PROJECT

DATING A SCYTHIAN TOMB

North of the Himalayas and Caucasus Mountains lie the vast rolling steppes of Central Asia, an area of grassland extending thousands of miles from China to the Ukraine. This area has been homeland to nomads for several millennia. The Scythians (*SITH-ee-ins*) were a great pastoral group occupying this region in the first millennium BC. The Greek historian Herodotus wrote that the Scythians ruled from the Don River in southern Russia to the Carpathian Mountains in central Europe in the fifth century BC (Fig. 8.24).

The **kurgans**—burial mounds—of the Scythians dot the steppe landscape. The deceased was usually placed in an extended position in a log tomb with the head to the east. The tomb was then buried under an earthen mound. For Scythian aristocrats, these tombs were made large and filled with astounding wealth. The body was usually embalmed and placed in a special coffin made from the trunk of a tree. The noble was buried with sacrificed retainers and attendants, horses and chariots, riding and military equipment, along with silk cloth, metal mirrors, and gold jewelry. These tombs and their contents are the primary evidence for the Scythians. The chronology of the tombs is also critical to understanding Scythian society and its relationships with other groups in Asia and Europe.

A new tomb has recently been discovered in the steppes. Although the tomb was heavily looted many years ago, a number of the timbers have survived, along with several important artifacts. Samples of the wood from six timbers have been sent for both radiocarbon and dendrochronological measurements, and the data are starting to come in.

There are three parts to this project: (1) work with the radiocarbon measurements; (2) work with the dendrochronology information; (3) compare the results of the two dating methods.

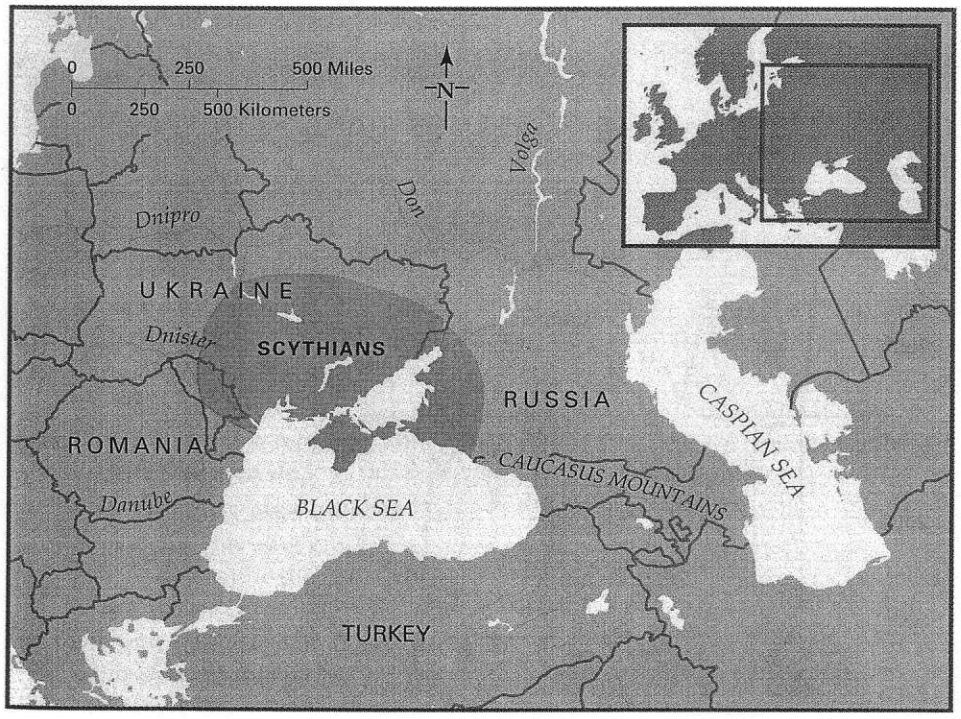

Fig. 8.24 Location of the Scythians in eastern Europe. The main concentration of Scythian materials, dating to the first millennium BC, comes from an area north of the Black Sea, largely in the modern country of the Ukraine.

