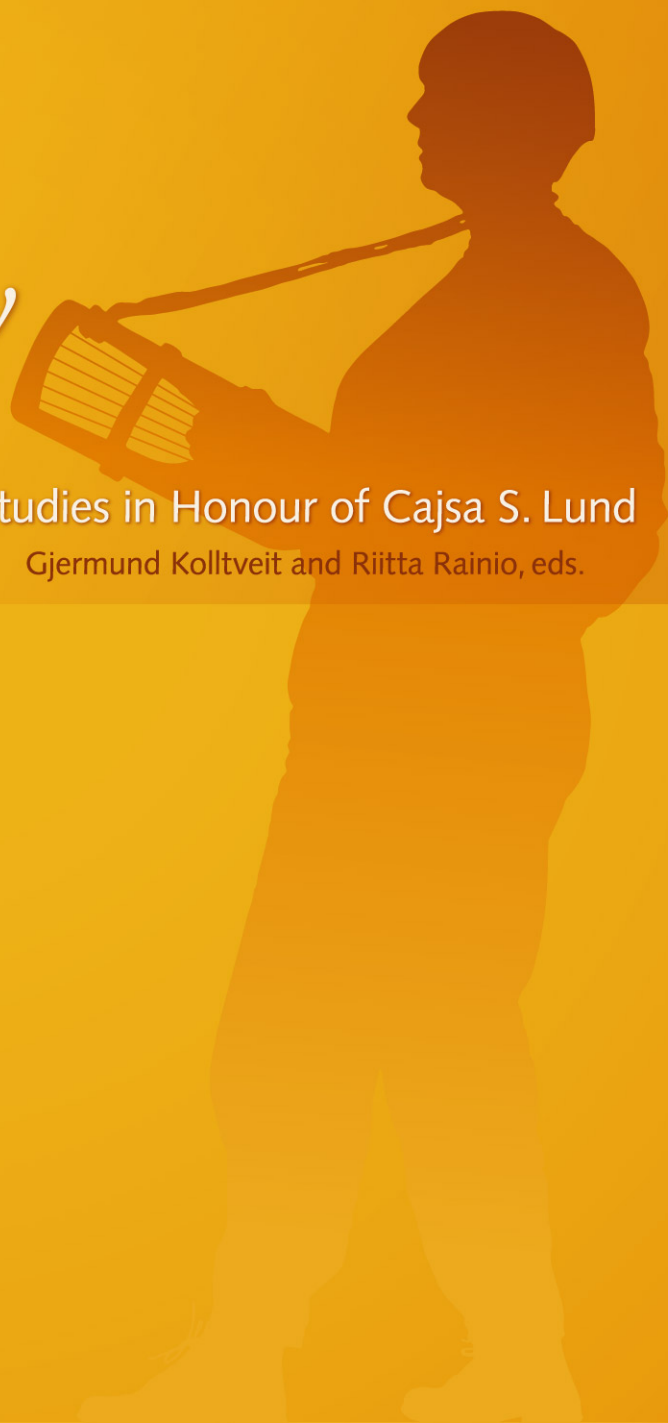


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Studies in Honour of Cajsa S. Lund  
Gjermund Kolltveit and Riitta Rainio, eds.

