CHAPTER 3

MAPPING THE COURSE

The design of an archery course is a complex task requiring the consideration of many factors. The most important of these is safety. Particularly for courses restricted in terms of space, great care must be exercised to ensure that sufficient room exists for arrow flight around each target lane. Since most courses are in terrain which does not allow viewing from a single point, often with wandering trails, the ability to see the course layout at a glance is a valuable resource. Few people can visualize such a complex system in their mind, so being able to map the course with some degree of accuracy becomes necessary.

COMPASS SURVEY

Compass Survey. An archery course may be mapped with a compass using simple procedures. The care with which this is done and the degree of accuracy used in taking measurements of direction and distance will determine the accuracy of the map. Rough compass bearings and paced distances will result in a coarse map sufficient for range briefings. Carefully plotted bearings and distances measured with a steel tape or rangefinder can produce an accurate map. This can help a designer by identifying possible safety problem areas.

The Process. Any survey is based on the general principle that an unknown point can be identified by its distance and direction from a known point. Professional surveyors employ high-tech equipment and complex procedures to establish locations and areas to a high degree of accuracy. The requirements to map an archery course are less stringent. In general, to map a course we will conduct a simple survey of the course features (the trail, shooting stations, targets, etc.). A running sequence of distances and compass bearings between points on the course will give enough information to prepare a basic map.

GETTING READY

Equipment to Survey. The equipment you will need to conduct a compass survey is very basic. You will need;

- A compass, preferably one with the smallest bearing divisions you can find. If the bearing ring is marked every 10 degrees, you can estimate to the nearest two or five degrees for greater accuracy.
- A means of measuring distance. You can pace the distances if you are consistent and know how many paces you take to 100 yards. A steel tape or a rangefinder would be better and more accurate.
- Pencil and paper.

Equipment to Produce the Map. Once you have conducted the survey, you will need certain items for the actual production of the map. These are;

- Graph paper, large sheets are better, I would recommend 1/4 inch squares.
- A good protractor.
- A sharp pencil.

THE SURVEY

Starting Data. Before we begin, we should decide on certain methods for note-taking. This

will simplify the task and greatly ease later reading and translating them to a course map. In my later notes I will use the notations which follow. Use these or set up your own, be sure you write them down so that you don't forget them.

- The numbers "1" to "20" will identify the Shooting Stations.
- The capital letters "A" to "T" will represent the target locations ("A" for target 1, etc.)
- Small letters following a number such as "1a" or "3c" will stand for intermediate points along the trail between shooting stations, the number will indicate the previous shooting station.
- The small letters "r," "l" and "p" used after the target capital ("Ar", "Al", "Ap") will indicate the estimated danger area to the right, left and past the indicated target when distances other than the standard template distances are used. Left and right will be as viewed from the shooting station. For plotting a target lane over level ground using the template, these distances will be; r = 30 yards, l = 30 yards and p = 100 yards **less the target range**.

The Data Table. I would recommend recording your course data in a table to help keep track of it. The headings can be;

"FROM" - the point from which a bearing is taken.

"TO" - the point to which a bearing is shot.

"DIST" - the distance between the two points.

"DIR" - the direction from the first point to the second.

"REMARKS" - miscellaneous comments to help with drawing the map, danger area sizes to the right, left, and past the target can be inserted here.

Getting the Data. Start at the entrance to the course trail, measure and record the distance and direction to the first shooting station ("1"). From the shooting station, measure the distance and direction to the target ("A") and record these. Move to the target. Assess the possible effects of obstacles and ground and determine the possible extent of the danger area. For each target, record the size of the danger area to the right, left and past the target. Next; measure and record the distance and direction to the next point along the trail. This could be the next shooting station ("2") or it may be an intermediate point along the trail ("1a"). This is the sequence to record data to map the course. Continue along the trail, measuring the distance and direction between each shooting station, using intermediate points if necessary, and the target and danger areas. A sample list of data for five targets is listed in the following table.

As you work your way around the course, you should be retracing the work you conducted earlier to design or review the range layout. Mark points as you go if you will need to refer to them, or return to them to continue your survey. Remember, no point looks the same once you have passed it and look back. After you have completed surveying through the last target, complete the loop and take down the direction and distance back to your start point, this is useful as a check when you draw the map. As you conduct your survey, record each feature in the "Remarks" column (streams, cross-trails, etc.), this will help when you want to add details to a final version of the map for the clubhouse.

FROM	TO	DIST (YARDS)	DIR (DEGREES)	REMARKS
ENTRANCE	1	25	315	

FROM	TO	DIST (YARDS)	DIR (DEGREES)	REMARKS
1	A	25	270	Ar - 20 YDS (ground rises sharply to right of the target) Al - 30 YDS Ap - 50 YDS (ground rises gently behind the target)
1	2	20	15	
2	B	50	15	Br - 40 (ground falls to right of the target) Bl - 30 Bp - 70 (ground falls slightly behind the target)
2	2a	20	280	
2b	3	25	300	
3	C	20	360	Cr - 30 Cl - 30 Cp - 80 (full template)
3	3a	15	270	
3a	4	20	340	
4	D	30	240	Dr - 30 Dl - 30 Dp - 70 (full template)
4	5	35	300	trail descends into a ravine
5	E	35	45	Er - 20 El - 20 Ep - 25 (ground rises steeply behind the target and the shot is towards the side of the ravine)

DRAWING THE MAP

We now have a large amount of raw data from our survey of the course. It is now necessary to translate these directions and distances into a map. Back at the get out your graph paper and pro-tractor.

