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Behind the Patterns and Designs that Cross Cultural Boundaries

Towards a Holistic Approach

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Behind the Patterns and Designs that Cross Cultural Boundaries

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Abstract

In examining the history of migrating ideas through the decoration of artefacts it is often the style of the drawing that is examined. For example, in Carolingian Europe the distribution and usage of objects that have been characterized by labyrinthine patterns and zoomorphic features have been classified as Insular style. The classification infers that the influence of these artefacts has come from Ireland and Britain. However, this form of classification can be deceptive as it fails to note the major changes in the construction of the patterns from the Insular style. The Insular style of labyrinthine patterns has a very rigid structure designed to very strict and distinct geometrical rules. In turn these patterns are influenced by ancient literate sources. Many of the zoomorphic and labyrinthine patterned artefacts of Carolingian Europe lacked this important geometrical structure, inferring that the influence was not directly from Ireland and Britain. Using a more multi-disciplinarily approach to history of art allows for the development of a clearer picture of migrating ideas. This paper examines a more holistic approach to the mapping of the transference of designs and patterns across cultures.

Keywords: History of migrating ideas, Designs and patterns, Multi-disciplinarily research, Interlacing patterns

Introduction

Symbols play an important role in modern communications. In marketing, the designs of logos of different products are important to the longevity of that product. If the consumer recognises and identifies with the logo of a brand they are more likely to purchase the produce. Particularly, with small inexpensive purchases, many of which are selected from the supermarket shelves in well under a second.¹ Religious and political movements use symbols to represent entire philosophies.² For example, a simple cross represents a complex religious ideology and last century a swastika began to symbolized a repressive political regime. Symbols now create a universal language and are becoming increasingly significant in technology and in an ever-shrinking world. There are international road signs that indicate the condition of the road ahead and what actions are required to responded to these conditions. To surf the Internet is to response to a sequence of icons until the required information is retrieved. In fact, the speed of retrieving information

in the 'information age' can be largely dependant upon how rapidly icons are interpreted and responded to. Symbols are an extension of language and they have an amazing power of communicating complex ideas instantaneously. Furthermore, symbols are the most ancient form of communication.

Many symbols have survived from prehistoric times. The oldest dominant symbols of the art of the prehistoric era are spirals, and concentric circles that are cut to the centre with a line. These symbols are called 'cups and rings' and they are carved into rocks and caves in Spain (Figure 1, see Appendix), France, Italy, Africa, Iran, Sardinia, Portugal, England, Scotland and Ireland.³ These symbols were carved into hard stone with only the assistance of a flint axe. This would have been very arduous and time consuming and suggests that these symbols had a ritual and personal significance. Often these symbols are all that remains from the civilization that carved them; however, the symbols leave tantalizing clues to their way of life, thoughts and religions.

The highest concentration of cups and rings motifs in Britain and Ireland are near a small village of Kilmartin on the West Coast of Scotland. Ninety-

¹ Paul Feldwick, "What Is Brand Equity Anyway, and How Do You Measure It?," *Journal of the Market Research Society* 38, no. 2 (1996), Randi Priluck Grossman and Joseph Z Wisenblit, "What We Know About Consumers' Color Choices," *Journal of the Marketing Practice: Applied Marketing Science* 5, no. 3 (1999).

² P. Ory, "The History of Modern Political Symbols: An Investigation," *Revue D Histoire Moderne Et Contemporaine* 47, no. 3 (2000).

³ Hermann Kern, *Through the Labyrinth* (Munich: Prestel, 2000). 67-75. Emilia Pasztor and Curt Roslund, "A Possible Astronomical Orientation of Rock Carvings in the Kilmartin Area," *British Archaeological Reports* 1154 (2003).



three of these symbols survive over an area of thirty square kilometres; the stroke or line to the centre is predominately orientated to 120° (i.e. 30° South of East) with only a standard deviation of 18°. ⁴ This is the midpoint between the Autumn equinox and the Winter solstice, and between the Winter solstice and the Summer equinox. This information suggests some form of celestial cult, which appears to be a general form of worship in the early Bronze Age throughout Ireland, Britain and Europe. However, the consistent orientation of the stroke is unusual and indicates a difference in ritual practice or a variation of religious beliefs. Consequently, although the symbol can only indicate the type of religion practiced by these early Bronze Age people, the layout of the symbol illustrates at least a regional difference in ritual practice.

