Cadence Characterises Labyrinths

Willem Kuipers

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Summary

In this article the concept of the cadence of a labyrinth is introduced, the rhythmic variation of the visual distance to the centre, which characterizes the labyrinth and part of its effect. A graphical representation of the cadence of the Classical and Chartres labyrinths shows their elegance and power. Their cadence is compared to similar labyrinths and its attractiveness and effectiveness is discussed.

Motivation for this Article

At the Labyrinth 2000 conference I was walking the labyrinth at Saffron Walden and later the one at Hilton. Both belong to the Chartres 'family' of labyrinths, the former having 17 circuits, the latter only 9. As I walked the Hilton labyrinth, it occurred to me that while leaving the labyrinth, the end comes unexpectedly soon. So, I noted down the pattern and decided to have a closer look at home.

I looked for a way to depict the pattern of the circuits and came up with a graph depicting the varying visual distance to the centre while walking towards it, using different colours for the different quadrants. This resulted in fascinating pictures and made immediately clear why Hilton 'felt' so strange: the pattern was asymmetrical with respect to the direction of moving. Moving inwards, the sequence of circuits was unlike the sequence moving outwards.

I became interested and began to look more into these sequences. In my opinion these sequences can be compared to a kind of rhythm, or rather a cadence, characteristic for walking a certain labyrinth and making it work the way it does. So, I found myself asking the following questions:

- What is unique about the cadence of a Classical or a Chartres labyrinth, and does that explain their proliferation?
- Are other existing cadences less attractive, if so, why?
- Are other attractive cadences conceivable?
- Is there a relation between cadence and effectiveness?

This article is about these questions and about my tentative answers.

Depicting the Cadence of a Labyrinth

My method of depicting a cadence takes the following rules:

The picture is an XY-graph.

The X-axis denotes the consecutive 'steps' through the circuit segments.

In a Classical-type labyrinth, a step is the arc between two turns, almost a circle.

When there are quadrants, e.g. Chartres labyrinths, a 'step' is an arc within a quadrant, almost a quarter of a circle.

The Y-axis denotes the number of the circuit, numbered from outside inwards. So, circuit 1 is the outermost circuit. In the Classical case: circuit 7 is the innermost circuit and number 8 denotes the centre. In the Chartres case: circuit 11 is the innermost circuit and number 12 denotes the centre.

The graph is the line connecting the consecutive steps through the circuits. It shows the inverse distance to the centre (or the distance to the outside world). In the Chartres case, the line is broken and the line-type is changed when changing from one quadrant to another (always while keeping the current circuit number).

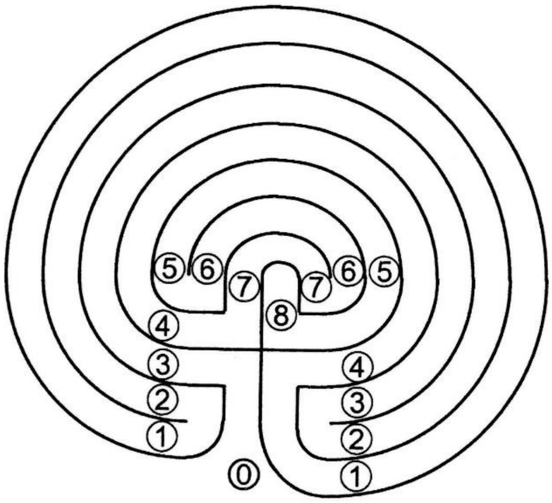


Figure 1: the circuit numbers of a Classical labyrinth

In the following paragraphs the Classical labyrinth is discussed first because the cadence is less complex. The Chartres labyrinth follows afterwards.

The Cadence of the Classical labyrinth

Using the rules mentioned above, the cadence of a Classical or Cretan 7-circuit labyrinth can be depicted as shown in figure 2. To make the special features more visible, I have added a diagonal (dotted) line and two so-called ribs, perpendicular on the diagonal.

