

# From Knots to Notes

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**Excerpted, with additions, from *The Thread-Spirit: The Symbolism of Knotting and the Fiber Arts*. Fons Vitae Press, (2010).**

John Cargill was a leading memorial designer for the Charles G. Blake Company in Chicago. A student of Celtic culture and an expert stone carver. In the 1930s, he wrote a number of monographs on the art of ancient Celtic crosses.



*Figure 1: John Cargill*

Cargill had made a study of Celtic stone crosses and reached the conclusion that their designers used “the intervals of the musical string to fix the outlines of monuments.” These rectilinear crosses exhibited the same regularities of proportion observed in Greek temple architecture, both having been derived from the numeric intervals of the diatonic scale (Step, step, step, half-step, step, step, step, half).

Take the stretched string for example. Everyone knows that the shorter the string the higher the pitch and each note requires its appropriate length and the differences between the various lengths are called intervals. If the full string measures 90 (inches, quarters or halves) then the intervals of the Diatonic scale would be 10, 8, 4 1/2, 7 1/2, 6, 6, and 3, and these sizes have been used in the construction of rectangles, Fig. 6. These rectangles have been used in cross design to give the ratio of width to height of the shaft.<sup>1</sup>

All of this “music in stone” was in keeping with the principles of Pythagoras, who saw numbers as the basic principle of order in the universe. How the Celts came into possession of these ideas is a matter of some debate, but it can be argued that the practical applications of geometry upon which

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1. John Cargill, *The Celtic Cross and Greek Proportion*, p.p 9-10.

Pythagorean speculation was based are older than the philosophy itself. John Burnett makes the point that the Greeks excelled at developing theories from the practices of others.

...and we can see how far the Greeks soon surpassed their teachers from a remark by Demokritos. It runs (fr. 299): "I have listened to many learned men, but no one has yet surpassed me in the construction of figures out of lines accompanied by demonstrations, not even the Egyptian *arpedonapts*, as they call them." Now the word *αρπεδοναπτης* is not Egyptian but Greek. It means "cord fastener," and it is a striking coincidence that the oldest Indian geometrical treatise is called the *Sulvasutras* or "rules of the cord."<sup>1</sup>

Once knotted, a cord can be chalked, hung by a weight, and then snapped like a stringed instrument to mark a stone for cutting.