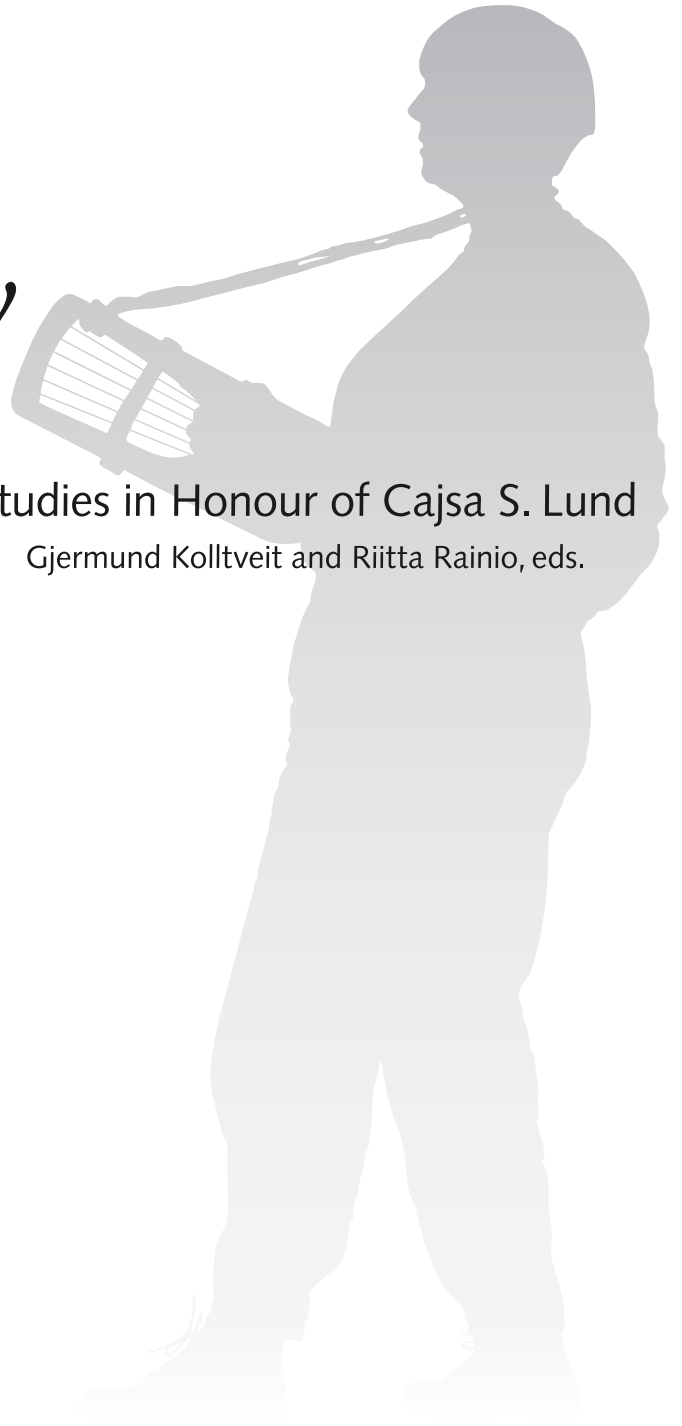




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## The Birth of European Music from the Spirit of the Lyre

By Stefan Hagel

*A possible connection between the “Guidonian hexachord”, along with the Sapphic melody with which it is associated, and the early medieval “Northern” lyre is suggested. The uniform tuning of the latter is argued to fit well within certain strands of “Western” music as it emerges in the late Middle Ages, as opposed to the “Mediterranean” music of Antiquity, which informed medieval music theory and the tradition of church chant.*

In previous studies I have tried to show how the music of ancient civilisations, most prominently the Greek and Roman world, was inextricably tied to the design of instruments, and how both may have changed together (Hagel 2005a; Hagel 2006; Hagel 2009a; Hagel 2009b; Hagel 2010; Hagel 2016). In the following I will propose a similar model that may help to explain distinctive traits of music of western Medieval Europe, traits that set it clearly apart from what is known about the music of Greco-Roman antiquity. Since I will focus on the Northern lyre as the instrument of socio-cultural primacy in the early Middle Ages, I will start the argument with a brief summary of lyre-based evidence from earlier periods and different societies.

The earliest known notated music comes from cuneiform tablets from the mid-2<sup>nd</sup> millennium BC, found at the palace at Ugarit (Ras Šamra).<sup>1</sup> Using well-known terminology for note pairs, followed by numbers, it appears not to convey a melody, but rather the basic harmonic structure of an intervallic accompaniment, associated with song texts in Hurrian language. As such, it might have been played on any instrument in any register, since the implied degrees of the scale were inherently conceived of as invariant regarding the octave in which they were realised. However, the tuning and retuning system, known from tablets dating from the first half of the 2<sup>nd</sup> to the first half of the 1<sup>st</sup> millennium BC, had been codified particularly with a view to an instrument of nine strings. One source explicitly mentions and names nine strings, while another makes clear that the outermost ones needed to be retuned together

1 Cf. Hagel 2005b for literature on and the author’s view on the musical cuneiform sources.

with their respective counterparts at the octave (U3011 [UET VII 126] + N4782 from Nabnītu 32; U.7/80 [UET VII 74]).