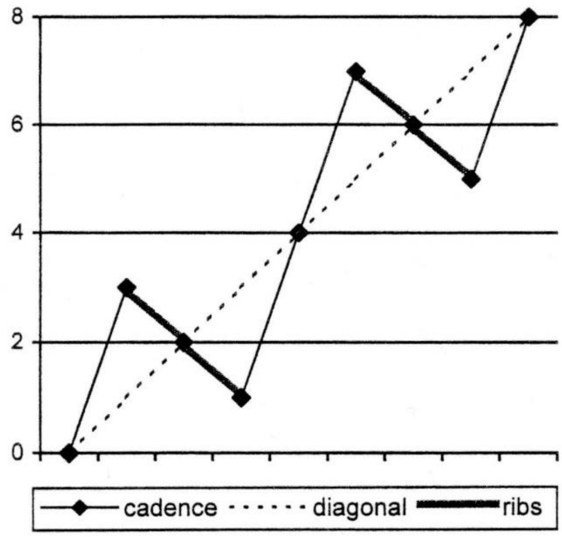


Figure 2: the Classical 7-circuit cadence

The most significant is the rotational symmetry about step 4 (the middle circuit). One can obtain the second half of the sequence by rotating the first half of the sequence about step 4 by 180 degrees. This aspect can be called self-duality. Going inward or going outward through the labyrinth, the sequence is identical (that is, if you invert the numbering of the circuits, going outward). In fact, the sequence is doubly self-dual: One can rotate the first half of the sequence about step 4 to obtain the second half and one can rotate the first quarter about step 2 to obtain the second. Therefore a 7-circuit labyrinth can be seen as two 3-circuit labyrinths, connected by the middle circuit. The meander in the next illustration makes this clear.

Secondly, if one counts the number of circuits walked consecutively, it holds that all even numbered circuits are passed on the same number in the sequence. If one indicates the sequence by using the circuit numbers, the Classical labyrinth goes: 0 3 2 1 4 7 6 5 8.

Thirdly, in the introduced way of depicting the cadence, it can be seen that the marking points of the graph are either on the diagonal, or on the transverse ribs, situated on one quarter and on three quarters of the length of the diagonal (at a rotational symmetry point).

As I will illustrate later, this cadence is a miracle of regularity, without being trivial. It has optimal complexity to impress without pushing the point. It is no wonder the pattern has been (re)invented all over the world through centuries or rather millennia.[1] You cannot get anything better.

Other Classical Family Members

The main family line, as I would like to define it, is based on making the seed pattern or the meander figure more complex.

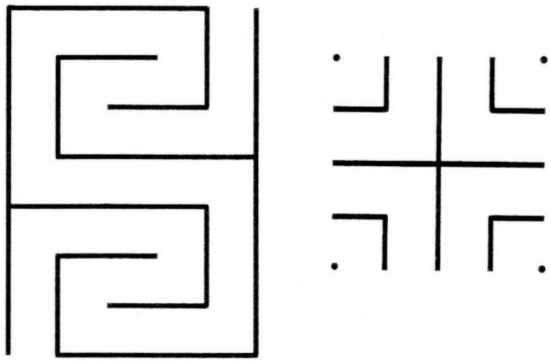


Figure 3: Meander and seed pattern for Classical 7-circuit labyrinth

By adding symmetrically more right angles in the seed pattern, the number of circuits goes up in fours: 7, 11, 15, etc. The meander gets more entangled: extra right angles are added to the four loose ends. In that way the double self-duality is preserved. Again, an 11-circuit labyrinth can be seen as two 5-circuit labyrinths, connected by the middle, 6th circuit. The meander makes that even more clear.