The Megalithic cairns provide some of the earliest evidence of organised society in Ireland. These cairns are a mound of stones placed within a perimeter wall of kerbstones. Many of these cairns have passages leading to a central chamber. Large stones, referred to as Orthostats, form the walls of the passages, which are roofed by large flat stones. ⁵ One of the most ornate and well-preserved cairns is Newgrange (c. 3150BC), ⁶ fifty kilometres North of Dublin. There are hundreds of patterns carved on the kerbstones and Orthostats. There is a great deal of variety of patterns; circles, spirals, arcs, serpentine forms, zigzags, lozenges, radials, star shapes. The lozenge and zigzags patterns are the most common motifs at Newgrange. However, the spirals are far more prominently displayed and are on the most important and well-placed stones. ⁷ To the visitor at Newgrange the spirals would appear to epitomise the designs of Newgrange. These spirals patterns are based on interlinking concentric circles and are combined abstract patterns constructed according to very strict and elaborate rules.

The entrance at Newgrange is orientated 135° (i.e. 45° South of East), to the Winter solstice. The light of the sunrise on the Winter solstice enters the main chamber of the cairn via a roof box at the entrance, which is marked by an ornate kerbstone (Figure 2, see Appendix). The entrance kerbstone K1, has a distinct division line, on the left of the line is a tri-fold spiral pattern, each spiral coils into the centre clockwise and on the right of the line a double spiral, both spirals coils into the centre anticlockwise. This mimics the movement of the

sunbeam on the floor of the passage on the days leading up to the winter solstice. The sunbeam grows in length every day moving west to east in a spiralling fashion until it reaches the chamber at sunrise on the winter solstice, then sunbeam diminishes in length in the days following the solstice, reversing the direction of the spiralling movement. ⁸

The tri-fold spiral design is repeated in the passage on the Orthostat C10, although, it is only a third of the size of the entrance tri-fold spiral. Furthermore, another kerbstone K52 has a distinct dividing line, down the centre of the kerbstone. The dividing lines of K1 and K52 divided the mound in the direction of the mid-winter sun. Like Kilmartin the mound and the symbols suggests some form of celestial cult. However, the highly sophisticated layout of the symbols illustrates a regional difference in the ritual practices of this early Bronze Age society. Furthermore, the style and structure of these symbols mark the beginning of a distinctive Irish style.

The strength of the influences of these interlinking spiral patterns has fluctuated from time to time but they have never altered very deeply in their appearance and they are fundamental to the spirit of Irish ornamentation. This pagan tradition is one of the most dominant elements of the essential design principle of Irish art that flourished in the monasteries of the Middle Ages. This style became known as Insular, because it was developed away from continental Europe. However, it did not develop in complete isolation.

The Development of Insular Design

The oral tradition of the druidic religion and teaching system makes the history of early Ireland obscure and dependent on later challengeable interpretations. ⁹ There are very few example of early Celtic art that survive and these rare examples display the same curvilinear designs as Newgrange. By the first century AD Ireland had close interaction with England and this is seen in the exported Romano-Celts goods from England into Ireland. However, the most important contacts appear to be directly with the Continent. ¹⁰ Although the Roman legions never attempted to cross the ill-famed Irish Sea there was some influence from the Romans; the first system of writing used in Ireland was the ogham alphabet that was a very inefficient script based on the Latin alphabet. However, the classical themes of the Romans made no impact on the tradition curvilinear spiral patterns of the Irish. The withdrawal of the Roman legions from Britain and

⁴ Pasztor and Roslund, "A Possible Astronomical Orientation of Rock Carvings in the Kilmartin Area." p.101

⁵ Timothy O'Brien, "Light Years Ago: A Study of the Megalithic Cairns of Newgrange and Loughcrew," *Journal of the Irish Colleges of Physicians and Surgeons* 19, no. 4 (1990), Michael J O'Kelly, *Newgrange: Archaeology, Art and Legend* (London: Thames and Hudson, 1982). p.260

⁶ Brian Fagan, "Timelines: Neolithic Newgrange," *Archaeology* 47, no. 5 (1994). 16

⁷ O'Kelly, *Newgrange: Archaeology, Art and Legend*. pp. 146-185

⁸ O'Brien, "Light Years Ago: A Study of the Megalithic Cairns of Newgrange and Loughcrew." p.264

⁹ D'aith'i O'h'Og'ain, *The Sacred Isle: Belief and Religion in Pre-Christian Ireland* (Doughcloyne: The Collins Press, 1999).

