CAERDROIA

THE JOURNAL OF MAZES & LABYRINTHS

: XL :

CAERDROIA 40

30th Anniversary Edition – 1980-2010

CAERDROIA

The Journal of Mazes & Labyrinths

40th Edition

30th Anniversary Edition

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Marble relief carving of the escape of Daedalus and Icarus from the labyrinth of Crete. Probably dating from the 17th century, although the artist and circumstance of its creation are unknown, it is set into the courtyard wall of a business college, formerly the Hôtel du Grand Maître de France, on the rue d'Austerlitz in Compiègne, France.
Photo: Jeff Saward

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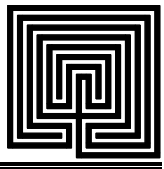
The Journal of Mazes & Labyrinths

Contents

Caerdroia 41 is due for publication December 2011, submissions by August 2011 please

Editorial - Caerdroia 40



Jeff Saward, Thundersley, March 2011

Welcome to the slightly delayed 40th edition of Caerdroia, marking the 30th anniversary of the founding of Caerdroia, way back in 1980, when I first started producing an occasional newsletter to keep a handful of fellow enthusiasts in contact with each other. From the 30 copies of three double-sided sheets, first sent out in March 1980, to now, 40 editions of Caerdroia have been produced over the years, appearing on an annual, if occasionally erratic, basis for the last 20 of those years.

And much has changed in the world of mazes and labyrinths over those 30 years. Back then, a handful of new hedge mazes had recently been planted, following the success of the Longleat Maze in England, and on the opposite side of the world, wooden panel mazes were beginning to appear in Australia, New Zealand and Japan. Labyrinths were very much a minority interest at that time, principally the domain of a few enthusiasts in Europe and elsewhere, a mix of historians, artists and mystics, all working within their own circles. The founding of Caerdroia, as a means for those disparate and remote folk to share their ideas and discoveries seemed a worthwhile venture for my youthful enthusiasm...

And now the world of mazes is a multi-million dollar industry. Hedge mazes continue to be planted around the world and historic examples are lovingly restored, while innovative new materials and interactive features have transformed the formerly staid concept. Hi-tech mirror mazes now feature at many major tourist destinations and maize mazes have become a staple crop for diversifying farmers worldwide.

Labyrinths have likewise undergone a revolution. Thousands of new examples have been built during the last twenty years or so, many in parts of the world where few were found before. The phenomenal growth of interest in labyrinths as a spiritual practice, coupled with a concomitant surge of historical and artistic awareness, has likewise been mirrored by an explosion in the number of books, articles and research papers published during the same period.

Thirty years on, one might imagine that the historical study of labyrinths was pretty much complete, but despite, indeed perhaps because of, this renewed interest in the subject, new discoveries within the field continue to surface. In this 40th edition of Caerdroia we present several surprising examples, with a promise of more to come...

Our next edition, Caerdroia 41, is scheduled for publication towards the end of 2011. As always, if you have a paper or shorter article you wish to submit for inclusion in the next edition, send it to me as soon as possible, along with the usual labyrinthine snippets and curios that help fill the pages...

Jeff Saward - E-mail: jeff@labyrinthos.net - Website: www.labyrinthos.net

The Petit Labyrinth Graffito of Chartres Cathedral

Jill K. H. Geoffrion & Alain P. Louët

Some 800 years after the completion of the thirteenth century pavement labyrinth in nave of Chartres Cathedral, France, a "little sister" labyrinth graffito has been identified in the cathedral.[1] The fact that a second labyrinth has existed in the cathedral, whether since the thirteenth century, or a much more recent time, will come as a surprise to most people.[2]

Figure 1: the "Petit Labyrinth" wall graffito, Notre Dame de Chartres, France. Photo: Jeff Saward, September 2010

Location and description of the labyrinth graffito

The labyrinth graffito in Chartres Cathedral is found around the corner from the door leading to the north tower, at the end of the north side aisle. It is located in an area that is currently staffed by the French Historical Monuments. Approximately one meter (39 ¼ inches) above the floor, it is 85 cm (approximately 33 ½ inches) from the west end of the tower wall.

The petit labyrinth is engraved in the thin *enduit* (render) that coats the stone underneath. The labyrinth graffito, which is smooth to the touch, has twelve circular lines (and therefore eleven circuits) engraved in its top half, but only seven circular lines (six circuits) completed in the lower half. Its diameter is approximately 9 cm (3 ½ inches) from the top line to that on the lower edge. Its centre, which is slightly wider at the bottom than the top, measures a maximum of 1.4 centimetres (approximately ½ inch) in diameter.[3] Turn dividers are clearly marked as straight lines in the upper section of the design, but are much less visible on the sides of the graffito. Two turns can be easily identified in the top of the lower right quadrant, while those on the top of the lower left quadrant are visible, but harder to perceive. The design lines are not spaced evenly; the labyrinth appears to have been drawn by hand. No visible traces can be found below the seventh lower line; it seems as if the complete (eleven-circuit) labyrinth graffito was never finished.

As one studies the graffito, it seems most likely that the centre of the labyrinth was drawn first, followed by the turn dividers in the upper section and perhaps the pathway to the centre, and afterwards, circular arcs were extended downwards towards the sides and lower edge of the design.

The surface of the wall render on which the labyrinth graffito is found is uneven. Several seemingly unrelated lines and other markings traverse the labyrinth pattern. Other graffiti of various sizes and shapes can be found higher on the same wall.[4]

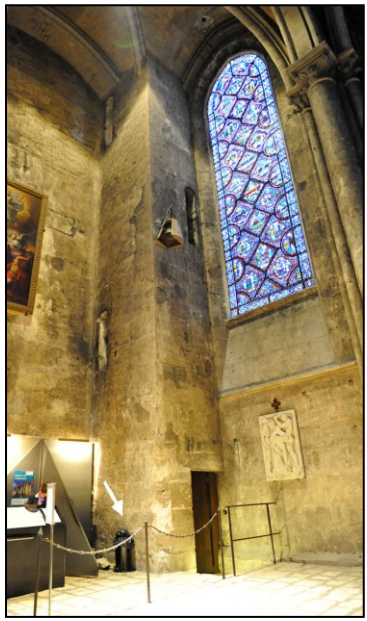


Figure 2: west end of north aisle, Chartres Cathedral, France. The position of the labyrinth graffito marked with an arrow. Photo: Jill Geoffrion

Relationship of the graffito to the floor labyrinth in Chartres

There is a clear relationship between the pattern of the floor and wall labyrinths in the Chartres Cathedral. Although lacking approximately half of the lower circuits, the shape and pathway pattern (as far as it can be discerned) of the smaller labyrinth are similar to its larger counterpart, see figure 3. The proportion of the centre to the rest of the design is significantly smaller on the wall labyrinth (1:6 if there were 12 lines on both the top half and the bottom half) than the floor labyrinth (1:4). In addition, the level of detail is markedly different: the wall labyrinth lacks the central rosette, the peripheral ornamentation and the rounded turn markers found on the floor labyrinth in the adjacent nave.[5]

Figure 3: designs of the floor labyrinth and the labyrinth graffito, Chartres Cathedral, France. Graphics: Jeff Saward

Relationship of the Chartres graffito labyrinth to other church wall labyrinths

The petit labyrinth at Chartres can be understood as both a graffito and a wall labyrinth. Unlike medieval stone carved labyrinths set into church walls, such as those found in Lucca, and Pontremoli, Italy,[6] or church wall and ceiling fresco labyrinths, such as those found in Scandinavia,[7] or at Alatri in Italy,[8] it does not appear to be the product of communal forethought. Graffiti labyrinths are by nature generally far more personal than other types of wall labyrinth.

When considering the Chartres labyrinth graffito, it is helpful to note the existence and characteristics of other ecclesiastical labyrinth graffiti. A medieval graffito of the eleven-circuit classical design is found on a pillar at Santa Maria de Taüll in Barrurera, Spain.[9] An eleven-circuit medieval labyrinth graffito that is undated, but with an origin no later than the eighteenth century, is found in the cathedral of St. Peter in Poitiers, France.[10] Several other labyrinth graffiti dating from the 14th to the 16th centuries have been found in churches on the island of Gotland in Sweden.[11]

When comparing the two French cathedral labyrinth graffiti, we discover that both are found on northern walls of western side aisles.[12] The eleven circuit pattern of each of these labyrinths is similar,[13] although the graffito of Poitiers documents the path, leaving empty space all around it, while the labyrinth design at Chartres has a path that is clearly defined by "walls" on either side. Both the labyrinth graffiti at Chartres and Poitiers appear to have been drawn "freehand" without a compass.

Figure 4: Wall Labyrinth, St. Peter's Cathedral, Poitiers, France. Two areas where the design differs from Chartres are marked. Photo: Jill Geoffrion

Areas for further research

Are there other church wall graffiti labyrinths that await discovery? We can hope that as enthusiasts and scholars pay renewed attention to the graffiti found throughout ecclesiastical buildings new labyrinths will be identified and studied.

We may never know whose hand was responsible for the petit labyrinth graffito at Chartres, or why it was created. However, it is likely that when specialists are able to study it closely, they will shed more light on its possible age.

Why the labyrinth was started, yet not completed is just one of the many mysteries that come to mind as one stands before the petit labyrinth on the wall in Chartres Cathedral. Was there a relationship between the wall and floor labyrinth is another.[14] If so, what was it?

For those who have come to appreciate the labyrinth in the nave of Chartres, this "little sister" labyrinth represents a new avenue for both research and wonder.

Jill Kimberly Hartwell Geoffrion and Alain Pierre Louët;
Chartres, France, November 2010.

Note to readers: The petit labyrinth graffito is located in an area currently staffed by Monuments Historiques, consequently it is not accessible without authorization.

References:

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1 Graffiti specialists at the cathedral have been aware of its existence for some time. Having no particular interest in labyrinths, they considered it as just one of the many graffiti that are found throughout the cathedral.

2 The wall labyrinth has not been dated. Specialists have found graffiti on the *enduits* in the cathedral from the thirteenth century, as well as from other periods, some as recent as the nineteenth century.

3 Thanks to Jeff Saward for visiting Chartres Cathedral with the authors to discuss the graffito and confirming these measurements.

4 "*vive le roi*" (long live the king), *Louis 18,* and *SR* (58 cm, approximately 22 3/4 inches from the labyrinth graffito), are all incised to the left of the petit labyrinth. A *fleur de lis* can be also be seen near these words (approximately 1.4 meters, 55 inches from the floor). All of these graffiti have significantly less dirt lodged in their grooves than the labyrinth. Furthermore, these graffiti, which seem related to the early 19th century (Louis XVIII's reign lasted from 1814-24) political realities in France, are carved much deeper into the render than the petit labyrinth; it appears that different tools were used in the creation of the upper grouping from those employed to incise the labyrinth. Above the labyrinth and to the right (41 cm, 16 inches and 78 cm, 30 ¾ inches), there are at least two other obvious graffiti involving straight lines. Until more research is carried out, it is not possible to know if any of the graffiti found on the wall are contemporary to one another.

5 The wall graffito seems to be at the approximate height of a crouching adult. The two westernmost pillars of the nave obstruct the view of the floor labyrinth, but much of it is still visible from the location of the petit labyrinth.

6 For more information on medieval wall labyrinths, see Kern, Hermann, *Through the Labyrinth. Designs and Meanings over 5,000 Years*. (New York: Prestel, 2000) and Saward, Jeff, *Labyrinths and Mazes of the World*. (New York: Lark Books, 2003). The stone and painted wall labyrinths seem to involve significantly more forethought, community involvement in the decisions of placement, precision and workmanship than their graffiti counterparts. These are much more likely to be the work of a single individual.

7 See Saward, 108-11.

8 See "The Alatri Labyrinth Fresco" by Giancarlo Pavat in this edition of *Caerdroia*.

9 "The recently discovered graffito on a pillar in the church of Santa Maria de Taüll in Barrurera is the only example so far recorded in Spain; it is unusual also for its classical design and twelfth-century date." Saward, p. 107.

10 The graffito's origin and its relationship to the labyrinth that is believed to have existed in the nave at Poitiers are uncertain. Kern states (p.158), "Construction of the church began in 1162. No more is known of the floor labyrinth it is thought to have contained than that it has disappeared. All that remains is a 90 x80 cm graffito on the inner wall of the third bay of the northern aisle... incised in the surface. The age of this graffito is not known, but it is generally regarded as a depiction of the original floor labyrinth." The graffito was cited in Chanoine Charles Auguste Auber's *Histoire de la Cathédrale de Poitiers, Vol.1*, published in 1849. Based on his comments, it is clear that the labyrinth graffito already existed in the eighteenth century.

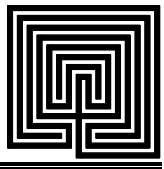
11 The first, at Lye, is found on the inner wall of the church tower and dates from the 16th century, at Ganthem (undated) the graffito is found on a church pillar and a third example at Hablingbo (also undated) is in a dark corner of the southern tower of the church (see www.labyrinthos.net/nordchurch3.html for details). Like the graffito at Chartres, the Hablingbo graffito was started, but never completed. For more information on these Swedish labyrinths, see Saward, p.108-110. John Kraft, Swedish labyrinth expert, comments on the two Swedish church graffiti, which like the graffito at Chartres, have been found on the walls of bell towers, "…two of the graffiti are located on the dark ground floors of church towers. It would seem the artists had chosen places where the labyrinths could not easily be discovered and this might suggest that these labyrinths were not accepted as part of the original adornment of the churches." See www.labyrinthos.net/nordchurch1.html

12 In the Cathedral of St. Peter in Poitiers, the labyrinth is found in the northern side aisle of the third bay, one bay west of the transept. At Chartres, the graffito is found all the way at the western end of the north side aisle.

13 There is an area in the Poitiers labyrinth where a "mistake" causes the path to head toward the center prematurely and then loop around. If the line had stopped in the center, and if the fifth and sixth lines from the center on the right side of the pattern between the upper and lower quadrants had included a turn area, the path would mirror that of Chartres exactly.

14 The supposed existence of both a graffito and a floor labyrinth at Poitiers raises the question about the possibility of finding graffiti in other medieval cathedrals that housed floor labyrinths.

The Alatri Labyrinth Fresco



Giancarlo Pavat

Alatri is a small town in central Italy, in Lazio, in the province of Frosinone, south of Rome, famous for its threefold city walls and Acropolis (formed by polygonal walls composed of huge boulders) entered through two gates, the Porta Maggiore and Porta Minore (or Porta dei Phalli). The Porta Maggiore, on the southern side of the Acropolis, is 4.5 m. high, 2.7 m. wide and built of eight huge overlapping blocks of limestone, topped by a monolithic architrave, c. 5 m. long with an estimated weight of at least 27 tons. The Porta Minore is equally remarkable, its monolithic architrave, carved with three apotropaic phallic symbols (largely erased in the Middle Ages) which gives it its alternative name, is 3.5 m. long. The builders of these megalithic structures are unknown and their dating is uncertain. Some archaeologists date them between the sixth and fourth centuries BCE, others say they are even older, at least 1000 BCE.

Alatri also boasts Roman and medieval monuments, including many beautiful churches and palaces from the 11th to 13th centuries CE. The church of St. Francis of Assisi dates from the 13th century and its adjoining cloister opens onto the Queen Margherita of Savoia piazza. Once a convent, then a prison and criminal court, today, having been restored, the church is now used as a hall for exhibitions and cultural events. During restoration work in 1996, a tunnel was discovered beneath the church, with a number of fresco paintings on its walls, including six-petal flowers (so-called *flowers of life*), spirals, triple circles, decorative plants and a unique depiction of "Christ in Glory" or "Christ the Judge" at the centre of a large labyrinth, composed of twelve black and white concentric circles.