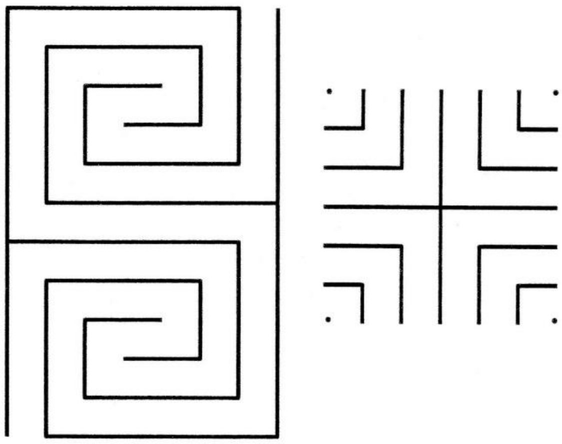
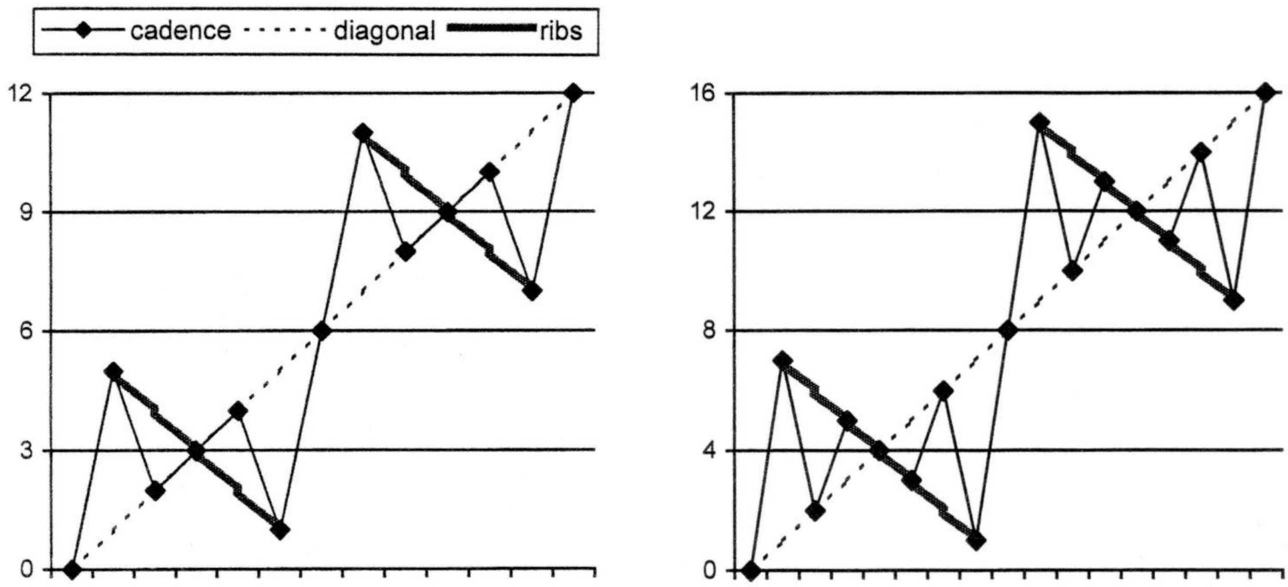


Figure 4: seed pattern and meander for Classical 11 circuit labyrinth

The symmetry is also shown in the cadences. All even circuit numbers keep being passed at their respective numbers in the sequence. The marking points of the graph are still either on the diagonal, or on the ribs, situated perpendicular on one quarter and on three quarters of the length of the diagonal.



Figures 5 and 6: cadence of a 11-circuit and a 15-circuit Classical labyrinth

Then the question of the effectiveness of more circuits. When I draw and walk a 11- or 15-circuit labyrinth on the beach I wonder whether 7 circuits are just necessary and sufficient to get in a proper meditative mood. I am well aware of the esthetic beauty of more circuits. The strict regularity of all these, mainly concentric, arcs please the eye. When there are more circuits involved, the changes in distance to the centre become more pronounced. It adds a kind of bewilderment, a maze-like sensation. That may come in handy when someone has to be torn out of his multiple track thoughts. But I tend to believe the regular user can do with seven circuits.

Alternative 7-circuit Labyrinths

In his article in *Caerdroia* 29, "Developing the labyrinth," Alex Champion also investigated different sequences for getting from the outside to the centre of a Classical-like, 7-circuit labyrinth.[2] Given that 0 is the entrance and 8 is the centre, the Classical sequence is as illustrated in the cadence of figure 2: 0-3-2-1-4-7-6-5-8. He remarks on his interest in cadence 0-7-2-5-4-3-6-1-8. As can be seen in figure 6, this is the first half of the sequence of a Classical 15-circuit labyrinth.

