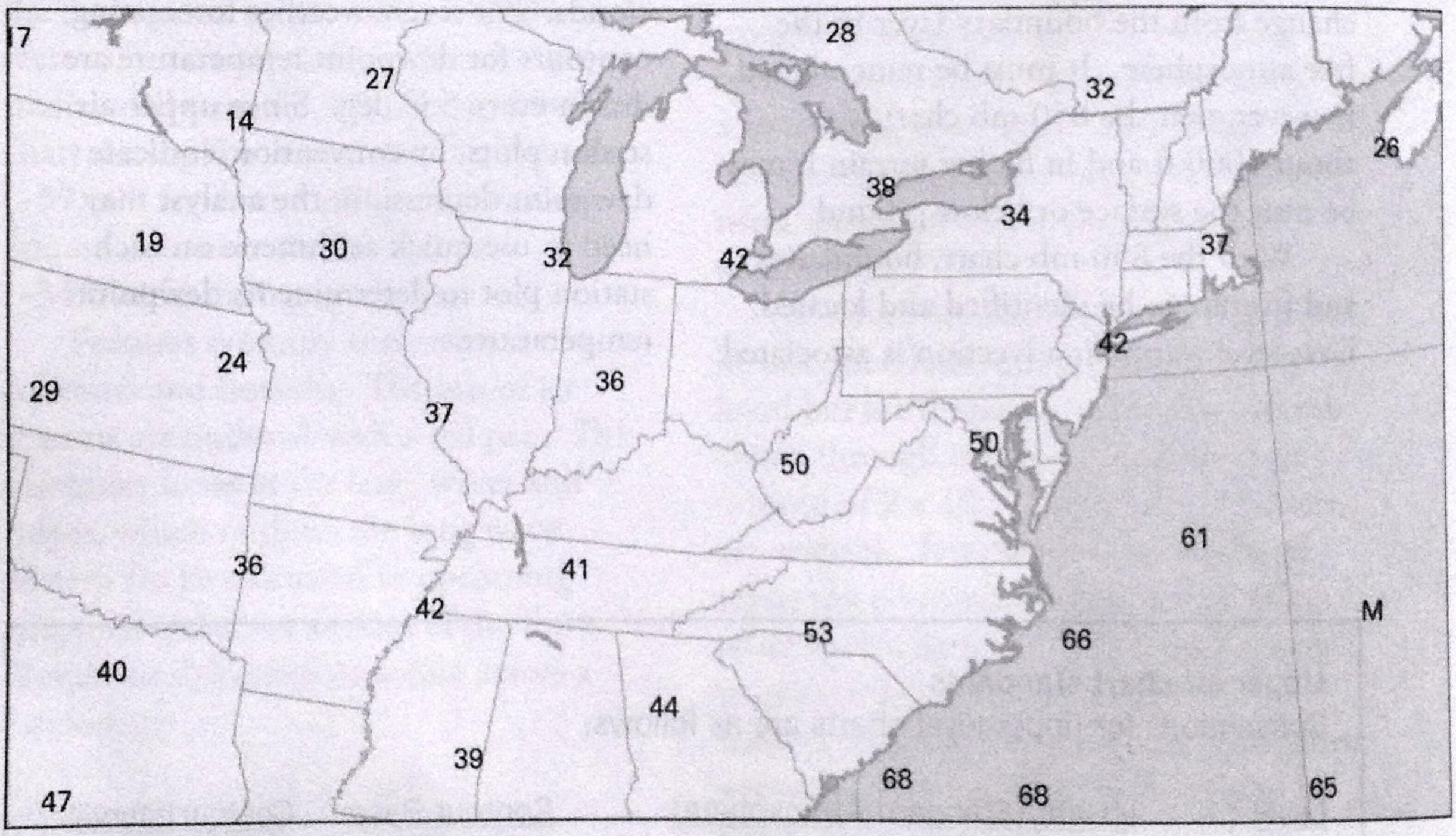
APPENDIX 6

An isoplething tutorial

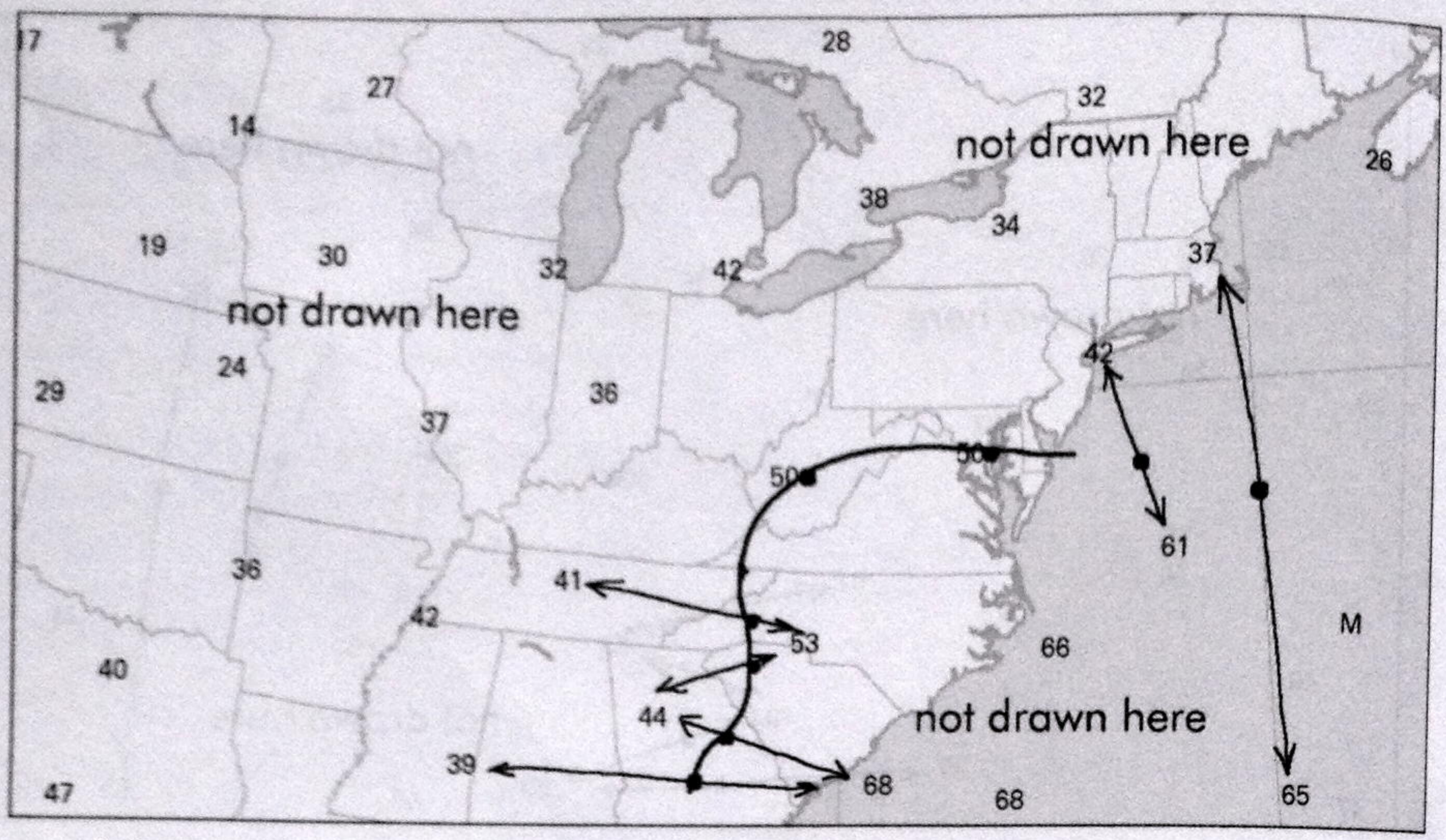
Those who are new to forecasting often have difficulties with hand analysis, especially the technique of isoplething.

Shown here is a sample field of temperatures across the eastern United States. We will analyze isotherms, which are lines of equal temperature, at an interval of every 5 degrees. Examining the