

THERMAL SNIFFERS

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thermal with a sailplane flying near it. The gradient $\frac{\Delta T}{\Delta y}$ is along the wing. It is an elementary concept of potential theory that the gradient is at a point perpendicular to the isotherms at the point and points in the direction of increasing temperature. The complete gradient is given by the vector sum of its three components. It is readily seen that if one had facilities to measure the three gradients on board a glider, he could determine the direction to fly in order to reach the core of the thermal. It is upon just such a principle that depends the device of using a smoke stream on a windless day to point out the nearest thermal. As a matter of fact if one is flying with wings level, the direction as well as a measure of the strength of the thermal is given by the vector sum of the two horizontal gradients $\frac{\Delta T}{\Delta x}$ and $\frac{\Delta T}{\Delta y}$. See Fig. 2.

The vector sum of two components is obtained graphically by the usual parallelogram addition. The gradient $\frac{\Delta T}{\Delta r}$ is, therefore, a measure of the magnitude of the vertical convection as well as a pointer in the direction of increasing temperature.

In addition to furnishing more easily interpreted information, the temperature gradiometer, since only the differences in temperature between the wing tips and the nose and tail are measured, can be made to read very small gradients without involving the use of sensitive laboratory instruments. For example, suppose the temperature on one wing tip to be 20°C . and on the other 20.1°C . With ordinary scalar temperature measurements it would require a thermometer measuring to $\frac{1}{2}\%$ but with a device measuring gradients, the difference in temperature would be indicated as 0.1°C . which could be measured to 5% or to 0.005°C . The latter corresponds to a gradient of $1/20^{\circ}\text{C}$. per $1000'$.

It was the purpose of this paper to point out that the fundamental physical property defining air structure is the temperature

and from this premise was derived the concept of temperature gradient, and its application to soaring flight was demonstrated. The actual instruments for making such measurements were developed by August Raspet and tested at Elmira in July 1939 and were not discussed in this paper because the development of the "SNIFFERS" (so aptly named by Alexis Dawydoff) has been so rapid that we are now completing Model IV and we are designing the fifth of a series of indicators. In a future article in SOARING, August Raspet and I will give more on the actual instrumentation.

MOVING PICTURES

The Soaring Society is considering the production of several new reels of motion pictures which will cover in greater detail the theory of soaring flight, training methods, club organization, etc., than the films that it now possesses. Mr. Wm. J. Shannon, of Nutley, New Jersey, has very kindly donated his services to direct this work. He is well known for his activity in the field of moving picture photography, and has published several pamphlets for the aid of the amateur. He is being assisted by Don Lawrence, Herb Sargent, and Frank Hirt, well known soaring pilots.

The new pictures will not require the comments of a speaker, but will be entirely self explanatory. Animated and still drawings will be used, where necessary, to clarify descriptions and technical parts. All possible 8 and 16 millimeter films on gliding and soaring will be assembled and the most suitable sequences selected for the new reels. In cases where the originals can not be used, reproductions will be made and the originals will be returned intact to their owners. It is requested that anybody who owns films that might be suitable, write either Mr. Shannon, 66 Elm Place, Nutley, N. J., or the Soaring Society.

FLORIDA SOARING

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"The Nomad's test flight at Pensacola was conducted on a slightly overcast day,

rather cool, yet the first launching to four hundred feet lasted about twenty minutes, on local thermals around the field.

"Cloud bases are, in general, rather low, from one to five thousand feet. Hence, distance soaring would be accompanied by less available altitude to be spent between thermals. However, it is believed, merely on the basis of what power flying I have done, that thermals are sufficiently numerous that this is no great obstacle. As one goes inland from the seacoast, the cloud level rises, permitting a start near the beach from a low tow, with gradually increasing altitude as one progresses inland."

ROBERT STANLEY.

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MOVING PICTURES: The Soaring Society has two sets of motion pictures available for promotional purposes. There is no charge for their use, but a deposit is required on each set, and the user pays the express charges. Write for information.

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BACK ISSUES OF SOARING available through The SSA headquarters. Complete set of 1938 issues, \$2.00. Nine issues of 1937, \$2.00.

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