tow rope, released and found violent down-drafts which beat me down almost to the valley floor before finding equally turbulent and unstable air lifting me up to some 800 feet, where this thermal became rough but lost its upward course and died out. Finding another just prior to landing, I was carried to 5,500 feet above sea level. I found no great lift, my maximum rate of climb being 8 feet per second.



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During the ensuing three hours, I enjoyed the sheer exhiliration of flying, playing hide-and-seek with another pilot beneath numerous small cumulus clouds around. My late start precluded the possibility of much distance, so I had determined to wait for the late afternoon thunderclouds. To the Northeastward, my projected direction of flight, and the direction of the wind's course, there were few clouds, and little indication of much thermal activity.

Finally, at about 4:00 P. M., E. S. T., I noticed that cumulo-nimbus clouds had formed to the southward. I had about 9,000 feet at that time, and started diving for this cloud, trying to reach it before it had spent its energy. I was too late, and flew through dense rain patches and moderate downdrafts. Heading away from this cloud, I began to scout about for promising-looking young clouds. Finally about 4:30, I arrived under a fairly small cloud whose crisp outline and rapidly ascending crest betokened favorable activity. Arriving directly under the cloud, my rate of climb gradually increased, the rain was replaced by simple condensation, the extent of the thermal current's area having increased so that turns of approximately 20 degrees bank were adequate to maintain position in the thermal core.

At about 12,000 feet I straightened out the turn indicator and flew out of the cloud to have a look around. I found that just before breaking free of the cloud, I encountered violent down-drafts, as had been my invariable experience on previous cloud-soaring flights. Breaking free, I found the cloud peak had already made impact with the tropopause and had assumed the familiar anvil top usually associated with cumulo-nimbus formation. Above was a broad canopy of ice crystals, from which was