THE WEATHER AND CIRCULATION OF MARCH 1950 [1]

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The atmospheric circulation over the Pacific, North America, and the Atlantic during March 1950 was characterized by three zonal belts of 700-mb. height anomaly, negative at middle latitudes (35° to 55° N.) and positive at higher and lower latitudes (see fig. 1). Consequently, westerly winds were considerably stronger than normal between latitudes 30° and 45° N. and weaker than normal between 50° and 60° N. In figure 2 the geostrophic zonal wind speed profile for March 1950 is shown in comparison with the normal profile for March for the Western Hemisphere (0° to 180°). It can be seen that the speeds in the mean jet stream for March 1950 exceeded the normal by as much as 5 m/sec, and the jet was displaced somewhat to the south of the normal.

Returning to figure 1 it is evident that the subpolar lows in the Aleutians and in eastern North America were displaced well to the south of their normal positions and the broad cyclonic circulations associated with them covered extensive areas at middle and lower latitudes. At higher latitudes a large warm ridge covered much of the Arctic Ocean and northern Canada while anticyclonic conditions were also well developed from Greenland into western Europe. The high centered in northwestern Canada was apparently associated with one that had appeared on monthly mean charts over the Bering Sea in February and in the eastern Pacific in January (see

[1] See Charts I–XI, following p. 57, for analyzed climatological data for the month.

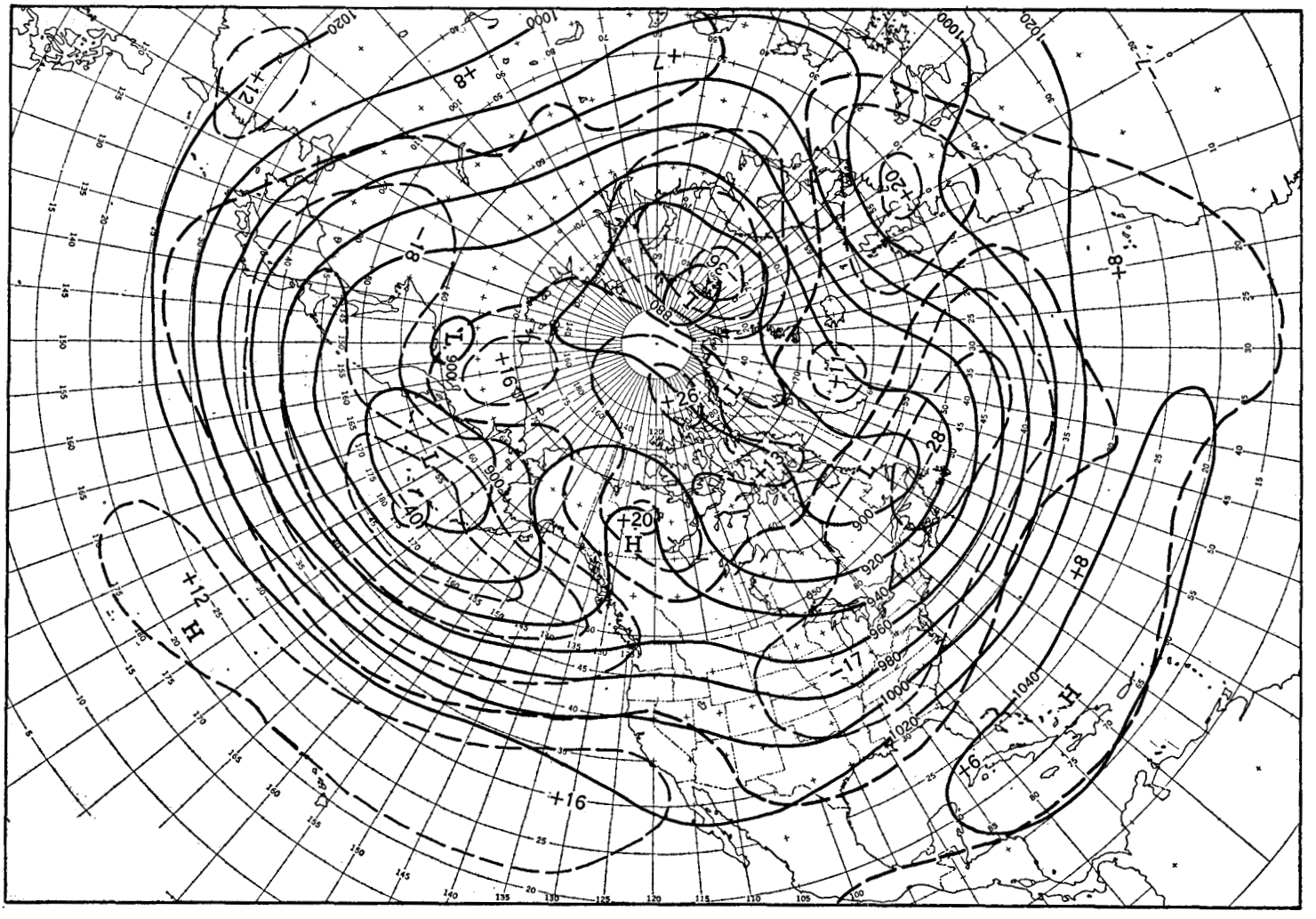


FIGURE 1.—Mean 700-mb. chart for the 30-day period February 28–March 29, 1950, inclusive. Contours at 200-foot intervals are shown by solid lines, 700-mb. height departure from normal at 100-foot intervals by dashed lines, with the zero isopleth heavier. Anomaly centers and contours are labeled in 10's of feet.

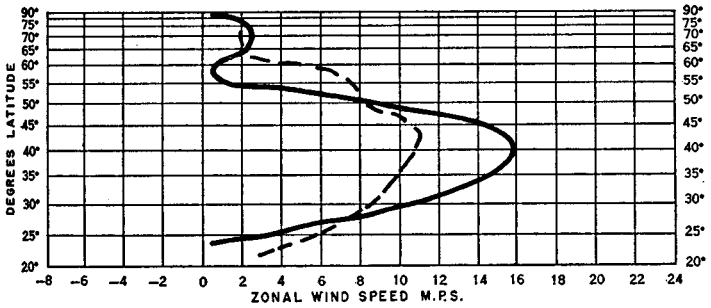


FIGURE 2.—Monthly mean 700-mb. geostrophic zonal wind speed profile in meters per second averaged from 0° westward to 180° longitude. Solid curve is for March 1950, dashed line is March normal.

fig. 1 of the articles by Klein in January 1950 and February 1950 Monthly Weather Reviews). This continuity, which was well established by the intervening midmonth charts (not published), is one of the most remarkable ever observed on monthly mean 700-mb. charts.