temperature ranges across the chart we can see that we will be plotting lines at 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, and 65 degrees.



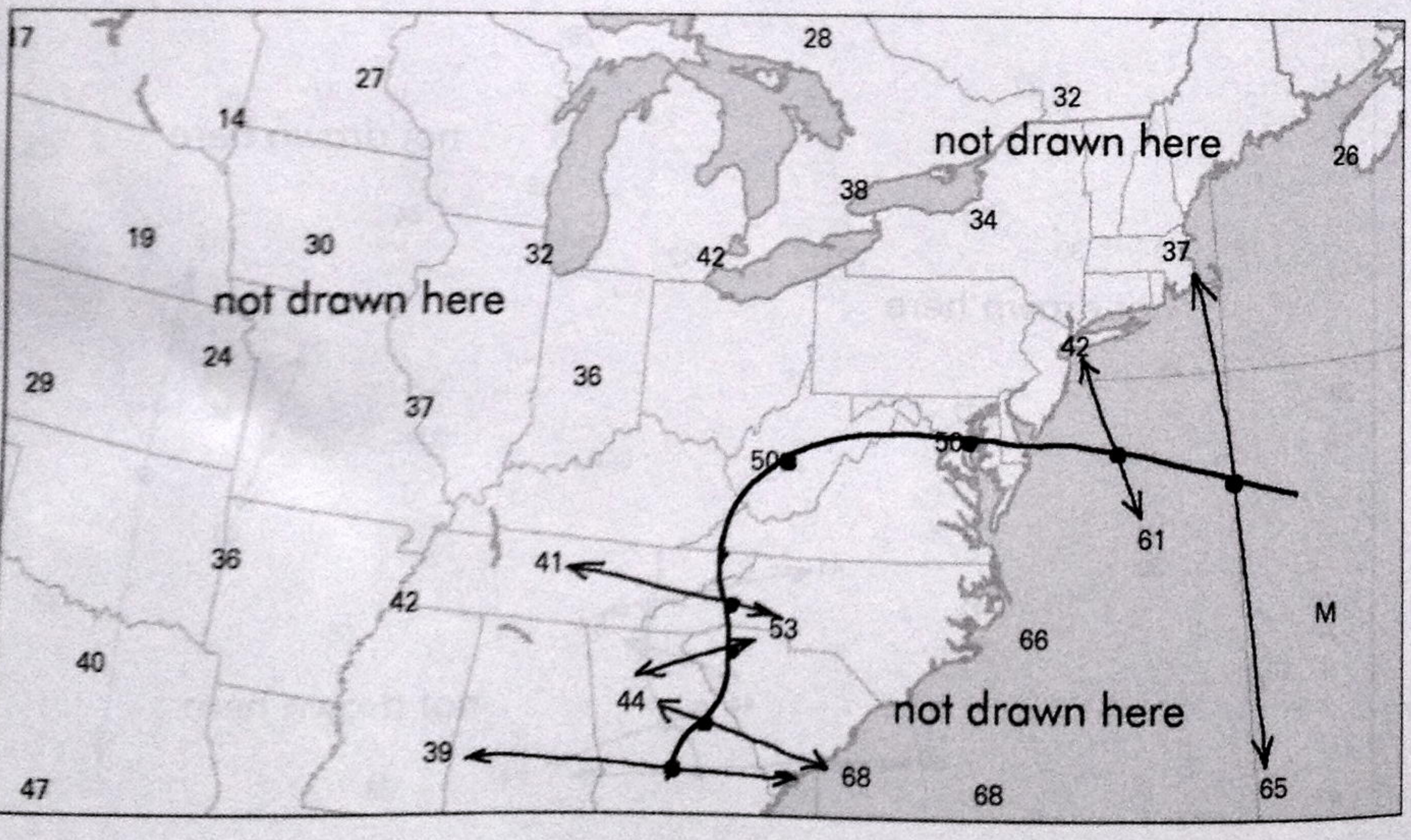
It is often easiest to plot an isopleth in the middle of this range. We will select the value of 50 degrees. At this point you may attempt to plot the 50-degree isopleth or turn the page for detailed instructions on how to plot this line.

