JET STREAM PROJECT—III

A Preliminary Report on its Soaring Aspects

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The "installment type" of writing adopted for this report on the 1955 Jetstream—Wave Project in Bishop allows for new results to come in continuously while the writing is progressing. As a consequence, more and more sequels become necessary and some illustrations and data concerning topics in the first installment may appear in the last one, making the material somewhat disorganized. Also some omissions and errors have slipped in, mostly due to the tardiness of the writer who, though urged on by the whip of the deadlines set by the SSA's relentless former president Jon Carsey, never produces the manuscripts in advance for proof reading. So we will have to look forward to more errors possibly but also to a report Number IV which, I hope, will complete the series.

The most serious omissions, so far, were failures to give due credit to photographers and scientists. The lost ground will be recovered at the end. The most serious error was the misprint which stated that updrafts at 40,000 ft. on 1 April 1955 were 100 fpm. This must be corrected right away:—The updrafts were 1,000 feet per minute.

At this point another misprint should be corrected. In the second article, page 4, lower left corner, one should read: ". . . an acceleration of 10G requires a minimal airspeed of $\sqrt{10}$ times the stalling speed . . ." (not 10 times the stalling speed).

In the earlier issues we have tried to describe some preliminary results of the 1955 field work at Bishop, namely the glider flights, the calibration of the B-29 and B-47 in the mountain wave, the weather situation, the exploration of the stratospheric flow over the mountains and the experience with turbulence in severe "rotor flow." In this issue we will bring some new results regarding the air flow at high levels over, and up- and downwind of the mountains together with some additional information on turbulence and airspeed fluctuations. Then we will discuss some navigational problems of glider flights above 40,000 ft.

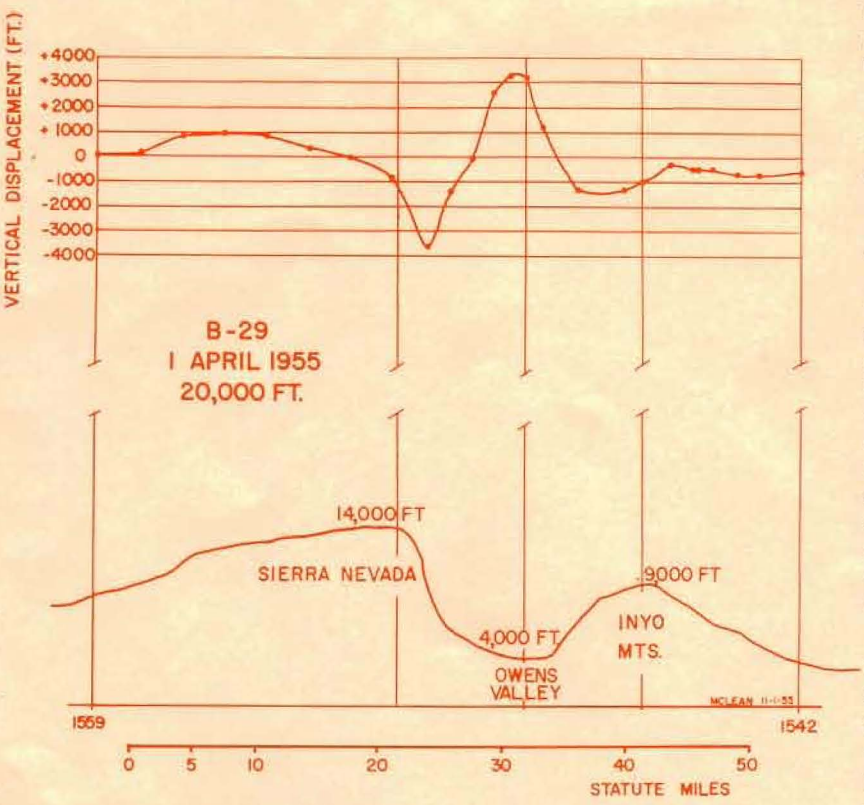

Fig. 1 — Vertical displacement of atmospheric streamlines across the Sierra Nevada as derived from temperature recordings along B29 traverses at 20,000 feet 1 April 1955. Airflow from left to right. Aircraft flight from right to left at constant altitude.

Tropospheric Airflow Over Mountains

New information on the tropospheric flow over the Sierra Nevada has been derived from the recent results. Fig. 1 shows approximate streamlines as deduced from the temperature recordings (vortex and stagnation probes) of the B-29 during its upwind traverse at 20,000 ft pressure altitude. The enormous wave can be recognized clearly over the Owens Valley with a maximum (total) vertical displacement of 7,000 ft. Also, the descent of the air directly over the steep lee slope of the Sierras is marked, in contrast to conditions seen in the stratosphere (Nov.-Dec. issue Fig. 1.) where it is entirely missing. There the downflow characteristic is entirely missing and the wave shape of the displacement is replaced by an upward step, a sort of mirror image of the ground contours. At 35,000 ft. the 4 traverses of the B-47 indicate a superposition of the stratospheric mirror-image effect and the tropospheric leewave. The results will be shown in the next issue.

The remarkable variation in (horizontal) wind velocity and direction leewards of the mountain range is illustrated by Fig. 2 for the 20,000 ft. level. As stated earlier the winds vary more than 40 knots and 45 degrees within distances of the order of 10 miles. Apparently representative radio soundings and wind measurements are not obtainable over mountain terrain under wave conditions. Wind variations of