This abnormally strong ridge in northwestern Canada combined with the below-normal 700-mb. heights over the greater portion of the United States led to frequent outbreaks of cold Canadian polar air into the northern, central, and eastern United States. Meanwhile, the influence of maritime tropical air was restricted by fast westerlies over southern sections of the United States near the Gulf of Mexico. These considerations explain the subnormal surface temperatures covering practically all of the country east of the Rockies and the northwestern border states as shown in Chart I. The above-normal temperatures in the Great Basin were associated with above-normal heights and anticyclonic conditions at 700 mb. over that area. The warm temperatures in west Texas could be attributed to the foehn effect, since the flow to the east of the Continental Divide in that section was faster than normal.

The tracks of centers of anticyclones given in Chart II show how predominant the polar continental anticyclones were over the eastern two-thirds of the United States during the month. These highs were generally steered by the mean 700-mb. circulation, several of them penetrating far into the South. It is noteworthy that most of these anticyclone centers left the east coast south of the Canadian border (contrast with Chart II for January 1950).

Chart V (inset) shows that heavy precipitation was largely confined to the northern border States and to portions of the eastern third of the country. The major cyclone track (see Chart III) along and south of the United States-Canadian border was responsible for this heavy precipitation stretching from coast to coast in the north. These daily cyclones traveled mainly through the zonal belt of negative height anomaly across the United States, generally steered by the monthly mean 700-mb. circulation. Cyclogenesis was frequent in the central Plains States under the cyclonic curvature and negative center of height anomaly aloft (see fig. 1). Another seat of cyclogenesis, also associated with negative height anomalies at 700 mb., appeared near the east coast of the United States. These cyclones were responsible for heavy precipitation along the east coast. The deficiency of precipitation over much of the Great Basin was associated with ridge conditions aloft and infrequent cyclonic activity in the area. Dry weather also prevailed over the central and southern Plains States since the predominantly northwesterly flow aloft allowed very little advection of maritime tropical air northward into this region.