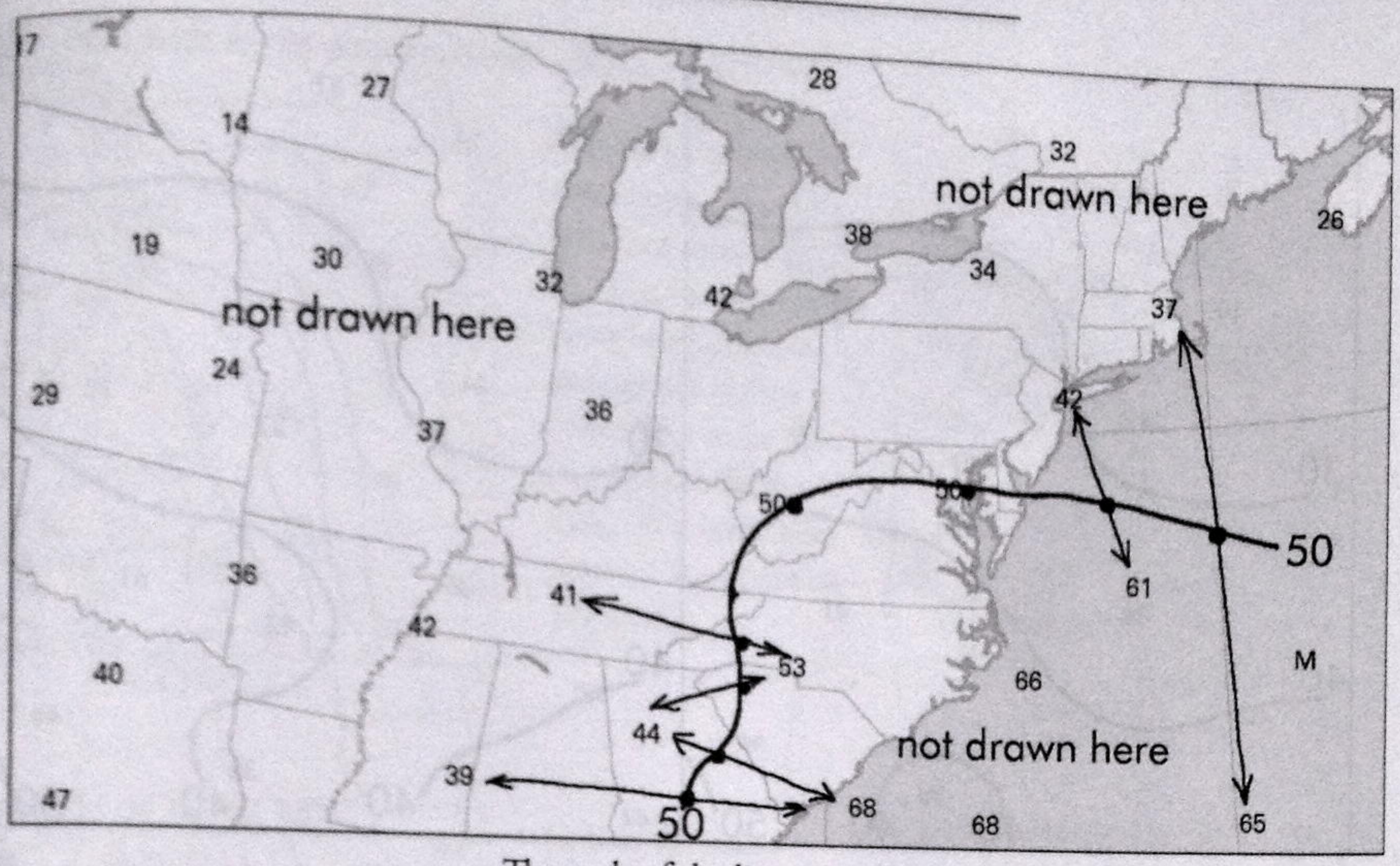
The first task is to mentally outline the areas where the line will be drawn. This is not done all at one; rather, start at the chart edge where the line should appear, and look ahead a couple of inches to find where it will lead. Once the *general path* it will take is determined, begin looking at the closest stations where the line will pass between (arrows seen here). By estimating where the line should fall between each station, this will help clarify its *immediate path.* Here we will start in Georgia at the bottom of the chart and work northward.



It's fortunate when two stations are reporting the exact value we are looking for, such as Charleston WV and Washington DC, as shown here. But instead of drawing a simple straight line, we take into consideration the *general path* and form somewhat of a curve as shown here.