TABLE 8.3 Radiocarbon dates bp for wood samples from the Scythian tomb.

Sample No.	Material	^{14}C Years bp	Standard Deviation	Calibrated Date BC
1	Wood	2500	±18	617
2	Wood	2418	±20	473
3	Wood	2505	±21	617
4	Wood	2453	±22	503
5	Wood	2533	±22	598
6	Wood	2468	±21	586

1. The radiocarbon data arrive first. You receive a list of the radiocarbon years before present (bp) for each of the six samples (Table 8.3). These dates have been calibrated—corrected to actual calendar years BC—so that you can compare them with the dendrochronological dates. What do the calibrated radiocarbon dates tell you about the age of the tomb? What do the dates tell you about radiocarbon dating? What is the most likely date for the tomb based on these radiocarbon dates?
2. There is a problem with this time period in terms of radiocarbon dating. As you can see from the curve of radiocarbon ages in Fig. 8.25, the time period between about 770 and 400 BC is flat and wiggly. These years are hard to separate with radiocarbon measurements because a radiocarbon date of 2460 ± 40 bp could come from several different calendar years in the flat part of the curve (Fig 8.25). Because of these problems, the dendrochronology dates will be very useful in determining the age of the kurgan.
3. The dendrochronology data consist of measurements of ring widths for four timbers. Only one of the timbers had remaining bark and sapwood while the outer rings of the other four were missing. Use the ring-width data in

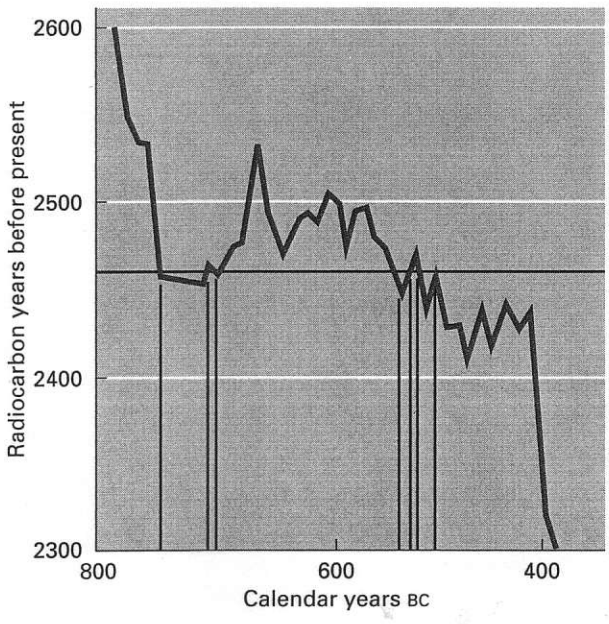

Fig. 8.25 Curve of radiocarbon dates for the period 800 to 350 BC. The horizontal line shows the radiocarbon date of 2460 years before present. The seven vertical red lines show where the horizontal red line intersects the blue calibration curve. There are seven possible calendrical dates for the one radiocarbon date, between 2500 and 2750 years before present, shown where the vertical red lines intersect the x-axis.

TABLE 8.4 Tree-ring data from the Scythian tomb.

Ring#	Timber 1	Timber 2	Timber 3	Timber 4
0	3	2	3	5 (Sap)
1	4	5	5	B
2	B	3	4	B
3	4	5	1	B
4	B	4	B	2
5	3	1	B	5
6	B	B	3	3
7	B	B	4	5
8	2	3	B	4
9	B	4	4	1
10	3	B	B	B
11	4	4	3	B
12	B		B	3
13	3		B	4
14	B		2	
15	4		B	
16	2		3	
17	5		4	
18	2		B	
19	5		3	
20	B			
21	B			
22	3			
23	B			
24	4			
25	5			
26	4			
27	B			
28	3			
29	2			
30	B			
31	3			
32	B			
33	5			
34	5			

Table 8.4 to determine the age of the tomb. To do this, you will need to compare the widths of the rings from the four timbers to the master tree-ring chronology for this area (Fig. 8.27).