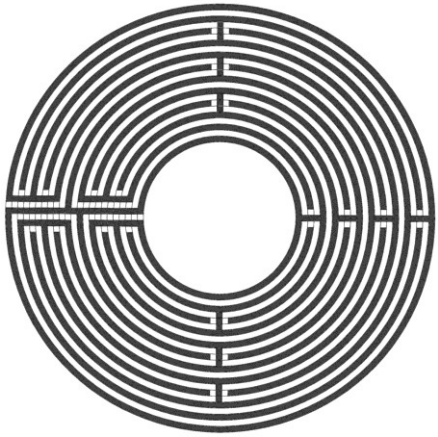
The size of the Alatri labyrinth fresco, and the fact that it is situated at the top of the wall, suggests that it was designed to be seen from a distance – perhaps it once decorated a large room used for worship. Almost nothing is currently known about the origin of this work of art, indeed, it was totally unknown until its casual discovery in 1996. The placement of an image of Christ within a labyrinth is unknown elsewhere, however, the design of the Alatri fresco labyrinth is essentially identical to that on the floor of the nave of Chartres Cathedral in France.

The author viewing the Alatri labyrinth fresco. Photo: Sonia Palombo

The labyrinth fresco in the church of St. Francis of Assisi, Alatri, Italy. Photo: Nello Rinaldi

The diameter of the outer circle of the labyrinth is c. 140 cm, while that of the inner circle measures 55 cm. At the centre of the labyrinth, a bearded Christ, his head surrounded by a halo inscribed with a cross, wears a dark tunic and golden cloak. In his left hand, on which he wears a ring, he holds a book closed with two buckles and decorated with a heart. With his right hand, he is shaking another hand issuing from the final path of the labyrinth, where it enters the centre.

To create the labyrinth, the unknown fresco artist has clearly first traced the central circle and then a further 23 concentric circles around it. Then, before painting the walls of the labyrinth in black, the circles have been cut to create the angles and corridors, giving the labyrinth a cross-shaped appearance resembling a "Cross Pattèe," similar to the red example that can be seen on the counter-façade in the church above. The wall painted with the "Christ in the Labyrinth" fresco faces south, so the entrance to the labyrinth lies to the west (to the left of the design) and the final path leads to the east. Therefore, the labyrinth is orientated like the vast majority of Christian churches and cathedrals; you enter from where the sun sets and you continue in the direction in which it rises, towards the light.



Schematic restoration of the design of the Alatri labyrinth fresco. Graphic: Jeff Saward

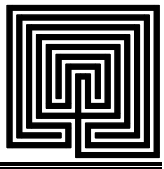
Of course, there are a number of other labyrinths from medieval times with the same Alatri/Chartres design, and many are in Italy. Some are still visible; or at least fragments remain, but others are gone forever. Among the missing is the example formerly in the church of Santa Maria Aquiro in Rome. The labyrinth in the San Michele Maggiore Cathedral at Pavia, in Lombardy in Northern Italy, has almost disappeared, leaving only a fragment. Still visible are the examples carved on a marble slab on the facade of the San Martino Cathedral in Lucca and another carved on a slab of stone in the church of San Pietro in Pontremoli, both in Tuscany. Finally, another Chartres-type fresco labyrinth is preserved in the small medieval church of Grinstad, in western Sweden.

At this moment the creator of the Christ in the labyrinth fresco of Alatri is unknown, however, study of the other decorations (the six-petal flowers, triple circles, spiral, stars, etc.) tend to attribute it to the order of *Pauperes Commilitiones Christi Templique Solomonici*, better known as the Knights Templar. Founded in the second decade of the 12th century in the Holy Land, in order to protect pilgrims and the Holy Sepulchre, it was destroyed by the French King Philip "the Fair" with the complicity of Pope Clement V in the 14th century. In my book *Valcento - the monastic orders of knighthood in southern Lazio* (Belvedere Editions, 2007), I proved that the Knights Templar were in Alatri between the 12th and 14th centuries. I found numerous "Templar crosses" painted in many of the churches of Alatri, including the churches of San Francesco and San Silvestro, and also at the Porta San Benedetto medieval gate, where there was a hospice for pilgrims. It has also been suggested that the locations of these labyrinths with the same Alatri/Chartres pattern indicate the stages of a journey, or pilgrimage, or places of spiritual initiation. According to Professor Graziella Frezza from the Ministry of Cultural Heritage of the Italian Republic, the Alatri frescos can be dated between the eleventh and fourteenth centuries and, currently, the Knights Templar are considered the likely authors or purchasers of the fresco of Christ in the labyrinth.

Currently the frescos at Alatri are in poor condition, but because of their importance, the Government of the Italian Republic has allocated 100,000 Euro for their restoration, with work scheduled to begin in November 2010. With the forthcoming restoration and further research, it may be possible to shed more light on these puzzles.

Giancarlo Pavat; Rome, Italy, May 2010.
email: giancarlo.pavat@gmail.com

The New Harmony Hedge Labyrinth



Robert Ferré

More than a decade ago, I began studying the three Harmonist communities built in the United States - one in Indiana and two in Pennsylvania - to find an answer to the question regarding their "pleasure gardens." Did they contain labyrinths or mazes? The former, of course, is unicursal, with a single meandering path, whereas the latter has multiple paths and dead ends.

Besides the differences in their patterns, labyrinths and mazes represent considerably different philosophical and metaphysical possibilities. It is my contention, and also that of several other labyrinth scholars, that the original pattern was unicursal, even though the "replica" built in New Harmony some 70 years ago was multicursal. I believe that the architect at that time thought that a maze would be more interesting than a labyrinth. So, he started with a pattern that we think is the historical Harmonist pattern, which is indeed unicursal, and changed it.

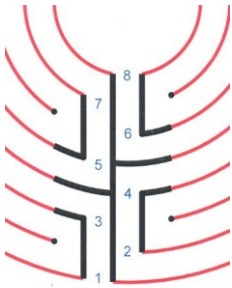
In the spring of 2009, I was contacted by Historic New Harmony, the non-profit organization staffed by the University of Southern Indiana, whose responsibility it is to preserve and promote the historical heritage of New Harmony. The hedge maze was in need of repair, thereby providing an opportunity to correct the pattern back to the original one. It was quite easy, once I made several drawings that showed where hedges needed to be removed and where they needed to be added. In the process, I found certain aspects of the original design to be quite unique and interesting.

A solid familiarity with the classical labyrinth pattern leads to understanding most other patterns, including circular patterns and even medieval variations. For most people, this starts with the seed pattern, from which one can easily draw a classical labyrinth.

The seed pattern (right, above), engenders the classical labyrinth (right, below). There are several features that we can identify. Notice that the dots in the seed pattern represent the ends of lines, around which there are turns. Because the seed pattern is symmetrical both vertically and horizontally, the same is therefore true with the turns, which are directly across from each other, both vertically and horizontally.

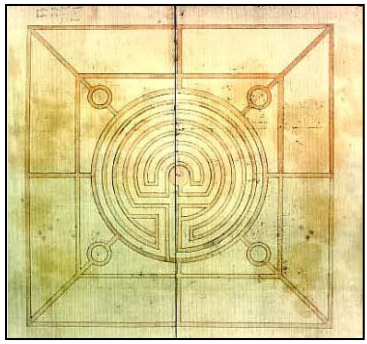
You will also notice that the pattern itself is not symmetrical, as the right side has one more path than the left side, due to the fact that the vertical arm of the seed pattern is to the left of centre, thereby forming a left-handed labyrinth. Finally, you will observe that the centre is very small. Essentially, the path just ends in the middle.

Suppose you want to have the labyrinth pattern symmetrical (especially across the base), as well as having a larger centre. This involves changing the seed pattern by lowering the left side, one path width. That will make both sides even at the base (shown right). The resulting seed pattern pertains to virtually all circular labyrinths and also allows for a larger centre.



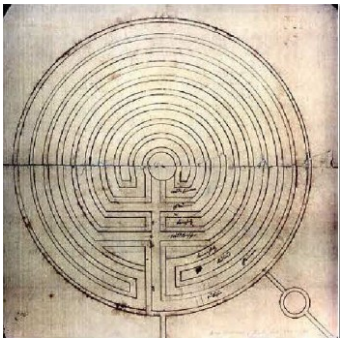
Looking at the changed seed pattern, we find that we lose the horizontal symmetry. The turns on the left side of the pattern no longer line up across from those on the right side. For any circular pattern, this will be true. The centre, being circular, can be of any diameter, large or small.

Frederich Rapp (nee Reichert), adopted son of George Rapp, the founder and leader of the Harmonists, was an architect who laid out the plan for the three villages. I think we can assume he also designed the labyrinths. My speculation is that he wanted a large centre, in order to accommodate the temple that would be built there, yet still wanted the turns to be as horizontally symmetrical as possible. To do this, he found an innovative solution which I have never seen elsewhere. To understand what he did, we must switch from looking at the lines (which are the hedges) and look instead the paths, as shown in the drawing to the lower right.

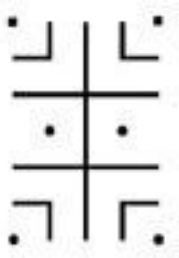


It takes a minute to get used to seeing paths rather than the hedges. Right, is the plan of the labyrinth believed to have been built in the first Harmonist community, in Pennsylvania. It looks like there are eight paths (the darker lines - the lighter areas being hedges), but the outer circle is just a walkway that connects with the other outer elements. So it is a seven-circuit design. Note that the top turns are horizontally symmetrical, as with a classical design, even though the pattern is circular. This unique feature caught my attention. The lower turns are a bit complicated, as two vertical paths divide to enclose a triangular area at the transition between the horizontal and circular paths. However, the paths quickly rejoin, thus, there is no real choice, as either part of the bifurcation has the same result, namely, continuing on with the unicursal design. It is still a unicursal labyrinth, even though on first glance there seem to be choices. Despite the creative upper turns, you will see that the two lower turns still do not line up. Nevertheless, they participate in the diversion of the circular paths to meet the horizontals, in such a way as to create symmetry, which otherwise would not be possible.

This innovative aspect of Rapp's design (see drawing left), which was to be repeated in two more patterns, a nine-circuit pattern now in New Harmony and another seven-circuit pattern in the third community, at Economy. The diagram (right) showing the classical seed pattern overlying the design may give us a hint as to how Rapp calculated where the horizontal diversions needed to go. The seed pattern, of course, represents the lines (in this case, hedges), which are between the paths and help to delineate them. He did not change the seed pattern to one suited for a symmetrical circular labyrinth, in the style shown previously.

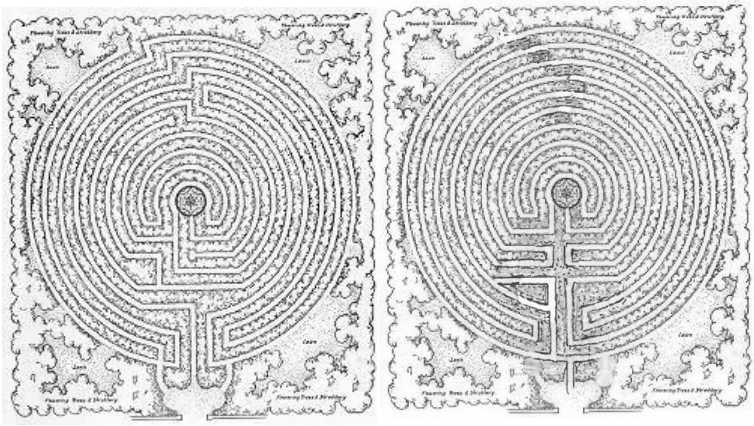


Let's graduate to the more sophisticated design, the nine-circuit pattern most likely to have been built in New Harmony (see plan, left). This is exactly the same as the seven-circuit design except that a pair of turns has been inserted in the middle. In terms of the seed pattern (shown right), it is as if he made two horizontal arms, with a turn between them (rather than adding a second bracket to two of the quadrants of the seed patterns shown earlier). To the left we can see that the added turns are horizontally symmetrical, due to the clever way in which the circles are diverted into horizontal paths.



This is much the same way a monk named Otfrid created an 11-circuit circular labyrinth in the 9th century. Here is his design (below, right). Like Rapp would do 11 centuries later, Otfrid enlarged a 7-circuit pattern by adding more turns in the middle. Seeking to have 11 circuits, he added four more paths, whereas Rapp, seeking a nine-circuit pattern, added two. However, Otfrid's pattern still reflects the normal situation for a circular labyrinth, in which the turns on the left and right sides of the entrance do not line up in a symmetrical way. This would be Rapp's contribution to the development of labyrinth patterns. Compare the seven-circuit Rapp path pattern (top left) and the nine-circuit version (above left). You can see the extra two paths inserted in the middle of the pattern.

The design used in 1941 to construct the hedge maze, which had 10 circuits, also added zigzags, intersections, and dead ends. When we redesigned the labyrinth, we had a relatively small number of changes to make to restore it back to being unicursal, thanks to the fact that they started with the original design, before making their changes.



Above left: the 1941 maze design. Above right: the newly restored unicursal design, with only one triangular area at the entrance - the one on the right was eliminated to save more hedges

Note that the hedges are supposed to be tight against the temple at both sides of the entrance. In fact, this is not actually the case, as there is a bit of space all the way around the centre. This leads to a bit of confusion, as the inner path seems to go around the building all the way to the entrance, rather than turning back outward. The extra space (not shown in the drawing) creates an unintended choice.

To review, note the diagram right. It numbers the paths sequentially, starting from the outside. The black lines form a typical circular nine-circuit labyrinth. The horizontal grey lines change the traditional pattern so as to achieve horizontal symmetry. You can see on the left side of the entrance, the black lines indicate that the turn formed by paths four and five does not line up with the black turn on the right side, formed by paths five and six. With the grey lines, however, paths four and five on the left side do, in fact, line up symmetrically with paths five and six on the right side. This, again, is the symmetry that Frederick Rapp achieved.

To the right, is the final design. I think this is a very unique pattern created by an ingenious technique to realize a circular labyrinth with much of the symmetry of a standard classical design. The restoration included one more feature. Much damage is done to the hedges by people crashing through, who only want to go to see the temple, without walking the entire labyrinth. To prevent such abuse, we placed three gates within the hedge walls, which allow visitors to go directly into the centre and out again without crashing through the hedges. These are evident in the photo below, which shows the labyrinth as it is today. I believe that the restoration from hedge maze to hedge labyrinth was a proper action, and furthermore, historically supported.

Now, in summer of 2010, the changes have had a chance to grow, the paths have been renewed, and the hedges trimmed and it's now beautiful again. Rather than a very ordinary hedge maze, New Harmony now has one of very few hedge labyrinths in the United States, and the only one of its particular pattern.

Robert Ferré,
St. Louis, MO, USA;
September 2010.

The newly restored hedge labyrinth, New Harmony, Indiana, USA.

Photo courtesy of Historic New Harmony

How Important is Context?

Penny Granger

A lot has been written in *Caerdroia* over the years about the designs of labyrinths and to a lesser extent mazes. Uni- or multicursal, square or round, Knossos, Reims, or Chartres types... The design possibilities are endless and may be discussed endlessly – though the maze or labyrinth itself must have an end somewhere! But little thought is given to context, beyond a brief description of the site, material, and possible date of construction. Perhaps this is because most mazes and labyrinths sit happily in their surroundings. However, the recent temporary installation of a hedge maze in London's Trafalgar Square, looking most uncomfortable, got me thinking about context and how much it matters *where* a labyrinth or maze is situated.

Temporary hedge maze in Trafalgar Square, London, August 2010
Photo courtesy of Small World News Service

I believe that the physical and social context of a maze or labyrinth is important because they affect how one approaches it, literally and metaphorically. Locations vary enormously: from ancient stone or turf labyrinths in remote, often elevated sites, sometimes with trees round them (e.g. Dalby or Breamore), through hedge mazes in formal gardens to modern fun mazes in theme parks, temporary maize mazes, and even labyrinths mown into long grass. But if you divide mazes into broad categories, spiritual and social, trends begin to emerge.