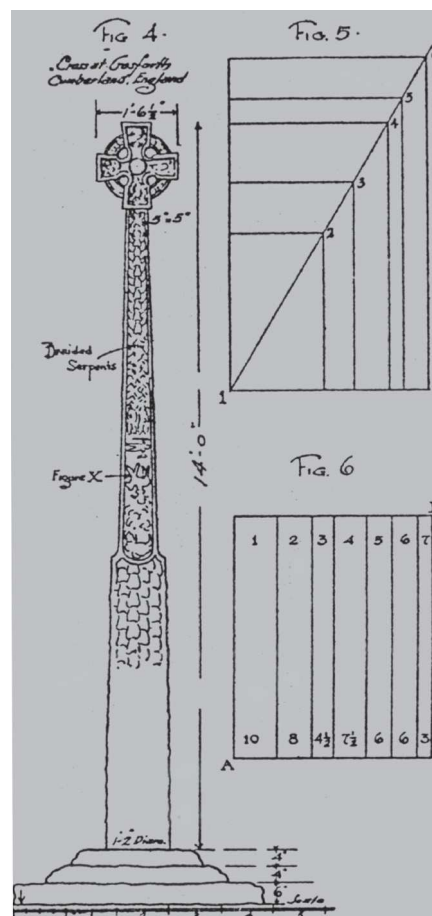
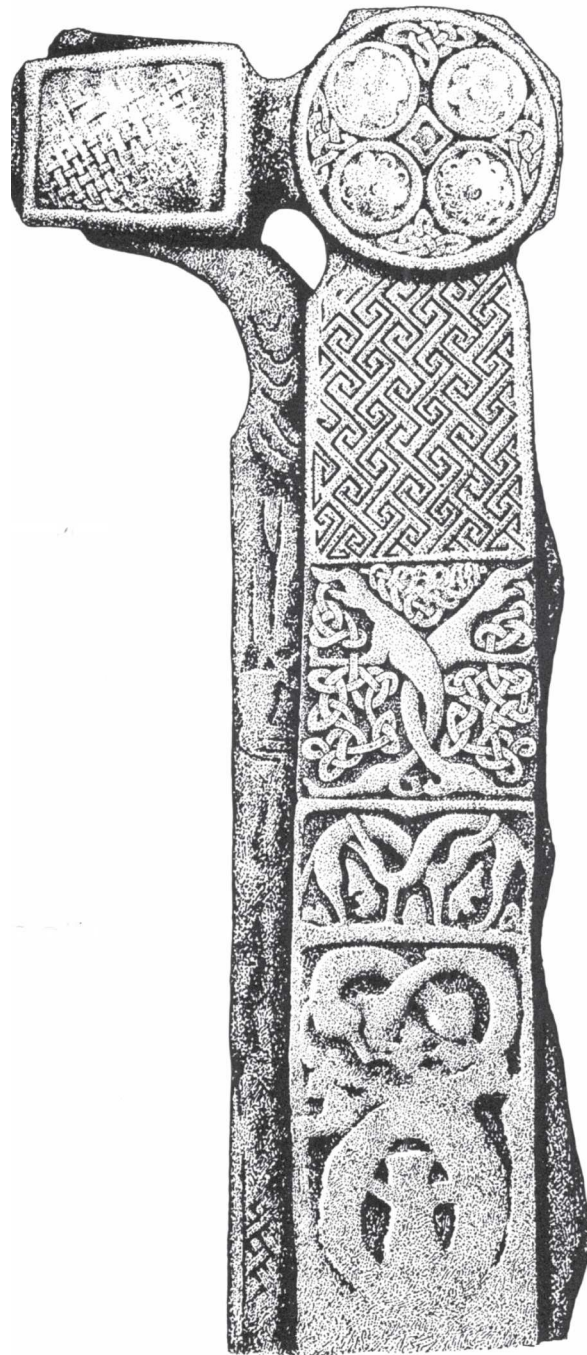


Figure 2: The Celtic Cross and Greek Proportion

Once Cargill had determined the principle involved in the design of stone crosses, he reasoned quite astutely that the designs on these stones might also contain musical symbolism. The idea

1. John Burnett, *Early Greek Philosophy*, p. 20. Burnett also notes that the word hypotenuse means "the cord stretching over against" (p. 105). More recent scholarship on the history of algebra and geometry has identified the use of Pythagorean triples in India, China, Babylonia, Egypt, and Neolithic Europe, suggesting a common origin in the 4th millennium B.C. See the work of the American mathematician Abraham Seidenberg and corroborating evidence from B. L van der Waerden and others.

came to him when he was considering a 10th century Celtic cross situated in the bottom of a glen on the Island of Canna, off the coast of Invernesshire, Scotland.

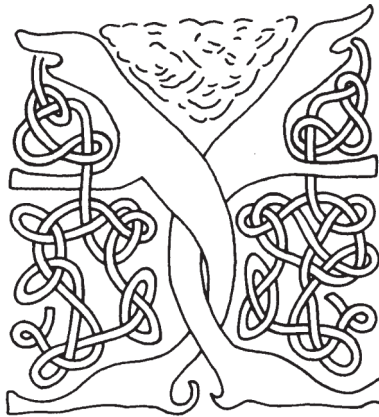


*Figure 3: Cross at Canna, Invernesshire, Scotland*

The cross's central panel contained two crossed animals with interlaced lines coming from their mouths. Cargill recognized the animals as panthers, typifying the resurrection of Christ. He noted a Saxon Bestiary of the period that contained the following poem of the Panther:

*When the bold animal rises up  
gloriously endowed,  
on the third day  
suddenly from sleep,  
a sound comes  
of voices sweetest through  
the wild beast's mouth.<sup>1</sup>*

Beneath the panthers, a panel depicted two intertwined dragons, symbols of discord and strife. Cargill reasoned that the design as a whole was meant to illustrate the power of sacred song to overcome evil. Then, in a moment of insight, he realized the interlaced lines were musical notation.



