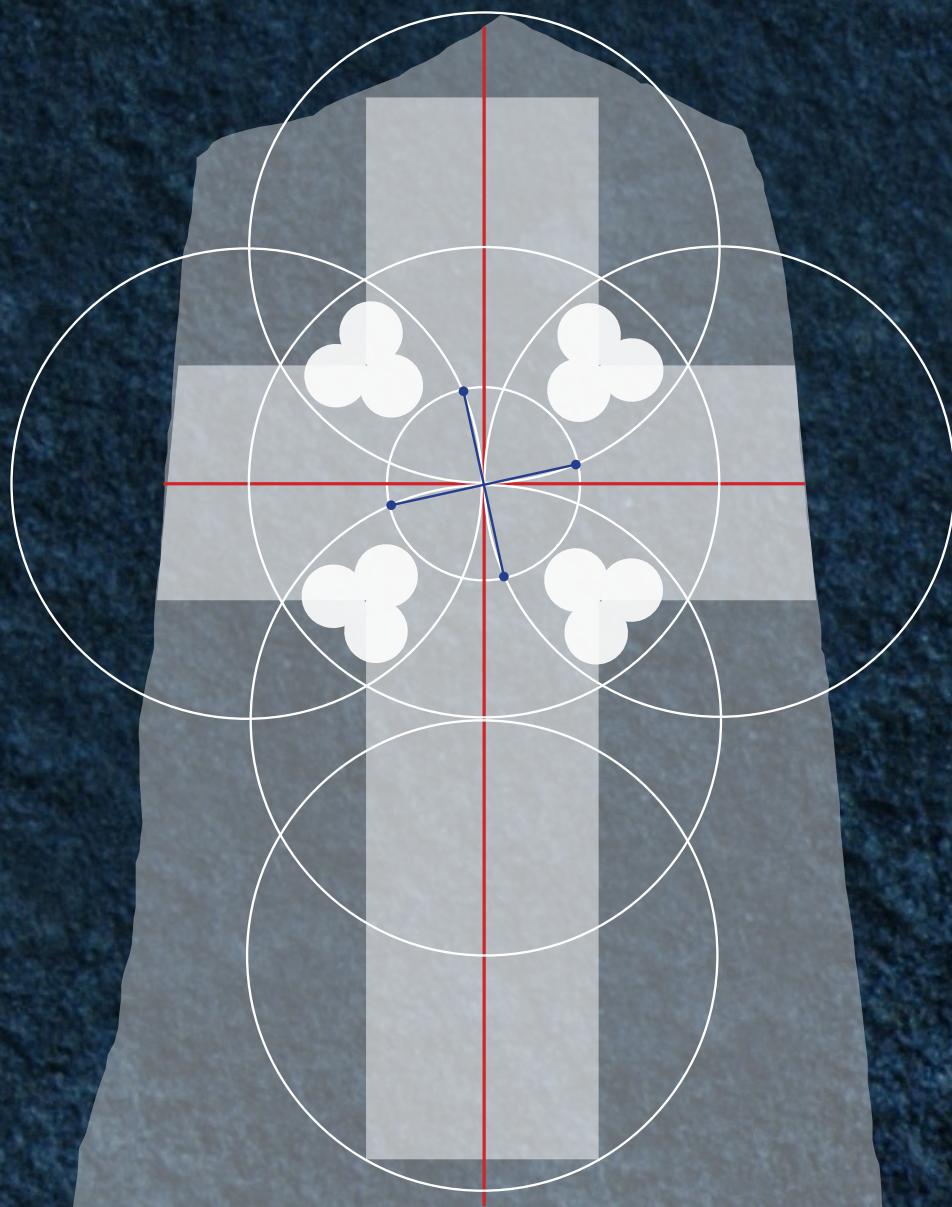


GLAMIS MANSE  
Pictish Stone Christian Cross  
*A Geometrical Reconstruction*



Laurie SMITH  
HISTORIC **BUILDING** GEOMETRY

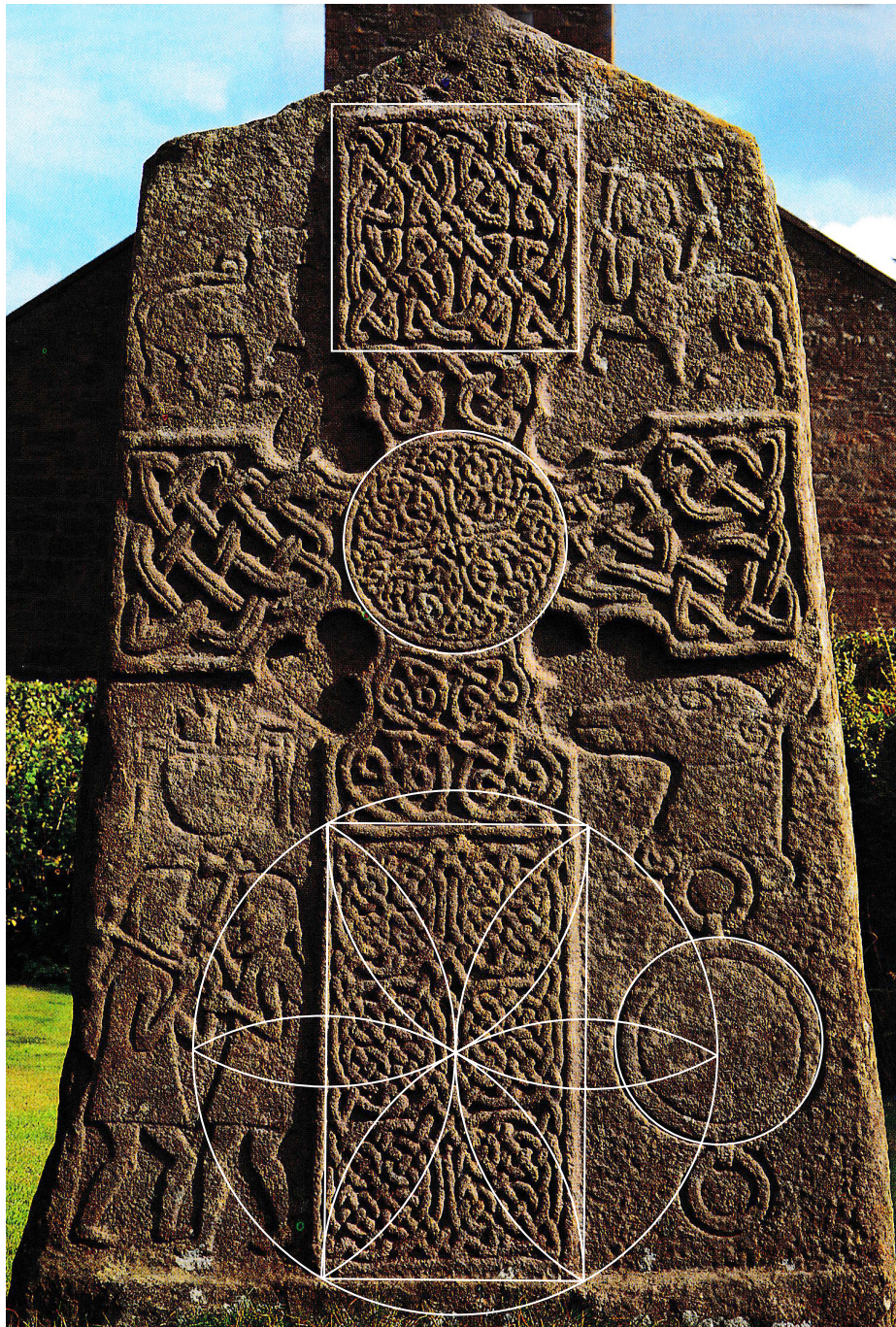
# GLAMIS MANSE

## Pictish Stone Christian Cross

The A94 north-east of Perth in Scotland passes through Meigle, Glamis and Aberlemno, each the site of free-standing carved Pictish stones and, at Meigle, the Stone Museum which houses a fascinating collection of carved Pictish stones. Many of the free-standing stones, which can be seen at roadsides, exceed human height. The Glamis Pictish stone stands 9 feet high in the garden of Glamis Manse and is carved on one side with a superb Christian cross. On the reverse are carved Pictish images of a serpentine creature that might be a snake, an eel or the meanders of a river, a great salmon and parallel circles thought to represent a mirror. Some of the Pictish stones in this area, including those in the Meigle Stone Museum, show specific geometrical constructions and raise the possibility that stones were designed geometrically in their entirety. This article commences with the outer boundary of the Glamis Manse stone and follows an exploratory geometrical design route, stage by stage, until the full layout of the cross is reached.