The Hurrian hymns do not mention any instrument. Nevertheless, the progression of notated intervals makes the most sense if interpreted within precisely the range of an instrumental ninth as described by the other texts. The top part of Fig. 1 provides a transcription of the dichords (and associated numbers) of hymn 6, the only piece that survives almost intact, within a tablature of nine strings.<sup>2</sup> Below, I have emphasised the occurrences of the two lowest notes (those which have their octave counterparts at the other end of the gamut). In this way, the composition appears harmonically structured around an interplay of these two pitches. It starts focussing on the lower one, up to a point where the notation is interrupted by an ill-understood remark. In the following, the intervallic melody twice moves away from the octave pairs, but when reaching them again, the lower is always preceded by the higher. Towards the end, the higher of the two is emphasised several times, before the piece finally ends with the lower, which is also emphasised by fourfold repetition. These concluding four “chords” are always separated by the same note pair one tone below the higher components of the “chord” that is to become the final. This final chord is the same as that with which the piece started; it can hardly be a coincidence that it does not appear even once in between.

Moreover, between the start and the end a significant part of the harmonic progression is built upon falling sequences of thirds, indicated at the bottom of Fig. 1. These sequences always stop right at the bottom note of the transcription, which makes musical sense only if executed on exactly such a nine-stringed instrument as forms the basis of cuneiform musical lore (Hagel 2005b: 319–320).

All this does not prove that a nine-stringed instrument did actually play a role in typical performances of the piece. However, if it did not, it would seem likely that such an instrument, most probably of the lyre type, had shaped harmonic expectations to such an extent that its characteristics were reflected in the conventions that formed the “mode” of the Hurrian hymn.

In contrast to the “harmonic” notation from 2<sup>nd</sup>-millennium BC Syria, Classical Greece developed a purely melodic musical script. Here it is thus not possible to study any harmonic progressions directly; but on the other hand, the relation between melodies and instrumental capabilities becomes clearer. Similar to the Near Eastern model instrument, the Greek *kithára* also encompassed a range of a ninth

<sup>2</sup> For an attempt to match the dichords with the syllables of the hymn text: cf. Krispijn 2002.

(Hagel 2009a: 122–134); this was likely true from the late Classical period on, when the age of the famous number of seven strings came to an end. Some particularly citharodic pieces of traditional make such as the Berlin Paean may have unfolded entirely within the range of the later instrument, establishing a tight relation between voice and lyre (cf. Hagel 2009a: 308–309). More importantly, a survey of melodic closures reveals that the most important ones focus on the two lowest notes of the *kithára*, often leading from one of these to the other in a way reminiscent of the Hurrian hymn (Fig. 2) (cf. Hagel 2016: 135–138). Regardless of the question of historical continuity, in both traditions these were also the strings whose sound could be reinforced by adding the pitch one octave higher, an option that – apart from their placement at the lower end of the scale, which made them natural candidates for finals – must have crucially contributed to their modal importance. Once more we find elements of musical composition co-determined by the material characteristics of an instrument of cultural primacy.

Another step of more than half a millennium takes us right into the Middle Ages of the Benedictine network. Early in the 11<sup>th</sup> century, the north Italian Benedictine monk Guido of Arezzo famously developed his sol-fa in order to imprint pitch relations upon the minds of his choir, and in this way to speed up sight-reading as well as the process of learning new melodies. The details are well known.<sup>3</sup> Guido started from a hymn to John the Baptist in which each half-verse happened to begin one degree higher than the preceding one. In this way the first syllables of the half-verses became the mnemonic icons for six degrees in the scale, from low *ut = c* up to *la = a*.

The system is still so ubiquitous that we normally fail to be astonished about its details. In particular, modern musical education makes us take a special status of the note *c* for granted. After all, it is C major that has no accidentals, and a *c* sits nicely at the centre of the piano above the keyhole. And so the archetypical scale of Western music runs from one *c* up to another and back.