*Figure 4: Detail of panel from the Cross at Canna*

Now, if, at either panther, we trace along the line which springs from the animal's mouth and count each intersection where this ornamental line crosses itself or another ornamental line as a musical note, and arrange the resulting progression of notes as a song, we may feel assured we are simply carrying out the old artist's intention.<sup>2</sup>

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1. John Cargill, op. cit., p. 2.

2. John Cargill, op. cit., pp. 2-4.

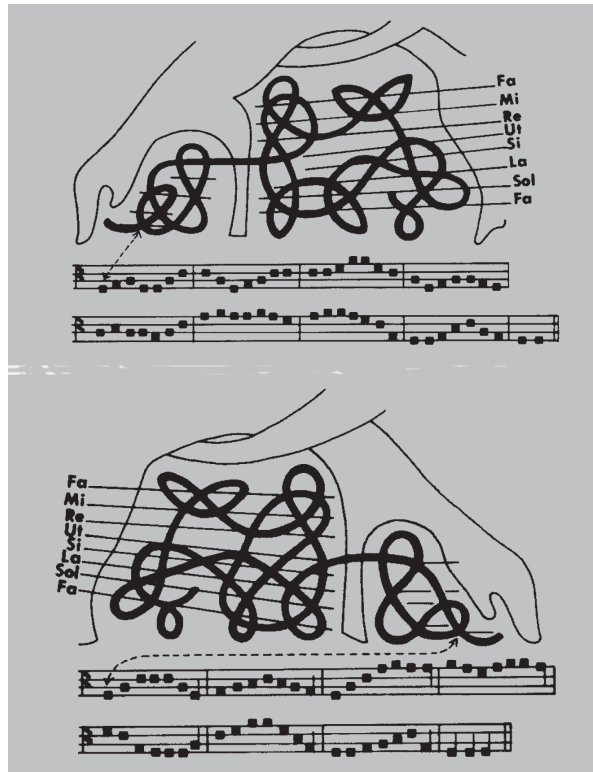


Figure 5: Decoding the knots

And music it was, a recognizably Celtic melody intended for Easter according to the musicologist James Travis<sup>1</sup>



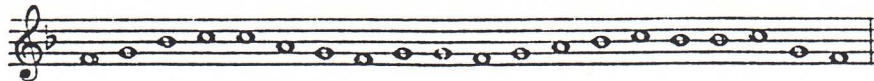
Figure 6: Transcription of the music on the Cross at Canna

1. "Old Celtic Design Music," *Miscellanea Musica Celtica*, Musicological Studies, vol. XIV, p. 66. The Institute of Medieval Music, Ltd., Brooklyn, N.Y.

Travis makes the following observations:

- Easter is the time of resurrection and that is what the panthers represent.
- The song may be in Gregorian Mode (key of F Major). This was a favored key for both voice and harp at the time.
- Seven-beat phrases were common in Celtic harp music and poetry, but the accenting is a matter of guesswork. The final cadence is plagal (Amen cadence), common in religious music to this day.
- Other numeric symbolism is contained in the 52 notes of the second melody. Beth El, the Center of the World (the Garden of Eden) is where the panthers traveled according to legend.

Other examples have been found. A cross, originally near Dupplin Castle (Perthshire, north of Glasgow), Scotland but now in an Edinburgh museum, shows David and his harp driving out the evil spirits. This example may be instrumental and is reminiscent of certain Irish lullabies.



*Figure 7: Monument from Duplin Castle, Scotland*



The cover of the Stowe Missal, an Irish illustrated manuscript in Latin with some Gaelic. It dates from the 8th or 9th century and was intended for church use. Its content is mixed and includes the Gospel of John, visitation rites for the sick and other church-related material. Embossed in each corner of the metal cover are four knotwork designs that contain encoded music.