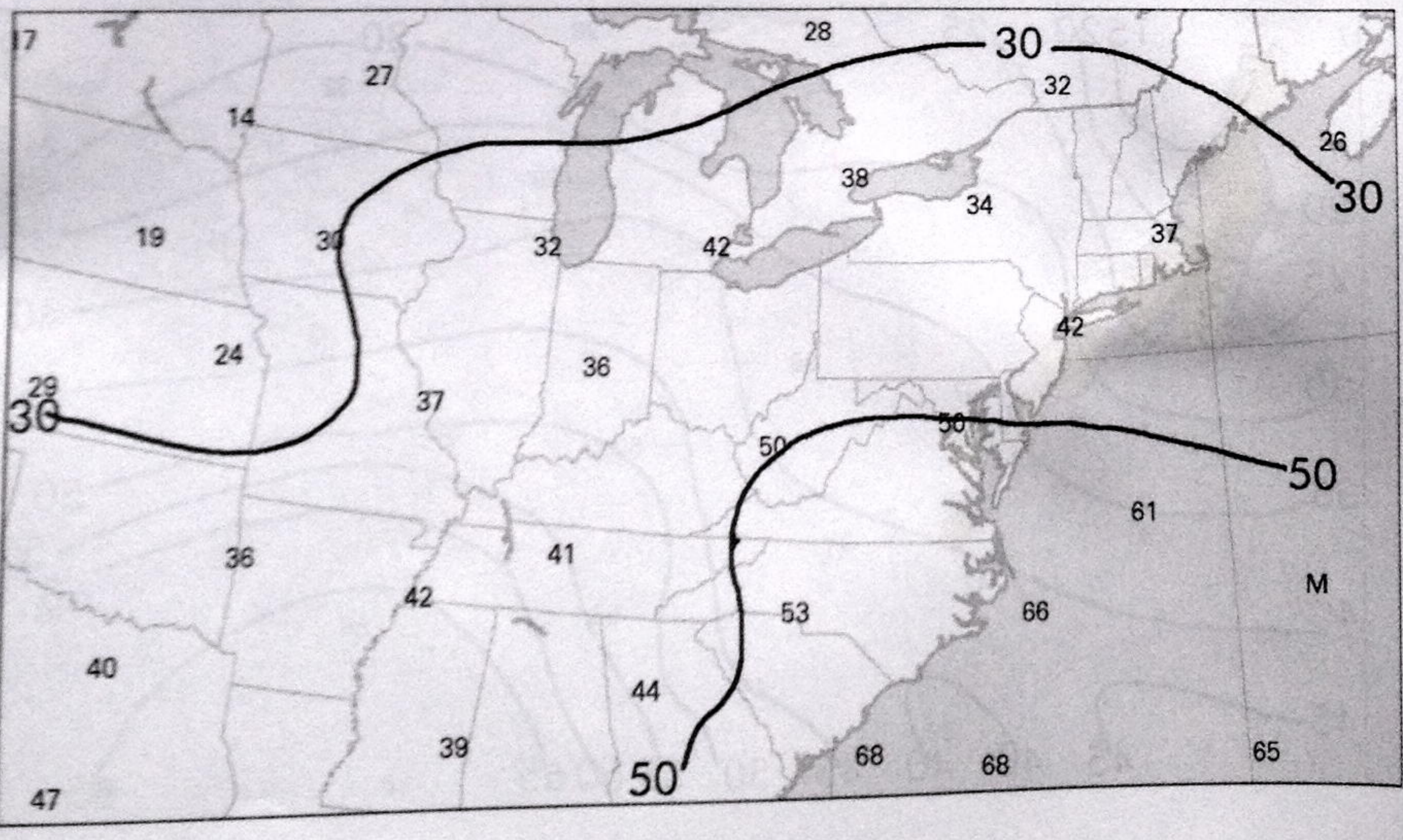
In the image below, note that the isopleth stops before reaching the right edge of the chart. The line should stop at this point because we don't have sufficient data to draw it any further, and the isopleth should reflect the actual data field.