Plots of the tree-ring data for the four timbers are shown in Fig. 8.26. Each vertical line represents one tree ring; the length of the line shows the width of the tree ring. Each block on the graph paper represents 1 mm. Note that there are a number of rings missing and that is why there are gaps in the tree-ring graph.

To determine the age of the timbers, you compare the plots of the timbers to the master chronology. The master chronology is shown in Fig. 8.27 and covers a 150-year period between 575 and 425 BC. Hopefully your timbers will belong to this period of time.

You need to fit the plot for each timber to the master chronology. You might want to copy this page and cut out the individual timber plots. Then

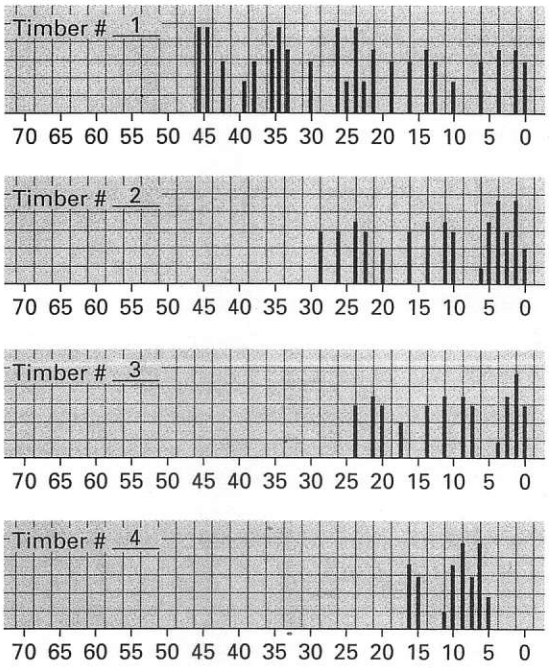

Fig. 8.26 Tree-ring graph paper.

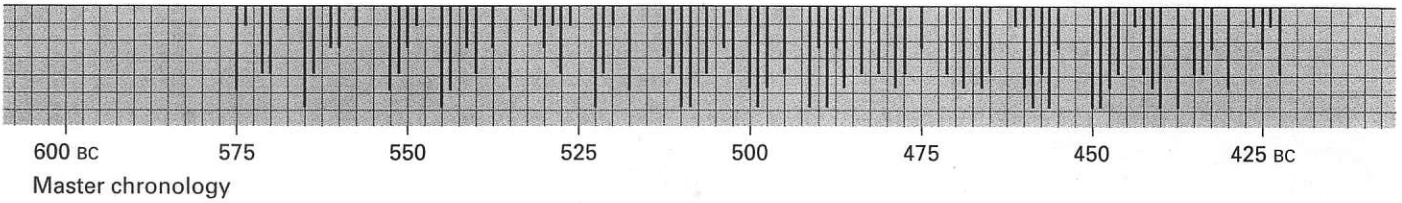

Fig. 8.27 Master tree-ring chronology.

you can slide each plot back and forth until the series of lines best match up. A close match should appear that fits the sequence of each timber to the known years of the master chronology. The plots for the different timbers will overlap on the master chronology.

Once all the timbers have been matched to the master chronology, look at the youngest sample you have with sapwood and see what calendar year on the master chronology this youngest ring corresponds to. That should be the year of felling for the youngest timber and should provide the best tree-ring date for the tomb. Fill in this date here: _____.

4. Now let's see if your radiocarbon results and your dendrochronology dates are comparable. Please answer the following questions.

   a. What are the two estimates for the age of the tomb?

   The best radiocarbon estimate is _____.

   The best dendrochronology estimate is _____.

   b. Are the estimates the same? Identical? If not, what does the difference mean?

   c. Which estimate is correct?

   d. What does this exercise tell you about dating in archaeology?