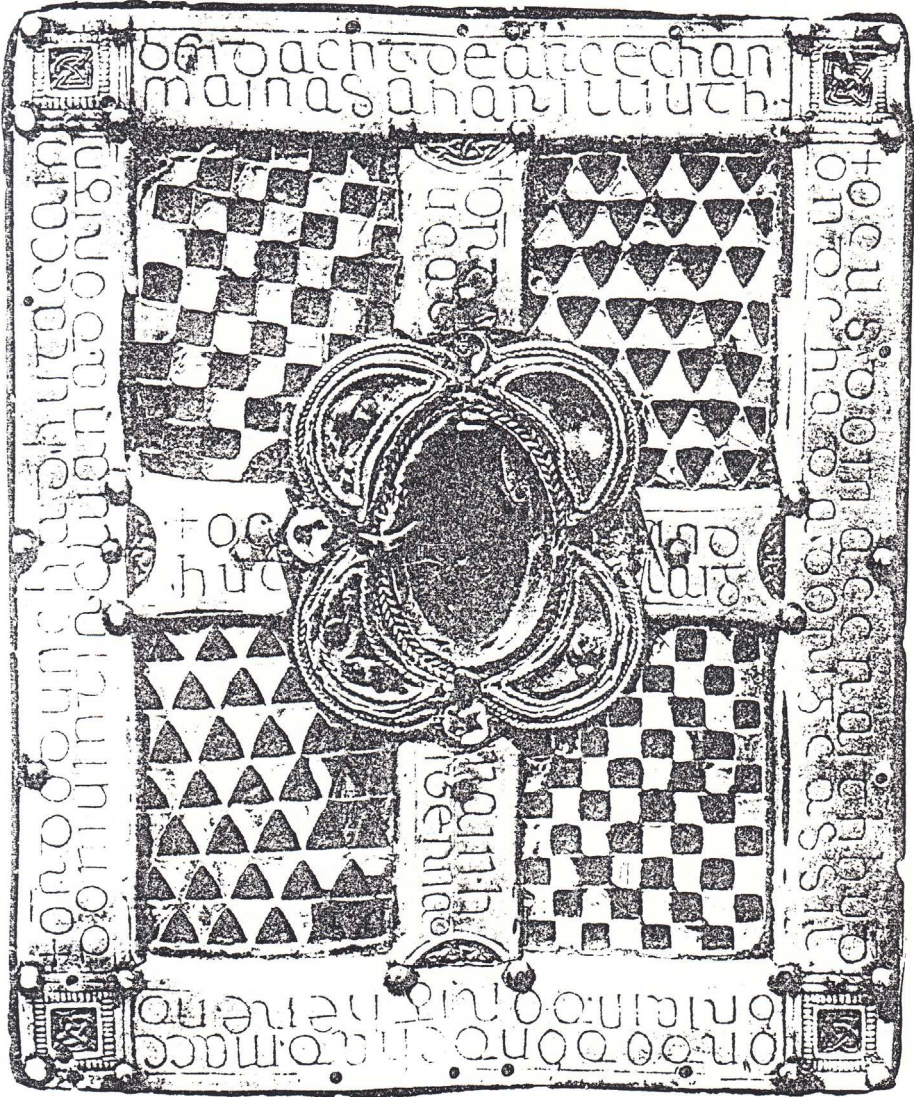


Figure 8: Stowe Missal design, Royal Academy of Dublin.

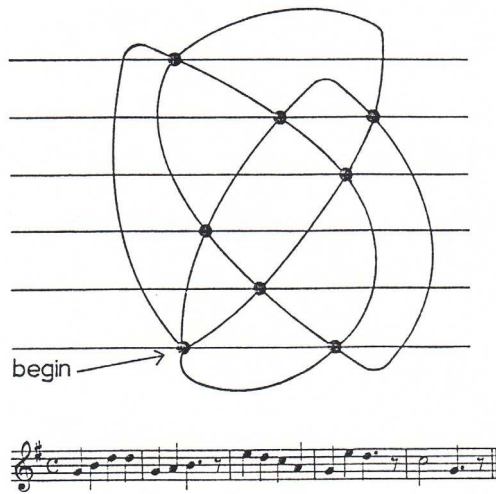


Figure 9: Transcription of music on the Stowe Missal

This is a short hymn in a major key with a closing plagal cadence.