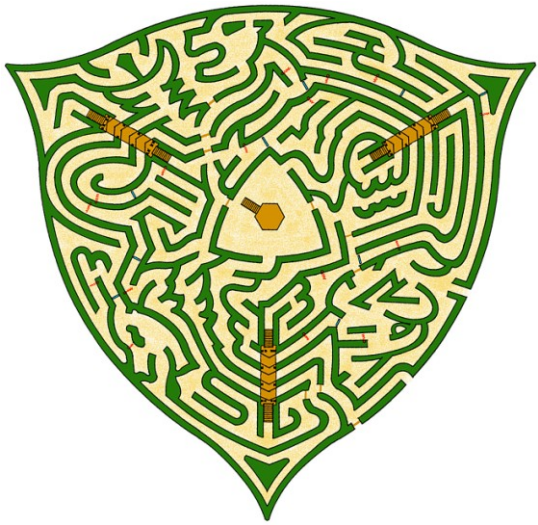
The spiritual category includes ancient stone labyrinths, and pavement labyrinths and mazes in churches. Labyrinths such as that most celebrated example in Chartres Cathedral are said to represent a pilgrimage to Jerusalem, which itself represents the spiritual journey to heaven - the New Jerusalem. Again, the position of the installation within the building varies: the most common site in a cathedral is at the east end of the nave - the point beyond which a worshipper approaches the altar, the holiest part of the building. But when Sir George Gilbert Scott restored Ely Cathedral in 1870 he designed a labyrinth, placing it at the west end where it must be negotiated (even if only by walking straight across) in order to enter the cathedral. There are other examples in church porches, e.g. Voorburg in The Netherlands. Mazes at the entrance to a church act like a footbath at the entrance to a swimming pool, providing spiritual cleansing on the way in.

Pavement labyrinth, Ely Cathedral, England

Two examples of spiritually-inspired mazes which are also social are the Van Buuren maze in Brussels and the Archbishop's maze at Grey's Court, Oxfordshire, which I have written about in an earlier issue of *Caerdroia*. One took its inspiration from the Song of Songs and the other from a sermon; one is in a private garden and the other in the garden of a property in the care of the National Trust. They provide a bridge between the wholly religious and wholly secular context of the maze.

Mazes and labyrinths in a social context are generally about fun and enjoyment, not to mention physical exercise. The locations are more interesting to study because they are so varied. Again, the types of site may be categorised: public open spaces (turf labyrinths in, e.g., Saffron Walden, Wing, Hilton), schools (e.g. turf labyrinth at Meridian School, Comberton; pavement maze at St John's College School, Cambridge), pavement mazes which may be public (Hull) or private (Kentwell Hall, Temple Newsam), hedge mazes in formal gardens (Hampton Court, my favourite at Menkemarborg in The Netherlands), playgrounds and theme parks. There are also mazes in private gardens, not open to the public, which present the intriguing scenario of one enclosed space within another. These include several commissioned by well-known celebrities - whose names and locations cannot, of course, be revealed...

Hampton Court hedge maze



The Drielandenpunt hedge maze

Many modern mazes have particular contextual signify-cance which may be reflected in their design. For example, the Drielandenpunt hedge maze in Vaals, constructed by Adrian Fisher at the place where The Netherlands, Belgium and Germany meet, is the most visited maze in The Netherlands. When inside it you do not appreciate that the plan of the maze is basically a triangle, representing the three countries and incorporating their symbols: the Dutch and Belgian lions and the German eagle. So when you walk the maze, climbing bridges and dodging fountains, you travel symbolically through the three countries.

My second and third examples are linked; both are in London. If you travel on the Victoria underground line through central London you will see a ceramic maze design repeated along the platform at Warren Street station. A visual pun on the station name it is one of a series of striking motifs on platforms along that line. But I have never stopped to trace the way to the centre of the maze, nor have I seen anyone else study it. It is simply there, giving silent witness not only to its immediate context but also that of the underground system as a whole. In a children's playground not far from the station there is a squared 7-ring labyrinth which post-dates the station maze and provides an alternative visual pun. Here you can physically walk its path and find your way out of the warren.

Tiled maze, Warren Street underground station

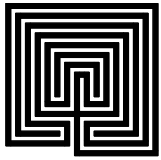
About two years ago I moved into a house with a small, undeveloped, back garden. Its one permanent feature was a circular drain cover in the middle. I decided that this must be the centre of a circular pavement maze, about 5m across. The path is brick, separated by small stones in concrete to create contrasting textures and colours. The maze has three entrances/exits, leading to/from the house, the shed door, and the back gate, joining up on the way to the centre. If you choose to walk straight across it barefoot you can feel which is the real (smoother-textured) path. Whenever my grand-daughters come to visit, the first thing they do is to walk all the paths in turn. So a tiny, uninspiring patch of garden has become transformed into a space to enjoy and an opportunity for special rituals. It feels good, and appropriate for its setting.

Pavement maze in the author's garden, Cambridge

So what of Trafalgar Square? The maze (30 x 20m.) was designed as a tourist attraction – and certainly succeeded, with queues of forty or so people waiting to enter it. Inside were information boards about West End attractions, with the stated aim of encouraging people to get lost in the maze while finding out about the surrounding area – in which they could presumably get lost all over again! So a pavement maze would not have worked, but on the other hand the hedge looked completely out of place: better to have installed it in, say, the Embankment Gardens, or to have built the maze from wooden fencing. But however inappropriate the context, the installation showed the continuing fascination with mazes and labyrinths that draws people to walk their paths and unlock the mystery.

Penny Granger; Cambridge, England, August 2010

Greys Court: an invitation to symmetry



Richard Myers Shelton

Abstract: The labyrinth embedded in the Archbishop's Maze at Greys Court, designed by Randoll Coate and Adrian Fisher, exhibits several remarkable and not entirely obvious geometric properties.

In 1980 Robert Runcie, Archbishop of Canterbury, commissioned the Archbishop's Maze to commemorate his enthronement as archbishop. The commission was given to Randoll Coate and Adrian Fisher, who had been introduced to one another only the year before, and had just formed Minotaur Designs as a joint enterprise. The Archbishop's Maze was thus one of their first designs, and, to my mind, one of their best. It is simultaneously a maze and a labyrinth: a path demarcated within the maze traces out a unicursal path from start to centre, while the "Crown of Thorns" elements along the internal axes introduce branching between the labyrinth courses (figure 1).

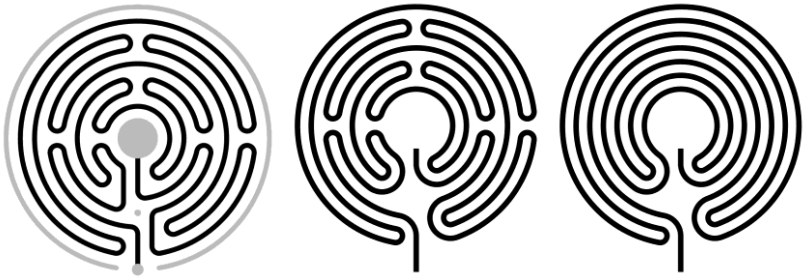
Figure 1: The Archbishop's Maze

There is much to admire in the Archbishop's Maze. Great care was lavished on its physical setting at the estate of Greys Court, a National Trust historic property in Oxfordshire; and the construction of rich red brick set in turf is very attractive. The details of the construction unite a veritable cloud of Christian symbols that engage the imagination of those with a mind for such things. Perhaps best known, beyond the Crown of Thorns itself, is the combination of the Latin and Greek crosses at the center, representing the unity of the Church that the archbishop worked so hard to promote. Intriguing also is the interplay of the maze, which wanders throughout the Crown of Thorns, against the simple directness of the embedded labyrinth, which cuts right through all the distractions.

Figure 2: Walled version of the Greys Court labyrinth

It is the labyrinth pattern itself, however, that draws my attention most. Abstracting this pattern from its setting within the maze yields a seven-course labyrinth on four axes. I call it *Greys Court* to distinguish it from the particular setting in the Archbishop's Maze.

The Greys Court design has since appeared in other settings, both in thread form (as in the Archbishop's Maze), and as a walled version (figures 2 and 4). Photos of various installations in Germany can be seen on the websites of Haufmann[1] and Reißmann,[2] including sites at Sießen and Wollbach, and a version with "ears" (in the fashion of Saffron Walden) designed by Gernot Candolini for the Abbey of Münsterschwarzach. The website of the University of Kent highlights a version of Greys Court designed by Jeff Saward,[3] constructed there in 2008 (figure 3); it overlooks the city of Canterbury and is aligned (in something of a serendipitous self-reference) with the tower of the archbishop's own cathedral.



Left to right: Figures 3-5: Jeff Saward's design for the labyrinth at the University of Kent, thread version of Greys Court & Greys Court without internal turns

But of all these installations, the Archbishop's Maze at Greys Court, built in 1981, was the first; it stands poised at the threshold of the modern enthusiasm for labyrinths. Given the increasing popularity of the design, it is something of a surprise that its striking properties as a labyrinth are not better known. In this article I will highlight four properties that I think help to drive that popularity.

A simple transformation

The first property is a very simple observation - but a very satisfying one: Greys Court is a direct transformation of the classical seven-course labyrinth into a cruciform labyrinth. If you ignore all the turns except those along the main axis, what remains is the classical labyrinth. In other words, Greys Court is formed simply by adding internal turns to the classical labyrinth (figures 4 and 5).

Much ink has been spilled over the development of the medieval design of Chartres. Most of us share an intuition that the classical labyrinth is ultimately what stands behind Chartres - that the Chartres pattern in some sense represents an attempt to Christianize the pagan seven-course labyrinth that was well-known from classical times and appeared in stone and field labyrinths and at least occasionally in churches well into the Middle Ages. Yet the direct transformation represented by Greys Court seems never to have arisen historically; the first step in the evolution of Chartres apparently was to change the number of courses from seven to eleven as in Otfrid (Kern 2000,[4] image 176), so that by the time the internal turns were being introduced, a seven-course solution had already been passed by.

But despite not being discovered early, Greys Court remains powerful, and I believe it inherits its emotional impact directly from the classical labyrinth. It was this power that the medieval monks were trying to tap into when they abandoned the four-square Roman-style mazes. And while the Christian symbolism in the Archbishop's Maze is intellectually intriguing, it remains surface noise; this relationship to the classical labyrinth touches me far more deeply.

The palindrome

My second observation is that, like Chartres and Reims, Greys Court is *palindromic*.

This property focuses on the way the path through a labyrinth divides the circular courses into shorter arcs. Ignore for the time being the connections *between* courses along the axes, and look at the courses themselves. When the path enters a course, it might trace out the entire course before leaving it for another course - but more often it traces out only part of the course, returning later to pick up more of it on another pass.

If the axes are evenly spaced around the circle, the segments traced out in the courses will be multiples of the basic angle between the axes. In the 4-axis case, with axes spaced 90 degrees apart, each time the path visits a course it might trace out a quarter-turn (90 degrees), a half-turn (180 degrees), a three-quarter-turn (270 degrees), or the full circular course (360 degrees). These angles, of course, are only approximate since some allowance must be made for the connections along the axes.

The *turning sequence* of a labyrinth is simply the sequence recording the lengths of these segments - in order - along the path from the entrance through to the centre. Using the numbers *1* through *4* to represent the size of each segment in terms of 90-degree increments, we can represent the turning sequence numerically. In Greys Court (as the reader may verify by comparing with Figure 2) the turning sequence falls out as follows. (The dashes represent points where the path returns to the main axis.)

1 1 – 1 1 – 2 1 3 – 2 1 2 1 2 – 3 1 2 – 1 1 – 1 1

The sequence starts with four 1s, showing that as the path leaves the entrance it makes a series of four quarter-turns along the courses. In Figure 2 we can follow along: the entrance connects to course 3 for a quarter-turn to the first side axis, and then back to the main axis on course 4; then two quarter-turns along courses 7 and 6, again to the side axis and back. The next sequence numbers are "2 1 3", signifying a half-turn to the back (along course 5), a quarter-turn retreat (in course 6), and a three-quarter turn all the way around to the other side of the main axis (in course 7). The sequence continues in this fashion until you finally reach the centre.

The turning sequence for any labyrinth is a characteristic property of the labyrinth, describing the order of the turns encountered along the courses as the path wends to the centre. Since the return path in a unicursal labyrinth simply re-traces the forward path in reverse, the turning sequence *read backwards* always describes the order of the turns encountered on the way out.

In Greys Court the turning sequence has an additional refinement: it is a *palindrome* - the sequence reads the same backwards as forwards. The numbers in the sequence are therefore arranged in a mirror-symmetric order, and this has two easily observed consequences.

First, the pattern of turns you encounter coming out from the centre is the *same* as the pattern you encounter going in - even though the outward path traces the turns in reverse order. If you trace Figure 2 from the entrance and the centre simultaneously, you will see that, in terms of angular measure, the segments going in are matched in order by the segments going out.

Similarly, the path exhibits a reflecting pattern as you travel in from the entrance: once you reach the point where half of the turning segments have been passed, the sequence of segments still to come on the way in to the centre will repeat what you just came through, but in reverse order - setting up (as Jacques Hébert described it) a certain rhythm in the path. The same self-reflecting order is encountered again on the return trip out.

Greys Court is not alone in this. Palindromic behaviour was first noticed in Chartres; and while it is certainly not shared by all labyrinths, it is found in several of the better designs. The palindromic nature of Chartres and Reims led Hébert to define a group of 20 palindromic labyrinths (all with 11 courses and 4 axes) that includes Chartres and Reims;[5] he called these the "Canonical Labyrinths" and intended them as a natural generalization of the notion of medieval labyrinth. Greys Court, with only 7 courses, is not one of them, but it shares their palindromic behaviour.

I could point out that even the classical labyrinth exhibits this palindromic property, but no one will get very excited over the sequence:

4 – 4 – 4 – 4 – 4 – 4 – 4

even though it is technically a palindrome!

Symmetry

"Palindromicity" (if we may call it that) is a symmetry property: that Greys Court is palindromic says that it is symmetric, in some sense. But Greys Court has a much stronger symmetry property, and this is my third observation: Greys Court is *self-dual*. Some background is required, however, to explain the meaning and significance of this.

When we say that a design is symmetric, what we usually have in mind is *left–right mirror symmetry*. But with the single exception of the trivial labyrinth with no courses (where the path goes straight from the entrance to the centre), no true unicursal labyrinth is symmetric in that sense: as the path leaves the entrance it must turn first to the right or to the left; it cannot do both simultaneously. The pattern thus has an inherent handedness that breaks this kind of mirror symmetry. Since mirror symmetry is therefore impossible in labyrinths, it is not an important consideration in distinguishing them, and we generally ignore mirror differences of this sort: mathematically, a labyrinth and its mirror image are considered examples of the *same design*.

But it is well known that Chartres illustrates a kind of symmetry in the placement of the turns along its axes. To formalize that we introduce the notion of *duality*. The dual of a labyrinth is a second labyrinth, obtained by turning the first one inside-out, so to speak. The construction is easiest to describe in terms of the *level chart* of the labyrinth: as long as the path doesn't cross the main axis, you can cut along the main axis from the outside to the centre, and then (holding the left side of the main axis down) unwind the labyrinth courses counter-clockwise so that the paths all lie in straight lines instead of curving around the centre. The outermost course gets unwound to lie at the bottom of the chart, and the innermost course lies along the top. The left side of the main axis lies (counter-intuitively) at the right side of the chart, and the right side of the main axis gets unwound to the left side of the chart (figure 6).

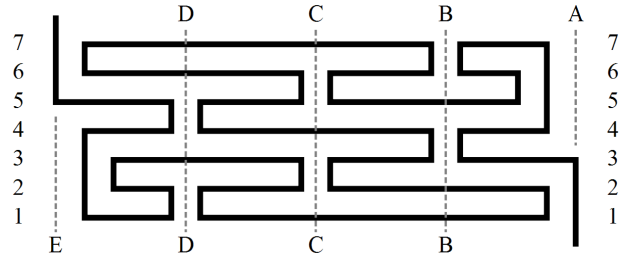


Figure 6: Greys Court level chart

(Some authors prefer to orient their level charts with the outer course at the top - rotated 180 degrees from what I just described. It seems more natural to me to put the outer course at the bottom, but both orientations are by now well established in the literature.)