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, March 1950

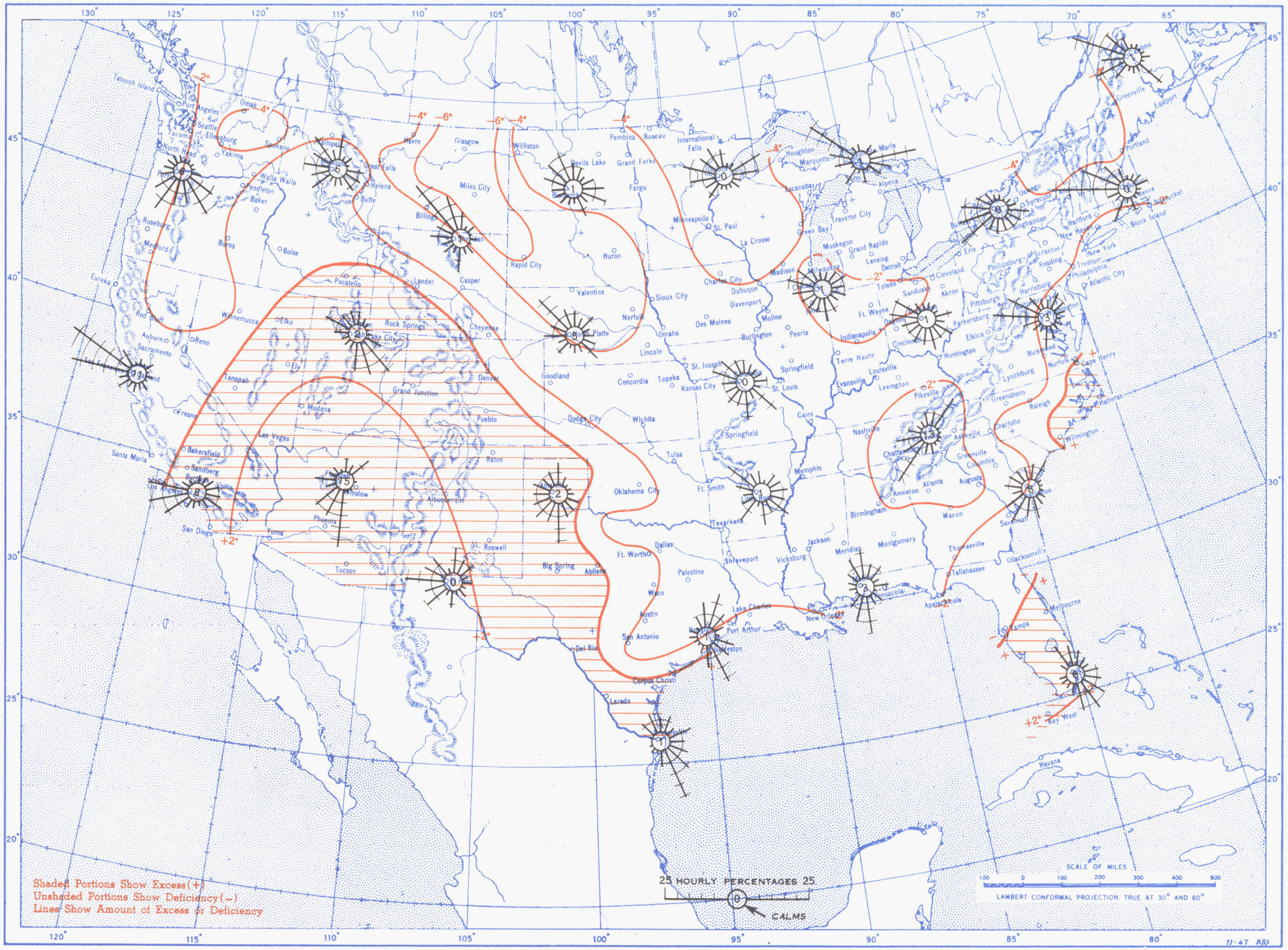
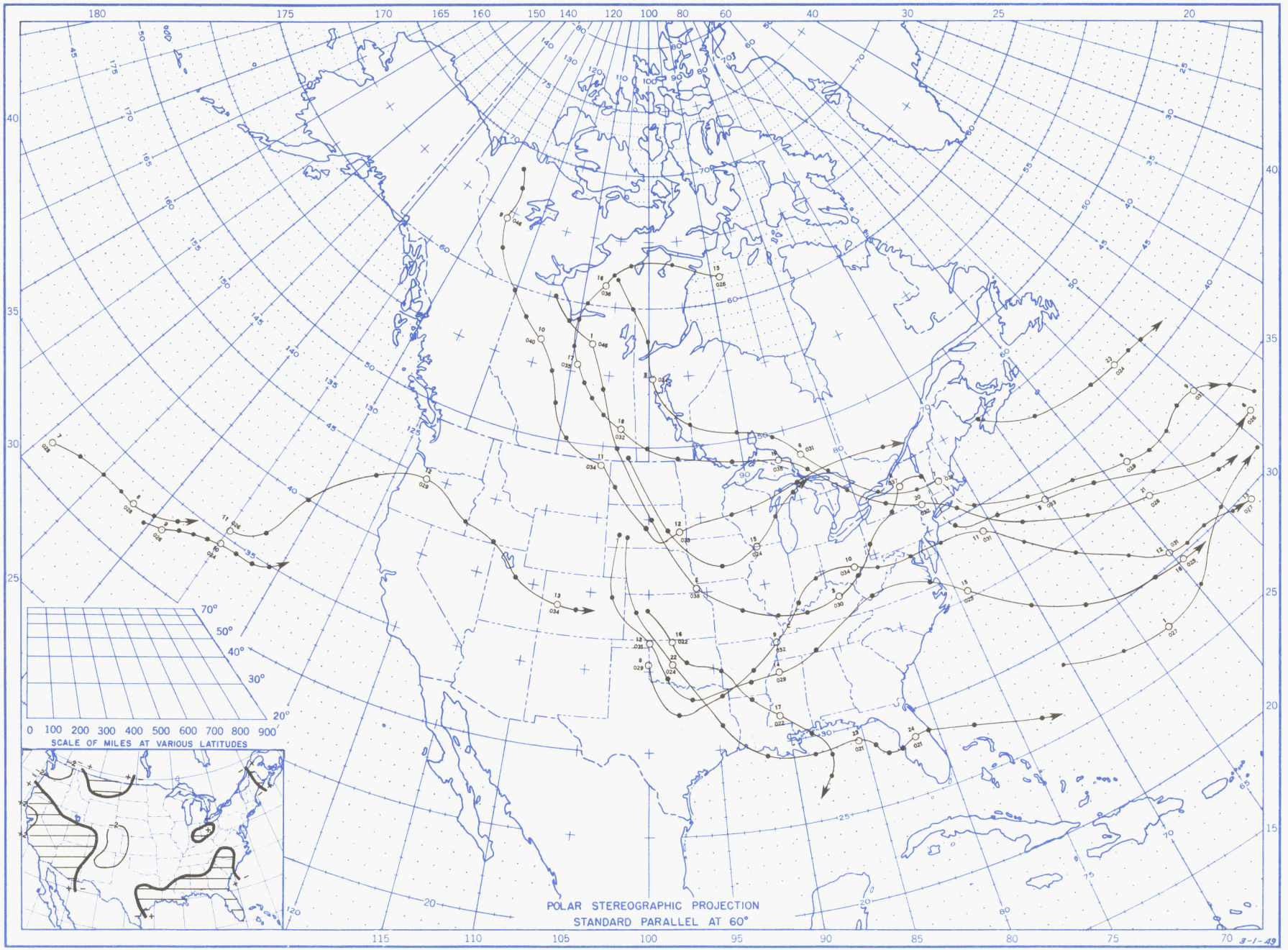
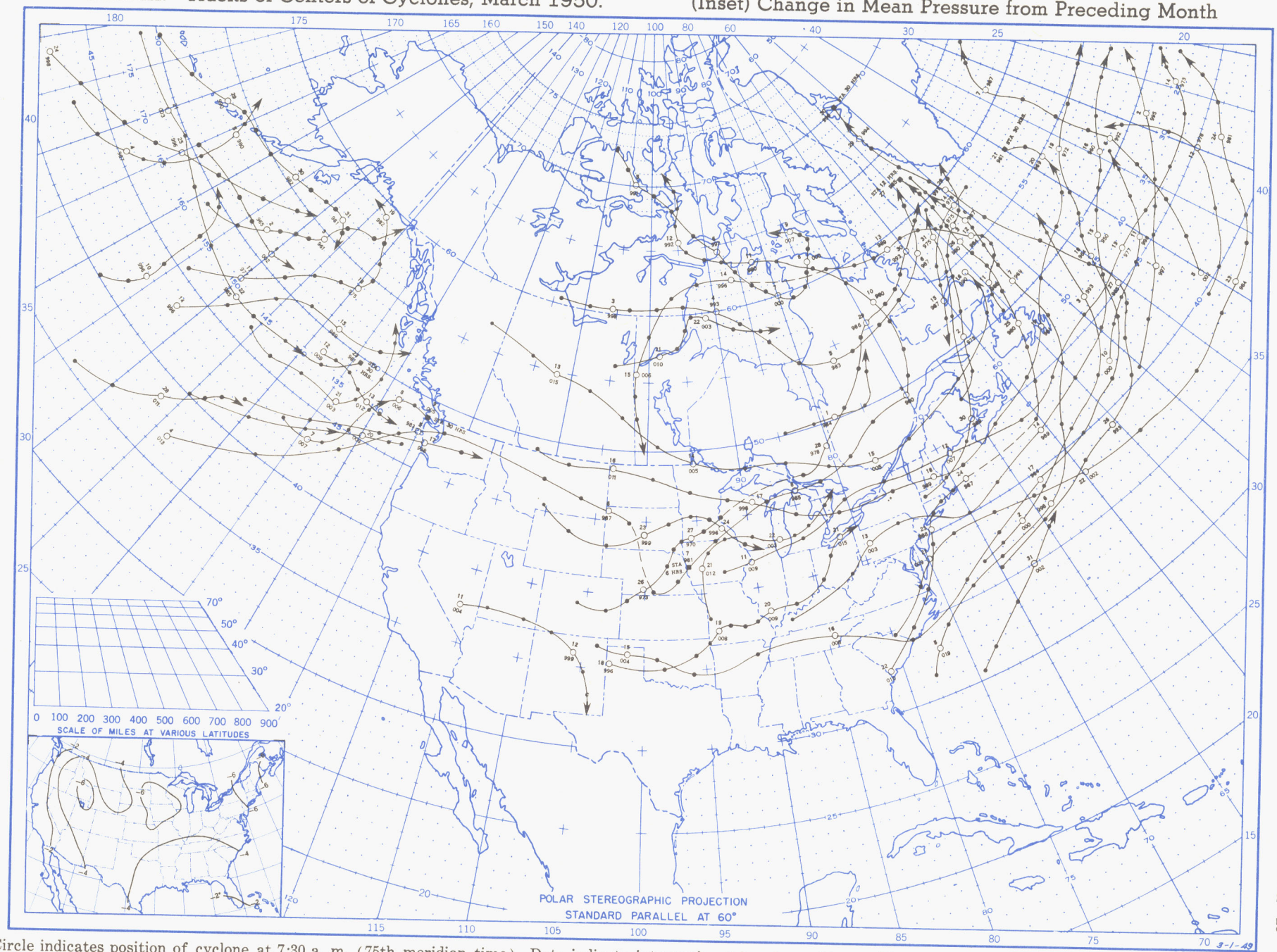