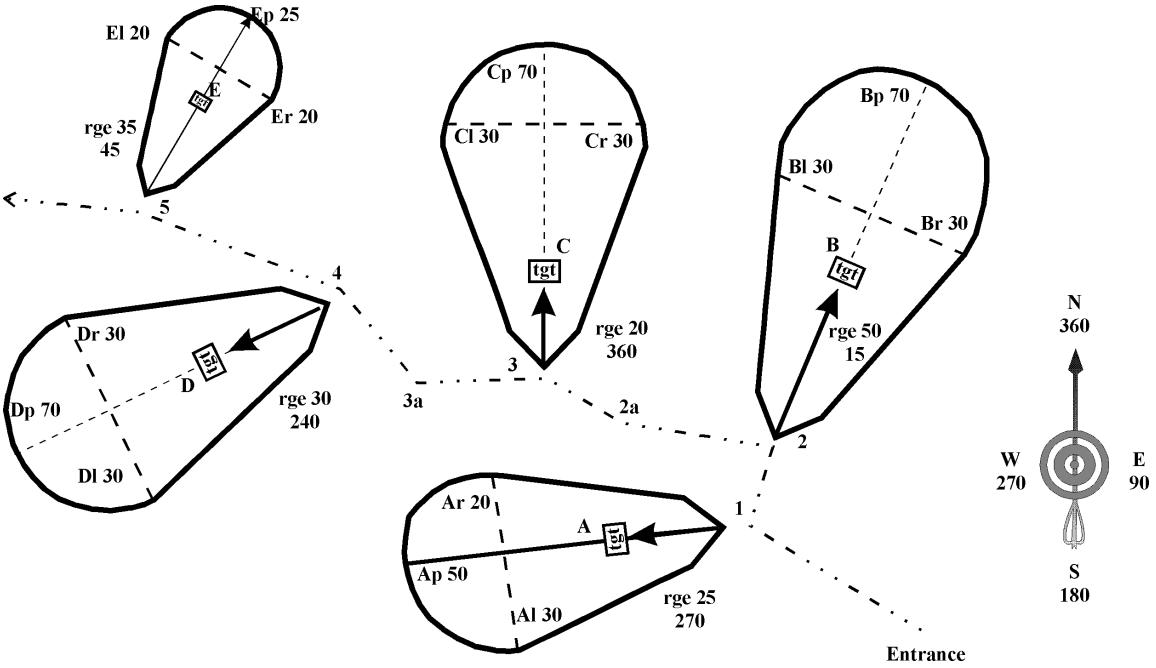
Scale. First, we need to decide on a scale for the map so that distances can be transferred consistently to the map. With 1/4" squares on the graph paper, use 1/4" to represent five (5) yards. This does mean that a mile of trail will become seven feet of drawing, but a fifty-yard target range will only be 2 1/2 inches. This scale should suffice for most courses, but keep in mind the fact that your map may be quite large when you are finished. To help with the measuring of map distances, make a small temporary ruler of light cardboard. Mark the edge of your "ruler" in 1/4" increments and number them for the distances in yards they will represent. This will save you from repeatedly having to convert distances in yards to inches to fit the map scale.

Orientation. When you begin to draw your map, start at the centre of your first piece of paper. This will give you some room to work before you run off the paper and will show you on which side the

next sheet attaches. Mark the first and every subsequent piece of paper with the main compass points and the number of degrees they represent. It might help to sketch a small compass star showing North (0 and 360 degrees), East (90 degrees), South (180 degrees), and West (270 degrees). Clip it to the sheet you're working on as you proceed. This will help you keep track of your general direction as you pass from one sheet of paper to the next and will aid in the plotting of each direction bearing. Ensure you number and mark adjacent sheets of paper so that you can assemble the entire map when you are done.

Plotting. Plot and label your entrance point. From this point, use your protractor to establish the direction of the first leg of the trail, mark this line and draw it in light pencil. Using your "yardage ruler" mark the next point along the direction line, label this point. Continue from here and plot each recorded point in turn. When you plot the location of a target, refer to the remarks column and insert the estimated danger area widths and length. Lightly sketch in the danger area for each target as you go, this will help you identify areas which might need closer examination or adjustment to ensure safety. Plot the entire course trail, all the targets and their danger areas. See figure 9 for a sample map plot of the information in the table above.

Conclusion. This mapping system is only as good as the care taken to measure and record data and that applied in preparing the map. To a professional surveyor, it would be a terribly inaccurate



method. However, it can provide a club with a usable range briefing map, and a course designer can gain sufficient information from his mapping to confirm the general layout of his course design. While the map cannot prove the safety of a course design, it can be a valuable aid in making design decisions.