¹⁰ Henry, 1965, p.2.

the eventual collapse of the Roman Empire resulted in an Irish expansion into the West Coast of England, Wales and Scotland. Christianity was introduced into Ireland at about this time. Ireland took up Christianity surprisingly rapidly; there were no Irish martyrs and no persecutions. The pagan calendar was retained and old pagan festivals and traditions were kept. However, they were now dedicated to the feast of the holy martyrs of the Christian church.¹¹

When the Roman Empire collapsed this left England open to Germanic invasion (or mass migration) of the pagan Saxons and Angles.¹² The occupation of England by the Saxons and Angles left the Christian communities of Ireland, Wales and Scotland isolated from the rest of Europe. The literate monastic schools replaced the oral druidic traditions. However, it is possible some of the old druid customs were integrated into the monastic customs. The Irish ecclesiastical customs developed in isolation from the continent.¹³

By the early seventh century there were many Anglo-Saxon converts to Christianity and many Anglo-Saxons received their education in Ireland. Jewellery is the finest of the surviving art forms of the Anglo-Saxons and interlacing, zoomorphic animals and snake patterns define its decoration¹⁴. During the mid seventh century this contact between Irish and Anglo-Saxons contributed a great deal to Irish Insular art. In the late sixth century the first interlacing pattern appeared in Irish Insular art and began to become an integral part of Irish Insular design. However, by the end of the seventh century the English Anglo-Saxons began to go their own way. By this time the Book of Durrow was completed, the Lindisfarne gospels were close to being in production and Irish Insular art was developing towards its pinnacle.

Another manuscript from the early seventh century was produced in an Irish scriptorium. Like the earlier manuscript the small amount of decoration in the surviving fragments is not very impressive and it has parallels to pages of Italian manuscripts of the time. What is interesting is there are the small dots that surround and create a frame around the Chi-Rho or Labarum. This style of decoration is distinctly of Coptic origin and is found in paintings of the monasteries in the Egyptian desert. It is thought that there was contact with Egypt and Byzantium and that these imports to Irish art took place directly by

way of Gibraltar.¹⁵ The earliest Northumbrian manuscript is from the early seventh century. While only ten pages survive it is the first surviving manuscript that displays both the Irish spirals and the interlacing of the Anglo-Saxon designs together in the one manuscript.¹⁶

From the mid-seventh century with the Book of Durrow to the early ninth century with the Book of Kells all of these influences, from the megalithic to the Anglo-Saxon, were absorbed. It was a time when cultures were metamorphosing and melting into one another giving birth to new identities and one of these new identities was Insular art. Insular art absorbed all of these influences but mirrored none it is unique. What makes it unique is the way that it has pulled all of these influences together. The geometric framework and the layout of the patterns are distinct to Irish scriptoriums of seventh to the ninth century. Like the consistent orientation of the cups and rings motifs at Kilmartin, and the distinct geometric structures of Newgrange, the geometric framework of the Insular artists was unique to them and defines not only their style but also their work practices.

The Structure of the Insular Interlacing

Interlinking spirals and interlacing patterns of the Insular artists both have a distinct geometric structure. However, this paper will examine the interlacing patterns only. The interlacing patterns have interesting geometric features that are visible and invisible. These patterns were executed with a great deal of precision and since there is a great deal of repetition across all the Insular manuscripts this implies that the construction of borders was formalised. The great Celtic artists must have had the power of visualising complex and completed work to its final state. This could have possibly come with experience but it is far more likely to have been assisted by formalised construction methods. This formalisation would have enhanced an experienced artist's capacity of draughtsmanship to an astonishing level, which was demonstrated in the Insular manuscripts of the Middle Ages. George Bain and Peter Cromwell have explored these geometric constructions in depth. George Bain examined the geometrical drawing of the borders¹⁷ while Peter Cromwell analysed their mathematical symmetries.¹⁸

The interlacing patterns form borders. These borders can be drawn onto a grid. This grid is composed of squares and it assists with the reference points such as curves and crossing points. Bruce-

¹¹ Ibid. p.19.

¹² It appears that the Anglo-Saxons did not massacre the native Romano-Celts but they assimilated with some ideas of the civilization of the dying Roman Britain. Lioryd Laing and Jennifer Laing, *Anglo-Saxon England* (London: Routledge & Kegan Paul, 1979). p. 8 However, Anglo-Saxon prowess came from the image of the Hero, strongest, brutal, boastful drunk and brave. Ibid. p.56-7.

