How To Construct a Small-area Plotting Sheet, Step by Step

STEP 1: Draw meridians and mid-lat

(Figure 13-8) On an 8½-x-11 sheet of paper, draw seven vertical lines 8½ inches long and exactly 1 inch apart. Start 1½ inches from the top, and run the middle line down the center of the sheet.

These lines are *meridians of longitude*. The seven lines define six equal spaces, with each 1-inch space representing 10′ of longitude. That's 1° in all.

Designate the central meridian 68°10′W, and label all the meridians accordingly.

Measure down 4 inches from the top of the left-hand meridian (A) and draw a horizontal line crossing all meridians at a 90° angle. This line is a *parallel of latitude*: 37°30′N. Label it 30′ and call it the middle latitude line, or mid-lat. (Later, you will designate the bottom parallel as 37°N, the top parallel as 38°N.)

STEP 2: Plot a latitude diagonal

(Figure 13-9) At point A, place the center of a 360° protractor, with its North line on the left-hand meridian. Measure up from the mid-lat line an angle of 37.5°. Mark. Label this point B. This angle is equal to the label of the mid-lat line of 37°30′N.

From point A through point B, draw a line to the central meridian (point C). This diagonal line, which forms an angle of 37.5° with a parallel of latitude, is the *latitude diagonal*. Designate the angle with a short arc and label it 37.5°.

STEP 3: Lay off the parallels

(Figure 13-10) By definition, a latitude diagonal that crosses meridians 30′ apart in longitude, at an angle equal to the mid-latitude of 37°30′ (A to C), is equal in length to 30′ of latitude, or 30 nautical miles. Therefore, a latitude diagonal that crosses two meridians 10′ apart in longitude is equal to 10′ of latitude, or 10 nautical miles.

Use dividers to measure the latitude diagonal that crosses two meridians of longitude (A to D), and lay off this distance on the left-hand meridian, three divisions up and three divisions down from point A. Check the total distance of 30′ of latitude, both up and down from point A, and ascertain that this length is equal to the distance from A to C.

If this checks out, complete the chart by drawing the other parallels of latitude from the points designated by the dividers on the left-hand meridian. Label these parallels.

STEP 4: Show 1′ increments of L, Lo

(Figure 13-11) One graticule must show increments of 1′ of longitude and 1′ of latitude so that you can locate the coordinates of a position on this chart.

In the rectangle marked X, divide the 10′ of longitude into 10 equal parts. You can break the inch into tenths with an engineer's scale or use the method shown in the illustration on page 13-7. Draw in these meridians 1′ apart in longitude.

By definition, the length of a latitude diagonal that crosses two meridians 1′ apart in longitude, at an angle equal to the mid-latitude, is equal to 1′ of latitude, or 1 nautical mile. This length is immediately apparent where each 1′ meridian of longitude intersects the latitude diagonal. Carefully lay off these 1′ increments of latitude on the left-hand meridian of your plotting sheet.

Inspect for Accuracy. Check your finished work to make sure that it is accurate. Use your dividers to see how many minutes of *longitude* are contained in the distance between L 37°30′ and L 37°40′. You should find 12.6′ of longitude, which is equal to a meridional difference (m) of 12.6.

Enter the meridional parts tables and check for the m between these two parallels of latitude. If you find 12.6, your SAPS is ready to use. It should look like the completed sheet in Figure 13-7. Erase the markings and lettering used in construction.