However, Guido's musical environment did not endorse such a thing as the major scale. If the hymn he used starts on *ut*, this is not to become the final – and at any rate, Guido would have abhorred the idea of a semitonal leading note which is so important for major-scale tonality.<sup>4</sup> Also, since Guido's

3 Cf. e.g., Mengozzi 2010, focussing specifically on the afterlife of Guido's hexachord and its being overrated as a conceptual device in modern scholarship, serving the fashion of construing a musical "other".

4 Cf. *Epistola de ignoto cantu* PL 141.430d: "It is further necessary to understand that in the authentic modes the song rises up to an octave from the final note, but descends no more than one tone below the final – with the exception of the third mode, which is not lowered below its final because it does not have a tone below but a semitone" (transl. from Latin by author).



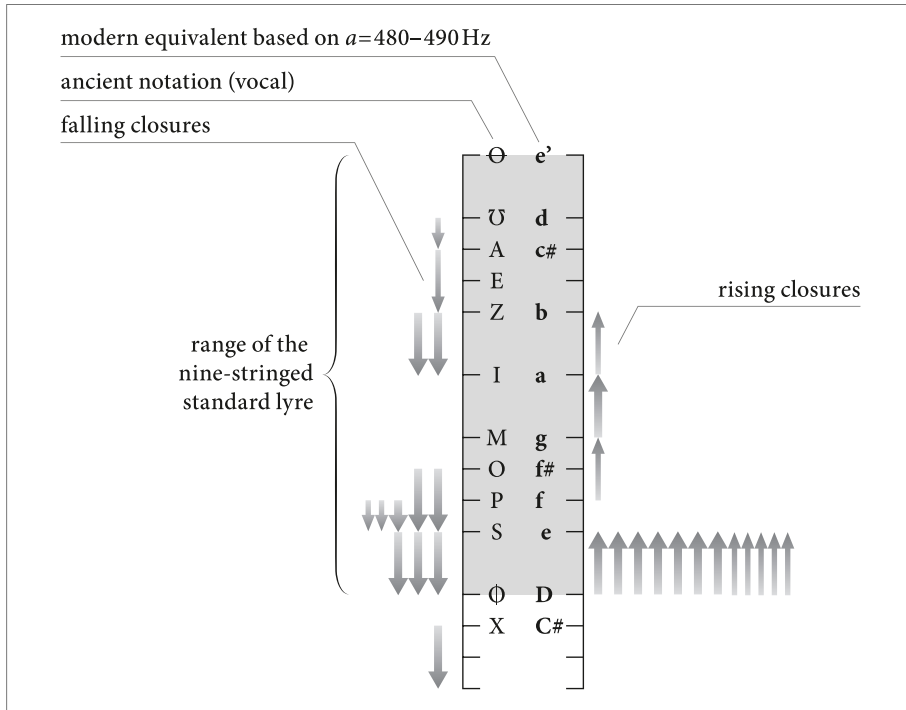


Fig. 2 Closures found in ancient Greek musical documents, compared to the kithára range. Redrawn by C. Zeissig.

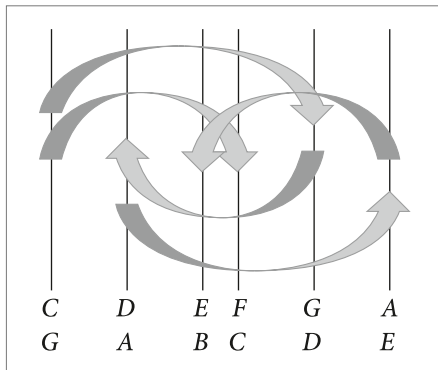


Fig. 3 Tuning six strings in alternating fifths and fourths. Redrawn by C. Zeissig.

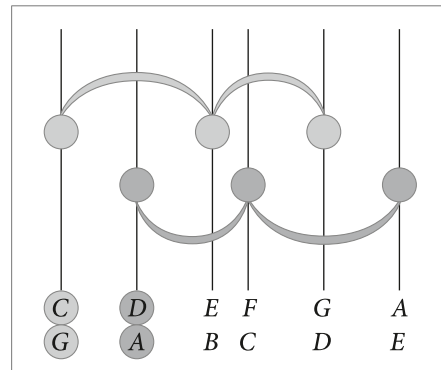


Fig. 4 Chordal triads available on the Medieval European lyre. Redrawn by C. Zeissig.