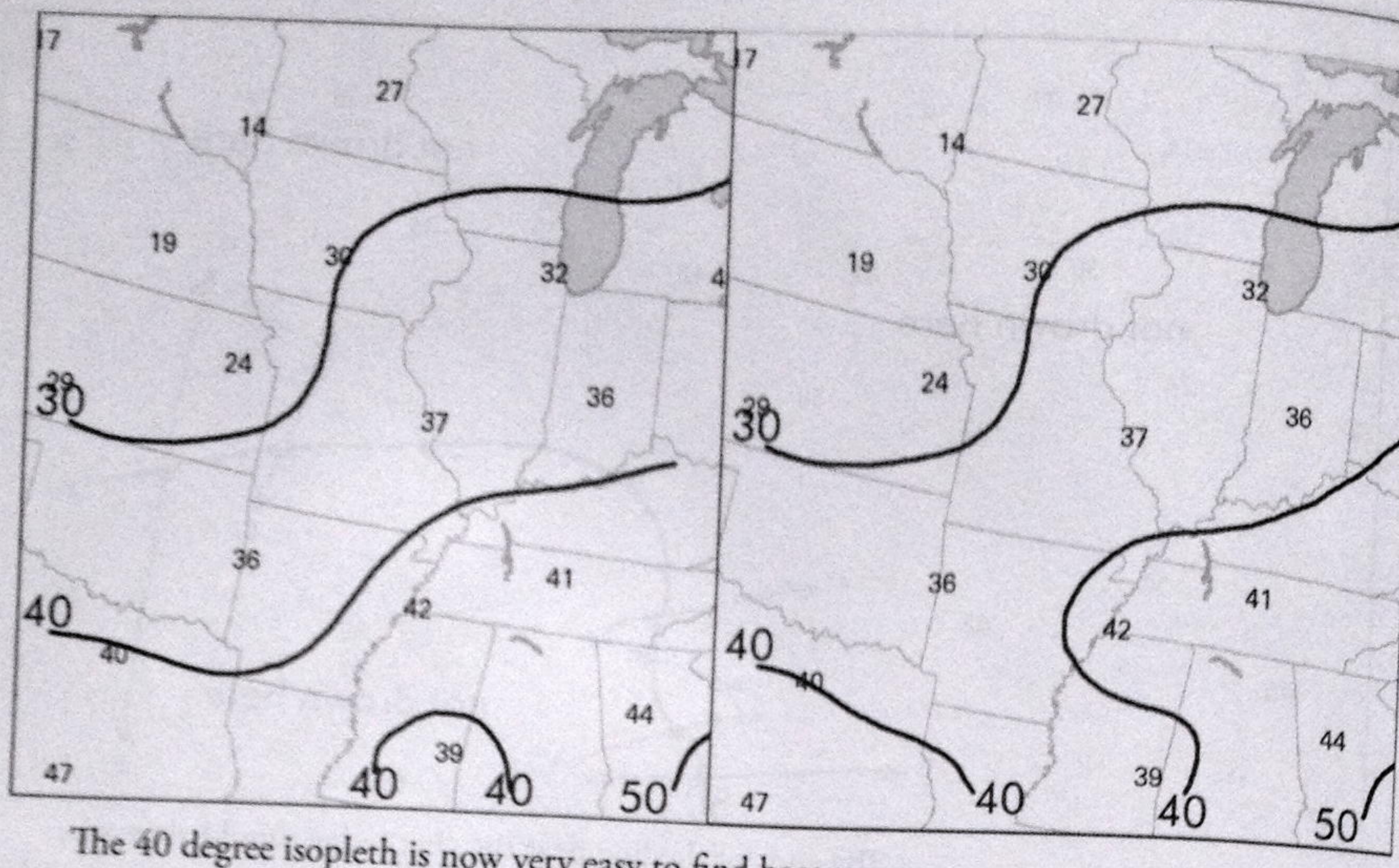




The ends of the line near the chart edge should always be labelled with the isopleth value. If the lines do not reach the edge, appearing as a "closed isopleth" as might be seen concentric isobars around a surface low, the label is placed at the top of the closed isopleth

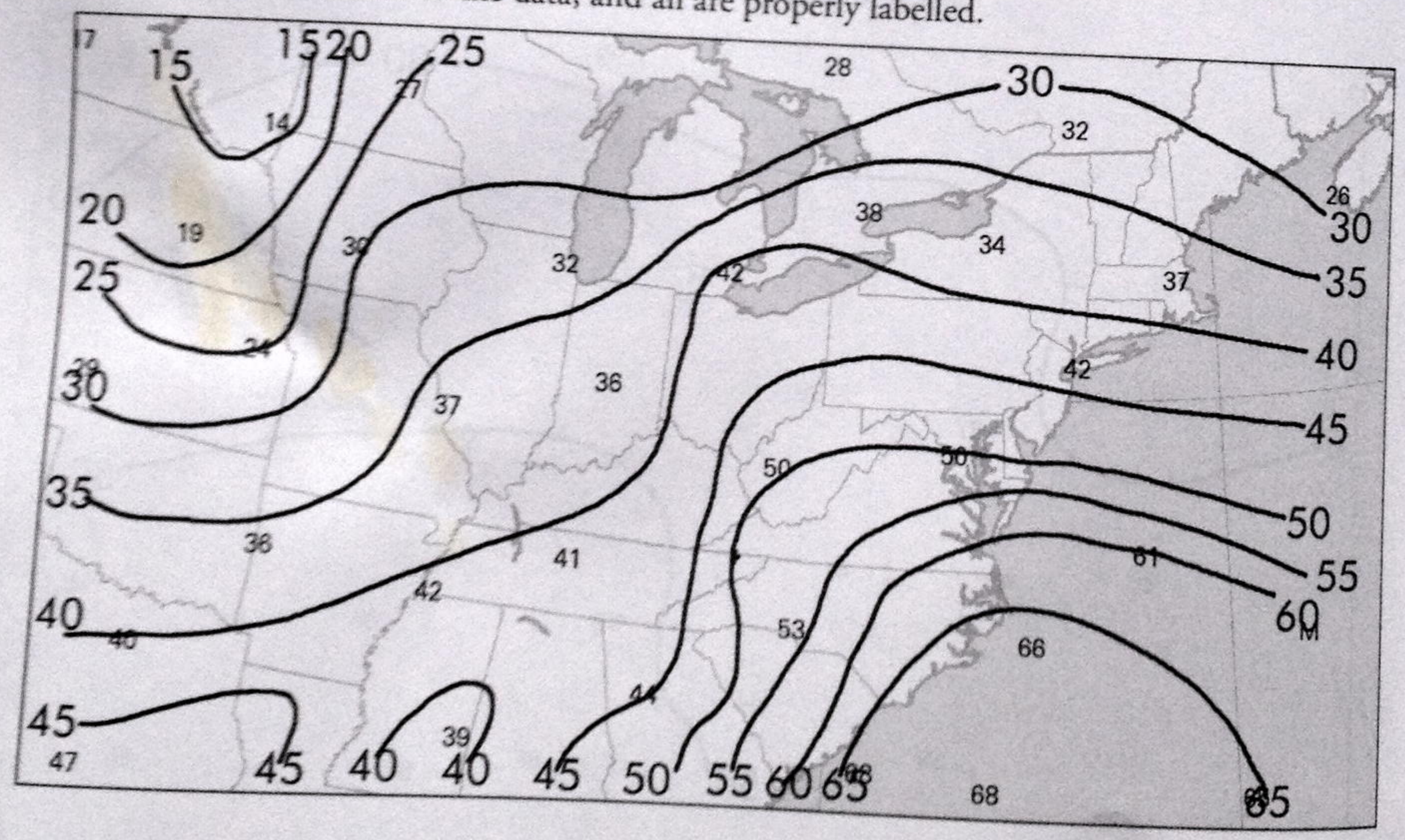
An easy way to draw more isopleths is to not go to the next incremental value (e.g. 45 or 55) but skip to the second or fourth isopleth away. This would be a value of 40, 30, or 60. This makes it easy to see the general paths at play and helps plot the ispleths in between. Now we will plot the 30 degree isopleth.