Chart II. Tracks of Centers of Anticyclones, March 1950. (Inset) Departure of Monthly Mean Pressure from Normal



Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time). Dots indicate intervening 6-hourly positions. Figure above circle indicates date, and figure below, pressure to nearest millibar. Only those centers which could be identified for 24 hours or more are included.

Chart III. Tracks of Centers of Cyclones, March 1950. (Inset) Change in Mean Pressure from Preceding Month



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time) Dots indicate intervening 6-hourly positions. Figure above circle indicates date, and figure below, pressure to nearest millibar. Only those centers which could be identified for 24 hours or more are included.

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, March 1950

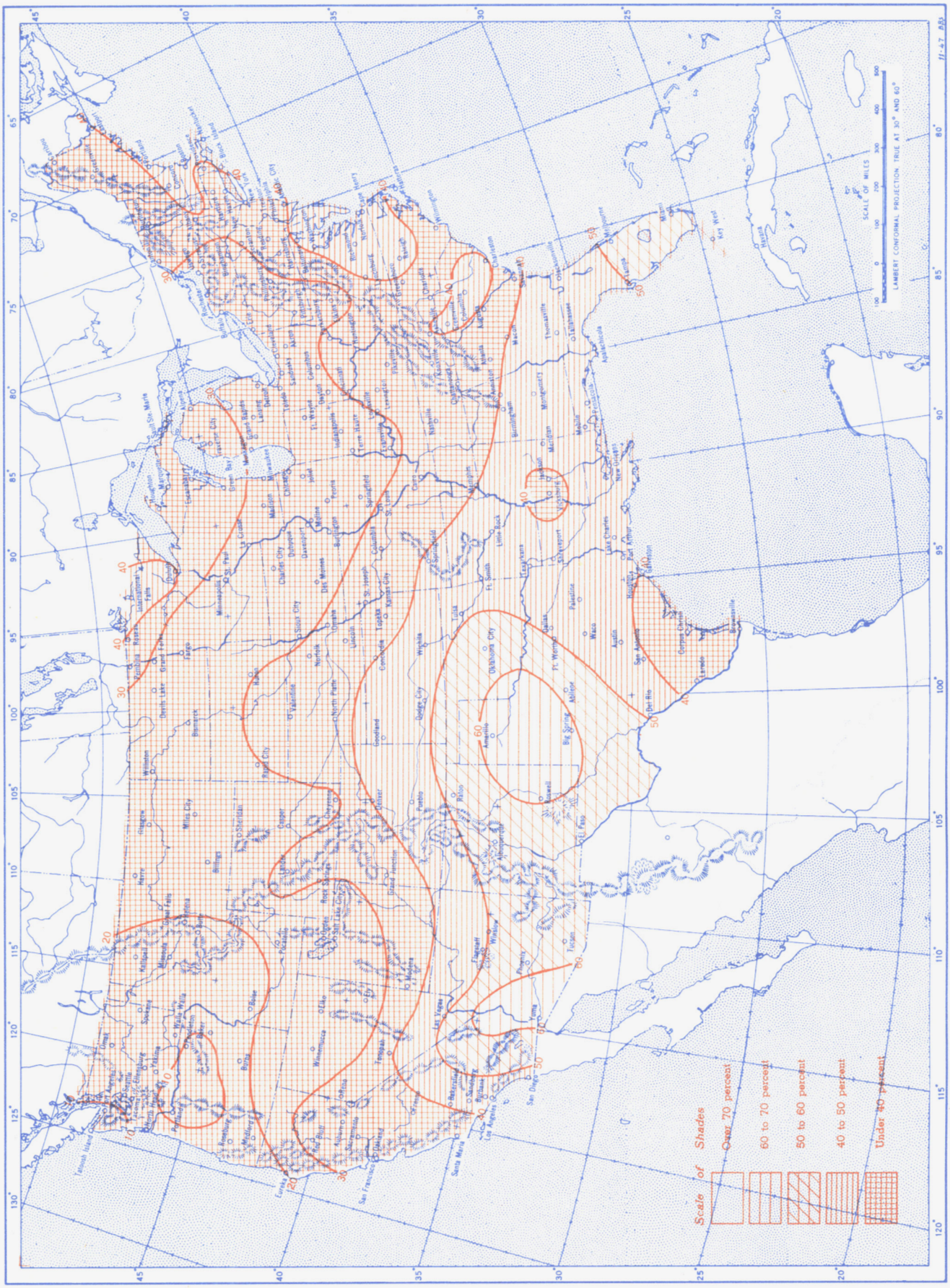


Chart V. Total Precipitation, Inches, March 1950. (Inset) Departure of Precipitation from Normal