The level chart captures all the information about the path in rectilinear form. Properties of the labyrinth are represented by corresponding properties of the level chart. For example, it is easy to see that if you take the left–right mirror reflection of the labyrinth and unwind it into a level chart, you end up with the left–right mirror reflection of the original level chart.

Now to form the dual, you interchange the notion of inside and outside: you flip the level chart over from top to bottom. The entrance turns into an exit, and vice versa. For a labyrinth with an even number of courses (an *even* labyrinth), the entrance and exit are on the same side of the main axis, and therefore both at the right side or the left side of the level chart - so flipping the chart from top to bottom will interchange the entrance and the exit. For a labyrinth with an odd number of courses (an *odd* labyrinth), the entrance and exit are on opposite sides, and this flipping makes them *switch* sides. (The entrance is typically on the left side of the main axis - the right side of the level chart - and the exit is on the opposite side. So when you flip the chart over, what was the exit becomes the new entrance, but on the side opposite the old entrance.) Since the mirror image of a labyrinth is mathematically equivalent to the original, we are allowed to flip the chart over again from right to left to get the new entrance back on the correct side of the chart.

This double flipping (from top to bottom, then right to left) is equivalent to leaving the chart flat and rotating it 180 degrees around the centre point - the midpoint of course 4 in Greys Court. (Try this with a sheet of paper if you're not convinced!) Thus for an even labyrinth, the level chart of the dual is obtained by one flip (top to bottom); for an odd labyrinth, by two flips (top to bottom, then right to left) or equivalently by a 180-degree rotation.

If you try this with the level chart of Greys Court (which has an odd number of courses), you will see that the rotated level chart is *the same* as the un-rotated chart: the chart matches itself when rotated 180 degrees. This says that Greys Court is its own dual - that it is *self-dual*. This implies that the turns of the labyrinth must be symmetrically placed to maintain the rotational symmetry of the level chart. For example, the turns along the right side of the chart get rotated into the turns along the left side of the chart, so that in the original labyrinth the turns along one side of the main axis are duplicated on the other side, but in reverse order. The axis diametrically opposite the main axis (axis C, the one in the middle of the level chart) gets rotated into itself, so the turns along C must mirror one another across the middle course. Similarly the two side axes B and D get rotated into each other, so the turns along one going from the outside in must match the turns along the other from the inside out.

This should sound familiar, because several other well-known labyrinths are also self-dual, including Chartres, Reims, and even the seven-course classical labyrinth. They all exhibit this symmetrical placement of turns along the axes. This is the notion of symmetry that is appropriate to labyrinths, and when we say that a labyrinth is *symmetric*, it is usually self-duality that is meant: the labyrinth remains unchanged when turned inside-out. Some authors distinguish between the one-flip symmetry for even labyrinths and the double-flip symmetry for odd labyrinths, calling the first *symmetry* and the second *skew-symmetry* or *anti-symmetry*. I use *symmetry* for both, since both are manifestations of the same underlying property, self-duality.

I said above that self-duality is a *stronger* symmetry property than palindromicity, and I mean that in a mathematical sense: any self-dual labyrinth is *automatically* palindromic. To see that, imagine a walker starting at the entrance of the level chart. Now rotate the level chart by 180 degrees, so that the walker is starting at the exit instead. If the labyrinth is self-dual, the rest of the diagram remains unchanged, and if we imagine both walkers now proceeding along the path, they must encounter segments of the same length in the same order. Self-duality means that the labyrinth looks the same whether viewed from the inside or the outside - and in particular, the order and the (angular) length of the path segments must be the same from both viewpoints.

And in an odd self-dual labyrinth, the midpoint of the palindromic sequence - the point where the two walkers meet each other, if they're careful to maintain a common pace through the level chart - will always fall at the midpoint of the middle course, where the middle course crosses axis C in the 4-axis case. This is because the first walker always maintains the same relationship to the entrance as the second walker does to the exit. So if the two walkers are at the *same* point, that point must be (a) the same angular distance from the entrance as from the exit (therefore on axis C, since exit and

entrance are on opposite sides), and (b) the same distance from the outside as from the inside (therefore on the middle course). Put differently, the rotational symmetry of the chart constrains the walkers to maintain positions that are symmetric to each other - and they can meet, therefore, only at the centre of rotational symmetry, which is the midpoint of the middle course.

Palindromicity is strictly weaker than self-duality: there are palindromic labyrinths that are not self-dual. As a trivial counter-example, *any* full-course labyrinth - one like the classical labyrinth with only a main axis and no internal axes - is trivially palindromic, but the connections along the two sides of the main axis need not reflect one another as they do in the classical labyrinth.

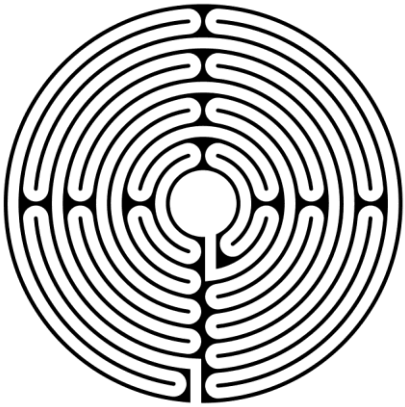


Figure 7a:
The self-dual pattern of Reims

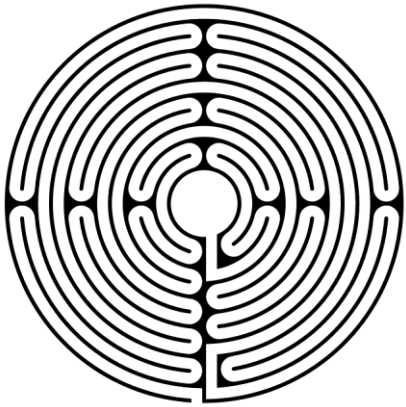


Figure 7b: Reims doctored to be palindromic but not self-dual

Hébert's development of Canonical Labyrinths as generalizations of Chartres fastened on palindromicity as the key property of Chartres, because Hébert was convinced that a palindromic path - specifically, one composed of the same (1 1), (2 2), and (2 1 2 1 2) elements that appear in the palindromic sequence of Chartres - would *necessarily* force the turns along the four axes into a self-dual configuration. But this is not true, as the accompanying counter-example shows. The counter-example is formed from the pattern of Reims (figure 7a) by turning the outermost three courses inside-out (figure 7b). The segments are still traversed in the same order, so the palindromic sequence of Reims is preserved, but the labyrinth is now obviously *not* self-dual - the pattern of turns along the axes is clearly not symmetric in the manner of Chartres. In effect, self-duality is a hidden assumption in Hébert's discussion, and therefore his twenty Canonical Labyrinths unsurprisingly all turn out to be self-dual. In fact, there are many patterns that satisfy all of Hébert's stated criteria (including palindromicity) without being self-dual. The Canonical ones are just the ones that happen also to be self-dual. The "merely palindromic" ones outnumber the self-dual Canonical ones 26 to 20.

"Most like Chartres"

Hébert's Canonical Labyrinths represent one way of generalizing Chartres to a larger class of labyrinths that share some of Chartres's pleasing properties. Another approach (focusing on a different set of properties) was developed by Pierre Rosenstiehl.[6] Rosenstiehl suggested the following rules as the characteristic properties of Chartres:

1. (The Rule of Alternation) Along each *internal* axis (B, C, and D in the 4-axis case), the turns on the axis and the straight runs that cross the axis strictly alternate with each other. (With a minor fudge: depending on the placement of the turns along the axis, there may need to be two adjacent straight runs at one or both ends of the axis.)

2. (The Rule of Height Regularity) Along the two sides of the *main* axis (A and E), the turns are always nested exactly two deep: a turn either joins two adjacent courses and is enclosed by one larger turn, or else it is a larger turn joining two non-adjacent courses (or joining a course to the entrance or exit), and encloses other turns without itself being enclosed.

Examining Chartres at this point will show that Chartres does in fact satisfy both of these rules - and will help to clarify precisely what each rule means.

Rosenstiehl called labyrinths that satisfy both (1) and (2) the *Alternating labyrinths* - but the reader should be aware that Rosenstiehl is using *alternating* here in a non-standard sense; usually it means simply that each time the path changes from one course to another it also changes direction - clockwise to counter-clockwise or vice versa. Rosenstiehl includes that more fundamental notion of alternation as part of the *definition* of a labyrinth. I will capitalize *Alternating* when using it in Rosenstiehl's sense.

It turns out that these two rules together are very stringent: Alternating labyrinths in Rosenstiehl's sense are few and far between. Indeed, Rosenstiehl proposed (without proof) a Uniqueness Theorem predicting the number of Alternating labyrinths for each given dimension $N \times A$ (where N is the number of courses and A the number of axes). He concluded that there are often none, and otherwise only one or at most two in each case. For example, it can be shown that an Alternating labyrinth must have an odd number of courses - so when N is even, there are *no* $N \times A$ Alternating labyrinths, regardless of the value of A.

Moreover, there is a close relationship between Alternating labyrinths and duality. It is easy to see that if a labyrinth satisfies both rules above, its dual must also satisfy them - since neither rule is affected by rotating the level chart. Thus, each Alternating labyrinth is either self-dual or else comes with a dual mate that is also Alternating.

Unfortunately the numbers predicted by Rosenstiehl are not correct in general: there are typically somewhat more examples than he predicted, and the discrepancy grows as the number A of axes gets larger. But for $A = 4$ (the case of four axes that we are usually interested in), Rosenstiehl's formula is very nearly correct. In this case, his prediction can be worded as follows:

- If N is even, or equal to 1, there are no $N \times 4$ Alternating labyrinths.
- If N is an odd number divisible by 3, there are exactly two $N \times 4$ Alternating labyrinths, and they are duals of each other.
- If N is an odd number not divisible by 3 (and greater than 1), there is exactly one $N \times 4$ Alternating labyrinth, and it is self-dual.

In a sense, therefore, the collection of 4-axis Alternating labyrinths picks out for each odd N (greater than 1) the one $N \times 4$ labyrinth (up to duality) that is "most like Chartres".

The case of 3 courses deserves some attention, because it is the one case among 4-axis labyrinths where Rosenstiehl's theorem fails: in addition to the two mutually dual Alternating labyrinths predicted by Rosenstiehl for $N = 3$ (figures 8a and 8c), there is another 3×4 Alternating labyrinth, which is self-dual (figure 8b). All three are *degenerate*, in the sense that one axis is superfluous, having no turns on it. All three can be seen as alterations of the unique 3×3 Alternating labyrinth (figure 8d), being obtained from the latter by pushing the two internal axes around to various positions to make room for the superfluous fourth axis. Curiously, this underlying 3×3 labyrinth was missed by Rosenstiehl, whose theorem incorrectly predicts that there are *no* Alternating labyrinths with 3 axes.

Figure 8a: 3 × 4 Alternating labyrinth (a)

Figure 8b: 3 × 4 Alternating labyrinth (b)

Figure 8c: 3 × 4 Alternating labyrinth (c)

Figure 8d: 3 × 3 Alternating labyrinth underlying (a), (b) & (c)

Chartres is itself, of course, the unique, self-dual 11×4 Alternating pattern. For $N = 7$, as 7 is not divisible by 3, there is also just one 7×4 Alternating labyrinth; and as the reader may by now have guessed, it is Greys Court. Greys Court is therefore (by these criteria) the one 7-course labyrinth that is "most like Chartres". It is remarkable that simply by asking for the turns to be nicely spaced and neatly stacked we should end up narrowing the field so dramatically!

What do some of the other "most like Chartres" labyrinths look like? Greys Court first appears only in 1981, but several other 4-axis Alternating labyrinths besides Chartres appear in the older historical record.

Inner Chartres (figure 9), essentially the five inner courses of Chartres, is represented historically by the Compiègne Relief from around the 17th century (Kern, image 354); by Guingamp, constructed in the mid-1800s (Kern, p. 155; Saward 2003,[7] p. 113); and by the tile labyrinth in St. Nicholaas Church, Nieuwegein, Netherlands, installed some time during or not long after the construction of the church, which was completed in 1873 (Schaefers 2001).[8]

Figure 9: Inner Chartres, 5 × 4

The octagonal labyrinth in the courtyard of the Neues Rathaus in Munich (see Haufmann), built circa 1910, is one of the two 9 × 4 cases (figure 10). This pattern probably arose because the full 11 courses of Chartres wouldn't fit comfortably in the limited space in the courtyard; the outer two courses were lopped off and the resulting loose ends patched together (figure 13a).

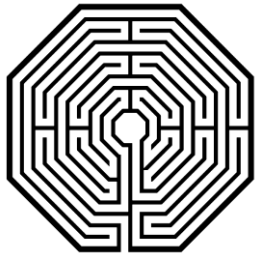


Figure 10: Neues Rathaus, Munich, 9 × 4 (a)

The Hilton turf maze (Kern, images 299–300; Saward, p.125), by an amusingly analogous process, turned into the other 9 × 4 design (figure 11). Hilton was originally constructed in 1660, almost certainly as a copy of Chartres, but over time the crowded inner courses became degraded. When the maze was re-cut in the 20th century, the two almost-obliterated courses nearest the centre were sacrificed (figure 13b). Since this is the dual of the operation that led to Munich - the same operation but applied to the inside instead of the outside - what resulted is the dual of Munich.

Figure 11: Hilton, 9 × 4 (b)

Saffron Walden (Kern, images 305–306; Saward, pp.118, 127) is the unique, self-dual 17 × 4 Alternating labyrinth (figure 12), by far the most ambitious to have been undertaken to date. As discussed in Saward (p.127) the turf maze was likely constructed in 1699, and was probably inspired by the popular garden book by Thomas Hill published in 1579 (Kern, image 471). This design in turn was obviously copied from an engraving by Guillaume de la Perrière published in 1539 (Kern, image 403).

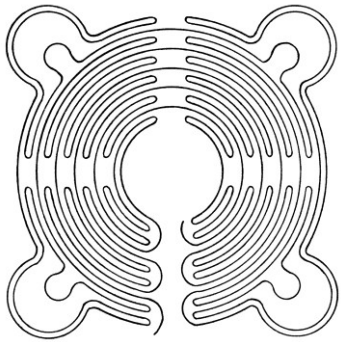


Figure 12: Safron Walden, 17 x 4

The paths in these two printed versions describe "ears" exactly as the maze does, with the two outer paths diverging far from the circular courses, and the third path much less so. The plan of the maze is very slightly obscured in de la Perrière (two turns are hidden by the figure standing in the centre), and it is not quite correct in Hill (one of those two turns is now clearly missing); but it appears unambiguously correct as a square maze in yet a third early printed source, a French book of garden maze designs by D. Loris (Kern, image 483), also first published in 1579.

Jeff Saward points out that the 15 shillings paid in 1699 for "cutting the maze at the end of the common" was a substantial sum at the time, when skilled agricultural labour earned 1 shilling a day and unskilled labour even less. Fifteen man-days would probably suffice for the maze's construction. An equal sum was spent that year on planting new trees around the common, so some sort of "urban renewal plan" seems to have been underway, and the maze could well have been a part.[9]

There is even one of the degenerate 3 × 4 designs (figure 8c), making an appearance: a 16th century tapestry (Kern, image 424) uses it to represent a (very simple) garden labyrinth.

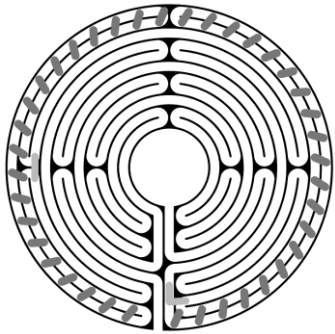


Figure 13a: Removing the outer two courses of Chartres yields Munich

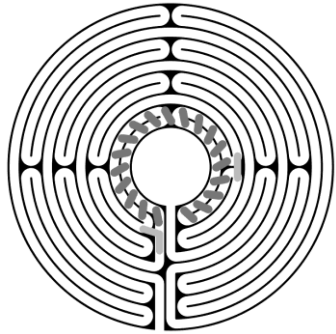


Figure 13b: Removing the inner two courses of Chartres yields Hilton

I should also mention the labyrinth designed by Pierre Cuypers for the Bergportaal of St. Servaas Church in Maastricht, Netherlands, completed in 1886. With 10 courses, it is not strictly an Alternating labyrinth, but the design (which predates Munich) incorporates the 9-course Munich pattern, simply adding an extra full circuit around the outside. See the website of Peter Mudge for a detailed diagram.[10] (Guingamp also displays an extra outer circuit, but that can be considered part of the decorative frame rather than a course of the labyrinth proper.)