**Laurie Smith** is an independent early-building design researcher, specialising in geometrical design systems. Because geometry was part of the medieval educational curriculum he uses geometrical analysis to excavate and recover the design methodologies of the past, a process he thinks of as design archaeology. He lectures, writes and runs practical workshops on geometrical design and publishes his work on his website [www.historicbuildinggeometry.uk](http://www.historicbuildinggeometry.uk)

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### Glamis Manse Pictish Standing Stone

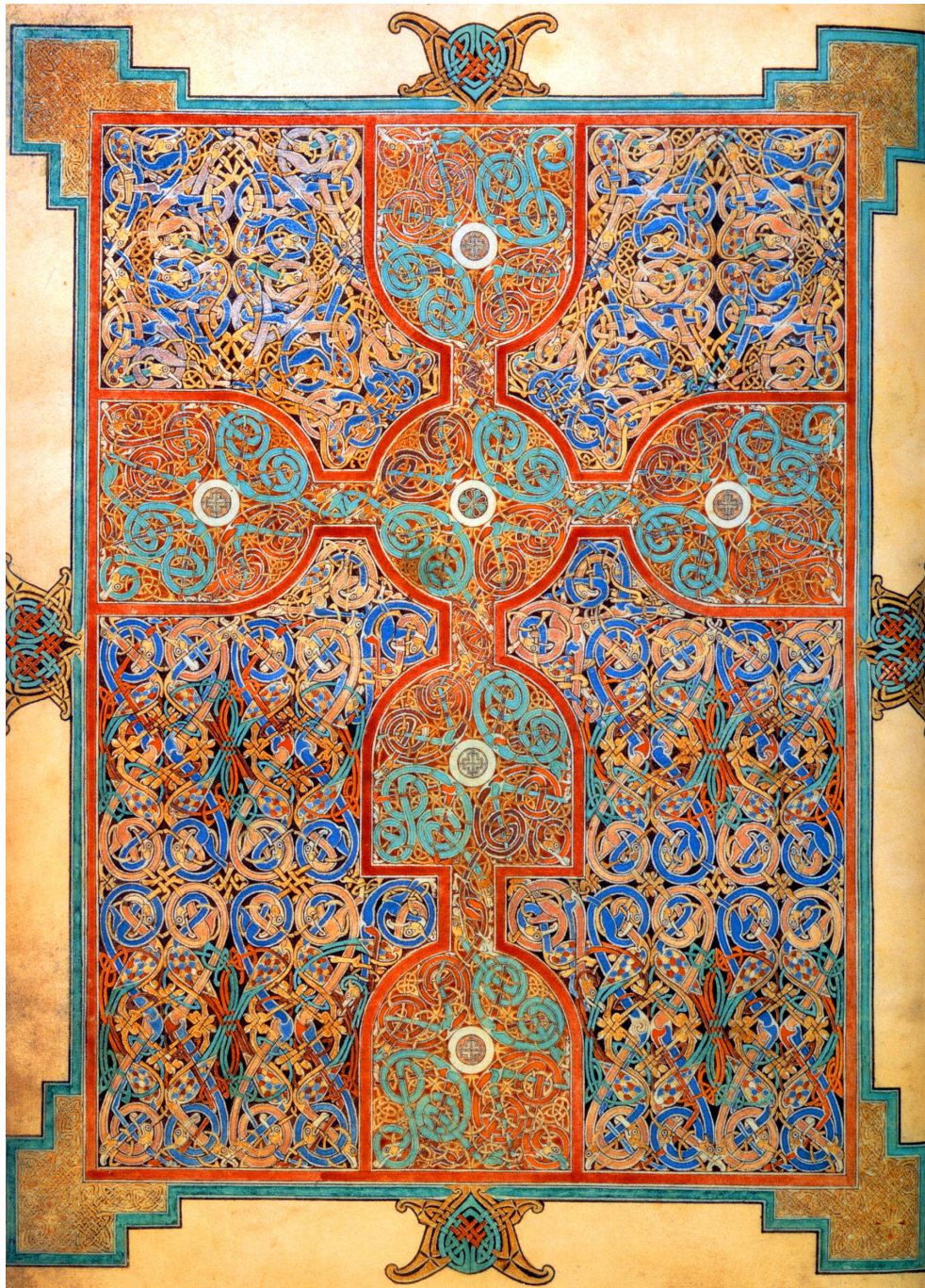
According to historians, the Glamis Manse Pictish standing stone dates from the 9th century AD. It's dimensions are given as 9 feet 1 inch tall, 4 feet 11 inches wide and 9½ inches thick.

Standing in front of this awe inspiring stone, the questions arise, where did the idea for this imagery come from and how did the sculptor lay it out for carving? A simple geometrical analysis reveals a square, circles and a root 3 rectangle derived from the compass drawn daisy wheel.



### Glamis Manse Pictish Standing Stone

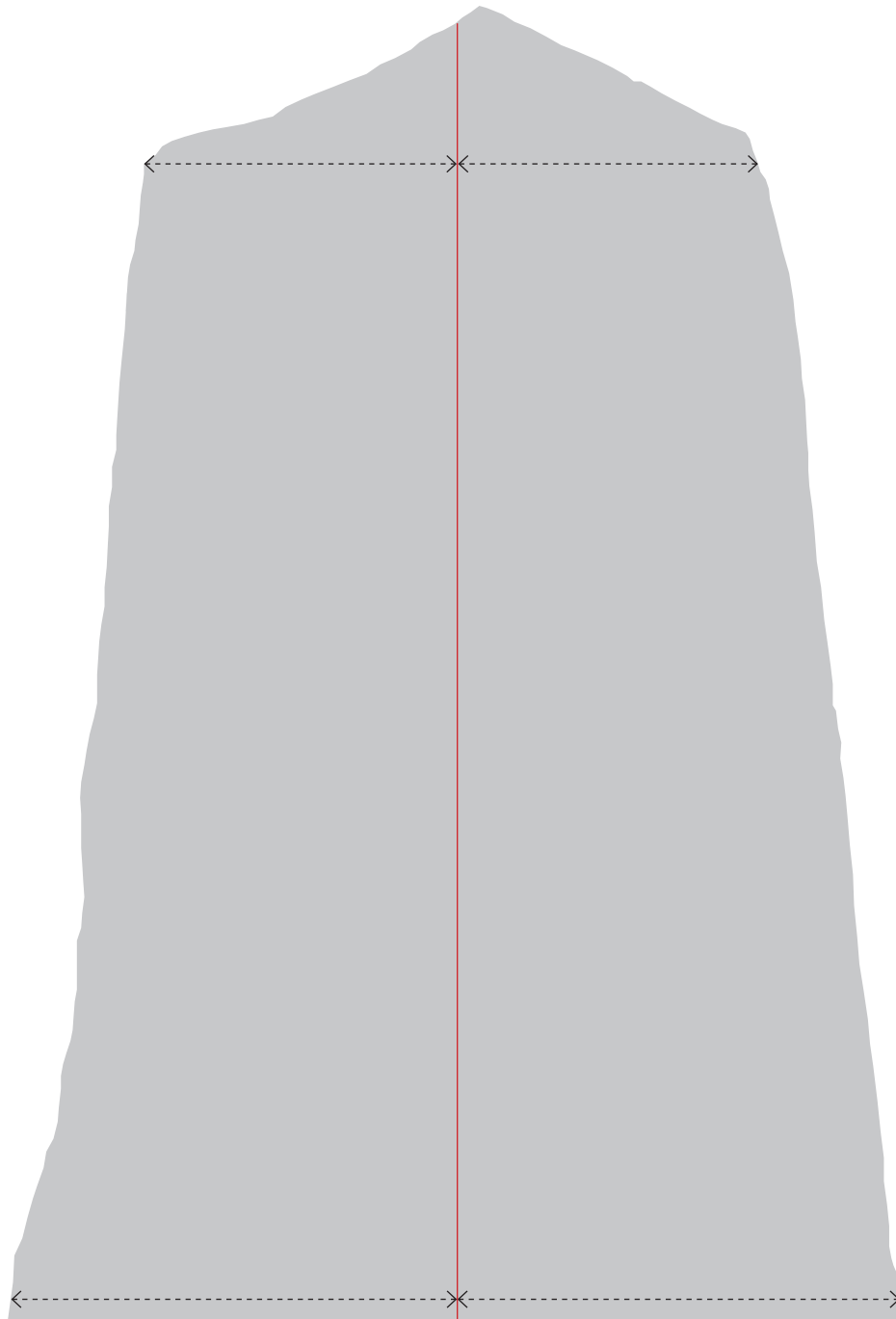
The source of the stone's design is clearly the Christian cross though the image has metamorphosed from the functional wooden cross used for the crucifixion of Christ into a stylised cruciform pattern. The Christian message is therefore carried forward in the visual power of the intricately interlaced panels that make up the cross while the endless interlacing suggests eternal life.