Title of Piece	Pitch Level	<i>Cyweirdant</i>	<i>Tyniad</i>
Caniad Ystafell	1	E-G-B-D	D-F-A-C
Caniad Marwand Ifan ap y Gof	1	E-G-B-D	D-F-A-C
	2	A-C-E-G	G-B-D-F
Clymau Cytgerdd	2	A-C-E-G	G-B-D-F
Gosteg Dafydd Athro	2	A-C-E-G	G-B-D-F
Caniad y Gwyn Bibydd	2	A-C-E-G	G-B-D-F
Caniad Bach ar y Go Gywair	2	A-C-E-G	G-B-D-F
Caniad Llywelyn ap Ifan ap y Gof	2	A-C-E-G	G-B-D-F
Caniad Suwsanna	2	A-C-E-G	G-B-D-F
Caniad y Wefl	2	A-C-E-G	G-B-D-F
Caniad San Silin	2	A-C-E-G	G-B-D-F
Caniad Crych	2	A-C-E-G	G-B-D-F
Caniad Hun Wenllian	2	A-C-E-G	G-B-D-F
Caniad Pibau Morfydd	2	A-C-E-G	G-B-D-F
Caniad Llywelyn Delynior	2	A-C-E-G	G-B-D-F
Gosteg yr Halen	3	D-F-A-C	C-E-G-B
Gosteg Ifan ap y Gof	3	D-F-A-C	C-E-G-B
Gosteg Lwyteg	3	D-F-A-C	C-E-G-B
Caniad Cadwgan	3	D-F-A-C	C-E-G-B
Caniad Cynrhig Bencerdd	3	D-F-A-C	C-E-G-B
Caniad Tro Tant	4	G-B-D-F	F-A-C-E

Tab. 1 Note groups and pitch levels in the Robert ap Huw Manuscript (Whittaker 2007: 8).

Title of Piece	Functional Notes								
	1 ( <i>Cyweirdant</i> )		O ( <i>Tyniad</i> )						
May Johnny return safely	A	C	E	A	B	D	F	G	
Beloved Scotland	A	C	E	A	G	B	D	F	G
Lament for the Harp Tree	A	C	E	A	G	B	F		
Hiharinödin hiharindro hiharinödin	A	C	E	G	G	B	D	F	
The Ürlar Tune	A		E	A	G	B	D	G	
Lament for Rory MacLeod		B	E	G		D	F	A	
The MacDougalls' Gathering	A	B	E	G	A	G	F		
The Park Pibroch	A		D	F	A	G	B	E	G
The Tune of Strife	A		D			G	B		

Tab. 2 Note groups in selected piobaireachd tunes (following Brown 2014: 3 Ex. 1).

method spans only a hexachord,<sup>5</sup> omitting the seventh step of the scale, the association of the hymn's *ut* with *c* is not even unequivocal – it might just as well be assigned to *g*, a fact that Guido was well aware of.<sup>6</sup> Still, he transcribed it as *c*, in line with the hymn's usual notation.

Guido's letter names were a medieval adaptation of the letters used in Boethius' work on music in the context of mathematical operations; but instead of an extended series of letters running on over two octaves, similar letters had now come to be used for pitches standing at octaves. The scale Guido himself quotes ranges over two octaves and a fifth in the following way:<sup>7</sup>

*G A B C D E F G a b c d e f g aa bb cc dd*

Note that below the typical lowest note of the ancient "Perfect System" *A = proslambanómenos*, an additional Greek gamma is added, obviously in order to serve new musical requirements. At any rate, in the environment of such a model scale, which was derived from ancient lore and perfectly served the purposes of church chant, Guido's reason for selecting specifically the range from *C* to *a* appears less than obvious.