¹³ Henry, 1965, p.25-29.

¹⁴ Laing, 1979, p.57-87.

¹⁵ Ibid p.62.

¹⁶ Henderson, 1987, p. 28.

¹⁷ George Bain, *Celtic Art: The Methods of Construction* (New York: Dover Publications Inc, 1973).

¹⁸ Peter Cromwell, "Celtic Knotwork: Mathematical Art," *The Mathematical Intelligencer* Vol. 15, no. 1 (1993).

Mitford has supplied the proof that the interlaced borders were built on such a grid in his examination of the Lindisfarne Gospels.¹⁹ He observed light markings of a grid on the surface of the vellum. This grid can be curved or distorted to any shape to assist in the drawing of the irregular shaped borders and the patterns can be drawn using the same method as the straight borders. Many of these irregular borders are integrated with zoomorphic motifs and these zoomorphic motifs do not pose a problem with the examination of the interlacing patterns. They do conform to a geometric framework and regularity; however, they usually form the ends of the distorted shapes and became part of the tracery. The borders are constructed with a fundamental unit of design and then repeated to form the continuous pattern. This repetition to cover a two-dimensional plane is achieved by only four processes: translation, reflection, rotation and glide reflection. Translation is just a displacement or shift along the plane. Reflection in a line or across a line is a mirror image. A rotation has exactly one fixed point at the centre of the rotation. A glide reflection can be described as a translation followed by a reflection in a line parallel to the direction of translation. M. C. Escher used these four processes in his designs that covered the plane with no gaps.²⁰ To cover an infinite plane there are seventeen different combinations of the four processes while there are only seven for one-sided border patterns. However, the borders of the Insular manuscripts are continuous paths threading over and under. This over and under of the passage of the thread forms a two-sided border, this adds two new processes: a screw, which is a rotation by a translation along its axis, and a rotatory-reflection, which is a rotation followed by a reflection in a plane perpendicular to its axis. With these six processes (Figure 3, see Appendix) there are thirty-one different combinations for border patterns symmetries.²¹ However, the Insular artist only used seven of these symmetries.

It is the patterns of the actual paths of the borders that reveal interesting and intriguing aspects of these borders. These patterns are invisible but it is possible to make these invisible patterns visible. To realize the hidden symmetries of the Insular borders, that transforms not only their aesthetic value but also their meanings, it is necessary to begin with the drawn border on the grid. Using a simple example from the Book of Kells (Figure 4a, see Appendix), first draw the border onto a grid. This type of grid is using exactly the same method that these borders

were originally drawn. In the original drawing of the interlacing the grid assisted with the reference points such as crossing points and curves. By using this grid the borders can be kept uniform and in proportion. The crossing of the grid marks a crossing point of the interlacing and the curves pass over the squares of the grid. The interlacing thread passes over every square of the grid and there are no empty squares on the grid (Figure 4b, see Appendix). To binary colour the border it is necessary to colour the squares of the grid, black and white alternatively, following the path of the interlacing. In Figure 4b, see Appendix the colouring begins on the right hand side beginning with colouring the first square of the grid black, indicated by the arrow, then follow the thread (from Figure 4b, see Appendix), colouring the squares white, black alternatively. When the end of the thread is reached return following the other thread end, indicated by a pointing hand in (Figure 4c, see Appendix) that returns to complete the path. Figure 4d shows the completed binary colouring of the border in (Figure 4a, see Appendix), (Figure 4b, see Appendix) displays the completed pattern of the binary coding this reveals an interesting mirror negative reflection.

The next example is a more complicated border from the Book of Kells (Figure 5, see Appendix). In this example there are four thread ends as opposed to the two in the first example. To cover the entire border always return on the thread next to the one that is finished, until all the threads are covered. The binary colouring (Figure 5c, see Appendix) shows the same negative reflection, yet (Figure 5a, see Appendix) is quite different to the first example (Figure 4a, see Appendix). Is there a counterexample to this H-shaped negative reflection? The first example (Figure 4, see Appendix) had a grid width of four squares and (Figure 5, see Appendix) has a width of eight squares, by looking at an example that is not a multiple of four, the pattern changes (Figure 6, see Appendix). In this example the border has a grid width of six, although it has a different path pattern from first two examples it retains the quality of a negative reflection.