## The Lindisfarne Gospels

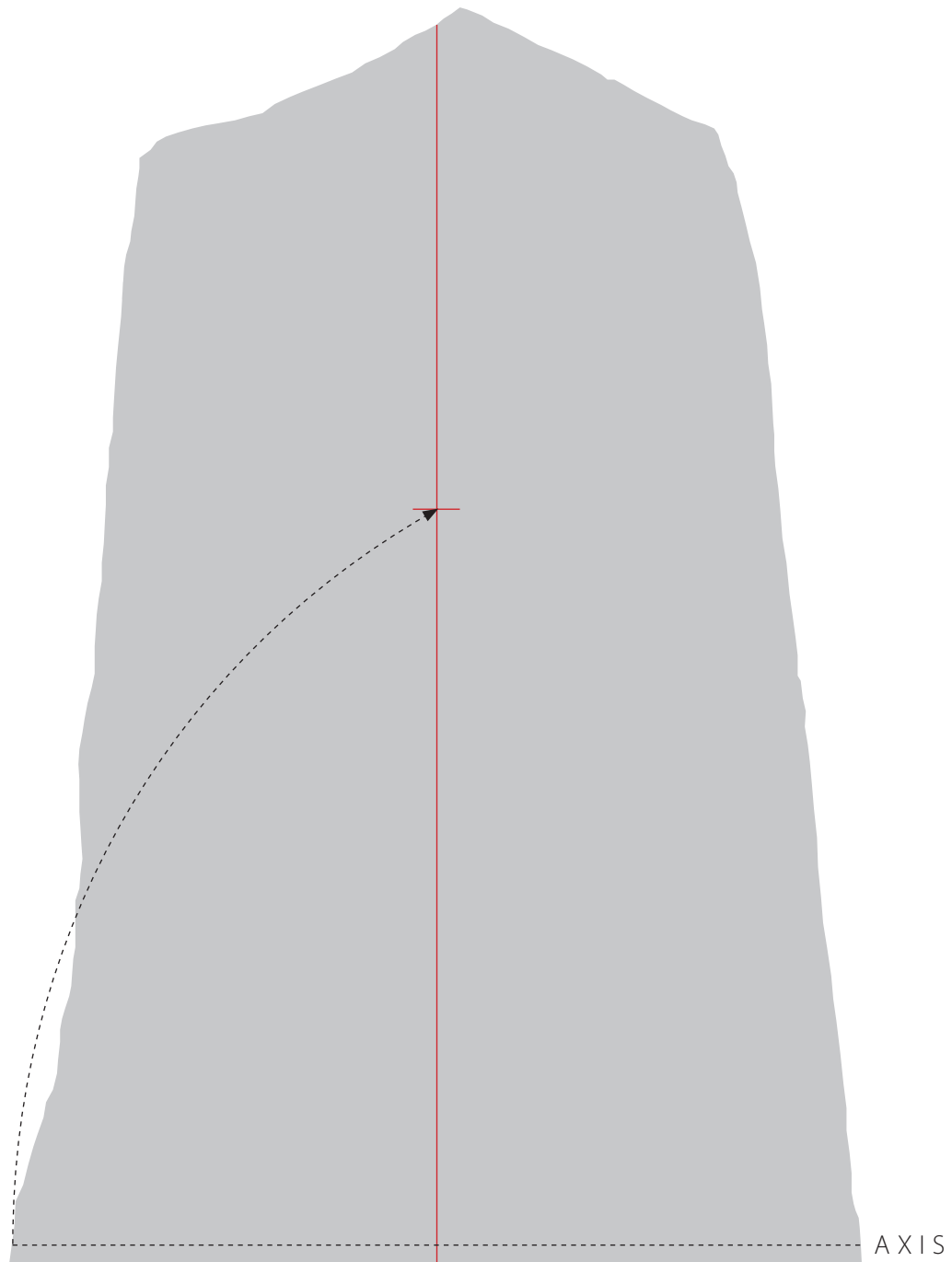
The idea of a cross composed of interlaced panels can be found approximately 100 years earlier in the carpet pages of the Lindisfarne Gospels. Lindisfarne and Glamis are both on the east coast, in northern England and southern Scotland respectively and are 150 miles apart, a journey of about six or seven days on horseback. Edinburgh is half way between the two.

It is thought that Eadfrith, Bishop of Lindisfarne from 698AD to his death in 721AD, was the originator of the gospels circa 715AD and that they were illuminated in honour of Saint Cuthbert who had also been a monk at Lindisfarne.



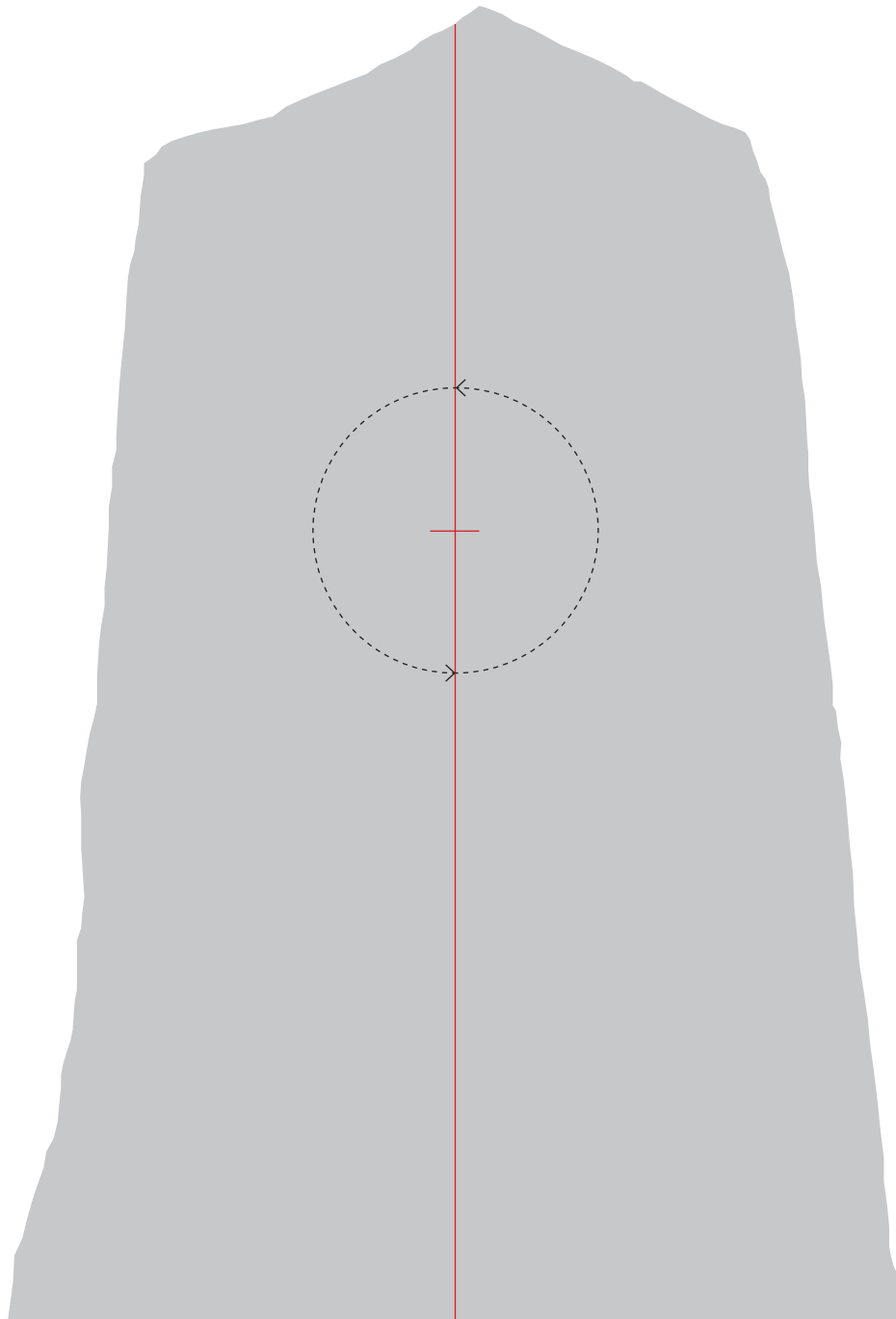
### Glamis Manse Pictish Standing Stone Finding the Vertical Centre Line

Finding the width of the stone's base and top is simple. A string stretched across the stone's base from side to side is folded in half to locate the centre line's path. This is repeated at the top of the stone. The upper and lower centre line marks are joined by a chalk line snapped between them. A straight edge, held firm against the chalk line allows a scratch awl to mark a permanent centre line in the stone. The centre line is the primary datum from which the layout of the cross can proceed.