So far as I know, these (along with the many copies of Chartres) are the only Alternating patterns that appear among historical labyrinths; and apart from Chartres and Inner Chartres, they are not common, even among modern labyrinths. I suspect this is partly due to a (surely unreasonable!) prejudice against three-quarter-turns, for all of the $N \times 4$ Alternating labyrinths involve three-quarter turns unless $N + 1$ is a multiple of 6 (as in Chartres, Inner Chartres, and Saffron Walden).

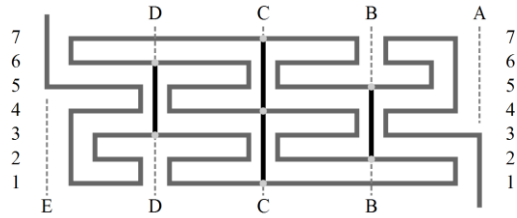
A Return to the Maze

I want to round out this discussion by returning to look in more detail at the maze that includes the labyrinth. I don't ordinarily think of multicursal mazes in terms of palindromicity or duality, since these concepts generally don't extend usefully from unicursal patterns to mazes. But in this particular case the full maze also responds to these notions - for Coate and Fisher added the "thorns" to the Archbishop's Maze in a self-dual fashion: the thorn pattern along axis C is reversible, and the pattern along axis B going into the centre is repeated along axis D coming out from the centre.

This symmetry is made explicit in the McKelvey Maze (figure 14a), a design produced by Fisher in 2002 for a commission from St. Paul's Episcopal Church in Englewood, New Jersey.[11] This maze is schematically equivalent to the Archbishop's Maze - and it exhibits the structure of the maze even more clearly than the original, for the "thorn elements" that add the branching are here reduced to bare essentials: they become ordinary path elements directly connecting various courses along the internal axes of the labyrinth. (Two courses are connected along axes B and D, and three along axis C.) It is easy to add these connecting segments to the level chart (figure 14b), and easy to see that they maintain the self-duality of the pattern: the augmented level chart is still preserved by a 180-degree rotation.

Figure 14a: McKelvey Maze

Figure 14b: The McKelvey level chart, with maze segments added



These extra segments function as short-cuts in the labyrinth: taking a detour from one course to another along the extra maze segments can cut off significant portions of the labyrinth in the journey from entrance to exit. Greys Court - like Chartres - traces its inner courses before its outer ones; so a radial maze segment taken from an inner course to a course farther out brings you to a point *farther along* in the labyrinth path. Fisher's description of this is almost poetic: "Paradoxically, every time one turns away from the centre, one gets closer to the goal."

How much closer? And what is the optimum short-cut through the maze? The answers fall out neatly from an examination of the level chart. If we focus on the junction nodes where branching occurs, we can simplify the level-chart into a graph of the multiple paths through the maze. The nodes are connected by portions of the ordinary labyrinth path and by radial short-cuts. Figure 15 introduces black line segments that join adjacent junction nodes - each new segment represents in one line the labyrinth

segments that connect the two nodes. In figure 16, the original labyrinth segments are omitted, leaving the black segments that represent them, together with the maze short-cuts. The result is a *node graph* of the maze. Each line segment in the graph (called an *edge* of the graph) represents a portion of the maze where no branching occurs, since the branching happens only at the nodes where edges come together. The labels on the edges of the graph give the combined angular length of the labyrinth components they represent - and with the labels it's easy to compute the total angular length of any path through the maze.

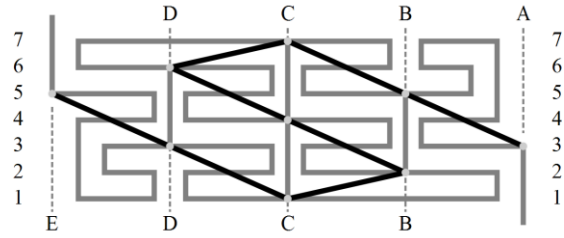


Figure 15: Connecting the junction nodes in the McKelvey chart

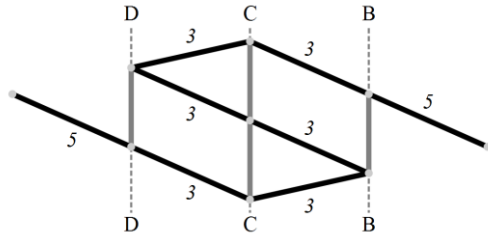


Figure 16: Node graph of the Archbishop's Maze

The total angular length of the original labyrinth path is 28 quarter-turns: 7 courses × 4 quarter-turns per course. Five quarter-turns bring us from the entrance to the first junction node, and five again from the last junction to the exit. Each of the labyrinth portions between the other nodes is three quarter-turns long. The short-cuts, which follow radial lines, count as having zero angular length. The original labyrinth path of 28 quarter-turns is represented in figure 16 by the one path from entrance to exit that avoids all the radial short-cuts.

From the graph it is clear that you can cut off two labyrinth portions (saving 6 quarter-turns) by following just one of the short-cuts along axis C. Four labyrinth portions can be bypassed (saving 12 quarter-turns) by taking both of the short-cuts along C, or by taking either (or both) of the short-cuts along B and D. Assuming that you are careful not to retrace any edge of the graph, the short-cuts reduce the total path length from 28 quarter-turns to 16 or 22.

So if we are trying to optimize the angular length of the path, there are several optimal short paths of 16 quarter-turns. If you are interested in the path that is actually shortest in physical length (rather than angular length), take the one that hews closest to the inside of the labyrinth, where the quarter-turns are shortest, before taking the short-cut along axis D.

Unlike the regular labyrinth path, the paths taking advantage of the short-cuts are in general not palindromic. But this node graph is symmetric, just as the underlying level chart is; since the figure is self-dual, any *symmetric* path through it will in fact be palindromic. There are two such paths (in addition to the original labyrinth path): the path that includes both short-cuts on axis C, and the path that includes both short-cuts on axes B and D. In both cases, the palindrome looks like this:

1 1 – 1 1 – 2 1 2 1 2 – 1 1 – 1 1

where in each case some of the 2's may be broken in the middle by changing lanes along a radial short-cut. (One path breaks the first and last of the 2's; the other breaks the central 2.)

So we see that the enfolding maze also is susceptible to mathematical analysis and also has pleasing symmetry properties. The interesting aspect of this to me is that it was only the embedded labyrinth that led me to recognize this - I would have missed it entirely if I hadn't looked at the labyrinth first.

Conclusion

I expressed surprise above that these properties of Greys Court are not better known. But the real surprise is that, given these properties, it took so long for Greys Court to surface historically - Coate and Fisher were apparently the first to discover it.

The 11 × 4 labyrinths over the centuries have been overwhelmingly dominated by Chartres: evidently if you are going to undertake such a large project, you might as well do it right and use what deservedly is considered the gold standard. But recently there has been something of an explosion of 7 × 4 labyrinths.

Partly this is because a 7 × 4 installation is a more manageable commitment of resources; but it is partly due also, I suspect, to our deep-seated attachment to some mystical property of the number seven, as reflected in the much longer history and the continuing popularity of the classical labyrinth of seven courses. Also, seven courses provide a more intimate setting than eleven, and don't require the scale of a cathedral for a proper rendition. It's a more human scale - which the mind encompasses more easily.

But the patterns used for 7 × 4 installations show nothing like the uniform popularity of Chartres. A whole raft of modern 7-course designs have appeared, including many essentially unique ones. Some are more successful than others, and attempt to adapt the symmetry of Chartres in various ways. None, however, has the inherent symmetric, organic structure of Greys Court. Examples of Greys Court beyond the Archbishop's Maze have only recently started to appear; but it remains one of the naturals, one of a small handful that are organic and whole, waiting all this time to be discovered rather than invented.

Richard Myers Shelton; Roseville, MN, USA, October 2010

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3 University of Kent (website). Home: www.kent.ac.uk Labyrinth page: www.kent.ac.uk/uelt/ced/themes/labyrinth/index.html - design page, with description and diagram by Jeff Saward: www.kent.ac.uk/uelt/ced/themes/labyrinth/design.html

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8 Schaefers, Fons. "A Catalogue of Labyrinths and Mazes in the Netherlands", *Caerdroia* 32, 1991, pp 28–35.

9 Jeff Saward, private correspondence, 2010.

10 Peter Mudge, *Unicursal Mazes* (website). Home: www.unicursal.net/MazeIndex.htm
St. Servaas page: www.unicursal.net/Maastricht.htm

11 Website of St. Paul's Episcopal Church, Englewood, New Jersey.
Home: www.stpaulsenglewood.org - design page, with diagram and Fisher's description: www.stpaulsenglewood.org/labyrinth_design.htm - maze page, with background information: www.stpaulsenglewood.org/mckelvey_maze.htm.

Note that the background information on St. Paul's website includes a fair amount of misinformation. In particular, the website claims that the labyrinth embedded in the McKelvey Maze is an example of the "Baby Chartres" design. But Baby Chartres (also known as "Petite Chartres") is a different 7-course pattern, distinct from Greys Court. It is an attractive pattern in its own right, but it is not self-dual or even palindromic.

The Wongkot Labyrinth

Serena Montironi & Reinoud Eleveld

Held annually at the Wat Jedlin (Jedlin Temple) in Chiang Mai, Thailand, the Loi Krathong festival is celebrated in honour of the Lord Buddha (Siddhartha Gautama), and the Thai Water Goddess, Phra Mae Khongkha. During the three days of the festival, people build Krathongs, small hand-sized rafts, decorated with banana leaves folded in various shapes, flowers, incense sticks and candles. These rafts are then floated on a river on the night of the full moon (and two additional nights) of the 12th month of the traditional Thai lunar calendar. Floating the rafts is believed to bring good luck and symbolizes the letting go of grudges and anger, in order to start life anew. Many participants will also add their fingernail clippings, or a few strands of hair, to the raft, as a charm for shedding personal vices.

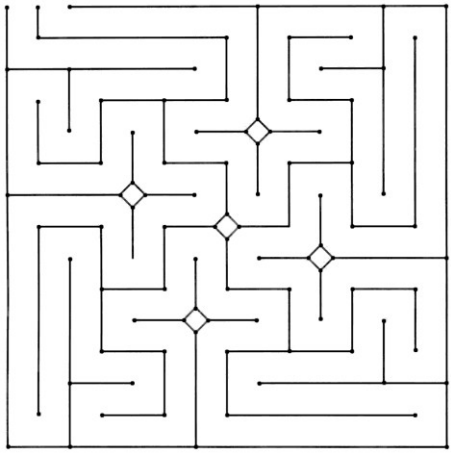
Apart from the floating of rafts, the Loi Krathong celebrations also include fireworks and beauty contests, known as Noppamas Queen Contests, in the memory of Noppamas, a consort of the Sukothai King Loethai, who allegedly initiated the tradition of Loi Krathong during the early 14th century CE. Historically, according to King Rama IV (writing in 1863), the Loi Krathong festival was adapted by Thai Buddhists from the Indian Brahman festival of Deepavali, during which Indians float lanterns on the Ganges to honour the river Goddess.

On the occasion of our visit to Chang Mai in 2009, while studying the list of ceremonies in the official Loi Krathong festival program, the following announcement captured our attention: "Presentation of six tribes folklore, visit of maze, and Mahachart preaching at Wat Jedlin." Because searching for labyrinths has been a part of our spiritual work for many years, once we discovered mention of the "maze" in the program, we set out for the temple. Dating from the 16th century, it is located on Phra Pk Klao Road, in the old town of Chiang Mai, and is an otherwise quite ordinary temple. Most people who visit Chiang Mai will visit famous temples of Wat Umong and Wat Phra Singh or (a little outside Chiang Mai) Wat Pra Thad Doi Suthep, and will only by chance step into the precinct of Wat Jedlin. We had visited mazes and labyrinths throughout Europe, but we knew there are not so many to be found in Asia, so were anxious to find this maze in Chiang Mai.

The entrance of the Wongkot labyrinth at the Wat Jedlin temple, Chang Mai, Thailand, November 2009.

What we found was not a maze, however, but one of the most colourful and exciting single-path labyrinths we had ever set eyes on. The labyrinth was constructed with bamboo poles, a little under two metres (6 feet) high, linked together with the typical orange sarong fabric the Thai monks use as clothing, to make a fence-like structure. Suspended above the labyrinth on higher poles was an exuberant display of coloured flags, banners and Chinese lanterns and the western side of the structure was decorated with symbols of the twelve animals of Chinese astrology. The whole construction was extremely beautiful and clearly made with loving care.

Right: Plan of the Wongkot labyrinth installed at Chaing Mai, Thialand, November 2009. The separate entrance and exit paths are situated at top left, the five shrines are clustered around the centre of the design



Left: the central Kao Wongkot shrine, dedicated to the hermit Wetsandon

A monk at Wat Jedlin kindly gave us a plan of the labyrinth with an explanation, all in Thai, on the flipside.[1] The "maze," entitled "Wongkot," was square in overall shape, but actually had a single labyrinthine path, with four particular points within the design, representing the four directions, where you could stop and pray at a small shrine. Each of these special points was open in such a way that it could be viewed from the adjacent paths in all four directions, and a further fifth shrine occupied the physical centre of the construction. These five shrines, or points of reverence, in the Wongkot labyrinth were a representation of the five holy mountains of Thai tradition, and each contained a different statue. The central station was called Kao Wongkot and the statue represented the hermit Wetsandon. At its opening ceremony it was officially inaugurated by a priest striking a metal gong, and representatives of the six major tribes of the province, all dressed in their local costumes.

The concept of five holy mountains is found in both Thailand and India, and also in Tibet, Nepal and China. They represent the outer symbols of the five element concept found throughout Asia. According to Asian philosophy, the soul is constructed out of five elements, continuously interacting with each other. As mentioned above, the labyrinth at Wat Jedlin was named Wongkot, as a representation of a holy mountain in India, similarly named

Kao Wongkot, surrounded by four other holy mountains and situated in the mythological Himmapan Forest in northern India. According to Buddhist mythology, Kao Wongkot has long been a place for meditating hermits and was created by Indra (the King of Gods), to test Maha Wetsandon Chadok (also known as Wetsandon or Vessantara). Submitting to this test, after a long spell as a hermit, he gave away all his possessions - his magical elephant Paccaya, his kingdom, his wealth, even his children and his beloved wife Maddi. This is why Vessantara displays the virtues of charity in the Sanskrit Jataka stories.[2] According to the Vessantara Jataka, Vessantara's hermitage was created as a very complex maze, with many entrances, full of deluding tricks and dead ends. Only a person with a very resolute mind, focused on living a life of virtue, detached from mundane goals and generous to the poor and needy would be able to find the centre of the maze.

People who visit the Wongkot labyrinth at Wat Jedlin today are encouraged to walk it in the spirit of the hermit Wetsandon (one of the reincarnations of the man who would become, in his next life, Prince Siddharta, the Lord Buddha), to worship and pay him respect, in order to be rewarded with spiritual progress in their present lifetime and good fortune in the future.

There is one more thing that drew our attention. In Europe, labyrinths are often connected to the Divine Feminine, but the Wongkot labyrinth in Thailand seemed to be related to Wetsandon and the Lord Buddha, a male deity. However, the festival itself, Loi Krathong, is a full moon festival and dedicated to the earth and river goddess Phra Mae Khong Kha. The festival originated from a practise that is found throughout Asia, a thanksgiving for the fertility of the land, at the change of the seasons, the 12th month of the Thai lunar calendar (in the western calendar this usually falls in November) that signifies the end of the rice harvest. Ancient practise was to honour and thank the rain, and pray to the earth and river goddess, but this observation now seems obscured by the dominant role the Buddhist temples play in the Loi Krathong festival. But despite this, you will still find small statues of Phra Mae Khong Kha on most temple sites, and flags depicting Matcha (Songkla), the mermaid, in front of the temples during the festival.