I also was intrigued by the possible alternatives and found practical reference in an article on the Internet by Tony Phillips, professor at the mathematics department of State University of New York, on so called Simple Alternating Transit mazes (s.a.t. mazes).[3]

'Transit' because the path runs unicursal from the outside to the centre (i.e., labyrinths in the often-used definition)

'Alternating' meaning one changes direction when going from one circuit to the next

'Simple' meaning the path makes essentially a complete circle at each circuit (unlike Chartres).

In his article he introduces the concept of self-duality, which I gratefully used earlier in this article, and states three necessary and sufficient conditions for sequences (or cadences) to determine a simple alternating transit maze.

Finally, he shows how many different 7-circuit s.a.t. labyrinths can be constructed.

I prefer to stick here to the self-dual ones, because of the inherent regularity of the cadence. The possible non-trivial self-dual cadences are:

0 3 2 1 4 7 6 5 8 (the Classical pattern)

0 5 6 7 4 1 2 3 8 (A)

0 7 2 3 4 5 6 1 8 (B)

0 7 2 5 4 3 6 1 8 (C, the first half of a Classical 15-circuit)

0 7 6 3 4 5 2 1 8 (D).

I drew the different patterns on the beach, using the various seed patterns provided by the article and reflected on the feeling of walking them. Later, my 'labyrinth partner' Regina Coppens used her pendulum to measure the energy of these cadences.

Assessment of the alternatives. Cadence A did not feel very useful: one starts with the three inner circuits, goes through 4 to the three outer circuits, both walked consecutively. After walking the first three circuits, the rest seems superfluous. The pendulum showed negative energy emanating.

Cadence B is rather dull: after the 7th circuit one goes outwards to the 2nd, going gradually inward, with a final 1st circuit which seems somewhat irrelevant. The pendulum was not very enthusiastic either, almost neutral.

Cadence C feels rather unrestful, as I mentioned earlier on the 15-circuit labyrinth. Its energy pattern however was strongest positive of the four alternatives. The Classical family shows its power.

I found cadence D rather interesting for two reasons: the pattern has a mild variation, and it seems the most regular way to make a cadence which goes generally from the inner circuits to the outer circuits, like Chartres. The circuits become gradually longer, but in a fanciful way which is interesting to walk. The pendulum however showed no movement at all, meaning neutral energy. It remains to be seen whether one could raise the energy level significantly by walking it, and what kind of effect can be obtained by using it.

So, the Classical 7-circuit labyrinth comes out most effective again, even in its more complicated form of a (half) 15-circuit labyrinth.

The Cadence of the Chartres Labyrinth

Using the rules mentioned earlier, the Chartres labyrinth cadence can be depicted. The picture looks more complex, because there are four quadrants and eleven circuits to take into account.

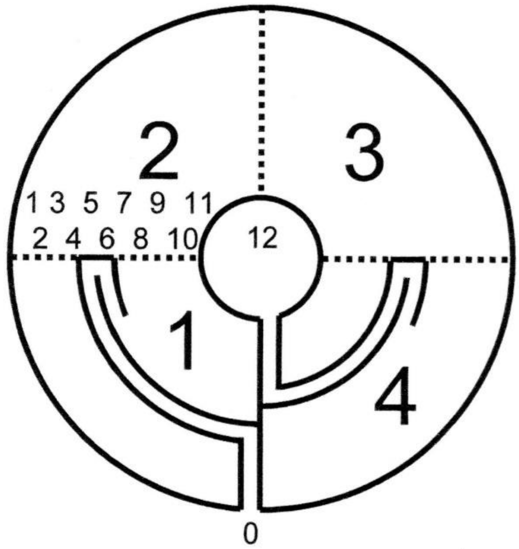


Figure 7: Four quadrants and circuit numbers of a Chartres labyrinth

This is indicated by breaking the line and using a different line pattern for each quadrant. The quadrants are numbered clockwise, 1 to 4. The entrance is in quadrant 1, the centre is reached from quadrant 4.