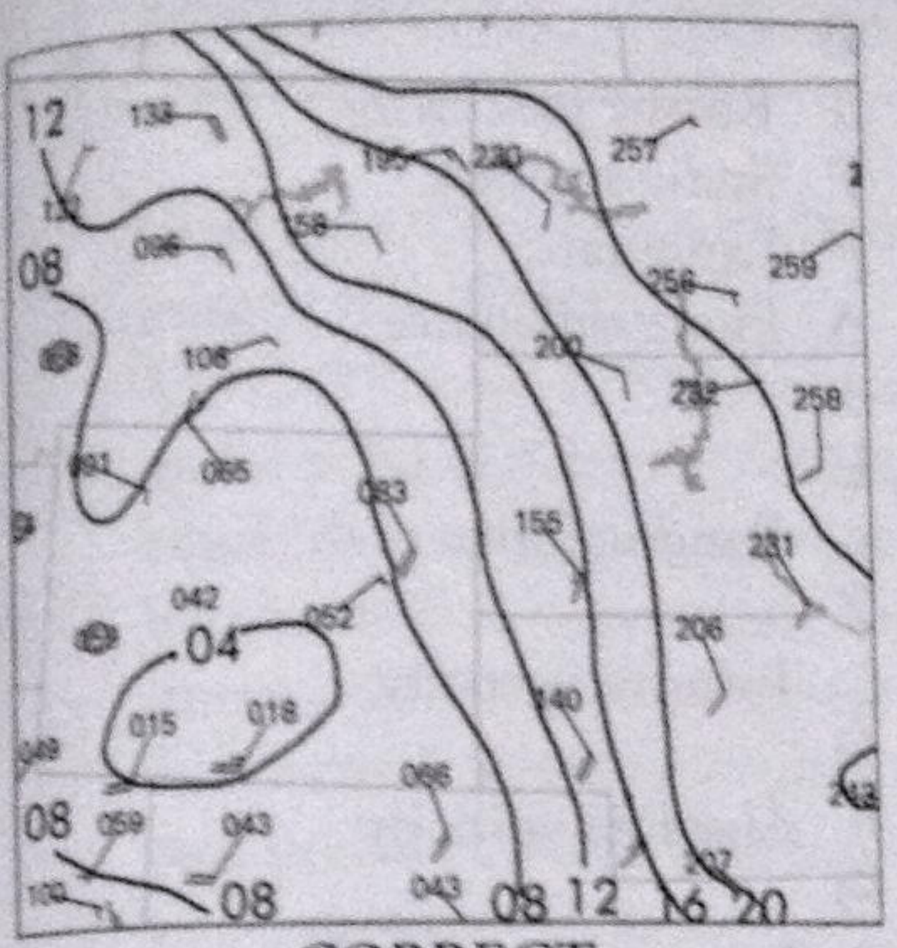


The 40 degree isopleth is now very easy to find because most parts should lie about halfway between the 30 and 50 degree lines. Note that there are at least two possible solutions for this line in Mississippi, where an outlying 39-degree temperature exists. The temperatures seem to be below 40 on a northwest-southeast axis but above 40 on a northeast-southwest axis. Both solutions are valid.

When all lines are drawn, the resulting isotherm field looks like the chart below. Double-check that no isopleths have been missed, that it conforms to the data, and all are properly labelled.

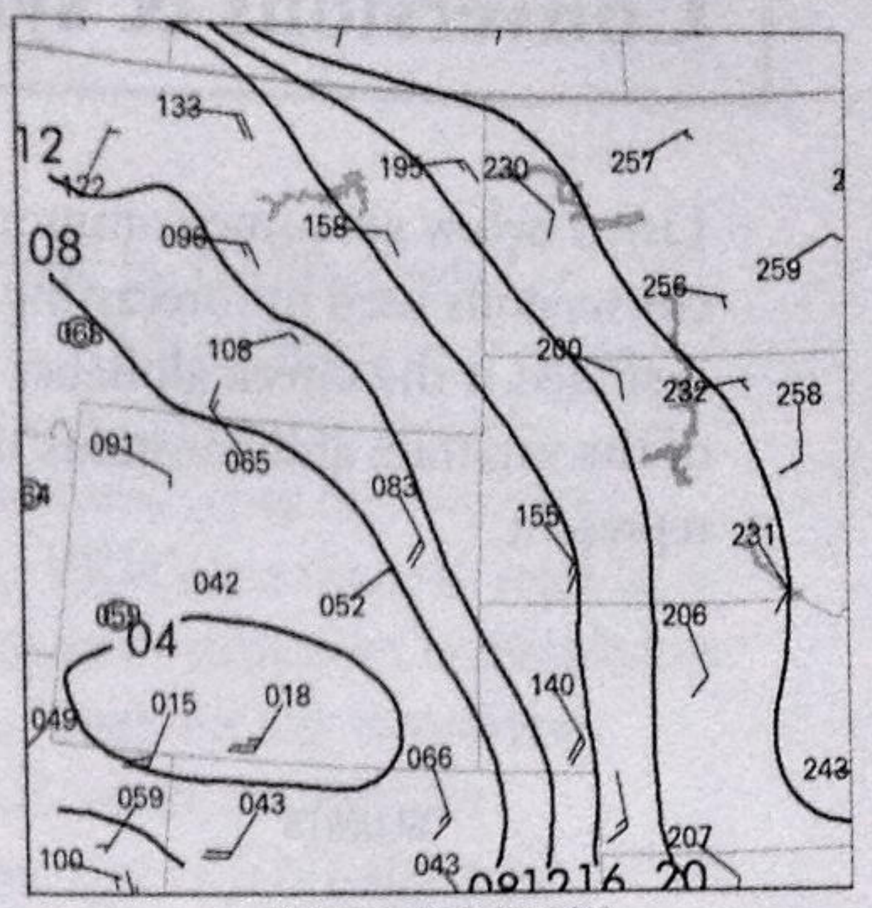


Additional advice for an accurate hand analysis . . .