### Glamis Manse Pictish Standing Stone Finding the Perpendicular level

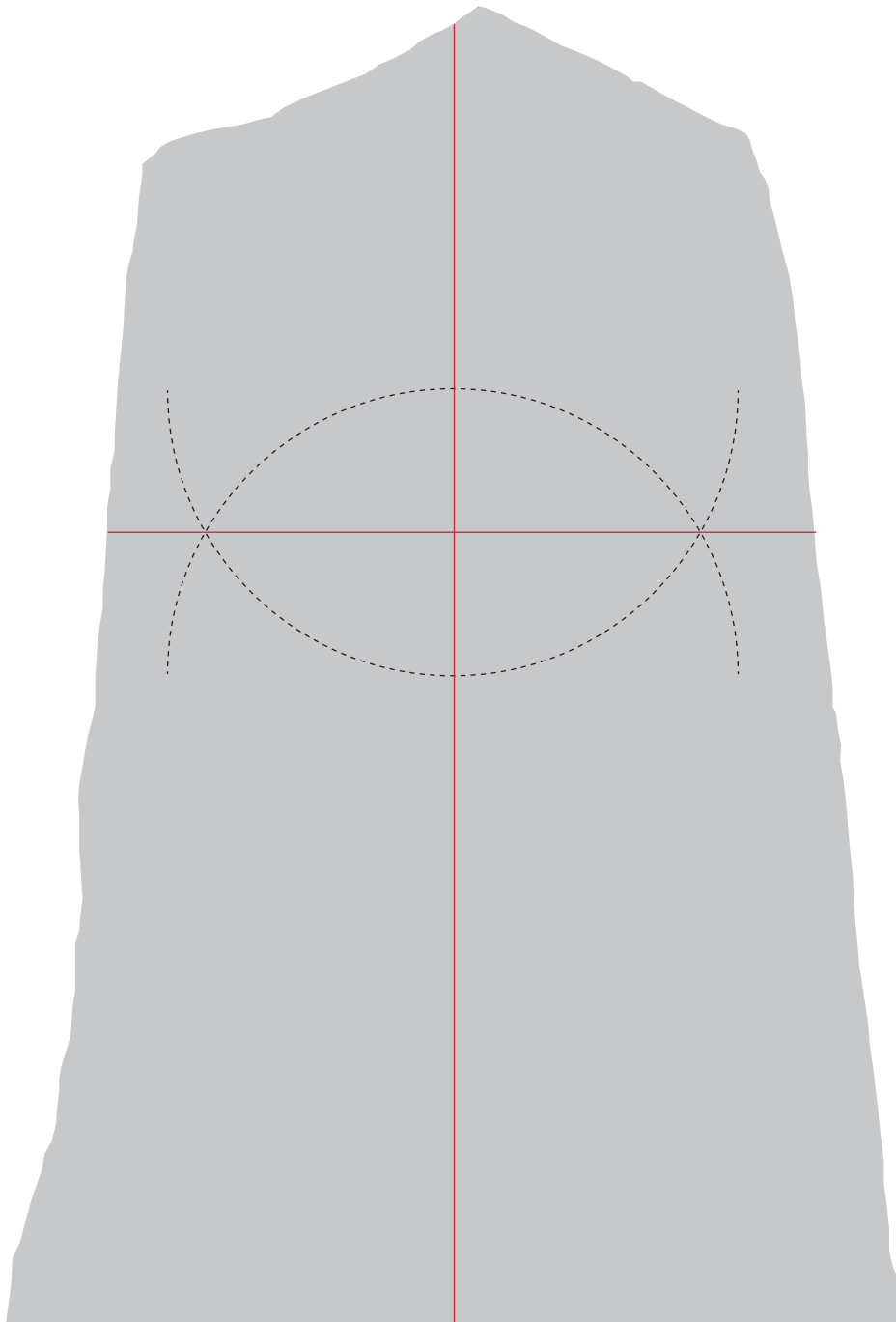
A perpendicular can be constructed at any point along the vertical centre line but analysis of the standing stone shows that it is at a specific height above the ground. Using the full width of the stone's base, either as a stick or a string, the dimension can be swung as an arc from the stone's bottom right corner (or the bottom left corner) until it meets the vertical centre line at the level of the perpendicular.



### Glamis Manse Pictish Standing Stone Constructing the Perpendicular stage 1

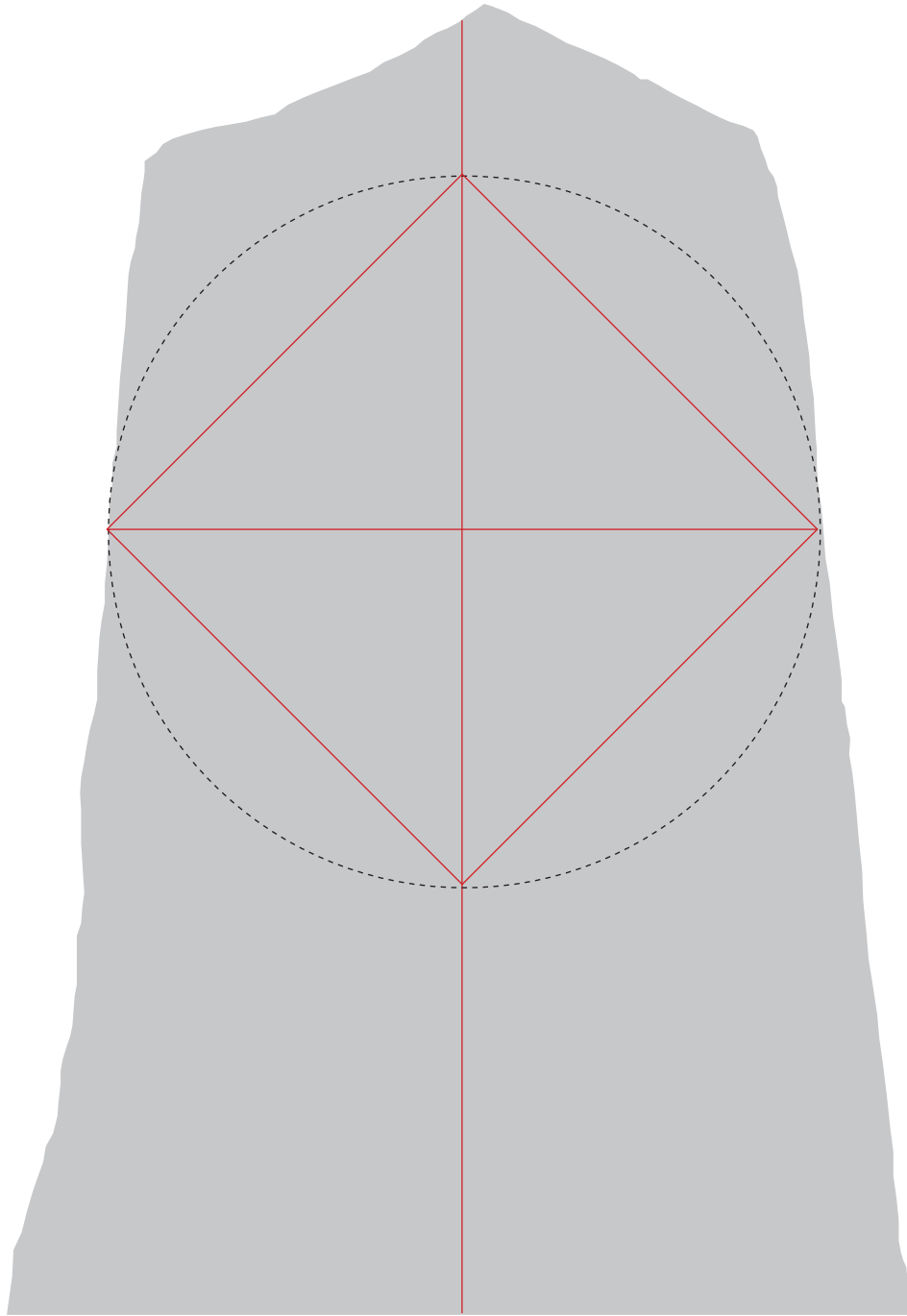
It is necessary to mark two points on the vertical centre line, equidistant from the perpendicular level mark at the arrowheads. The simplest method is to scribe a circle from the perpendicular level mark. The full circle is shown here for clarity but it is only necessary to cut the vertical centre line at the arrowheads.





