The following designations are used to form the basis of such a chart:

- D drift
- H altitude
- v vertical velocity
- w wind velocity
- w_0 wind velocity on the ground
- t time

The thermal drifts with the wind velocity which is w_0 on the ground but increases somewhat with altitude. The function $w = f(H)$ is known to science but does not apply on days with thermal weather because whenever there are pronounced vertical air currents there is pronounced interlocking of the wind velocities of the turbulent zone. Therefore, the assumption that w is constant at all altitudes on days with thermals probably comes as close to actual conditions as any other assumption. The drift D then is the wind velocity w_0 times the time t required by the thermal to reach the altitude H.

$$D = w \, . \, t$$

On the other hand, the time required for the thermal to rise to the altitude H is this distance H divided by the average vertical velocity. The vertical velocity of the thermal at the ground is zero and at the altitude H it is v, the average vertical speed therefore ½ v. Thus: $t = \frac{2}{v} \, . \, H$. By substitution it is found that: $D = 2 \, . \, \frac{w}{v} \, . \, H$. A thermal having a vertical velocity v at a height H when there is a wind w originates at a point upwind at a distance $D = 2 \, \frac{w}{v} \, H$ irrespective of the acceleration experienced by the thermal. The relationship states that the drift is larger, the stronger the wind, or higher the thermal. The drift is smaller the stronger the vertical velocity, which is easy to understand because a strong thermal rises in a shorter time than a weak one.

From this formula the data of Table 5 are computed. They give for the various wind velocities the distance (on the ground) of the origin of the most frequent thermal, namely the 1/10°F thermal, when encountered 1000′ above the ground.

Drift from Its Source of a 1/10°F. Thermal Encountered at 1000′

TABLE 5

Wind Velocity	Distance	
mph	feet	miles
3	2,300	½
6	4,700	.9
9	7,000	1.3
12	9,400	1.8
15	11,700	2.2

From the same relationship $D = \frac{2 \, w \, H}{v}$ a chart for universal use at all altitudes, vertical velocities and windspeeds can be prepared. However, in order to be practicable, it should contain the sinking speed of the ship to be used and take into account the sea level elevation of the field over which it is to be used.

Since the rate of climb indicator and altimeter are now quite universal equipment of gliders, and since wind measurements can be obtained on many fields, there is every reason to believe that observations during regular operation of any particular field should soon reveal the principal thermal sources in that vicinity. Once a clue to those is established, the procedure can be reversed and it can be determined where the thermal should be found on any particular day and tows be adjusted correspondingly.

The location of a thermal from a particular source changes with the wind direction, the wind velocity, the height at which it is approached and—unfortunately—also with the intensity of the upcurrent. These factors move the thermal around constantly. Systematic use of the information presented here should enable a pilot to look for a thermal where it is likely to be found instead of searching blindly for it. Such a procedure can not help but increase the number of soaring flights made from tow.

Randall N. Chapman

Randall N. Chapman, chief engineer of Laister-Kauffmann Aircraft Corporation, was killed in a glider accident at Starling Airport, St. Louis, Missouri, on August 12. He was 29 years of age.

At a special air show being staged in honor of the nation's aviation magazine editors, Randy was demonstrating that a glider could follow through any stunt that an airplane could do. Everything went well until he attempted a vertical figure eight whereupon the left wing twisted off at the bottom of the lower loop. Most stunt airplanes have sufficient built-in drag not to exceed their placard speed in such a maneuver, but the super-slippery Yankee Doodle I must have far exceeded its 125 mph design speed. Although high enough to parachute safely, Randy apparently made no attempt to open the canopy or release his safety belt.

Chapman graduated from the aeronautical engineering college of Lawrence Institute of Technology, Detroit, where he later served as instructor in aeronautics. There he was extremely active in glider design, construction and operation, and was one of the prime movers in the development of the Midwest Sailplane. He became the country's most outstanding glider stunt pilot and demonstrated the Yankee Doodle's capabilities throughout the Middle West. At the outbreak of the war he joined his old friend, Jack Laister, as chief engineer of Laister-Kaufmann, where he became the mainstay behind the development of the CG-10A Trojan Horse. Randy was one of the few civilian recipients of a pair of Army "wings" for his test flying of the CG-10.

A native of Detroit, Randy is survived by his wife Margaret and son Johnny. Randall Chapman has numerous friends in the SSA, all of whom mourn his passing with the deepest regret. His passing will leave a big gap to fill.