

JET STREAM PROJECT—II

A Preliminary Report on its Soaring Aspects

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In the last issue we discussed the flights achieved, the general weather situation, the calibration mission of the B-29 and B-47, the turbulence encounters and some new results on the airflow over mountains. In this issue we will stress a little more the atmospheric motions near the tropopause and the background of Larry's accident in the severe turbulence of the roll cloud.

Atmospheric Motions Near the Tropopause

It is well to point out that not only vertical motions at very high

deduced from the temperature variations along the traverses and the vertical soundings made during ascents and descents. (Measured by both vortex thermometer and aerograph thermistor). The fact that the patterns resemble a mirror image of the ground contours rather than a lee-wave is also suggested by the airspeed reactions of the B-47. In Figure 2 the change of maximum updraft is plotted against height as reduced from the glider recordings in the first wave. It may be seen that the vertical motions of the air on the 1st of April

tainous terrain, even up to great heights, depend entirely on the location where they were taken.

Under jet stream conditions typical cirrus bands were frequently observed and the wave clouds were drawn out in similar bands, as in Fig. 3. A specific difficulty in exploring these bands by gliders will be described later.

At this point it may be mentioned that periodic vertical motions have now been measured over the Eastern part of the country in intense jet streams (over 150 knots). The general

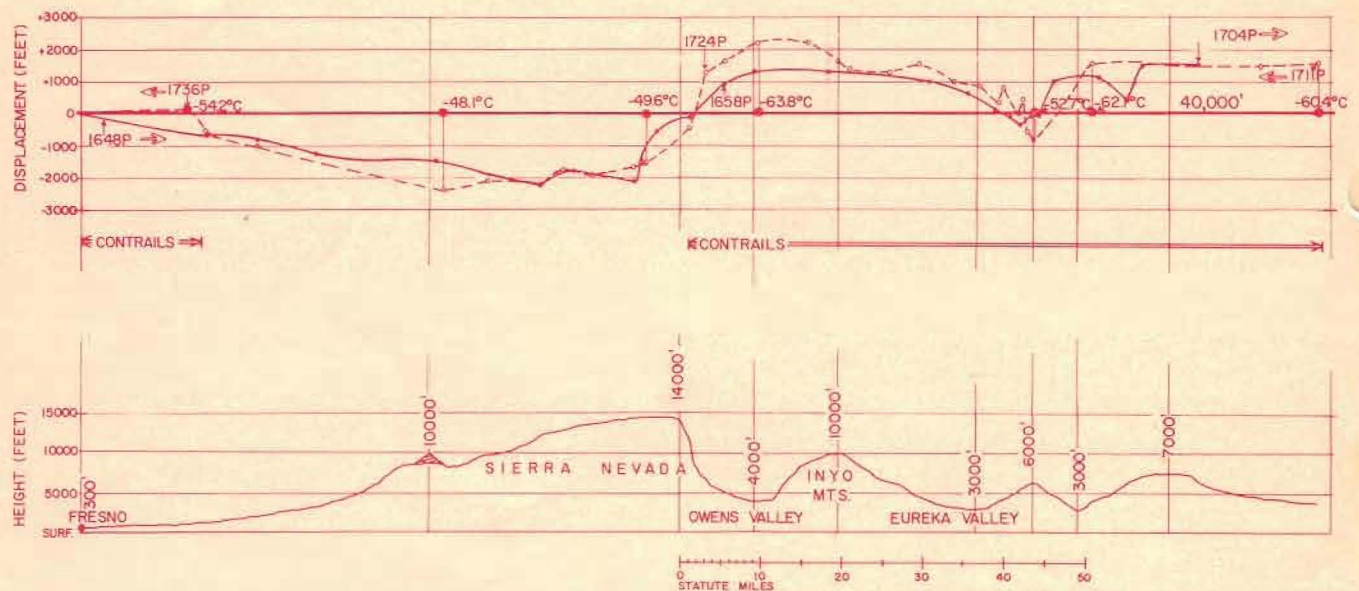


Fig. 1 — Vertical displacement of the stratosphere across the Sierra Nevada as derived from temperature variations along B-47 traverses at 40,000 ft. (April 1, 1955). Length of leg = 155 miles. The displacement curves may be interpreted as approximate streamlines about 6,000 ft. above the tropopause. Solid line = East traverse, dashed line West traverse.

altitudes but the modifications in the speed and direction of the upper winds were of primary interest to us. There is reason to believe that great mountain ranges have a profound influence on the development of the jet stream and its horizontal and vertical wind profile. Figure 1 shows in more detail one of the more remarkable results of the project, depicting in a graphic manner the displacement of the tropopause over the Sierra Nevada as measured by the B-47 at 40,000 ft. The streamlines are indirectly

were about 100 ft/min at 40,000 ft. It is deplorable that we did not yet have both ships in good shape to soar this enormous wave. Also in this same figure the wind distribution with height west of the Sierras is shown.

During their traverses the aircraft recorded not only temperature changes of over 15°C at the same level but also variations in wind speed up to 50 knots and changes in directions up to 45° within less than 10 miles. Obviously vertical soundings of temperature and wind in moun-

zone of these periodic motions seems to form a wide and long band almost parallel to the jet stream axis with a little lateral displacement. However the orientation of the individual updraft and downdraft areas is not yet clear; they are either in waves or in bands (or both). Their maximum intensity may be estimated to be around 200 ft/min.

The Background of Edgar's Accident

Larry's flight has been described by himself in "Soaring." (See Vol.