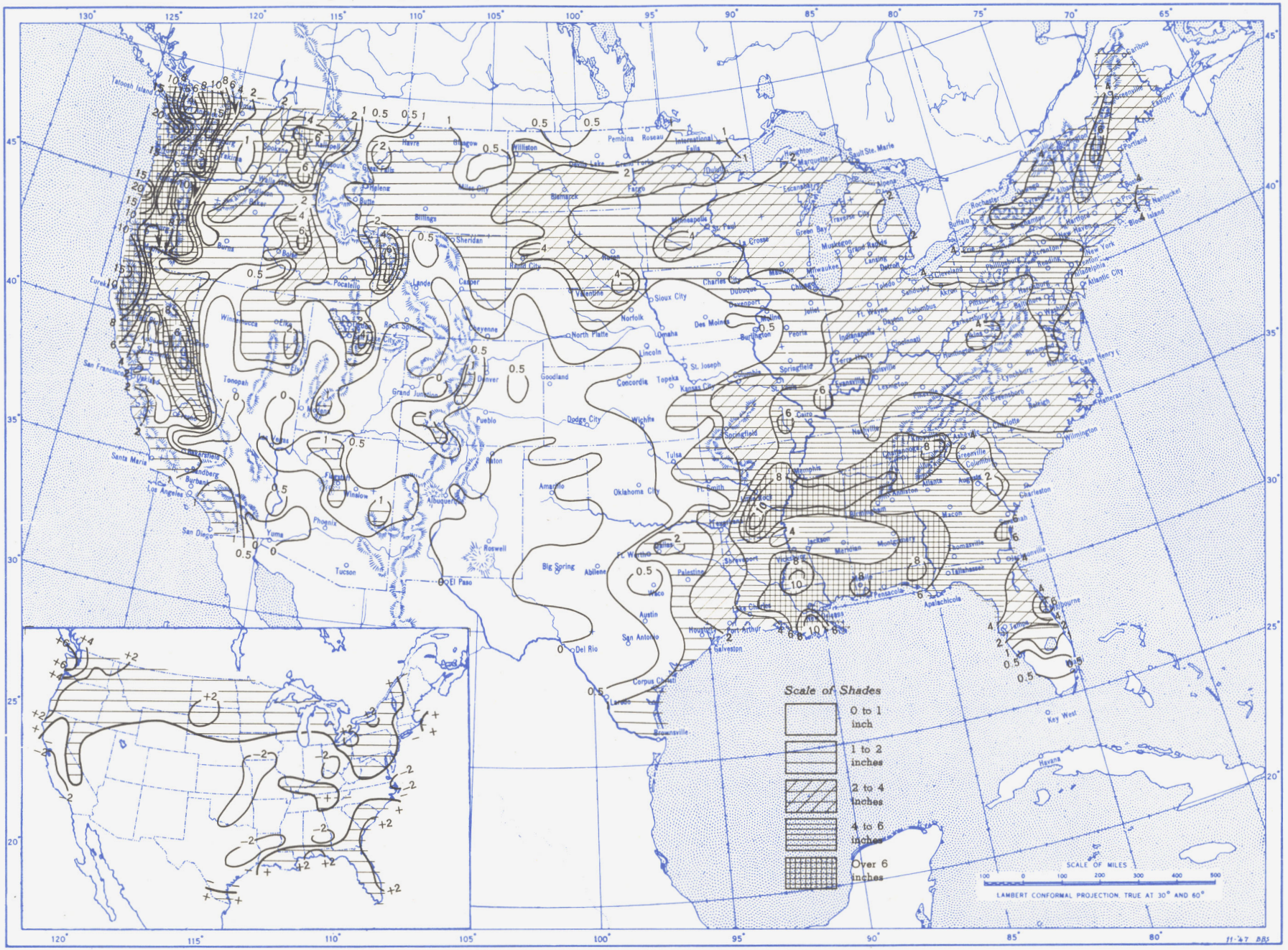


Chart VI. Mean Isobars (mb.) at Sea Level and Mean Isotherms (°F.) at Surface., March 1950

Chart VII. Total Snowfall, Inches, March 1950. (Inset) Depth of Snow on the Ground at 7:30 a. m., March 28, 1950