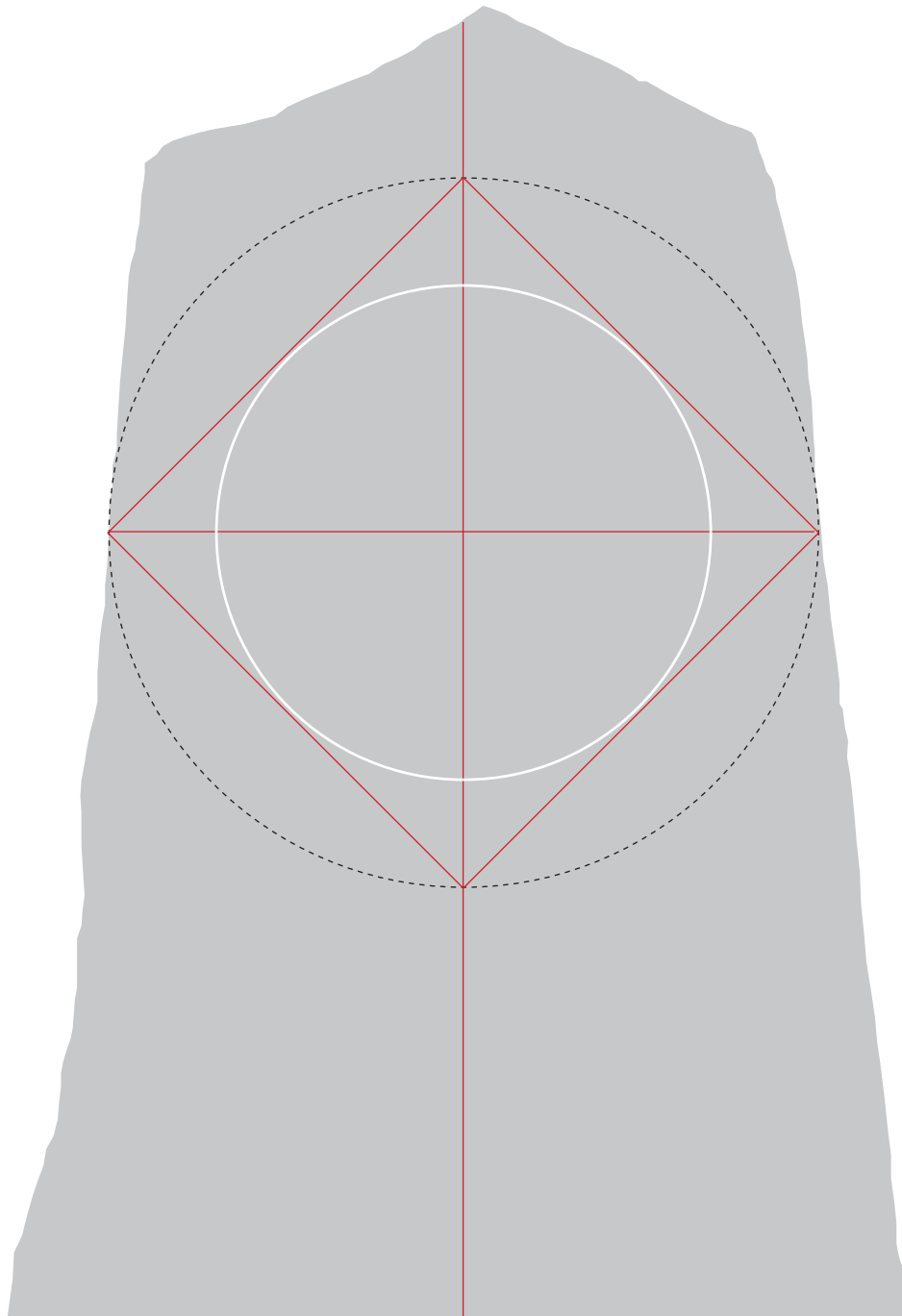
### Glamis Manse Pictish Standing Stone Constructing the Perpendicular stage 2

Two arcs of circle are drawn from the arrowhead locations so that they intersect at either side of the stone. The horizontal perpendicular is scribed along a straight edge held firm against the intersections. The vertical and horizontal perpendiculars intersect at precisely  $90^\circ$ .



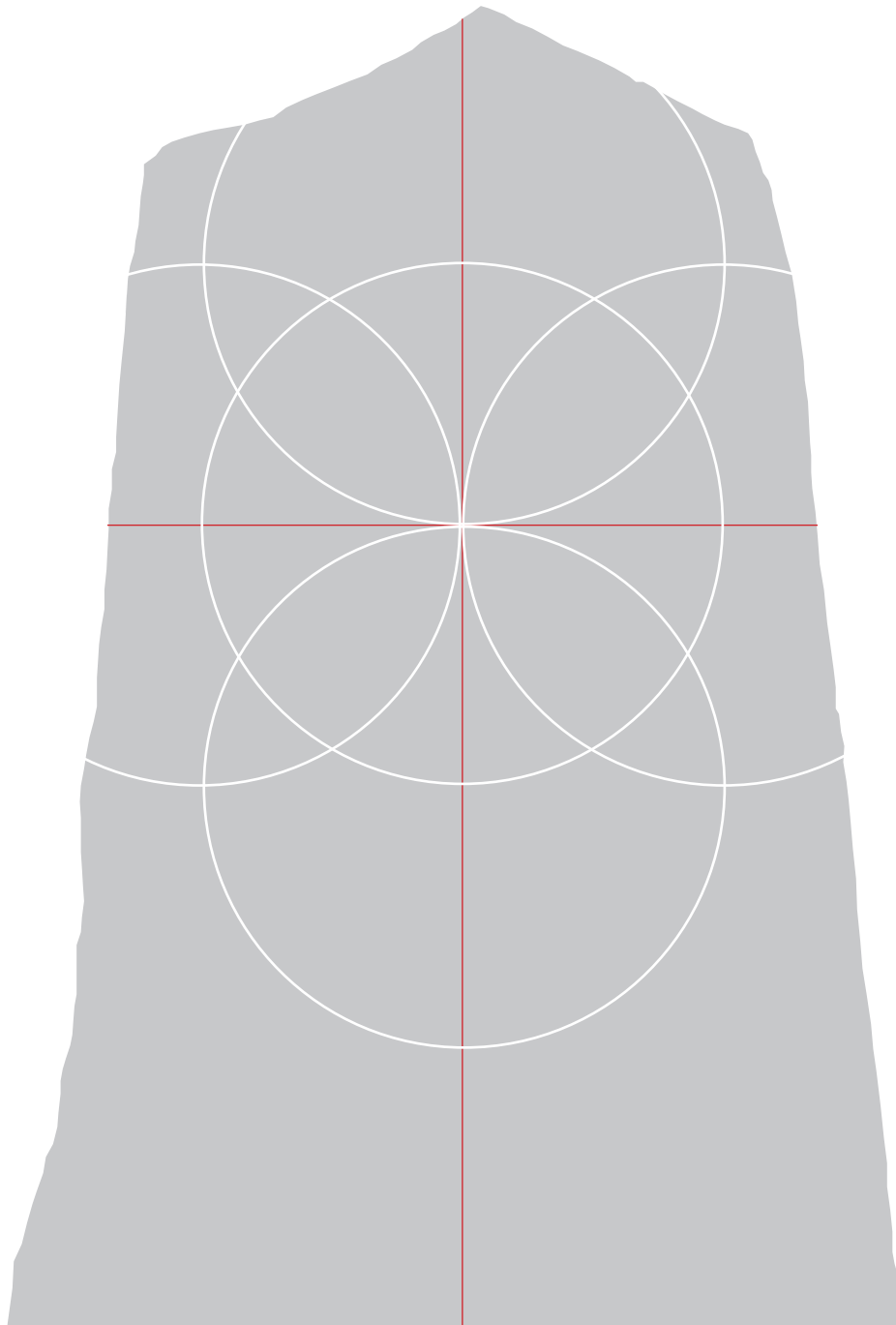
**Glamis Manse Pictish Standing Stone** Constructing a square/diamond

A circle is drawn with its axis at the intersection of the perpendiculars. The perpendiculars automatically cut the circle precisely at its north, east, south and west poles. Lines scribed between the poles generate a perfect square/diamond.