The diagonal line and the transverse ribs of the Classical labyrinth are omitted, having no function for this type of labyrinth.

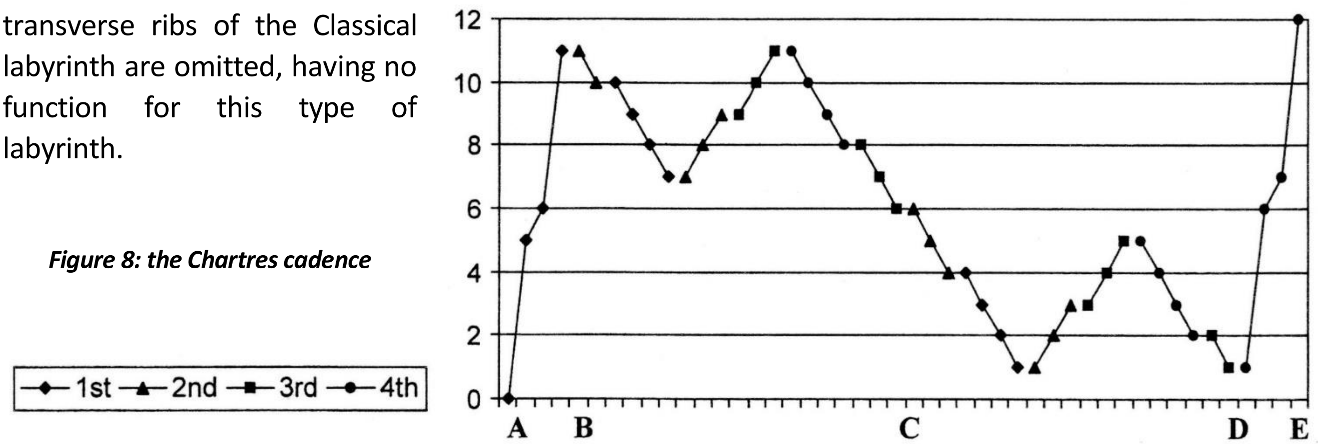


Figure 8: the Chartres cadence

This picture makes clear that the Chartres cadence is very simple and elegant. Again, the most significant is the self-duality: the fact that one can rotate the first half of the cadence about step 22-23 in the middle circuit (6th), to obtain the second half of the cadence.

The second point is the use of a 5-circuit pattern. It shows in figure 7 from B to C (circuit 11-7) and from C to D (circuit 5-1), circuit 6 serving as a border. I'd like to call this 5-circuit pattern the characteristic cadence of the Chartres family of labyrinths. I'll introduce some other family members later. Note that this 5-circuit pattern is self-dual too. Therefore, the Chartres cadence, like the Classical, is doubly self-dual, and a 5-circuit Chartres labyrinth can be made (see below).

The third point is the 'smooth travel' through the four quadrants from B to E, going forward from 1 to 4, back to 1 and forward to 4 again. Combined with the second point it offers in my opinion the optimal regularity of pattern.

The fourth point is about the general movement from the inner circuits to the outer circuits while moving towards the centre. The Classical labyrinth goes the other way around, as was shown earlier.

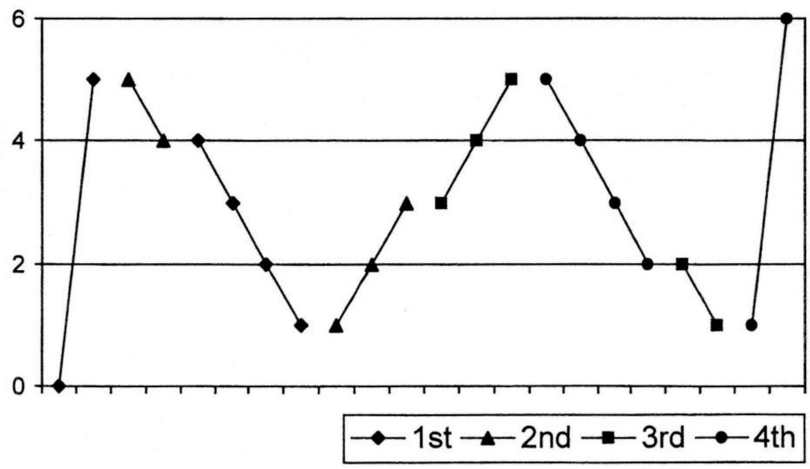
According to my knowledge and experiments, it is not possible to achieve a comparable regularity in an 11-circuit cadence, under the condition of that general movement from inner to outer circuits, other than by the Chartres model.