Serena Montironi & Reinoud Eleveld;
Amsterdam, the Netherlands & Rome, Italy, March 2010

A view over the Wongkot labyrinth, showing the construction from bamboo poles and lengths of fabric

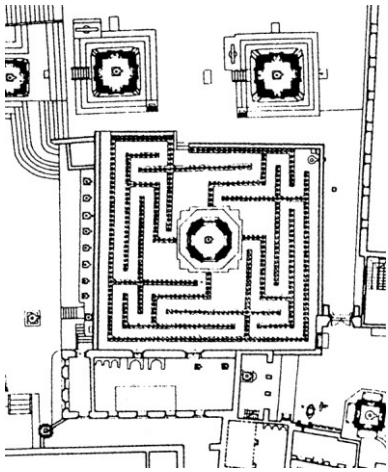
References

1 Back in Holland we found a Thai friend, Patcharee Sa-ardkitinun, who was kind enough to help us with the translation of the literature we obtained in Thailand, and thank her for her valuable contribution to this article.

2 The Jatakas refer to a voluminous body of literature, originating in India, concerning the previous births of the Buddha. Amongst the earliest of Buddhist literature, their origins are dated to around the 4th century BCE.

Editors Footnote

The design of the Wongkot labyrinth as installed at Wat Jedlin, although unusual, has precise parallels elsewhere in India and Nepal. A series of stone relief carvings on the eastern sepulchral building of the Ibrahim Rouza mosque (built in the 1620's) at Bijapur, in northern Karnataka, India, depict almost the exactly the same design – see Saward, Jeff & Kimberly. "Labyrinths in Western India" in *Caerdroia* 36, p.62. Another example, in the form of a finely carved marble water labyrinth from Rajasthan is dated to c.1800 - see Bowden, John. "A Water Maze from Rajasthan, India" in *Caerdroia* 37, p.56. This same swastika-meander labyrinth design is also found as a painted ceiling decoration in the Dattatreya temple in Bhaktapur, Nepal, where the coils of the labyrinth are filled with warriors, chariots and elephants – a depiction of the story of Scimangada, a mythical city in the foothills of the Himalayas, whose impregnable defences were breached by treachery – see Lundén, Staffan. "A Nepalese Labyrinth" in *Caerdroia* 26, pp.13-22. Finally, another labyrinth of very similar design, formed from 500 or more stone *lingas*, and clearly designed for ceremonial purposes, is to be found in the precinct of the temple at Paśupatinātha, also in Nepal - see Lundén, Staffan. "A Nepalese Labyrinth" in *East and West*, vol.48 (1998), n.1-2, pp.117-134.

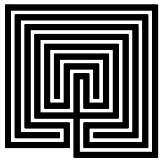


The labyrinthine structure at Paśupatinātha, plan by Surendra Joshi, from Lundén, 1998

Similarly, the legend of Vessantara and his labyrinthine hermitage has a direct connection in the form of depictions of labyrinths – although this time of the classical form – illustrating the story on the walls of two temples at Mädavala and Arattana in the central highlands of Sri Lanka – see Kern, Hermann. *Through the Labyrinth*, p.295.

While it is certain from the leaflets collected by the authors of the above article that the Wongkot labyrinth has been a feature of the Loi Krathong festival at Wat Jedlin since at least 2005, it is unclear how long this tradition has been observed at this location, where exactly the source of its design was derived, or whether similar Wongkot labyrinths might be found elsewhere in Thailand. Without a doubt, further research is required...

Considering the Duality of Labyrinths



Andreas Frei

In Caerdroia 39 I described how the pattern of a labyrinth can be obtained.[1] The labyrinth, represented by its path, or Ariadne's Thread, is first transformed into a rectangular form. To achieve this, the basic form is dissected from the centre to the bottom edge, along the wall at the middle of the lower arm. Then the Ariadne's Thread is uncurled, symmetrically on both sides by half the arc of a circle and the resulting form is straightened out. Bending this form back downwards reverses this transformation and brings us back to the original labyrinth.[2]

However, instead of reversing it, the transformation can be continued. For this, the rectangular form needs to be bent over to the other side from where it was uncurled and then curled in symmetrically on both sides by half the arc of a circle. Figure 1 shows the entire transformation. After the original labyrinth is uncurled (figure 1a-c) it is bent over and re-curled to the other side (figure 1d-f). By this process the entrance and the centre of the pathway is exchanged (figure 1c & d). This results in another labyrinth in basic form, which lies with the entrance on top (figure 1f). We now have completed a full transformation process that begins with the original labyrinth, leads to the pattern and ends in a second labyrinth that is dual to the original labyrinth.

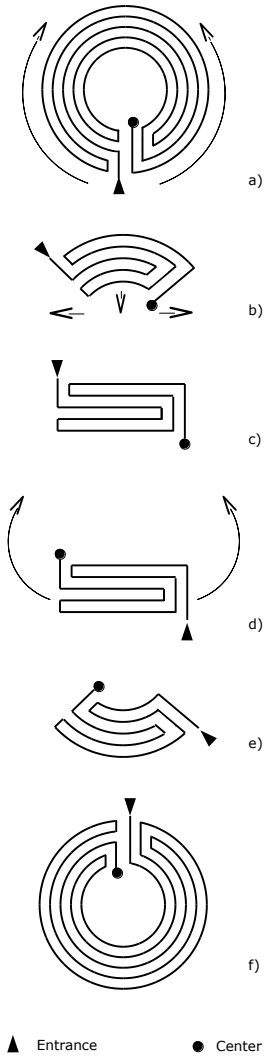


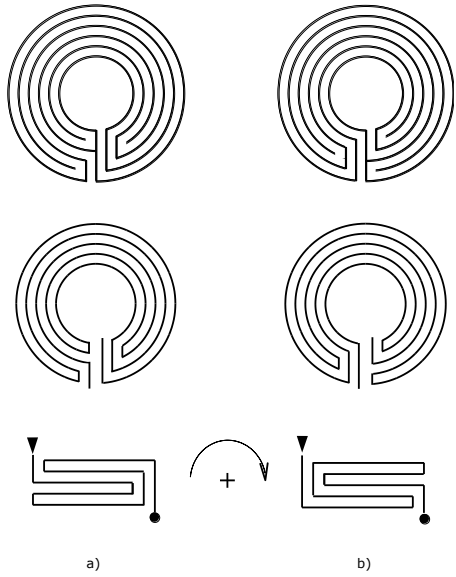
Figure 1: Transforming the original into the dual labyrinth

- ***a) Original labyrinth***
- ***b) Uncurled to section of a circle***
- ***c) Pattern, obtained by uncurling the original labyrinth from below***
- ***d) Same pattern bent over to the other side***
- ***e) Pattern re-curled upwards***
- ***f) Dual labyrinth***

Figure 2: Original and dual labyrinth compared

a) original labyrinth
b) dual labyrinth

Both have the same pattern, but this is rotated by 180 degrees



In order to compare the original and dual labyrinth the latter is rotated so that both have the same orientation. This is shown in figure 2 with the original and dual Ariadne's Threads (from figure 1) and their corresponding labyrinths and patterns added (figure 2). Although the two labyrinths are different, they have an obvious relationship. This is due to the fact that both have the same pattern, even if the pattern is rotated by 180 degrees. Remember that in figure 1 the dual labyrinth was lying with the entrance from above. This was rotated in figure 2, and rotating the labyrinth rotates the pattern too. Thus for each pattern there exist two labyrinths that are the dual of each other.

A labyrinth is defined as a closed form that separates the exterior from the interior space. The perimeter has only one opening. This is the entrance, where the path to the centre begins. Thus the pathway is clearly directed from the entrance to the centre. Each pathway can be walked in two directions. In the labyrinth, the same pathway that leads from the entrance to the centre also leads from the centre to the entrance. However the sequences of how the lanes are encountered are different depending on the direction in which the way is walked. The pattern shows the course of the pathway through the labyrinth (figure 3).

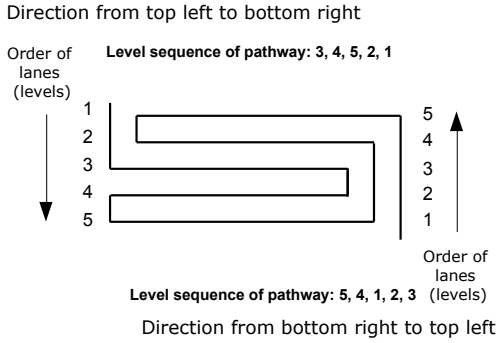


Figure 3: Directions and level sequences of the pathway. The lanes (levels) are numbered in ascending order beginning with 1 for the nearest to 5 for the most distant from where the pathway begins

However other than the labyrinth it is indifferent with respect to the exterior and interior. This enables us to show that the sequences of the lanes are different depending on whether the way is gone from the top left to the bottom right or vice versa. Starting from the top left and moving to the bottom right in the pattern corresponds with the direction from the entrance to the centre in the original labyrinth. In this direction, the path passes the first and the second lane and enters the pattern on the third lane. It then turns to the 4th, 5th, second and first lane before it reaches the goal. Starting from the bottom right and moving to the top left corresponds with the way from the centre to the entrance of the original labyrinth. In this direction, the path passes the first four lanes and enters the pattern on the fifth lane. It then turns to the 2nd, 5th, 4th and 3rd lane before it reaches the goal.

Bending and curling-in the pattern downwards results in the original labyrinth where the pathway from outside to the centre corresponds with the level sequence from top left to bottom right and the way out of the labyrinth with the sequence from bottom right to top left. Bending and curling-in the pattern upwards results in the dual labyrinth where the pathway from outside to the centre corresponds with the level sequence from the bottom right to top left and the way out with the level sequence from top left to bottom right. Thus the level sequence of the way into the original labyrinth is the same as the sequence out of the dual labyrinth and vice versa.

Interestingly, among all historical labyrinths I have found no examples that are dual to each other. Only on a series of drawings produced by Kern after a suggestion of Christian Löwenstein there are seven one-arm labyrinths (see figure 4).[3] Two of them have five circuits and are dual to each other. Likewise the two labyrinths with nine circuits are also dual. Both of the labyrinths with five and nine circuits respectively have the same pattern rotated by 180 degrees.

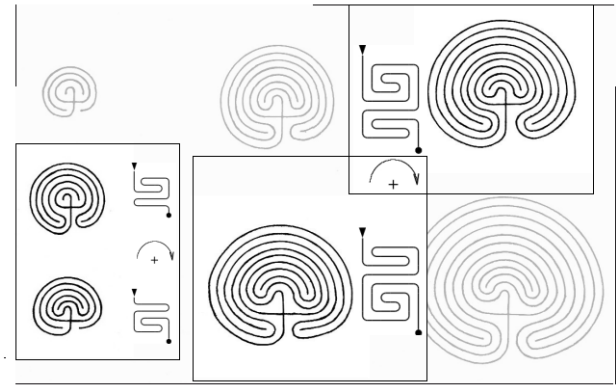


Figure 4: A series of 7 labyrinths by Kern as suggested by Christian Löwenstein. The two labyrinths with five and the two with nine circuits respectively are dual to each other. Source: Kern, fig 6, series C, page 34

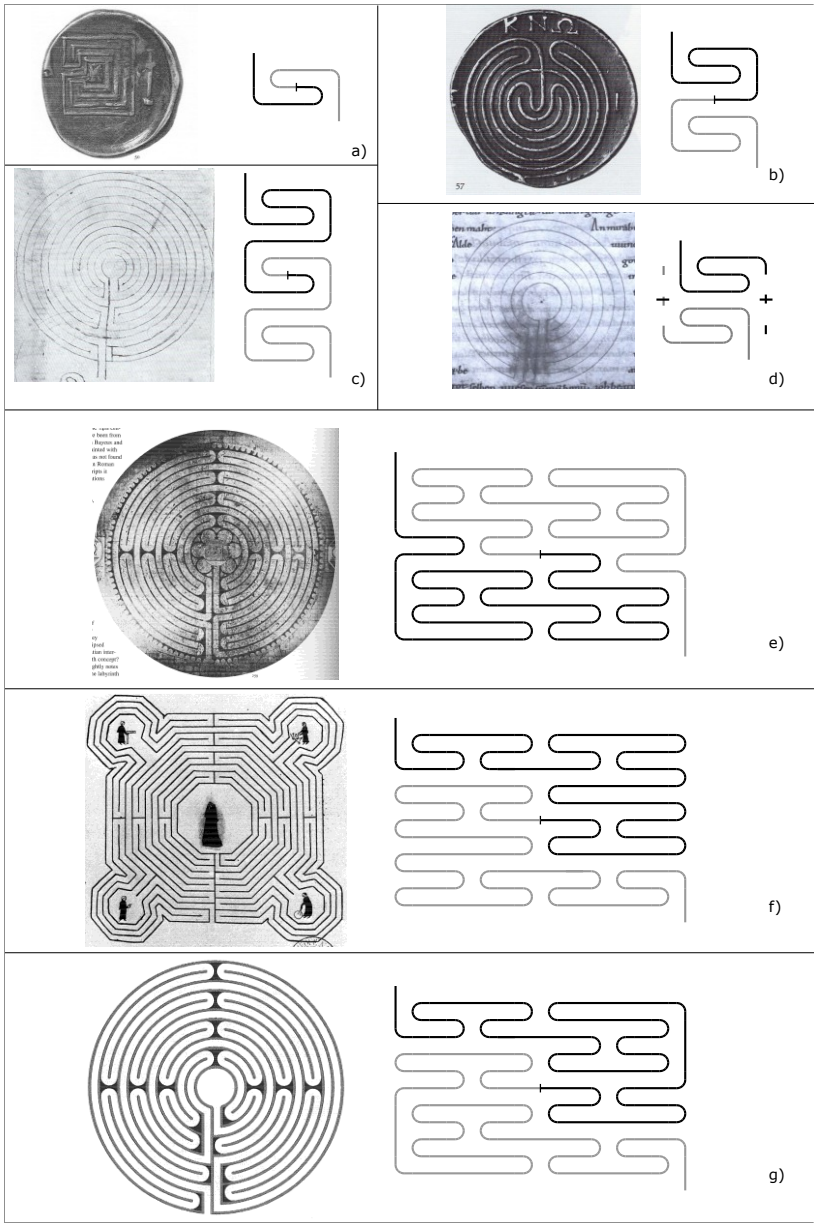


Figure 5: Some self-dual labyrinths
a&b) Coins from Knossos - c) Otfrid - d) St.Gallen - e)Chartres - f) Reims - g) Auxerre

Usually the two dual labyrinths with the same pattern are different. However, if the transformation shown in figure 1 was carried-out with e.g. the Classical/Cretan labyrinth, this would result in a dual labyrinth that looks exactly the same as the original labyrinth, although with the entrance on top. There exist a certain category of patterns where the two labyrinths are identical. Such labyrinths are called self-dual. Figure 5 shows some examples of self-dual labyrinths. Some of the most famous labyrinths are self-dual such as the Classical, Chartres and Reims designs. Self-duality is one of the essential properties of these labyrinths. What they all have in common is that their patterns are symmetric around the point in the middle of the rectangular form. The second half of the pathway (grey) exactly mirrors the first half (black).

Figure 6 illustrates the difference between the patterns of self-dual and other labyrinths. In the pattern that was used to demonstrate the transformation process in fig 1 the first (black) and second (grey) halves of the pathways are different, whereas they are congruent in the pattern of the (self-dual) Knossos-type labyrinth.

Figure 6: A dual and self-dual pattern compared
a) dual pattern from fig. 1 – b) self-dual pattern from Knossos labyrinth

So what are these considerations about the duality of labyrinths useful for?

The fact that each labyrinth bears a counterpart in it is an interesting characteristic of labyrinths per se. Labyrinths are closed forms. They fix the indifferent pattern into one of two possible directions by enclosing an interior space and separating it from the exterior. It is possible to turn the inside out and thus enclose the exterior of a given labyrinth. That unveils its counterpart, the dual labyrinth. Dual labyrinths are normally different, but in some exceptional cases they are identical. In these cases the labyrinths are self-dual. This self-duality is an important if not the most important feature of highly organized excellent labyrinths.