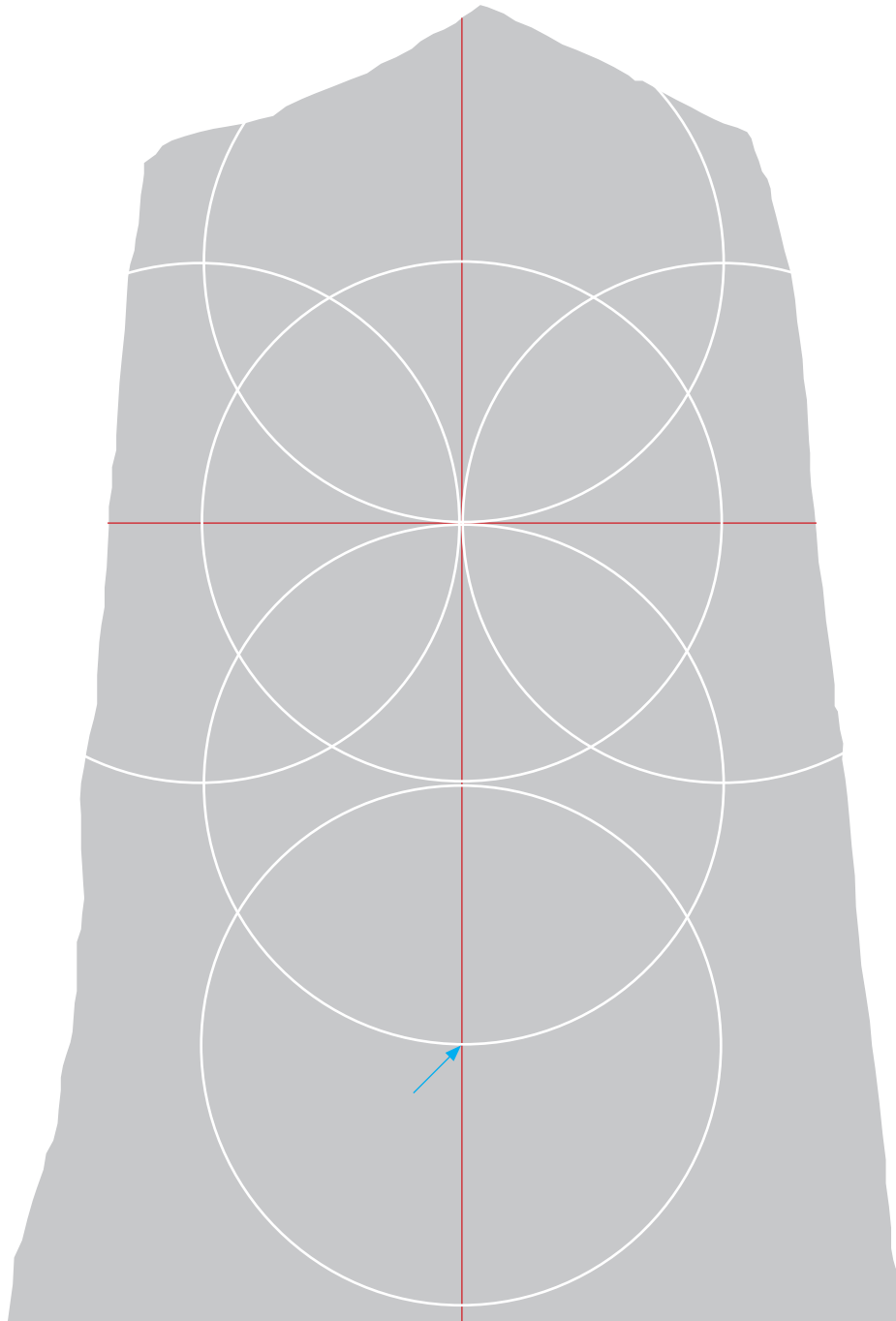
### Glamis Manse Pictish Standing Stone Constructing the Primary Circle

A circle is drawn with its axis at the intersection of the perpendiculars so that it kisses the four sides of the square/diamond. This is the primary circle, the first constructional element of the stone's carved cruciform design.



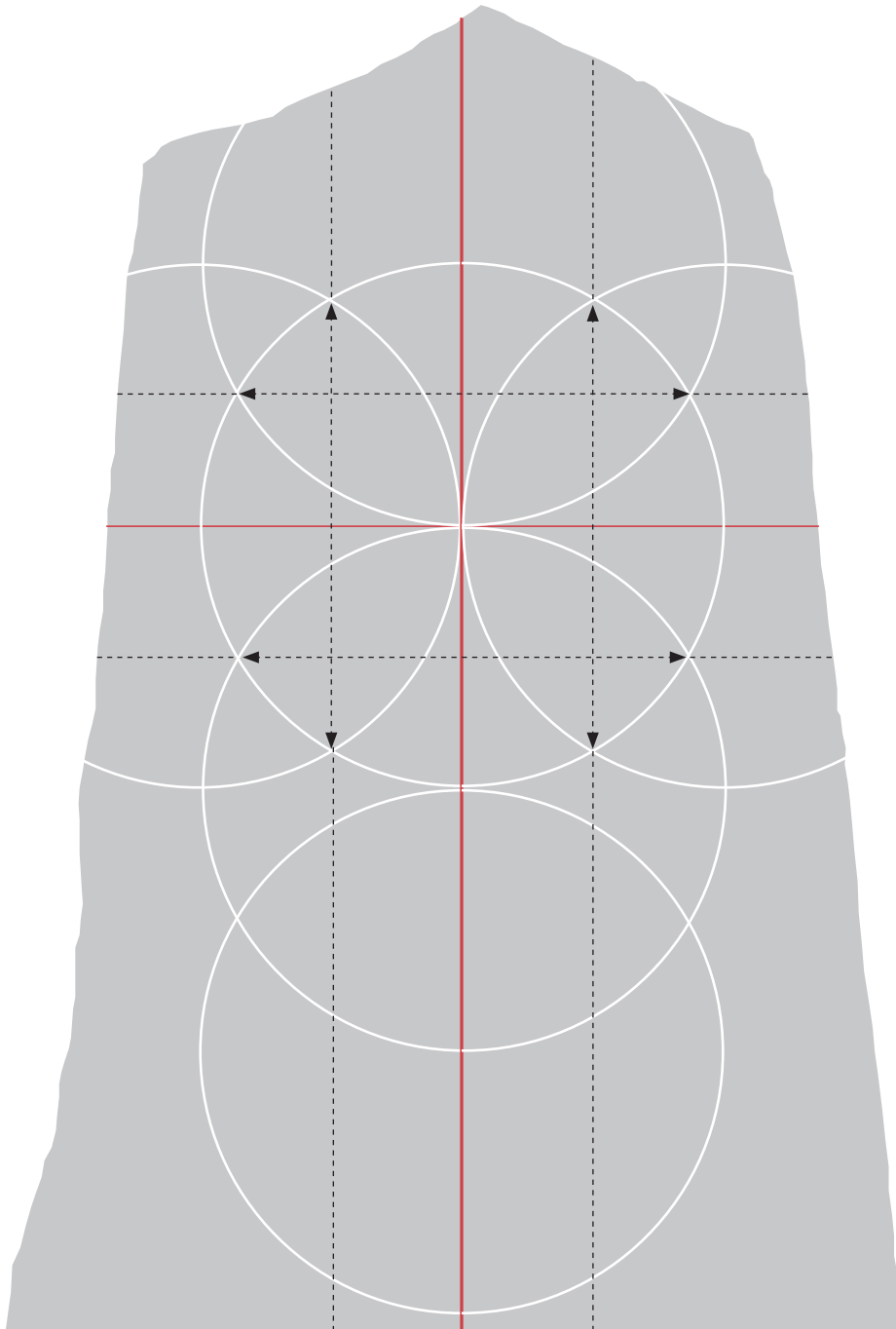
### **Glamis Manse Pictish Standing Stone** Constructing the Five Circles

Once the primary circle is drawn, four additional circles can be drawn from the primary circle's north, east, south and west poles. All five circles are of identical radius and combine to form the Five Circles, one of the fundamental geometries. The fact that the circles run past the stone's boundary in three places has no influence on the layout of the cross.