Therefore at least one very good reason for the success and the proliferation of the Chartres cadence is its optimality. Given the wish to use eleven circuits, four quadrants and striving for maximum regularity of cadence, there is no alternative.

Other Chartres Family Members

The 5-circuit labyrinth. As was explained earlier, the cadence of the Chartres labyrinth is doubly self-dual. This implies that it should be possible to construct a self-supporting 5-circuit Chartres-like labyrinth. Looking properly at the cadence, a self-dual 5-circuit cadence arises logically.

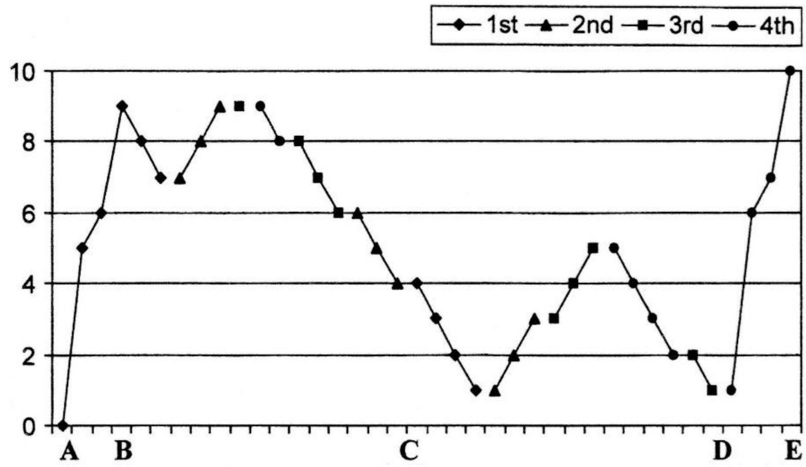
The labyrinth itself can be drawn using the cadence. Regina's pendulum showed the energy of this labyrinth is positive.



Figures 9 & 10: the Chartres 5-circuit labyrinth and its cadence

The Hilton Labyrinth.

In figure 11 the current Hilton labyrinth cadence is depicted. One can easily see why going outward the exit is suddenly encountered: the cadence is not self-dual, and the irregularity occurs in the inner circuits 7-9, which are already short because of their position near the centre. It may help to experience the feeling by following the path with your finger.



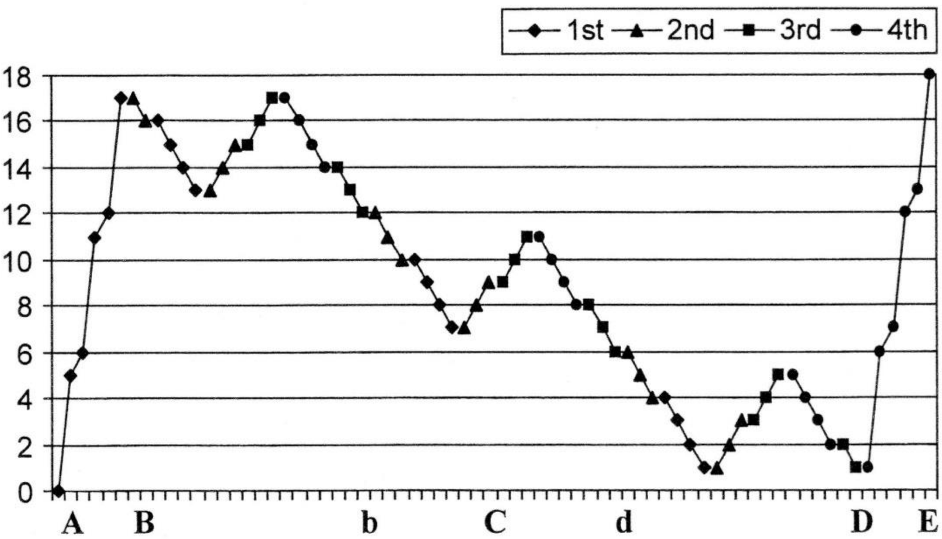
Figures 11 & 12: the Hilton labyrinth and its cadence