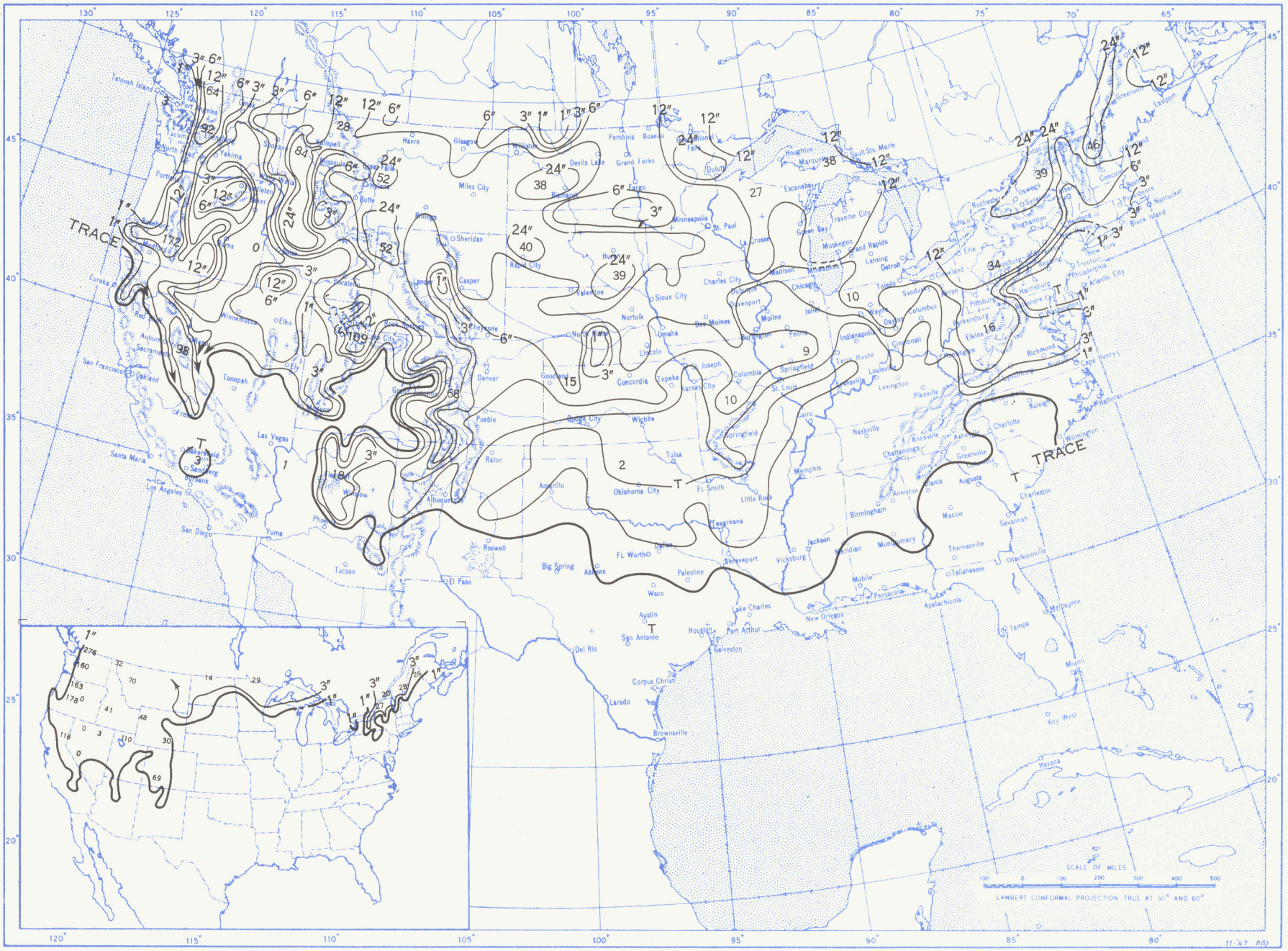
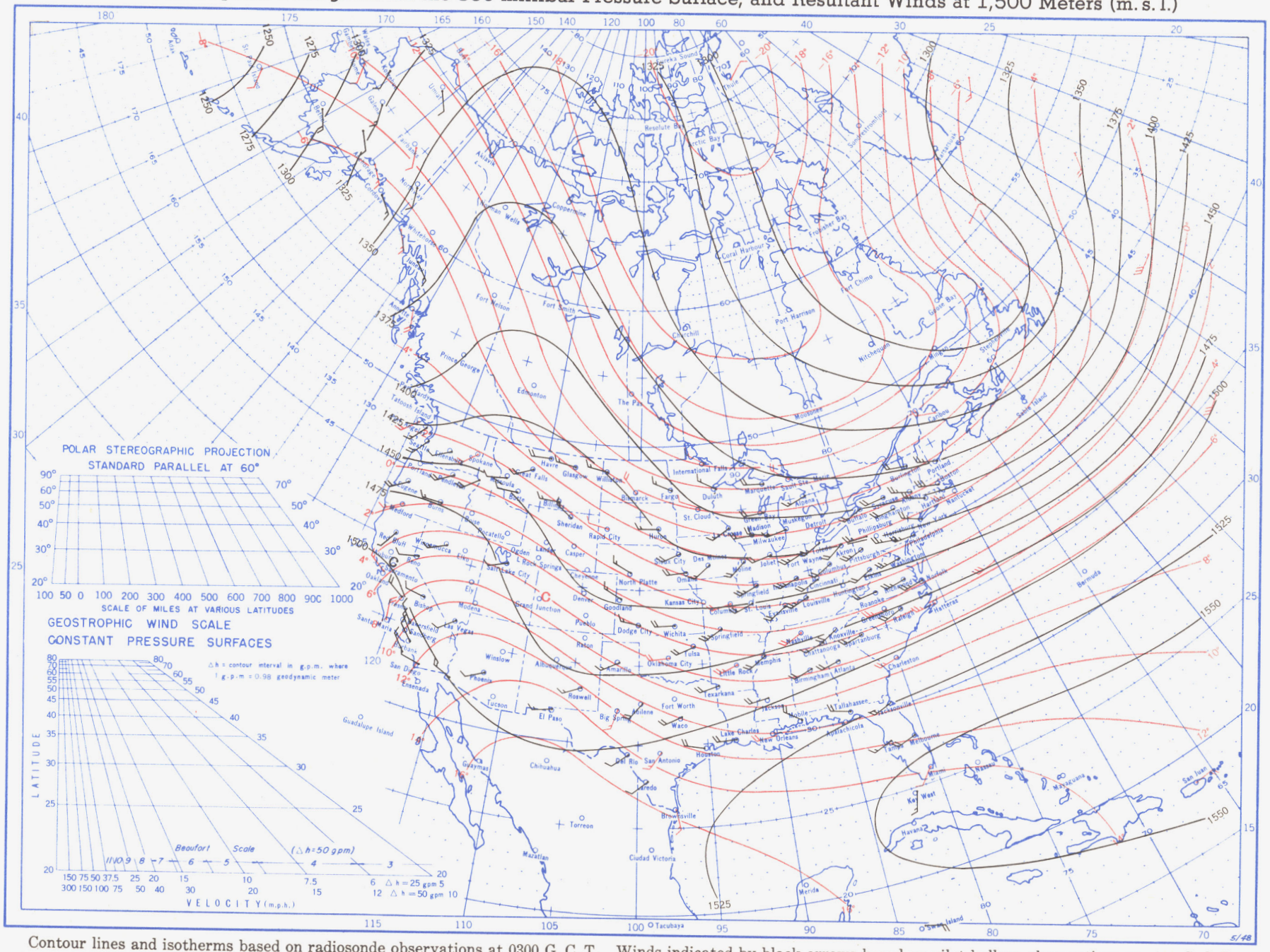
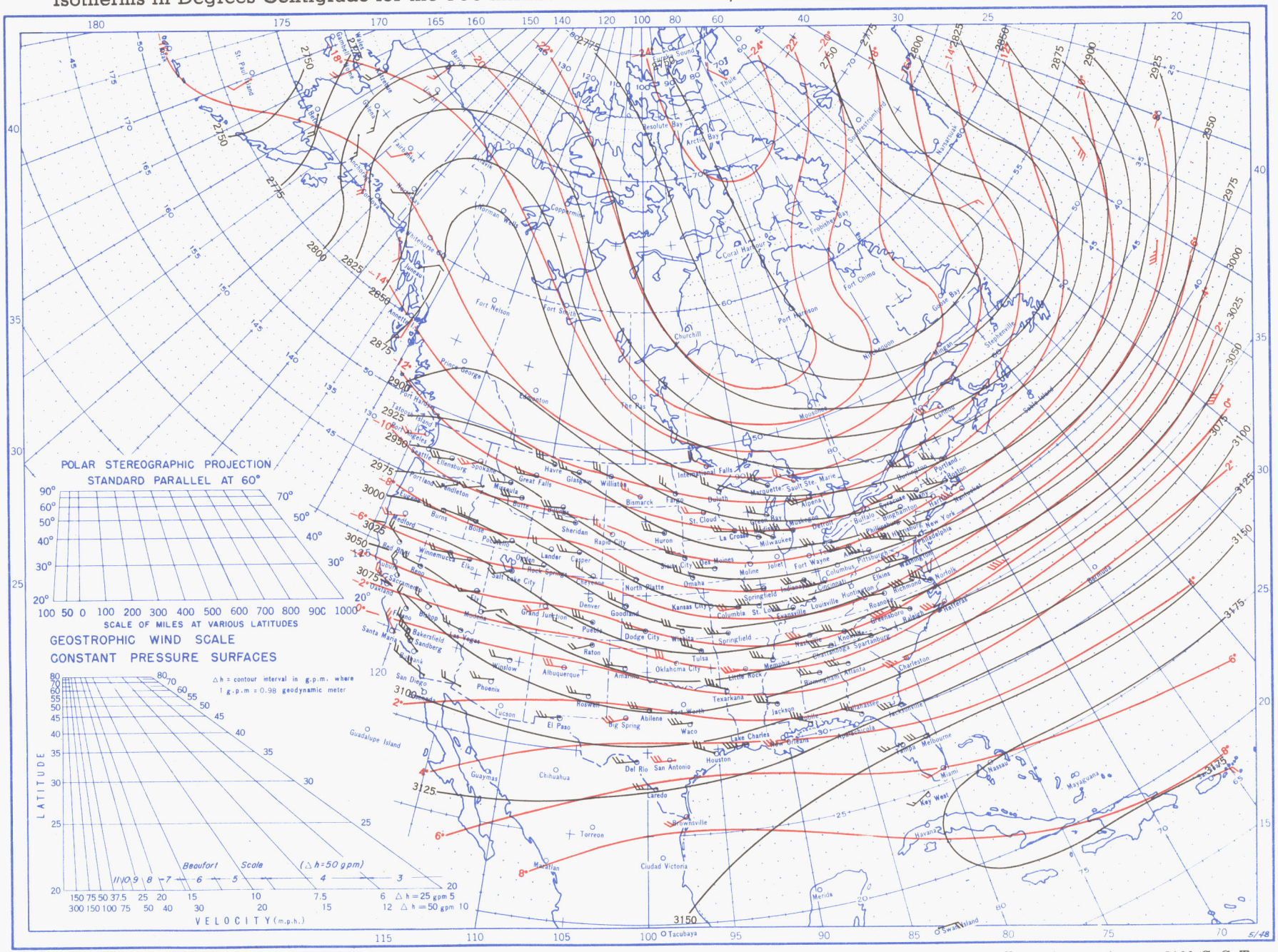