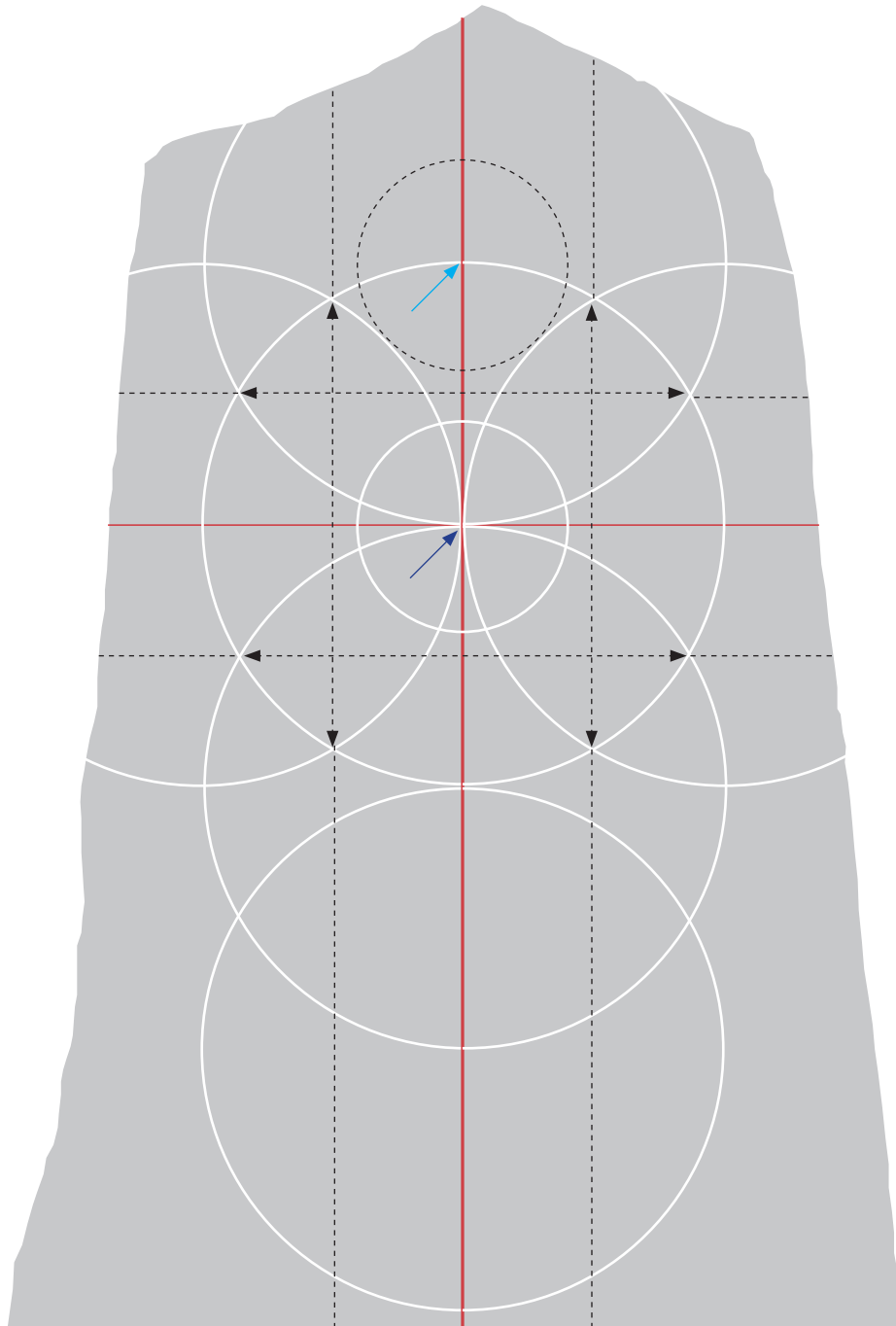
### Glamis Manse Pictish Standing Stone Completing the compass circle cross

Because the cross is the implement of crucifixion it mirrors the human form. In consequence, the vertical axis which comprises the legs, body and head, is longer than the horizontal axis which describes the arms. The final circle, which accounts for the greater vertical length of the cross, is drawn to the same radius as the five circles with its axis at the south pole of the lowest circle, indicated by the pale blue arrow. The final circle completes the compass grid and it is from this grid that the boundaries of the cross can be laid out for carving.



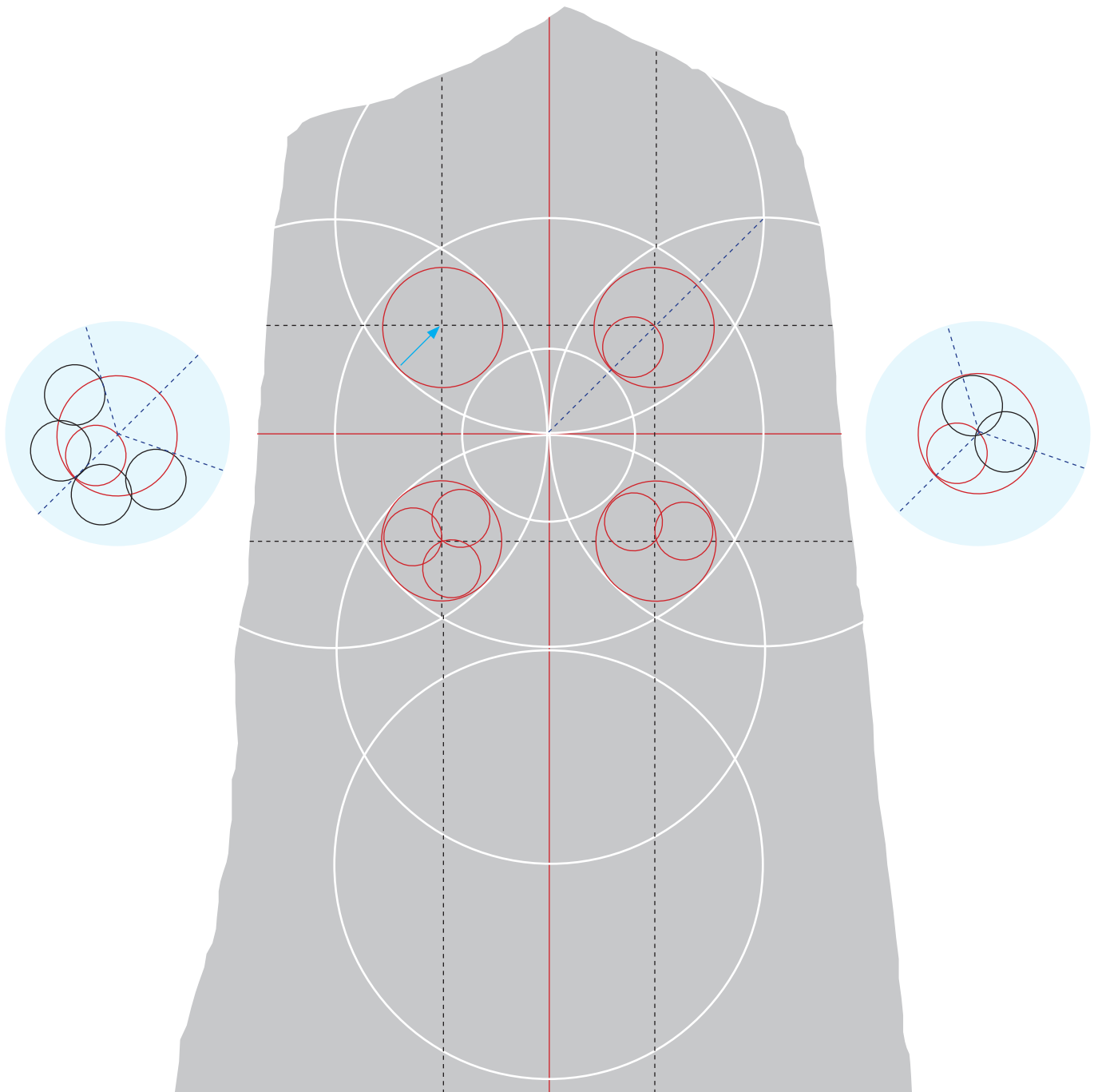
**Glamis Manse Pictish Standing Stone** Constructing the linear perpendicular cross

With the circle grid complete the vertical and horizontal perpendicular boundaries of the cross can be scribed along a straight edge. The straight edge is held firm against the intersections indicated by arrows for scribing.