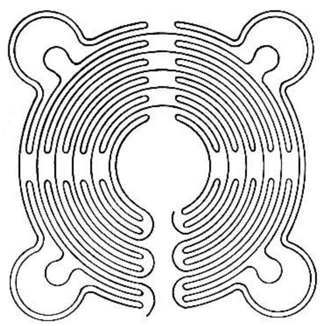
There are two articles in *Caerdroia* 22 about the Hilton labyrinth.[4,5] Presumably the erection of the pillar in the centre around 1730 spoiled the two inner circuits of a Chartres labyrinth. For many years the three 9th circuit ends were connected to a large centre comprising the presumed 10th and 11th circuit plus the original centre. When the labyrinth was re-cut in 1967 the loose ends were connected in a logical way to each other, producing the current cadence.

When I recall our walk of the Hilton labyrinth during the Labyrinth 2000 conference it puzzles me however 11 circuits plus a centre could have fitted there, since the current centre is still quite small. However, it is a pleasantly situated, well-kept labyrinth and I'm glad its irregularity put me on the track of finding out about cadences.

The Saffron Walden Labyrinth.

The Saffron Walden cadence is the larger sister of Chartres. Instead of two, it is made of three consecutive 5-circuit cadences, separated by circuits 6 and 12. Figure 14 makes this visible between Bb, bd and dD.





Figures 13 & 14: the cadence and design of the Saffron Walden labyrinth

Effectiveness. The actual labyrinth takes some time to walk, due partly to the size of the centre grass mound, partly to the use of bastions, and partly to its 17 circuits. The length being 5 times the length of Chartres raises again the question whether there exists an optimal path length for meditation.

I never felt the urge to walk out through the labyrinth, but always took the grass 'stem' of the labyrinth. But I generally suffer from impatience. So maybe 11 circuits are necessary and sufficient, more is less, unless an element of sport is brought in, like running to a maiden in the centre, as the legend goes.

An interesting alternative: the Reims labyrinth. There was a labyrinth in the cathedral of Reims. It was destroyed in 1778 [see Kern, fig 283], but drawings have been found. It had bastions, was octagonal and had a specific cadence which I find interesting. A typical feature of this cadence is the path gradually getting nearer the centre, like the Classical labyrinth, and unlike Chartres. I drew the labyrinth in the Chartresfied way on a piece of paper and Regina's pendulum showed a very strong positive energy. We both think it will be worthwhile to investigate the effectiveness of this cadence and labyrinth further.

Conclusion

My intention was to investigate the cadence of various labyrinths and see how cadence can offer an explanation for the attractiveness or proliferation of a certain kind of labyrinth. Both the Chartres cadence and the Classical 7-circuit cadence are miracles of elegant design, due to their double self-duality without being trivial. An important difference between the two is their general tendency to go from inward circuits to outward circuits, or vice versa, respectively. This could convey a different feeling while walking, which I would like to experience further, and hear about from others.

The tool of depicting cadences proves to be a very practical way to describe the pattern of a labyrinth, like staff-notation is for music. There is rhythm in a labyrinth, and the connection with song or sacred dance comes naturally.

Like liturgy offers different functions within the sacred space of a church, different cadences may provide different functions within the sacred space of a labyrinth. Choosing cadences may provide a way to experience labyrinths in the most appropriate way for the occasion.

Willem Kuipers, Voorburg, the Netherlands. August 2000

References

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2. Champion, Alex. "Developing the Labyrinth: Chartresfication of the Cretan." *Caerdroia* 29, p. 43-51, 1998.
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