Here are two more melodies retrieved from a single design on the Cross of Tola, circa AD 1100, at Dysert Odea, in County Clare, Ireland. This standing posture was recommended for monks at prayer because of its resemblance to Christ on the Cross.<sup>1</sup>

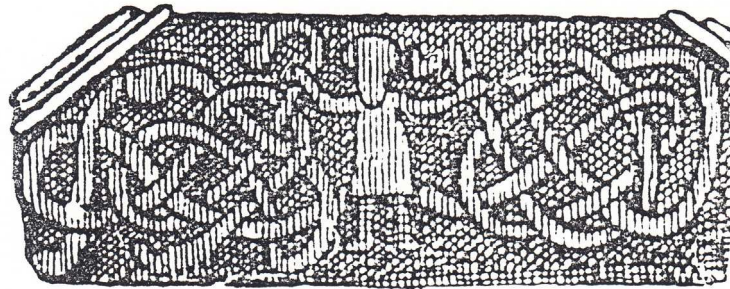


Plate IV A human figure with arms extended, and a winding band issuing from each hand from Thomas J. Westropp, *Churches with Round Towers in County Clare*, p. 156

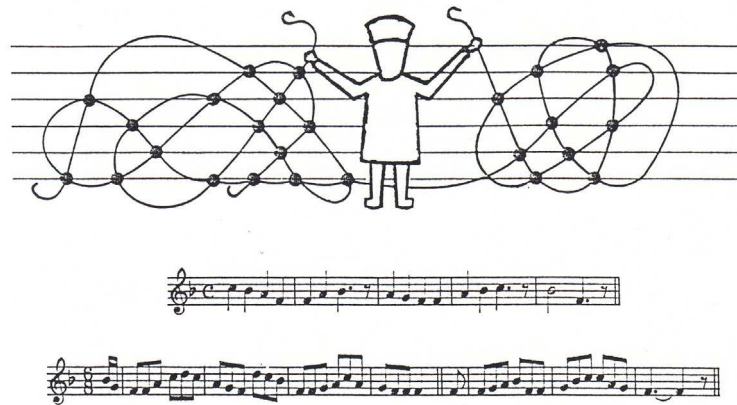


Figure 10: Design on Cross at Tola, County Clare, Ireland (c. AD 1100)

1. Thomas Westropp, *Churches with Round Towers in County Clare* (1894).



Certainly such practices were not common but it is worth noting that knotted cords were used in India and elsewhere as mnemonic devices to teach sacred music.

Cargill's findings might be considered as interesting, but of no particular importance, were it not for the deeper connections they reveal between knots and joints. In fact, his findings prove to be the tip of a very large iceberg.<sup>1</sup>

The human hand was also used as an aid for teaching music in China, Japan, India, and among the Arabs and Jews. References to the practice in Europe date from classical times and numerous illustrations of the different techniques employed are preserved in manuscripts and early printed works.

But one of the most ubiquitous images of the Middle Ages and Renaissance relating to memory and the learning of music is the so-called Guidonian hand, associated with the eleventh-century music theorist and pedagogue, Guido of Arezzo, who is credited with developing modern staff notation where lines signify pitches a third apart and a method of sight-singing (solmization) that became associated with a hand that later bore his name.<sup>2</sup>

A 17th century German manuscript, written in Latin, uses the joints as well as the tips of the fingers and thumb to depict the syllables used in solmization



Figure 11: Mnemonic diagram used for learning the syllables used in singing

Finger joints are probably man's oldest memory aid. From an original association with ancestors and kinship, they were ultimately externalized as knotted cords and used for a wide variety of purposes including accounting, geometry, and apparently, the encoding and teaching of music.

1. I have investigated these matters in detail in *The Thread-Spirit*.  
2. See Susan Forscher Weiss, "The Singing Hand," in Richter, *Writing on Hands. Memory and Knowledge in Early Modern Europe*, (2001)