### Glamis Manse Pictish Standing Stone Constructing the central circle

It is evident from observation of the real stone that there is a circular area of pattern at the centre of the cross and that the boundary of this circle is narrower than the vertical and horizontal elements of the cross. This slightly smaller circle is drawn in dashed black line from an axis at the north pole of the central of the five circles, with the axis indicated by a pale blue arrow. The radius of this circle is determined by where it kisses the circumferences of the left and right of the five circles. The circle can then be scribed to the same radius from its axis at the epicentre of the cross, a point indicated by the black arrow.



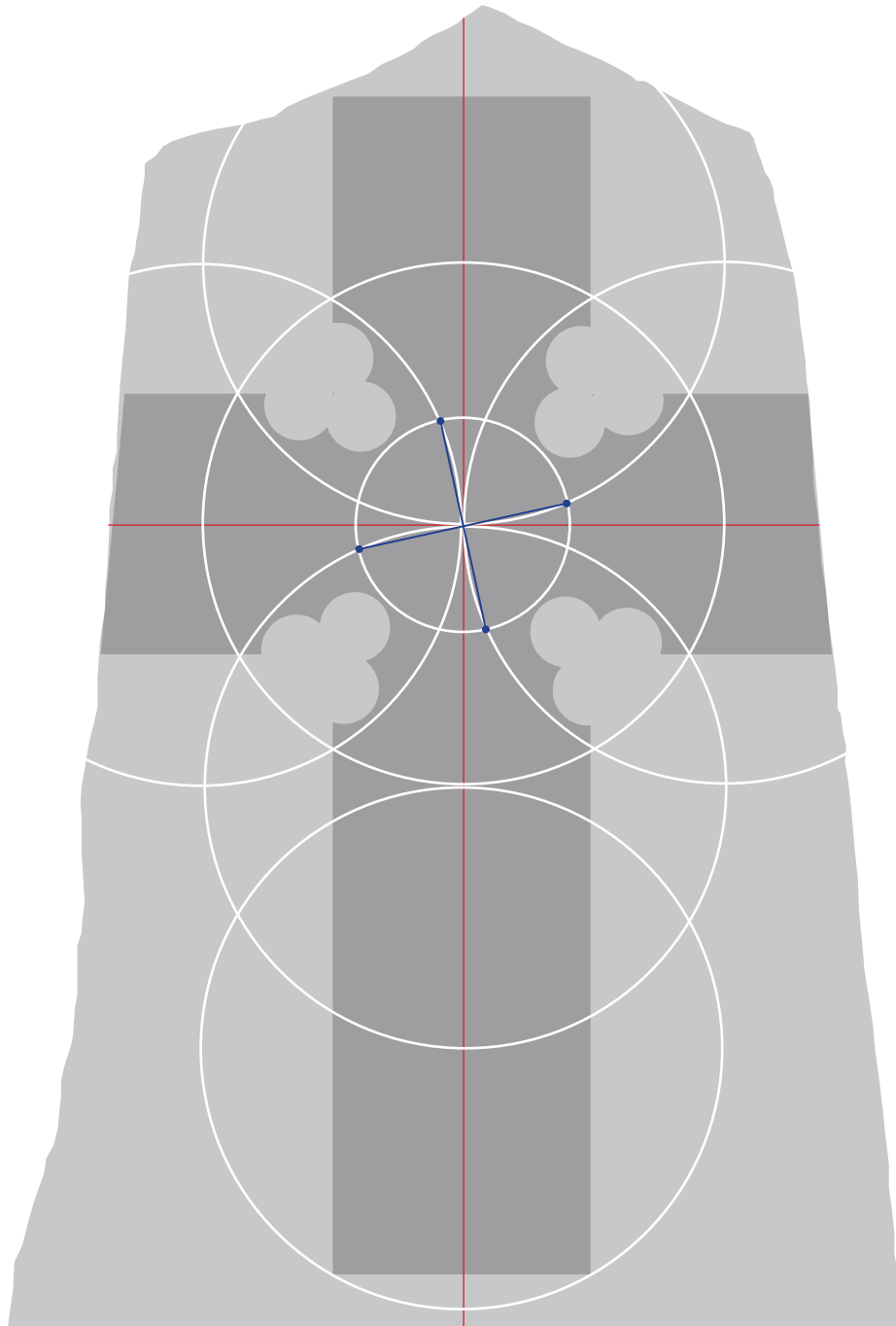
### Glamis Manse Pictish Standing Stone Constructing four trefoils: stage 1

The vertical and horizontal boundaries of the cross intersect at right angles and it is at these locations that four trefoils, each symbolic of the Trinity, are introduced. The trefoils occupy the space between the central circle of the white five circle group and the smaller white central circle.

The construction of a trefoil is shown in red line in four stages, commencing from the top left where the axis of the red circle is indicated by the pale blue arrow. The top right construction shows the addition of a small red circle (half the radius of the first circle). The lower right construction shows a second small circle and the lower left construction shows the completed trefoil.

The secondary geometry, left, shows how to draw the axes for the second and third small circles and the secondary geometry, right, the construction of the trefoil on the three axes.





### Glamis Manse Pictish Standing Stone Constructing the offset central cross

The drawing shows all four trefoils in place between the five circle's primary circle and the smaller central circle. At 45° to the vertical and horizontal arms of the cross, the trefoils form curvilinear links between them.

The small central circle has an additional small cross within it that marks the division between its four quadrants of interwoven decoration. This cross is offset from the vertical and horizontal centre lines of the main layout and is constructed by linking points of intersection between the small central circle and the circumferences of the north, east, south and west circles of the five circles group. This linkage generates a third cross, so that the linear centre line cross, the five circle cross and the offset central circle cross form a unified and sophisticated Trinity Cross.



### Glamis Manse Pictish Standing Stone Weaving the decorative panels

Isolating the cross itself from the background stone allows the eye to focus on the patterns constructed within the individual panels. The first thing to notice is that, where the form of the cross has been attained through precision geometrical construction, the patterns inside the panels are looser. Diagonals in the top square and the group of six circles in the stem of the cross are hinted at but have the character of woven cord or rope. The clearest examples of this slightly asymmetrical rope weave are in the two side arms of the cross which have a free flowing character in a heavier line. It is my belief that, with the stone laid flat in a horizontal position, actual cords or ropes were plaited or woven within the geometrical panel boundaries and then scribed around, a technique that would enable the fluid two dimensional rope and cord patterns to be laid out for cutting permanently in the three dimensional medium of stone.

**Glamis Manse Pictish Standing Stone**

is located on private property.

**Meigle Sculptured Stone Museum**, which is nearby, houses a small but visually stimulating collection of 27 carved Pictish stones, several standing above head height, that were found in Meigle churchyard or in the structure of the old church. The current church dates from around 1870 but the Museum, originally the parish school, was built earlier in 1844. The museum is on the A94 from Coupar to Forfar and can be found at the centre of the village.

The address is –

Meigle Sculptured Stone Museum  
Dundee Road  
Meigle PH12 8SB  
Scotland  
Telephone 0131 668 8800

*Further standing stones can be found beside public roads in the vicinity of Meigle and Aberlemno.*

[www.historicbuildinggeometry.uk](http://www.historicbuildinggeometry.uk)