By the binary colouring of the path it is possible to deconstruct the borders into simpler and regular constructions. The mirror reflection becomes a regular and consistent feature in all of the path patterns of the border of the Insular manuscripts. The seven symmetries used in the Insular manuscripts all have this hidden quality of mirror reflections. From the twenty-four symmetries that are not used by the Insular artists the seven one-sided symmetries are discounted, however, this still leaves seventeen possibilities that are not used by the Insular artist.

¹⁹ R. L. S. Bruce-Mitford, "The Lindisfarne Gospel," in *Evangeliorum Quattuor Codex Lindisfarnensis*, ed. T. D. Kendrick and T. J. Brown (Olten-Lausanne-Fribourg, 1960).

²⁰ M. C. Escher, *Escher on Escher: Exploring the Infinite*, trans. Karin Ford (New York: Harry N. Abrams, 1989).

²¹ Cromwell, 1993, p.39.

Tracing the Migration of Ideas through Design

Insular art of the seventh and eighth centuries is some of the most outstanding abstract art ever produced. A manuscript of Kildare was described as the 'work of an angel, and not of a man' by a twelfth century Welsh historian.²² These works have been continually admired since their production. In 781 Charlemagne invited an Irish Scholar, Alcuin to supervise the reorganization of the imperial scriptorium in Rome.²³ It is unknown whether Alcuin took up the offer; however, the first books of the palace style were a result of exchanges and inspirations. They were part Insular and part Continental style, and some revealed an Oriental influence.²⁴

In the ninth century the incessant Viking raids of Ireland resulted in a great exodus of scholars who settled in the Carolingian Empire. The Carolingian emperors surrounded themselves with Irish scholars, such as, Alcuin, Sedulius Scottus, Clemens Scottus and Scottus Eriugena. However, the influence was not only one-way. Although the patterns of interlacing, spirals and pattern work of the *Book of Kells*, early ninth century, creates hypnotic works of art that epitomize Insular art, the figurative work has a distinct Continental influence.²⁵

Throughout the Continent in the second half of the eighth century, sacred manuscripts, secular metalwork, and objects of liturgical use that has been classified as Insular are strongly represented.²⁶ The first noticeable feature of these Continental Insular works is the increased dominance of the animal features and less emphasis on the pattern work. These art works are earlier than the *Book of Kells* and although animal features were increasing in Insular designs of this time, patterns still strongly dominated. The second thing to note is the interlacing. There is an increase in the symmetries used in the interlacing patterns produced by the Continental Insular artists. The symmetries chosen were not restricted to the seven that have the hidden mirror reflected symmetries. At this time the Irish Insular artist did not deviate from the selected symmetries with the hidden mirror reflected symmetries.

This clear break away from the rigid design features of the Irish Insular artists reveals that the Continental Insular artists had different design principles and different work practices from the Irish Insular artists. These different principles and

practices strongly imply that the influence of these designs did not come directly from the Irish artists. The early work of the Continental Insular artist could have been Continental artist mimicking the Insular artist without understanding the structure of the patterns and later influences could have come from the mixed palace style of the imperial scriptorium

By the ninth century the Irish Insular artist were no longer isolated from the Continent and influences began to flow between Ireland and the Continent in both directions. Now the patterns of the Irish Insular artists began to be dominated by figurative and animal patterns. In the golden period of Insular art, the seventh and eighth century, the designs of metalwork, the manuscript illustrations and the sculptures had followed the same rigid designs. By the ninth century they made their own version of these patterns only the sculptors used the old traditions, the interlacing was used less and the symmetries increase massively, the hidden mirror reflection forgotten. The use of the spiral in Irish art disappeared in the early eleventh century, breaking with the long pre-historic tradition.²⁷ The Irish art of this period was definitely the work of man, certainly not the work of an angel.

Conclusion

It is possible that this highly selective process of pattern symmetries reveals more than a regional differences and preference to the particular layout of these designs or the work practice of the Insular artist of this time. The negative mirror reflections of the hidden patterns of the selected interlacing could indicate parallels in ancient Anglo-Saxon epic poems, such as *Beowulf*,²⁸ circa sixth century (thought to be about the time the interlacing patterns was introduced to Irish Insular art). The only enemies *Beowulf* confronts are not human, but are incredible monsters and supernatural beings, trolls and dragons from the other side. These creatures are creatures of the night and are unwilling to engage in their depredations by the light of day. *Beowulf* has the elements of natural against supernatural, day against night, and good against evil. These elements are easily fitted into Biblical texts.