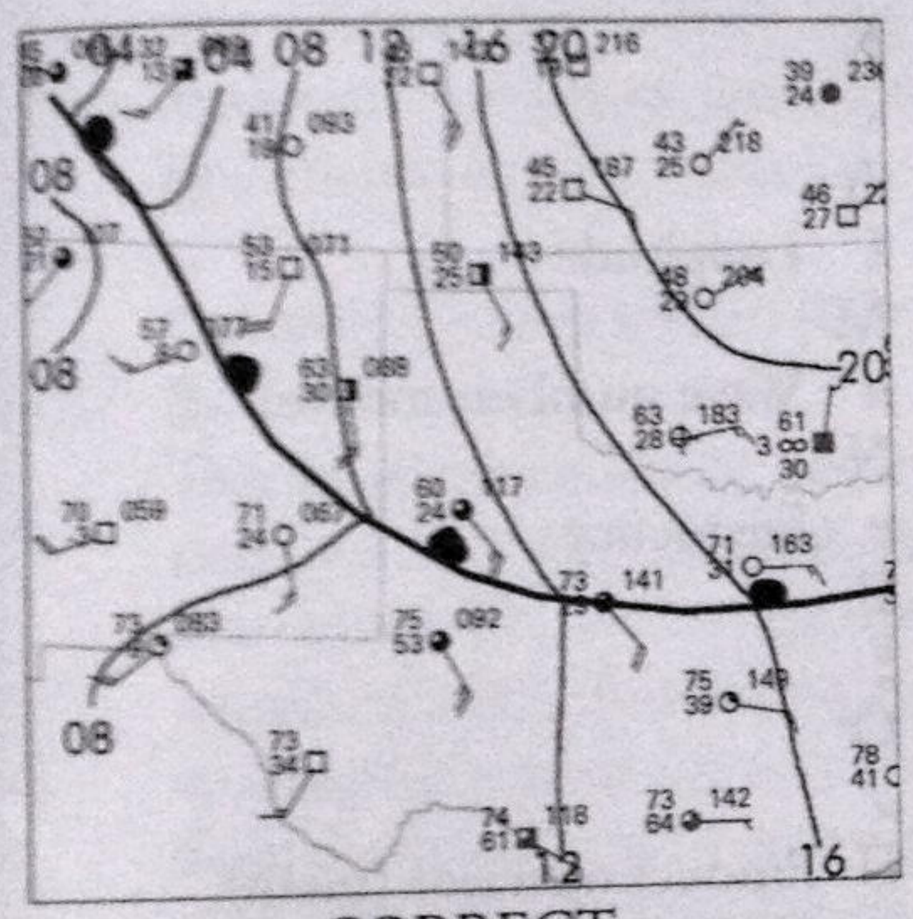


CORRECT

Do not smooth over a data point that does not seem to fit. If it is obviously erroneous, circle it and ignore it, but otherwise, force the isopleths to fit the data. The error here appears in northwest Wyoming.