Chart VIII, March 1950. Contour Lines of Mean Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Mean Isotherms in Degrees Centigrade for the 850-millibar Pressure Surface, and Resultant Winds at 1,500 Meters (m. s. l.)



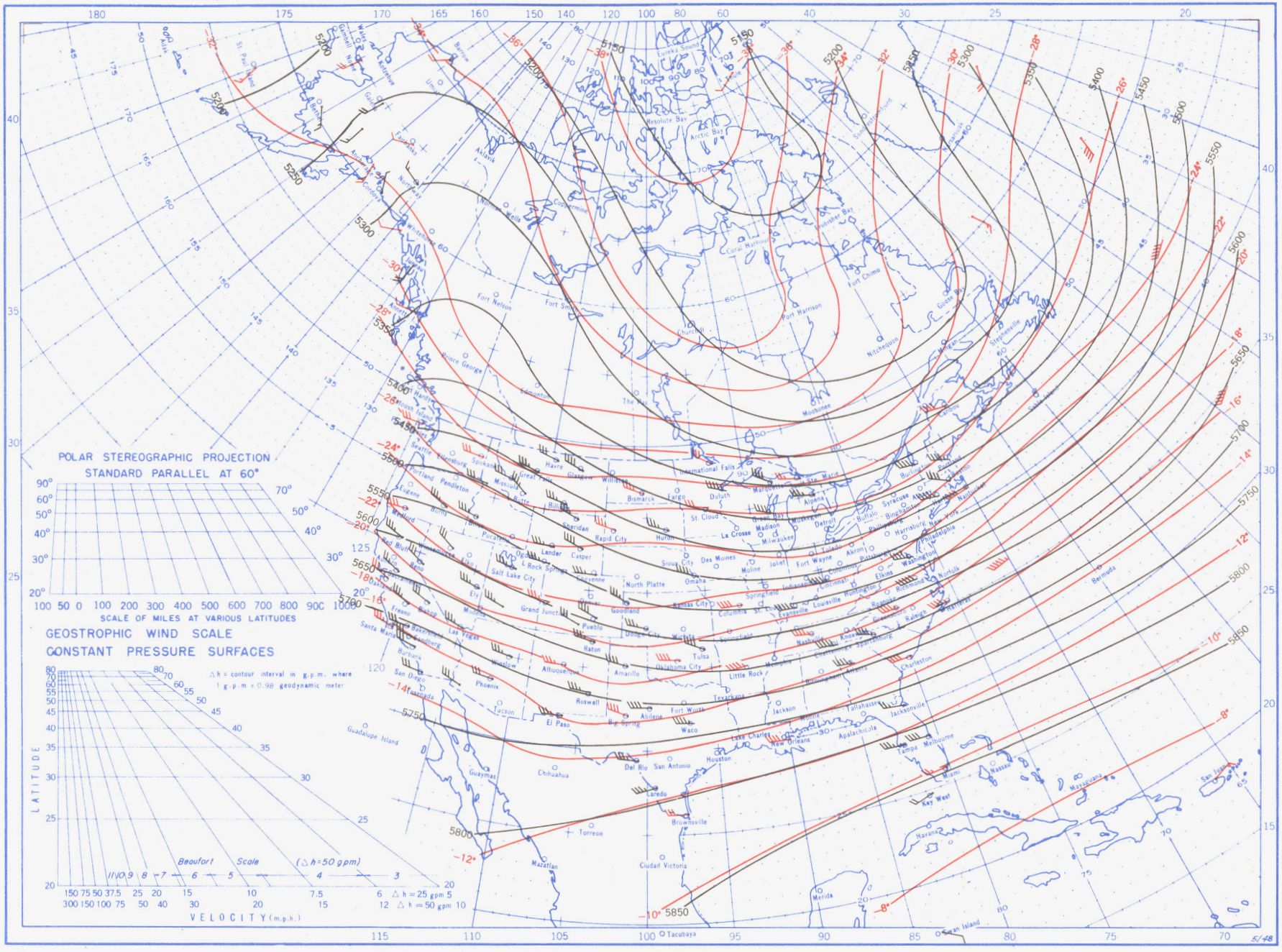
Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2100 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