Interlacing is a relatively common border pattern; however, it is the consistent rigid geometric structure that the Insular artist used that made it a dominant feature of Insular art. The highly selective choice of the seven symmetries is unique to Irish Insular scriptoriums of the seventh and the eighth century. Whether this choice of these seven symmetries was because of the property of the hidden mirror reflections or just the result of

²² Francoise Henry, *Irish Art During the Viking Invasions (800-1020 A.D.)* (London: Methuen & Co Ltd, 1967). P.95

²³ Ibid. p.29

²⁴ Ibid. p.94

²⁵ Ibid. p.83

²⁶ Egon Wamers, "Insular Art in Carolingian Europe: The Reception of Old Ideas in a Empire," in *The Age of Migrating Ideas*, ed. R. Michael Spearman and John Higgitt (Edinburgh: Alan Sutton Publishing Ltd, 1993).

²⁷ Francoise Henry, *Irish Art in the Early Christian Period* (London: Methuen & Co Ltd, 1965). p.210

²⁸ Michael Swanton, *Beowulf*, trans. Michael Swanton (Manchester: Manchester University Press, 1997).

restrictive work practices is not known. However, either way it makes it possible to track the movement of the Insular designs outside of Ireland in the seventh and eighth century. It makes it possible to distinguish between direct exports of Insular art and work that is merely influenced by Insular art.

This methodology of examining the migration of patterns and designs is not restricted to Insular art.

Different regions develop their own style and this style goes beyond the style of the drawing, the region differences are echoed in the structure of the designs of the symbols and patterns. Using this form of multi-disciplinarily analysis of the history of art makes it possible to develop an insight into the transference of designs and patterns across cultures.

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About the Author

Dr Tessa Morrison's academic background is in art, mathematics and philosophy. Her current research examines the geometrical structures of symbols and patterns throughout history. By classifying the structures of these symbols and patterns it becomes possible to track these designs through time and cross-cultural boundaries. She is particularly interested how and why particular symbols remained unchanged or became embedded into other symbols despite cultural evolution and longevity. This research has led her to the study of visual communications and mnemonics. Dr Morrison is also a practising artist in computer graphics and printmaking. In recent years she has exhibited in England, Canada, Belgium, Italy, China, Korea, Turkey, Spain, Poland, Romania, Yugoslavia and Australia.



Figure 1

Prehistoric cups and rings rock engravings, these engravings illustrate variations in the orientation of the stroke to the centre of the motifs, Pontevedra, Spain.

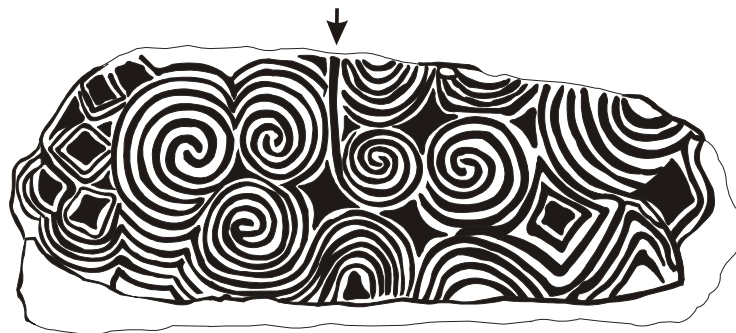


Figure 2

The Entrance kerbstone at Newgrange.

