way (Fig. 2). Many features attributed to the jet-stream are probably peculiarities of certain sectors only, depending on whether they are encountered on the front or rear side of a trough, on the nothern or southern side of the jet, on its upper or lower side or in its accelerating or decelerating sections.

The greatest mean intensity of the jet-stream is reached on the east side of the continents. This is especially true for the Asiatic coast. Over Japan the jet-stream contains winds between 100 and 200 knots most of the winter time, and the greatest upper wind velocities ever recorded were observed there. A recomputation of the so-called RAWIN data shows that no report on wind velocities over 300 knots could be reliably verified so far, but observations close to this value are confirmed. In parts of the Japanese Islands the jet-stream is of such remarkable persistance that it has been seriously considered as part of a great lee-wave created over the Himalayan and Tibetan mountain plateau. As overstatements on the velocities in the jet-stream are common, it should be made clear that over the American continent, any jet-stream of more than 150 knots may be termed "intense."

For over a year the Geophysics Research Directorate at the Air Force Cambridge Research Center has operated especially equipped B-47 and B-29 aircraft in its "Project Jet-Stream." Among the interesting results are observations on the horizontal and vertical wind-shear. Surprisingly enough the horizontal and vertical wind profiles of the average jet-stream are quite similar (Figs. 3 and 4). From the outside toward the core, the wind-shear (not only the wind) increases to a relatively sharp peak. The wind-speed in the peak appears to be higher than can be accounted for by the pressure and temperature field alone; in other words, the jet-stream core seems to overshoot its equilibrium and, as a consequence, the air curves against the high pressure side, crossing the isobars as pointed out by R. Endlich and S. Solot of Geophysics Research Directorate. This is especially true for the whole southern half of the jet-stream. The horizontal cross-section through the jet-stream resembles the vertical cross-section if one compares the nothern and the upper half with each other. Both show stronger wind-shears than the corresponding other halves—that is, the wind decreases more rapidly from the core towards north and upwards than toward south and downward (Figs. 3 and 4).

There is evidence that this configuration tends to form waves, the wind peak acting like an interface. According to the scale difference in horizontal and vertical wind shear. the resulting vertical waves are of the order of mountain waves, while the horizontal waves correspond to cyclonic disturbances. Actually, recent data show that the jet maximum is not a sharp peak but a layer of several thousand feet vertical depth in which the shear gradient is smoothed out. Such a layer will act as a duct which traps waves traveling inside of it. As soon as such waves grow in an unstable way, they may break down into turbulence and even if they do not grow in this manner. they may be "bound" by unstable layers on top and underneath.

The "peak structure" is not always observed. Sometimes there are several "fingers" in the horizontal as well as in the vertical cross-section and occasionally, the vertical wind profile is "blunt," rather than pointed.

That has been observed over the Sierra Nevada, for example, when Edgar and Klieforth reached almost 45,000 ft. on 19 March 1952. The type of profile encountered seems to depend on whether the jet-stream is accelerating or decelerating.

There is good reason to believe that the vertical wind profile is responsible for many of the fine scale features of the jet-stream. It is this part of the jet-stream which can be explored by gliders in cooperation with powered aircraft. A first attempt was made last spring using the Pratt-Read glider of the Southern California Soaring Association and the B-29 of "Project Jet-stream." This short field work (10 days) served mainly to check the procedures to be applied. The results were encouraging;

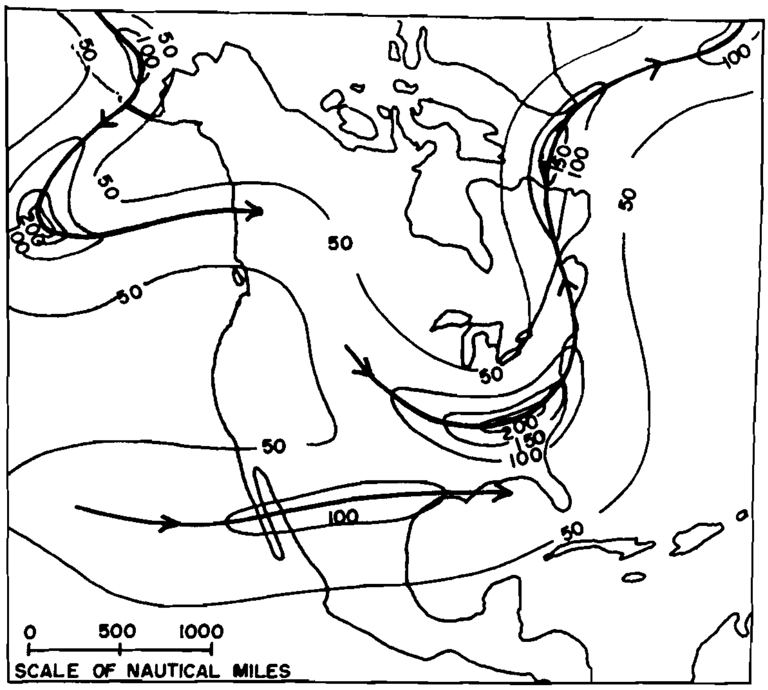


*Fig. 2 — Typical Jet Stream pattern over North America at the 250 mb pressure level (approximately 34,000 ft), for March, 1952. Thin lines with numbers are "Isotachs" giving wind speeds in knots. Heavy lines mark jet core. Two jet stream maxima of 200 knots each can be seen.*

they were obtained largely as a result of unselfish efforts of S. C. S. A. members, especially of Victor Saudek, Thomas Caldwell, Einar Einarvoldsen and many others in preparing the Pratt-Reed in top condition in a very short time. This has helped us to save one year in planning a somewhat more extended field phase for 1955.

Vital in the 1954 operation (briefly sketched already by Victor Saudek in the *Thermal*) was the communication between the B-29 and the glider. By the courtesy of Lynn Brown, we were allowed to use his neat and efficient light-weight "Skycrafter" VHF radio set for which he supplied special crystals. This most