allowing an understanding of the relationship of temperature aloft and thermal lift by the soaring pilot who may have no desire to pursue the thermodynamics of the problem.

In the language of the mathematician, a low value of TI is necessary but not sufficient for strong thermals. It's like the hook on the end of the fish line. Without the hook, no fish can be caught, but adding the hook does not guarantee a catch.

It is probably true that the Thermal Index will be frequently confused with the Stability Index. The Stability Index is computed and reported by the Weather Bureau to indicate the potential for precipitation and thunderstorms. It has occasionally been useful for predicting lift. Its definition is indicated in

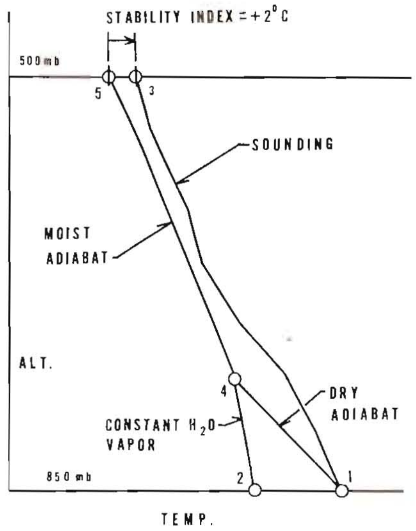

FIGURE 3

Figure 3. Point (1) is the temperature observed at 850 mb, (2) is the dew point at that altitude, and (3) is the temperature observed at 500 mb. (1) is extended along a dry adiabat to point (4) where it intersects the extension of point (2) along a line of constant water vapor content (constant saturation mixing ratio). The temperature at (4) is extended to the 500 mb level along a moist adiabat to point (5). SI is defined as the temperature at (5) subtracted algebraically from the temperature at (3). If the resulting value is less than +4 a chance exists for cumulo-nimbus development.

Since the main problem in soaring is to climb through the first few thousand feet above the surface in dry thermals, the Stability Index is not a practical clue to the quality of soaring to be expected.

A potential for improving the state-of-the-art in soaring appears available here. It is entirely possible that interested Weather Bureau personnel could prepare TI forecasts during the summer weekends. The author urges other soaring pilots to utilize the concept of the "Thermal Index" to test its potential for predicting lift.

ADDENDUM

The Thermal Index can be plotted on a pseudo-adiabatic diagram very rapidly and with high precision. If a diagram is not available, however, the TI can be computed using the approximate mathematical formulae shown below.

Given:

h = Surface pressure altitude = 1600′

Ts = Surface high temperature forecast = 26.7 °C. (Convert 80°F to Centigrade by subtracting 32 and multiplying by 5/9.)

Tr(850) = RAOB temp. at 850 mb = +13.0 °C (taken at 1200 Zulu time).

Tr(700) = RAOB temp. at 700 mb = +4.5 °C (taken at 1200 Zulu time.

1. Estimate 850 mb temp. lapse
   $Tl(850) = .003\ (5000-h)$
   $Tl(850) = .003\ (5000-1600)$
   $Tl(850) = 10.2\ °C$

(Note: For maximum accuracy the temperature lapse should be computed for pressure altitude. If field elevation is used in place of pressure altitude the pressure error will amount to about 1.5°C on the TI for a barometric change of ½-inch of mercury, the error being optimistic if the glass is low and pessimistic if it is high. Soaring is frequently successful with the barometer ½-inch off standard and 1.5°C appears to be a significant change in TI so it is recommended that the temperature lapse be computed on the day of the observation. If the recommendation is ignored, the standard lapse can be used for all forecasts at the same elevation which would reduce the drudgery at the expense of accuracy.)

2. Estimate 700 mb temp. lapse
   $Tl(700) = .003\ (10{,}000-h)$
   $Tl(700) = .003\ (10{,}000-1600)$
   $Tl(700) = 25.2\ °C$
3. Est. 850 mb temp. of surface air
   $Ts(850) = Ts - Tl(850)$
   $Ts(850) = 26.7 - 10.2$
   $Ts(850) = +16.5\ °C$
4. Est. 700 mb temp. of surface air
   $Ts(700) = Ts - Tl(700)$
   $Ts(700) = 26.7 - 25.2$
   $Ts(700) = +1.5\ °C$
5. Compute TI at 850 mb
   $TI(850) = Tr(850) - Ts(850)$
   $TI(850) = 13.0 - 16.5$
   $TI(850) = -3.5\ °C$
6. Compute TI at 700 mb
   $TI(700) = Tr(700) - Ts(700)$
   $TI(700) = 4.5 - 1.5$
   $TI(700 = +3.0\ °C$

Bibliography

1. *Glossary of Meteorology,* edited by Ralph E. Huschke, published by the American Meteorological Society, Boston, Mass. (Especially page 508 for definition of "Showalter's Stability Index.")
2. *Natural Aerodynamics,* R. S. Scorer, Pergamon Press, New York, London, Paris. (Includes a definitive discussion of the mechanism of thermal convection.)

Fred Hefty pilots the German-built Scheibe L-Spatz-55 sailplane he owns with Elmer Katinszky near Tehachapi, Calif. Increasing numbers of these ships are being imported as the design becomes more popular. It has an approved type certificate in the U.S. so is easy to get licensed. Wings and empennage are of wood construction, fabric covered, and it has a welded steel tube fuselage. Basic specifications are as follows: span, 49.3 ft.; wing area, 126 ft.; aspect ratio, 19.0; empty weight, 337 lb.; gross weight, 583 lb.; wing loading, 4.6 lb./sq. ft.; glide ratio, 29 at 45 mph; sinking speed, 2.1 ft./sec. at 40 mph.

Photo by Eugene G. Bartos