Chart IX, March 1950. Contour Lines of Mean Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Mean Isotherms in Degrees Centigrade for the 700-millibar Pressure Surface, and Resultant Winds at 3,000 Meters (m. s. l.)



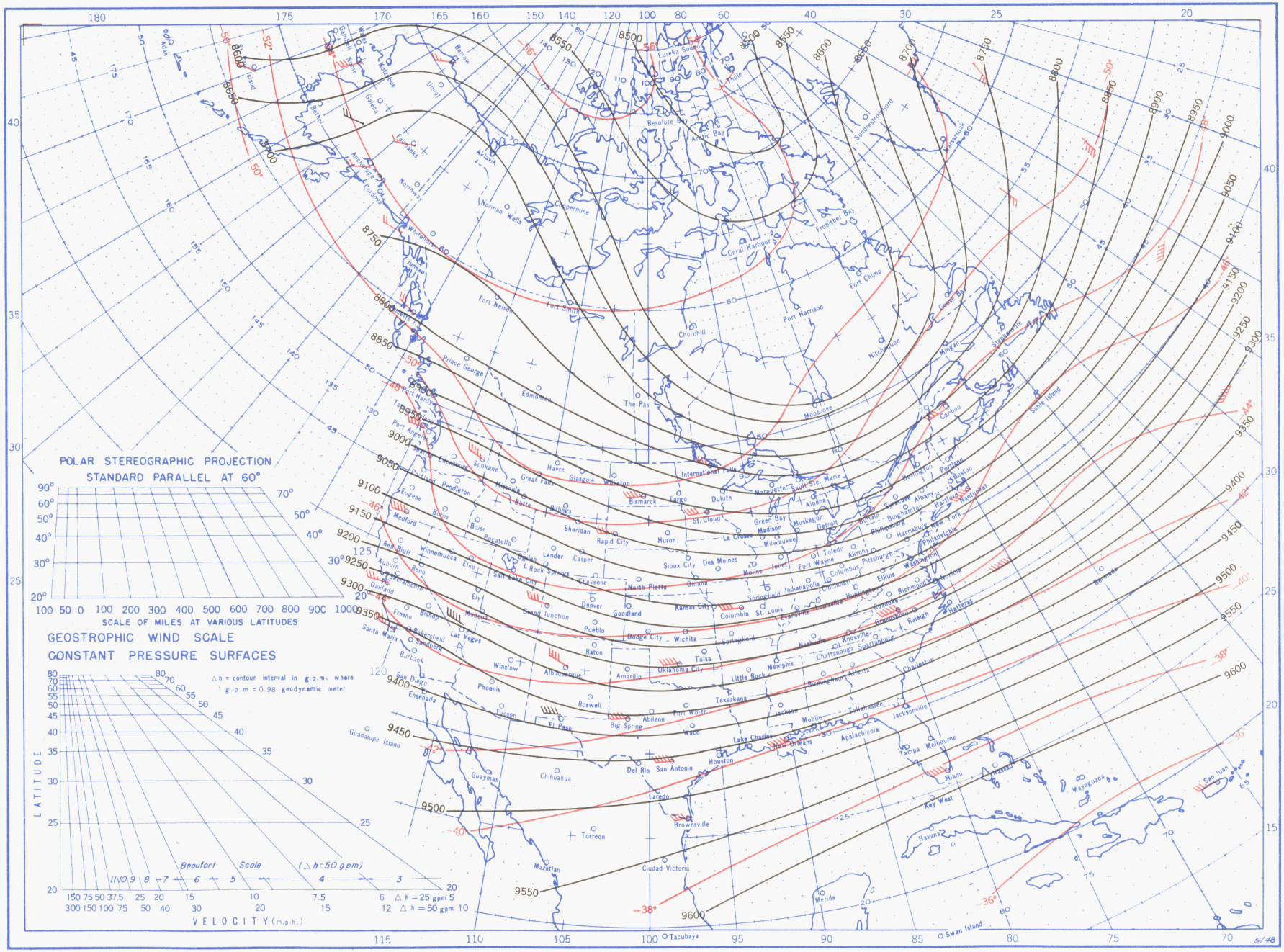
Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2100 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

Chart X, March 1950. Contour Lines of Mean Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Mean Isotherms in Degrees Centigrade for the 500-millibar Pressure Surface, and Resultant Winds at 5,000 Meters (m. s. l.)



Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2100 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

Chart XI, March 1950. Contour Lines of Mean Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Mean Isotherms in Degrees Centigrade for the 300-millibar Pressure Surface, and Resultant Winds at 10,000 Meters (m. s. l.)



Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2100 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.