Understanding the duality can also be used to design and create labyrinths. In the following I describe two possibilities.

As there are no dual labyrinths among the historical examples, a new labyrinth can be created simply by adding the dual counterpart to each existing (non self-dual) labyrinth. Figure 7 shows four examples. In the first column the original appearance of the labyrinth is shown. The second column shows the script version of the original labyrinth with the entrance from below and the labyrinth in clockwise rotation. The third column shows its dual counterpart.

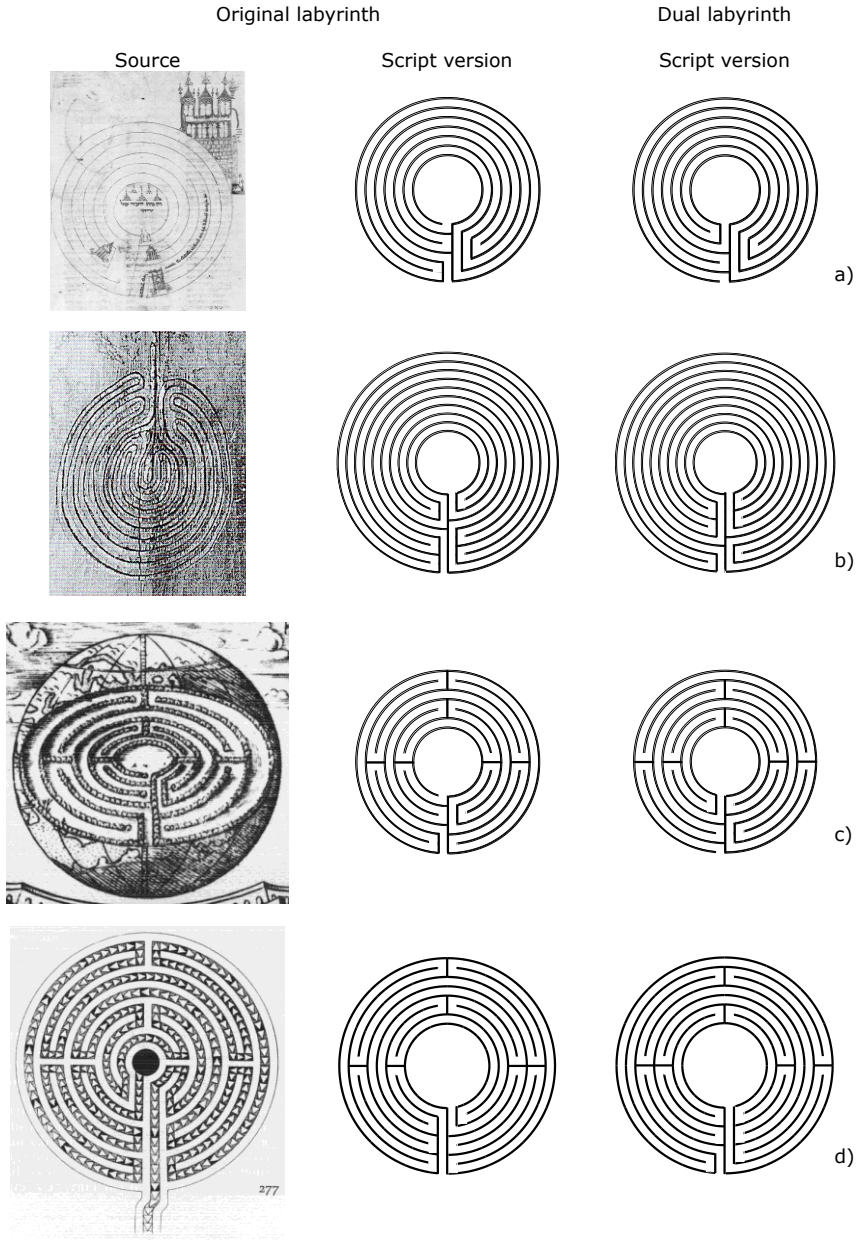


Figure 7: Some historical labyrinths and their dual counterparts
a) von Xanthen – b) Tal, Pakistan – c) Beccaria – d) Ravenna

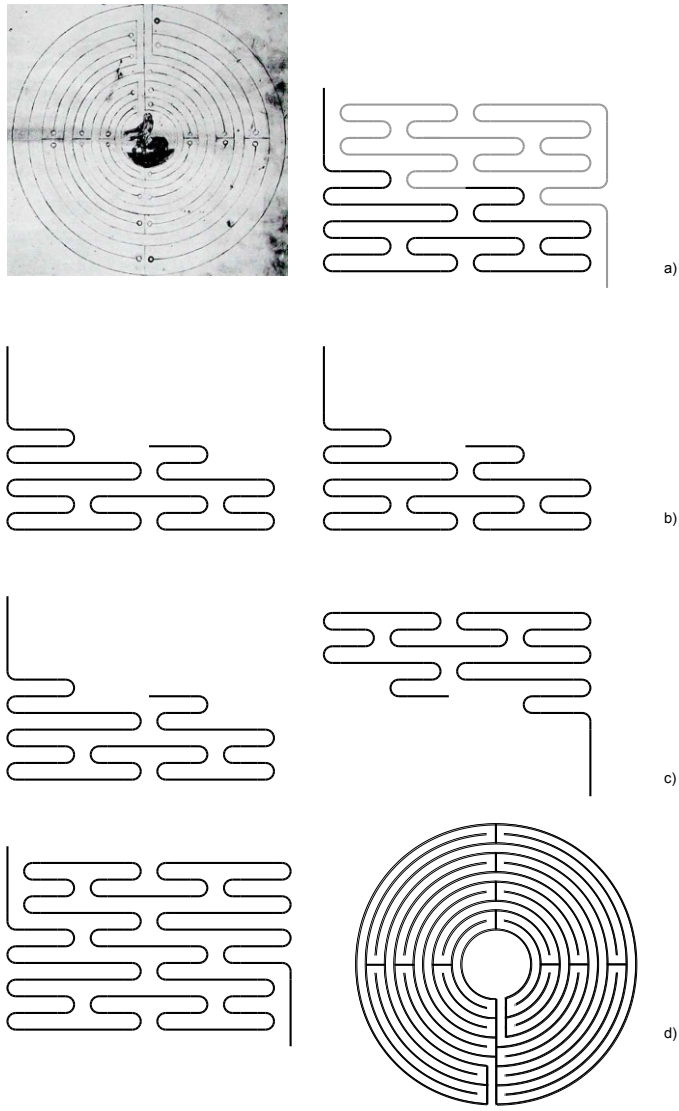


Figure 8: Creating a new self-dual labyrinth

- ***a) The Dante labyrinth has a pattern very similar to Chartres. The first half (black) is somewhat different, the second (grey) is exactly the same as Chartres***
- ***b) Separate and double the first half***
- ***c) Rotate the copy of the first half by 180 degrees***
- ***d) Fit the rotated copy to the first half. This results in a new pattern where the pathway is symmetric to the middle of the rectangular form and a self-dual labyrinth***

As described above, in self-dual labyrinths the pathway is symmetric to the point in the middle of the rectangular form. There are some labyrinths where the first half of the pathway ends exactly in the middle of the rectangular form but is not symmetric. For instance, among others, there exist some labyrinths with very similar patterns as that of Chartres, either because the first or the second half of their pathway exactly follows the same pattern as that of Chartres. In such cases it may be possible to create new self-dual labyrinths by doubling one of the halves, then rotating the second half and adding it to the first. This is illustrated in figure 8 with the Dante labyrinth. Dante is one of the examples with a pattern very similar to that of Chartres. The second (grey) half of the pathway follows exactly the pattern of Chartres whereas the first has a slightly different pattern. Thus, doubling, mirroring and adding the second half would result in the Chartres-type pattern. Figure 8 shows the result of performing the same process with the first half of the pathway.

Duality is in my understanding an essential, although hidden, property of labyrinths. It may be brought to appearance by completing the process of transforming a labyrinth into the rectangular form. Furthermore, the transformation has to be carried-out using the more ordinary non self-dual labyrinths. Transforming self-dual labyrinths does not unveil the duality, because the dual labyrinth in these exceptional cases is identical with the original. The general fact that there exists a dual labyrinth can only be noticed if the dual labyrinth is different from the original labyrinth and would be overlooked in self-dual labyrinths.

Andreas Frei, Pratteln, Switzerland; July 2010
Website: www.labyrinth-muster.ch

References:

1 Frei, Andreas. A catalogue of historical labyrinth patterns. *Caerdroia* 39 (2009), pp. 37-47.

2 Phillips, Tony. *Through Mazes to Mathematics*. Website: www.math.sunysb.edu/~tony/mazes/unrolled.html#dual

3 Kern, Hermann. *Through the Labyrinth*. ed. R. Ferré & J. Saward, Prestel, Munich, 2000; fig. 6, p. 34.

Notes & Queries

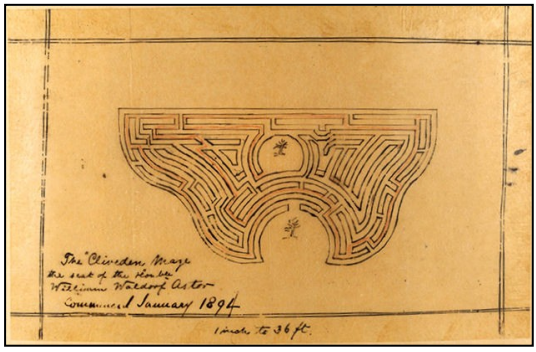
Our regular round up of matters labyrinthine brings together short contributions and notes from Caerdroia readers, also items from the Archives that need further research, or simply deserve recording. Similar notes and queries are welcomed for future editions.

The Cliveden Hedge Maze Restored

Jeff Saward

Cliveden, at Taplow in Buckinghamshire, England, has had a long and colourful history. Originally built in the 17th century for the 2nd Duke of Buckingham, the current house on the site was built in 1851 in Italianate style and purchased in 1893 by the American billionaire William Waldorf Astor (later 1st Lord Astor), who lived at Cliveden as a recluse after the early death of his wife. He subsequently gave Cliveden to his son Waldorf, on the occasion of his marriage to Nancy Langhorne in 1906 and then moved to Hever Castle, Kent, where he constructed another hedge maze, which still survives in splendid condition.

During his time at Cliveden, Astor made many changes and additions to the gardens, including a hedge maze commissioned and planted in 1894. By the 1930's the yew maze was becoming overgrown and had all but disappeared by the 1950's. However, in 2005, Astor's original design for the maze was discovered in the archives of the National Trust, the current owners of the property, and over the last couple of years a program to replant the maze to its original plan and close to its previous site has been underway. The new maze has taken two years to create, using over 1,000 metres of steel edging and 60 tonnes of gravel, to produce over 500 metres of paths. 1,100 12-year-old, two metre high yew trees were planted during October and November 2010 and the maze will reopen to the public in April 2011.

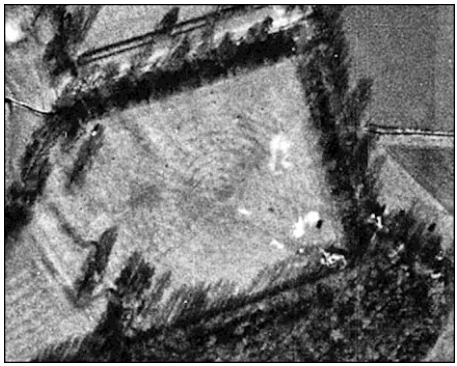


Original sketch plan of the Cliveden Maze, dated 1894. Discovered in the National Trust Archives in 2005, it has been used as the basis for the reconstruction of the maze, planted in 2010 and open to the public in 2011. Photo: National Trust

Located near Oundle in Northamptonshire, England, the ruined house of Lyveden New Bield, now owned and maintained by the National Trust, was the former property of Sir Thomas Tresham of Rushton Hall, a devout Roman Catholic. Tresham was imprisoned for his beliefs for a total of 15 years in the late 16th century, during the reign of Elizabeth I, and on his release in 1593 built his famous Triangular Lodge folly at Rushton, completed in 1597. Redolent with religious symbolism, it was designed to demonstrate his faith in the Holy Trinity. Soon after in the first few years of the 1600's, he started work on a summer house and landscaped gardens at nearby Lyveden New Bield, but the project was abandoned, uncompleted, in 1605 when Tresham died.

Tresham's new house likewise incorporated religious symbolism in its build and cruciform design, and the surrounding gardens contained a number of features typical of the period - prospect mounds and terraces, flower gardens and orchards - but like the house, the ambitious scheme was abandoned in 1605 to become completely overgrown, and largely undisturbed until modern times. Beginning in 1995, the National Trust has been undertaking a campaign to survey, clear and restore the gardens, including the dredging of a moat surrounding three sides of a large quadrangular garden adjacent to the house in 2000. Pollen samples recovered at that time document some of the plants and trees that were evidently planted in the gardens and orchards, and coupled with Tresham's correspondence on the matter (fortunately preserved in the British Library), it has been possible to piece together information on various aspects of the plants and planting schemes, both planned and actually carried out for his gardens at Lyveden New Bield.

One feature, referred to in Tresham's letters as his "circular borders," remained a mystery, although those same letters mention 400 raspberries and roses to be planted within this part of the garden. The question of what form this may have taken was recently solved, when in 2010, staff at the National Trust acquired prints of WWII German aerial reconnaissance photographs of the property, taken by the Luftwaffe in 1944, and held at the United States National Archive in Baltimore. Within the overgrown moat, the quadrangular garden is clearly shown, and filling this area are the faint outlines of ten concentric circles, with breaks in the circuits visible in a number of places. Taken late in the day, when the shadows were long, the circles clearly represent slight undulations in the ground surface.



Aerial photo of the Lyveden New Bield gardens, taken 1944, showing a series of concentric features interpreted as a garden labyrinth or maze from the early 1600's. Photo: United States National Archive

While the exact design is difficult to interpret with any certainty, its design is very clearly a labyrinth, or a simple maze, at least 110 metres (360 feet) in diameter. Unfortunately the area in question has been surface ploughed since the 1940's, so nothing is visible at ground level today, but the National Trust intends to carry out a detailed geophysical survey of the area during the summer of 2011, to determine if any further information can be discovered concerning the design or purpose of this unusual element of the gardens. While garden labyrinths and mazes from the early 1600's are by no means unusual, this new discovery will provide a rare opportunity to carry out an archaeological investigation of such a feature. Undoubtedly, more will follow when the results are announced.

A Swastika-Pelta Wall Painting near Chaldon — Jeff Saward

The labyrinths and swastika-peltas (also known as fylfots) chalked on the walls of an underground stone quarry at Chaldon, in Surrey, England were described in *Caerdroia* 10, way back in 1982, and are also described in more detail on the Caerdroia webpages at www.labyrinthos.net/chaldon. In 2009 another very similar swastika-pelta was discovered painted on the wall of an old farmhouse, originally built c.1640, at Caterham-on-the-Hill, only a mile or so from Chaldon. While redecorating, the new owners of the house uncovered a wall painting of a swastika-pelta, 26.5 x 19 cm. (10½ x 7½ inches). Black on a white background, with a small pink circle at the very centre of the design, it is in what would originally have been the main bedroom of the house, above a door leading into a small dressing room.

The swastika-pelta. Photo: Hazel Plastow

A wall painting specialist reports that it seems to be on the first layer of limewash and therefore probably of a similar date to a similar decoration in the lower living room of the house, a geometric cross and initials of the former owners, dating from the late 17th century. While it could be argued that a connection might exist between this wall painting and the graffiti in the quarry (dating from around 1720-1730), it is more likely that the symbol was simply well-known in the Chaldon area in the late 17th/early 18th century, and consequently turns up in both the quarry and the nearby cottage.