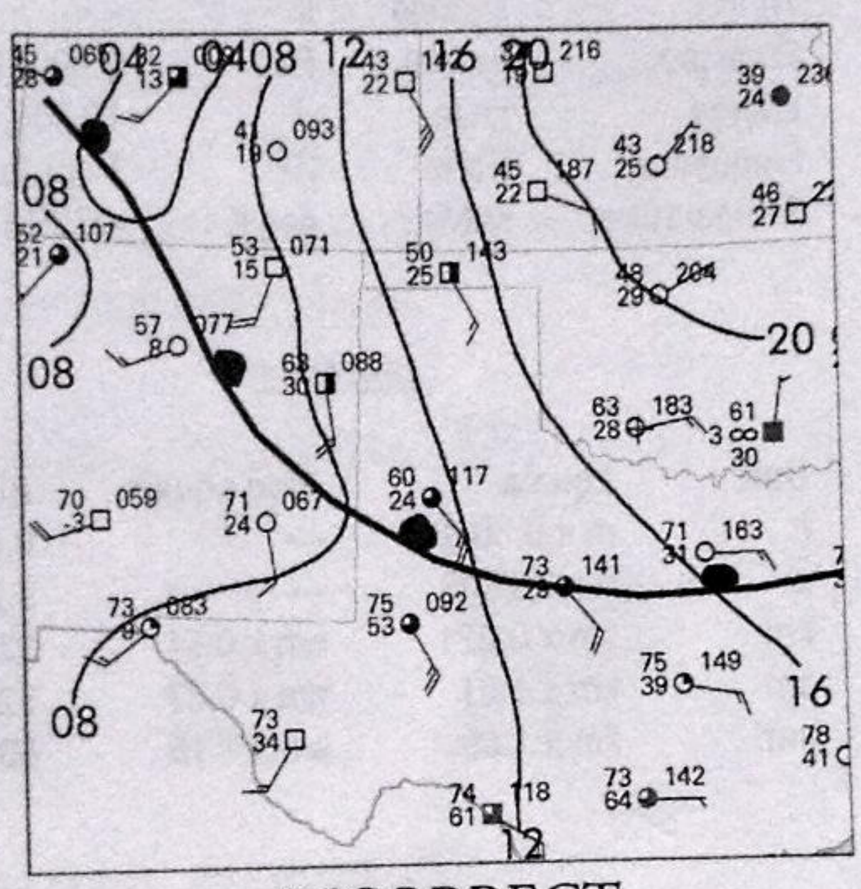


INCORRECT

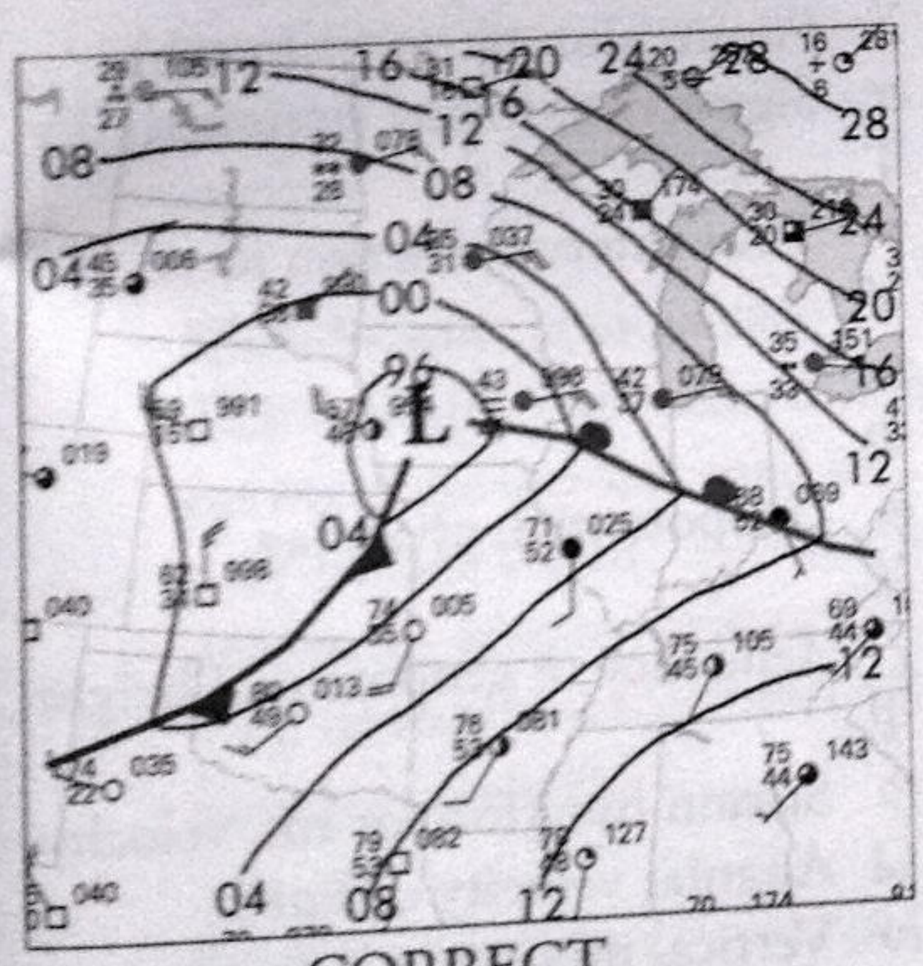


CORRECT

Isobars (pressure lines) will kink at frontal boundaries. This is a consequence of the change in density across the boundary. The kink should be added when the drawn isobars and frontal placements are finalized.

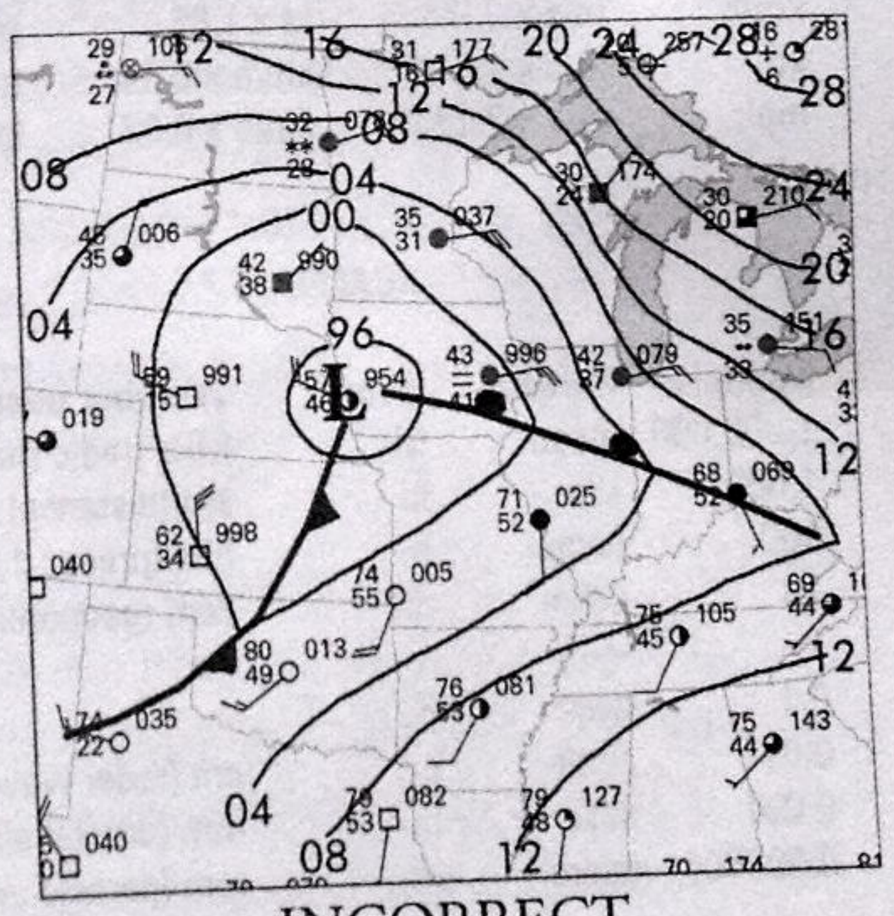


INCORRECT



CORRECT

Instead of placing pressure centers directly on the most extreme pressure found on the chart, follow the winds at that station using Buys Ballot's Law to adjust the pressure center to the correct location.



INCORRECT