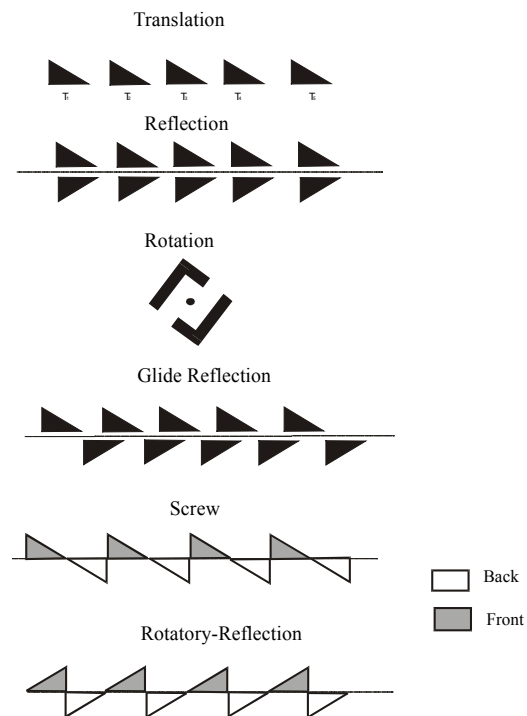


Figure 3

The six processes that generate thirty-one symmetries of two-sided borders

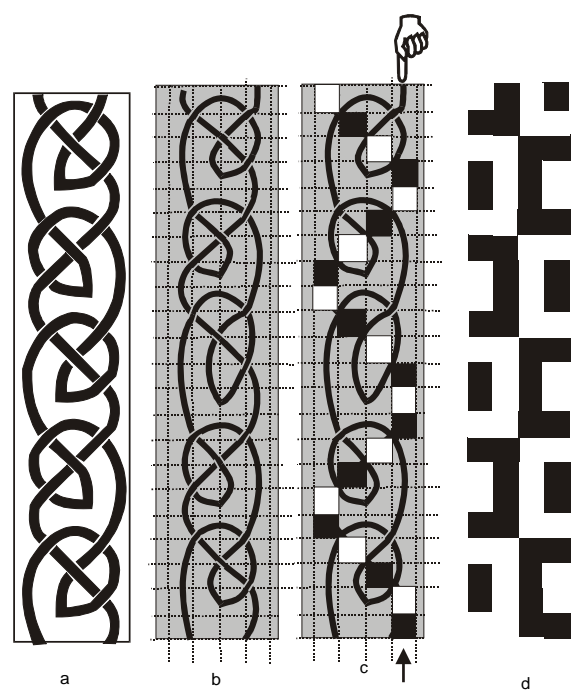


Figure 4
(a) the border (b) the border placed on a grid (c) the beginning of the processes of binary coding the path pattern
(d) the final pattern of the path pattern

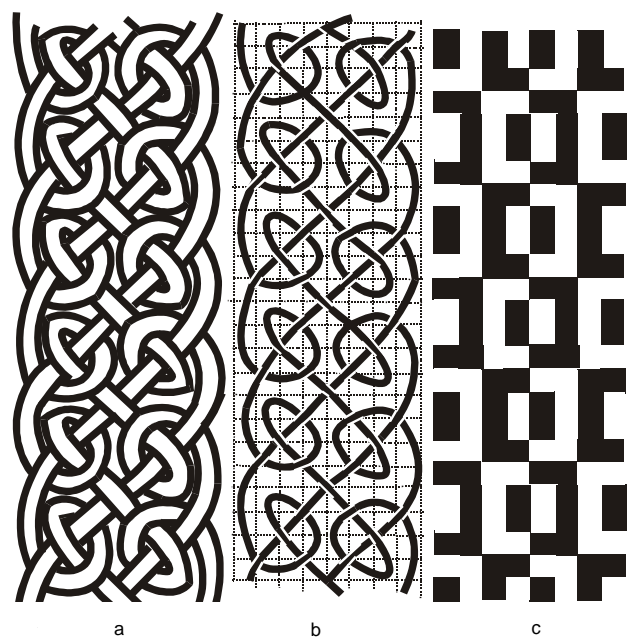


Figure 5
Binary coding of a more complex border pattern

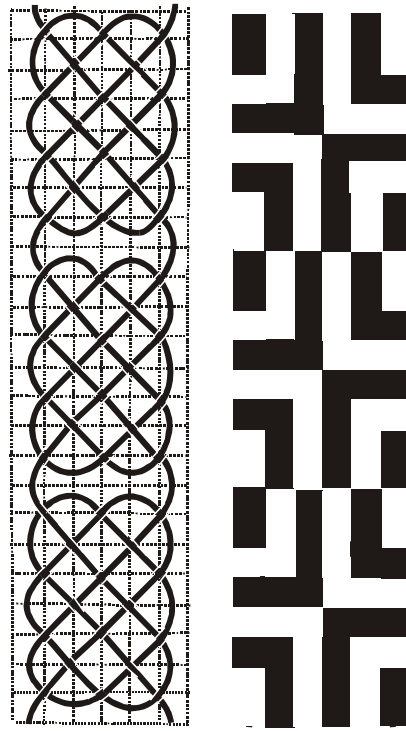


Figure 6
Further binary colouring of a border