The swastika-pelta is a fairly common device in late and post-medieval graffiti - there are a number of examples scratched on the walls of churches in southern England, for instance. While the examples in the Chaldon quarry were probably created as a test of drawing skill, the exact meaning and purpose of the design is rather uncertain. It is often thought to be a good luck charm and the location of the recently discovered swastika-pelta directly over the doorway in the house could probably be interpreted as such, much as folk would hang horseshoes over doorways, and indeed still do!

The World's Largest Hedge Maze? — Jeff Saward

Franco Maria Ricci, the retired Italian publisher of some of the world's most fantastic and luxurious volumes, has now created its largest maze. Inspired by an earlier conversation with the late Argentinian writer Jorge Luis Borges, when he retired in 2004, he set about building his maze of bamboo hedges at Fontanellato near Parma, Italy. Reportedly covering some seven hectares (17.5 acres), this would make it more than five times larger than the Pineapple Garden Maze near Wahiawa, Hawaii, the largest permanent hedge maze recognised by the Guinness Book of Records, although similar in overall size to some of the gigantic, but temporary, maize mazes constructed in recent years.

The Fontanellato Maze. Photo: The Guardian

The maze is scheduled to open to the public in 2012, but the owner suggests you bring a cell phone if you visit, just in case you get lost!

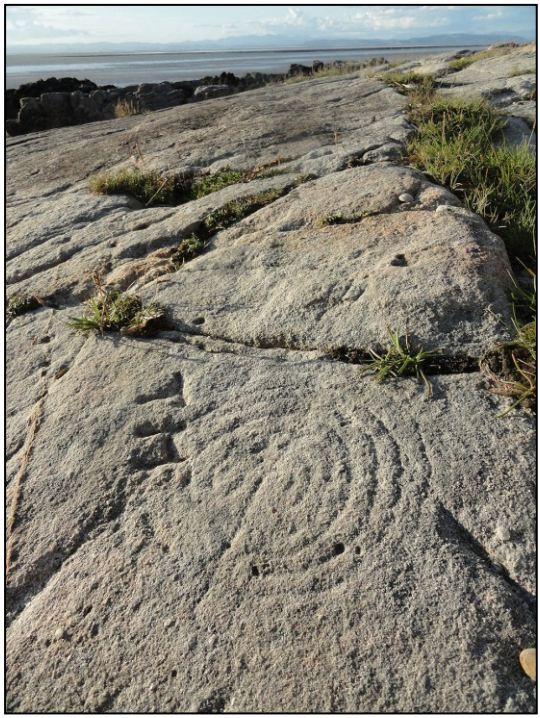
Keeley's Garden Labyrinth, Los Angeles — Lynn Goodpasture

A new labyrinth has recently been installed in the grounds of a new Los Angeles public school, Central Los Angeles Learning Center #1. The location is the former site of the Ambassador Hotel, home of the famous Cocoanut Grove nightclub and the scene of Robert Kennedy's assassination. Due to the significance of the location, it was mandated that all public artwork at the new school must relate to the Ambassador or its history. Lynn Goodpasture Art & Design was selected for this public art commission and recently completed the labyrinth, a tribute to the famous hotel.

Entitled *Keeley's Garden, Labyrinth 1*, this interactive work of public art integrated into the school environment was designed to provide the young students with opportunities to express creativity, be contemplative, and have fun. Eleven large slabs of black basalt stone, positioned along the labyrinth's path to the centre, offer the children surfaces on which to create their own artwork or poetry using bright washable chalk. The labyrinth itself is paved with custom French encaustic tiles with designs derived from the decorative tiles found throughout the Ambassador Hotel and also offers teachers a unique instructional tool integrating art and education. For more details of this labyrinth and Lynn's other installations, visit: www.lynngoodpasture.com

Previously mentioned in *Caerdroia* 27, p.64, in 1996, the enigmatic classical labyrinth (approximately 25 cm./10 inches in diameter) inscribed on a rock near to the ruins of St. Patrick's Chapel at Heysham, Lancashire, England, has recently been the object of a study by respected archaeologist and rock-art specialist Dr. George Nash. His discussion of this petrolglyph (and other inscriptions nearby) is contained within a fascinating and wider comparison of the placement and purpose of rock art and modern graffiti in "Graffiti-Art: Can it Hold the Key to the Placing of Prehistoric Rock-Art?" published in *Time and Mind: The Journal of Archaeology, Consciousness and Culture*, vol.3, Issue 1 (March 2010), pp.41-62.

Nash wisely refrains from trying to precisely date the labyrinth at Heysham, but clearly ruling out a prehistoric origin, he concludes that it could date from the 18th or 19th centuries, linking it with the various items of graffiti and folk-art inscribed on the rocks at this formerly popular seaside resort. He also notes that the labyrinth inscription is now markedly weathered and has been subsequently overlain with further graffiti, in the form of a set of initials. The photograph opposite, kindly supplied by Dr. Nash and taken in August 2010, shows the current condition of the inscription.



The Heysham labyrinth inscription, August 2010. Photo: George Nash

I would concur that the labyrinth at Heysham cannot be of any great antiquity, or it would have vanished long ago, especially carved on relatively soft sandstone and situated in such an exposed location - it is occasionally washed by waves during stormy weather. In my opinion, however, while it might date from the late-19th century, when this particular labyrinth design was still fairly well-known and widespread, I suspect that it more likely dates from the 1970's, or even a little later, when several books on labyrinths became widely available and the same design again became popular with artists and antiquarians.

When the Heysham labyrinth was first 'discovered' and recorded in 1995, photographs taken at the time (see photo opposite) show fairly 'clean' incised lines, indeed one might suggest reasonably 'freshly-carved,' albeit shallow lines. If it really is from the 18th or 19th century, the apparent lack of erosion to the carving between that time and 1995, and the exponential increase since then, would certainly require some further explanation. However, with the inscription now rapidly weathering away, the mystery may never be solved.

The Heysham labyrinth inscription, summer 1995. Photo: Colin Mather

The Labyrinth Society

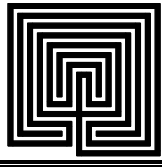
The Labyrinth Society, affectionately known as TLS, was founded in 1998 to support all those working with, or interested in labyrinths. Although based in the USA, it is an international organization with members all over the world. Membership in the Society not only connects labyrinth enthusiasts to a worldwide community, but also supports websites and other labyrinth projects that provide information and resources to the world at large, including the Worldwide Labyrinth Locator website that now lists over 3650 labyrinths worldwide - **www.labyrinthlocator.org**

The Labyrinth Society Annual Gathering in November 2010, held in historic New Harmony, Indiana - home to two important labyrinths itself - was a great success, and blessed with beautiful weather! Temporary labyrinths built for the weekend included several made from pumpkins (one with a maypole at its centre), a projected light labyrinth and a remarkable pair of equine labyrinths.

The TLS Gathering 2011, will be held October 20-24, in Taos, New Mexico - to learn more about The Labyrinth Society and for details of the 2011 gathering, visit their website: **www.labyrinthsociety.org**

Riders on the Trojan Ride equine labyrinth at the TLS Gathering, November 2010. Photo: Jeff Saward

Labyrinth Reviews



Review copies of maze and labyrinth related books, publications, software and CD's, etc., are always welcome for inclusion in future editions of Caerdroia.

Dancing at the Edge of Death - The Origins of the Labyrinth in the Paleolithic : by Jodi Lorimer. Kharis Enterprises Publishing, 2009. ISBN 978-0-9578329-5-4. paperback, 316 pages, b+w illustrations.

This lively and absorbing exploration of the origins of the labyrinth symbol takes the reader on a journey through a mythic past. Beginning with a spirited re-telling of the legend of Theseus and the Minotaur, Lorimer explores the concept of the labyrinth as a metaphor of the spiritual journeys that may have been undertaken by our remote forebears. Drawing on a wide range of ethnographic, historic and archaeological sources, she attempts to link the symbol of the labyrinth right back to the spectacular parietal art of the Upper Palaeolithic period in Europe.

Lorimer is much concerned with the concept of shamanism as being central to the human condition through the ages. She discusses many examples of shamanic cultures, from Native American to Aboriginal. The case study of the San bushmen and their tradition of trance-dance hallucination and executing rock art is central. In her discussion of Upper Palaeolithic art, Lorimer includes an almost image-by-image analysis of the Lascaux cave paintings among other examples. Important to her argument are the rare images of creatures with human body and animal heads occasionally found in parietal and portable Ice Age art. These she equates directly with the Minotaur of Cretan and Greek legend as a symbol of the journey into, and return from, the spirit world.

Dancing at the Edge of Death presents much that is thought-provoking. However, the reader should perhaps be aware of some caveats. The assumptions made to reach the conclusion that the labyrinth as a symbol has its origins in so distant a time are just a little too large, and specific examples of the classical labyrinth are never really discussed. Evidence of human-animal composite figures in art of the Upper Palaeolithic period does not necessarily indicate a link to the Minotaur legend. Indeed, the symbol of the classical labyrinth was apparently not initially associated with the myth, despite it having being in use for some centuries prior to its appearance on the famous coins from Knossos. In the words of the author, "When attempting to enter into the mind of a Palaeolithic artist, we must be wary of interpretive traps set by our own cultural perceptions."

Abegael Saward

Lapps and Labyrinths - Saami Prehistory, Colonization and Cultural Resilience : by Noel D.Broadbent, with contribution by Jan Storå. Smithsonian Institution Scholarly Press, Washington, D.C., 2010. ISBN 978-0-9788460-6-0. Hardback, 269 pages, numerous b+w illos. throughout.

The pioneering work of Noel Broadbent and his colleague Rabbe Sjöberg, applying lichenometric dating techniques (ages determined by the growth of encrusting lichens) to the stone labyrinths of northern Sweden in the late1980's, finally provided some answers to the long standing question of their ages and origins. The majority of the stone labyrinths in this region are found in association with ruined settlement sites - harbours, seal hunting and fishing stations, etc. - on remote islands or coastlines, now uplifted from the modern shoreline by the rapid and ongoing isostatic uplift following the Ice Age. While the height above sea level provides a maximum age for any given location (as prior to this point it would have been underwater), the complex jumble of ruined structures at these sites often produce radiocarbon dates ranging from the late Iron Age through to relatively modern times. Lichenometric dating has provided a valuable tool for assigning dates to those structures, including the labyrinths, that otherwise provide no radiocarbon evidence.

While various papers and articles covering this aspect of labyrinth research have been published over the years, Broadbent's new book, Lapps and Labyrinths, finally brings together a review of the archaeological excavations by the author, and others, at a number of these locations where labyrinths are found on the coast of the Gulf of Bothnia, in Northern Sweden. Focusing on a selection of excavated sites, the author has teased out a convincing chronology for the various occupation phases at many of these locations, revealing in the process that many started as indigenous Saami hunting encampments, a thousand years or more ago, and were later reused by Swedish fishermen that colonised the region during the medieval period. It is clear that the stone labyrinths belong to this later period of occupation, dating from the 1300's onwards, with a pronounced peak of popularity during the 1500's, while a few date to as recently as the mid-1800's.

While much of the scant archaeological evidence from these sites consists of bones and charcoal - from which their purpose can be determined - the Saami occupation levels also provide evidence of their spiritual beliefs (including the surprising discovery of bear skeleton burials), practices that were regarded with great suspicion by the incoming Christian Swedes that reused these sites. While Broadbent recognises that the labyrinths may well have been recognised at the time of their construction as a magical symbol, a device to provide good luck with the fishing and protection in a hostile environment, he goes further and suggests that the cross at the centre of the majority of these classical design labyrinths, the first section of the design to be constructed, was an overt act of Christianising the sites, to provide protection from both the sea and the heathen practices previously carried out at these locations. A fascinating conclusion and a valuable sourcebook for students of these labyrinths in the far north of Europe.

Jeff Saward

El Laberinto – Historia y Mito : by Marcos Mendez Filesi. Alba Editorial, Barcelona, Spain, 2009. ISBN 978-84-8428-442-0. Paperback, 404 pages, numerous b+w illos.

Marcos Mendez Filesi must be congratulated for this book, as it indeed covers the history and mythology of labyrinths and mazes, in their many forms, as the title suggests. For a small, pocket-sized paperback the book is surprisingly comprehensive, and also very up-to-date. The author has done his homework and includes details of the various recent discoveries of petroglyphs and pebble labyrinths in Spain and provides level-headed commentary on the various theories surrounding the age of specific controversial labyrinths.

With a good selection of black and white illustrations and photos, and valuable distribution maps, hopefully this concise Spanish-language guide to the subject will inspire a new generation of Spanish labyrinth researchers to add further to the increasing catalogue of labyrinths in the Iberian peninsula, a region much neglected in the past, but recently revealing some of the most interesting and important new finds.

Jeff Saward

Dutch Maze & Labyrinth Symposium

The Dutch Society for Mazes and Labyrinths presents

Dutch Maze and Labyrinth Symposium - 2 & 3 June 2011

Muldershuis, Eibergen, the Netherlands

near the Mallum labyrinth designed by Jim Buchanan

- Listen to presentations by international renowned experts on mazes and labyrinths and their application (main programme, 2 June)
  Jim Buchanan ('drawn walk'), Oskar van Deventer (mechanical mazes) Ruud Haak (puzzle mazes), Willem Kuipers ('from stagnation to flow'), Jeff Saward (church labyrinths), Fons Schaefers/Martin van der Gaag (mazes and labyrinths in the Netherlands)
- Experience the *Labyrinth Illuminaire* performance by *Jim Buchanan* (night of 2 June);
- Join a guided tour on 3 June. Two options are available: (1) selected objects in a 40km circle around Eibergen; (2) church labyrinths between Eibergen and Amsterdam

A basic registration fee of € 55 applies for the main programme. This includes a lunch and break refreshments. The night performance can be booked separately at € 5. The guided tour fee depends on the number of attendees.

For further details contact the Dutch Society for Mazes and Labyrinths:
f.schaefers@planet.nl

Or visit the symposium page on **www.doolhoven.nl**

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The story of mazes and labyrinths is as long and tortuous as their plans might suggest. For many, mention of the labyrinth may recall the legend of Theseus & the Minotaur. An increasing number will know of the ancient labyrinth symbol which occurs around the world, at different points in time, in places as diverse as Brazil, Arizona, Iceland, across Europe, in Africa, India and Sumatra. This symbol and its family of derivatives have been traced back 4000 years or more, but its origins remain mysterious. Modern puzzle mazes, however complex their form, are but the latest episode in this labyrinthine story.

Labyrinthos is the resource centre for the study of mazes and labyrinths, with an extensive photographic & illustration library and archive, offering professional consultation and services for owners, designers, writers and publishers. Labyrinthos also provides consultation for maze and labyrinth design and installation, lectures, workshops & slideshows. We also specialise in personalised tour guide services to labyrinth locations. Contact Jeff Saward or Kimberly Lowelle Saward at the address above, or visit our extensive website www.labyrinthos.net for further details.

Our annual journal Caerdroia, first published in 1980, is dedicated to maze and labyrinth research and documentation. Produced by labyrinth enthusiasts for fellow enthusiasts, it keeps in regular contact with correspondents throughout the world, exchanging information and ideas, to help create a clearer picture of the origins and distribution of the enigmatic labyrinth symbol and its descendants, from the earliest rock carvings and artefacts through to modern puzzle mazes of ever increasing complexity and ingenuity.

Current subscribers to Caerdroia include maze and labyrinth researchers and enthusiasts, archaeologists and historians, artists and authors, designers and owners, and members of The Labyrinth Society. As a non-profit making journal, dealing with a very specialised subject, Caerdroia relies on reader contributions, submissions and subscriptions for support. If you are interested in the history, development, diversity or potential of mazes and labyrinths in any of their forms, perhaps you would care to join us on the path...

Caerdroia 40 was produced during March 2011 by Jeff Saward and Kimberly Lowelle Saward at Labyrinthos HQ. Opinions stated by contributors are not always those of the editors, although Caerdroia welcomes open discussion and endeavours to provide a forum for all who are lured by the labyrinth.

For submission guidelines visit: www.labyrinthos.net/submission.html

Printed copies of this edition are available from: www.labyrinthos.net/caerdroia40.html

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CAERDROIA

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