Secondly, Guido was of course perfectly aware that there are seven notes within the octave. Creating a system that comprises only six of them may seem motivated by the ambiguous status of the remaining note *b*, which in contemporary music teaching would appear in two flavours, alternatively as *b durum* or *b molle* (modern *b flat*). This ambiguity was later countered by a complex system of shifting the hexachord to various alternative positions within the gamut.<sup>8</sup> On the one hand, this was certainly an ingenious way of dealing with modulation. On the other, it is hardly the most straightforward way, and even less so, if one's musical mindset is informed by the tradition based on ancient theory. After all, the ancient sources talked mostly about tetrachords, occasionally pentachords, heptachords and octachords, but never hexachords, and they invariably conceived of modulation in

5 I use the term "hexachord" freely to indicate the structure; note that this is not Guido's or medieval terminology.

6 Cf. *Epistola de ignoto cantu* PL 141.427f: "as for instance the first note *A* and the fourth note *D* are called similar and belonging to one and the same mode because both have a whole tone below, but a whole tone, a semitone and two whole tones above" (transl. from Latin by author).

7 *Epistola de ignoto cantu* PL 141.426.

8 The model suggested in the following is intended to replace rival explanations like that put forward by Mengozzi (2010: 30–33), which I think are bound to retro-project, in some way or other, the idea of hexachordal modulation into Guido's mind (even when phrasing this in terms of *affinitas*), thus re-introducing aspects of the unhistorical view Mengozzi himself has so successfully deconstructed otherwise.

terms of insertion or deletion of “disjunctive” whole tones between tetrachords. Starting from this paradigm, one would rather expect a solmisation system that included *b durum* and *b molle* side by side to become based on a modulating melody. Guido himself is not fond of the idea of a *b molle* at all, which he regards as invented by people without a proper grasp of the matter,<sup>9</sup> nor does he take the possibility of modulation within a single melody into consideration.<sup>10</sup> Consequently it is hard to see what theoretical principle would have kept him from devising a complete heptatonic sol-fa. Also, his insistence on a number of no more than six melodic intervals, from the semitone up to the fifth, but stopping short of the sixth,<sup>11</sup> would have suggested adopting pentachords rather than hexachords. Nevertheless Guido settled on a hexachord, and specifically the symmetrical species with the semitone in the centre (as would later be required for hexachord transposition).

Since ancient theory offers no motivation for such a choice, we are prompted to search for related structures in contemporary medieval music. So it may be more than just a coincidence that the period in question indeed fostered an instrument that was literally a hexachord. As is well-known, the tall slim Northern variant of the lyre, found in graves and depictions from the 6<sup>th</sup> century AD up until the High Middle Ages and often called the “Germanic lyre”, was typically equipped with six strings (Lawson 2005: 104–105).<sup>12</sup> Its superior social status emerges from its association with ruling figures: not only was it found in elite burials, it also appears in iconography as the instrument of both king Gunnar in the Norse variant of the Niflung story and the biblical poet-king David. Fortunately, its tuning is known from a musical treatise composed by Hucbald about a century before Guido’s innovations. Hucbald introduces the cithara to illustrate the notion of the semitone: “Porro exemplum semitonii advertere potes in cithara sex chordarum, inter tertiam et quartam chordam, seu ascendendo seu descendendo [Besides, you may find an example for the semitone in the six-stringed lyre between the third and fourth string, whether ascending or descending]” (*De Harmonica Institutione* PL 132, 912D).

9 *Epistola de ignoto cantu* PL 141.429c: “Quidam autem minus plene pervidentes istam differentiam [...]”

10 *Micrologus* 8.

11 *Micrologus* 4; *Epistola de ignoto cantu* PL 141.427b.

12 For a statistics of the archaeological evidence (though likely under-representing six strings on the basis of disputable bridge finds): Hillberg 2015: 34.

This passage is of the highest importance for our argument in more than one respect. Firstly, it shows that around 900 AD a Frankish monk writing on music theory would expect his readers to be perfectly familiar not only with the six-stringed lyre



as such but also with its tuning. Secondly, Hucbald would not have been able to refer to the position of the semitone on the lyre if there had been more than one way of tuning it. The stringency of the latter point cannot be emphasised enough. The passage proves beyond doubt that within Hucbald's musical horizon, the tuning of the Northern lyre was fixed, with a semitone in the centre flanked by two tones at each side.

Though this may at first glance seem surprising, there is good reason for such a remarkable restriction. Paucity of strings is not necessarily balanced by a wealth of tunings. The canonical nine-stringed instrument of the cuneiform sources indeed gave rise to a music in which all seven possible diatonic tunings were used.<sup>13</sup> Ancient Greek music, however, which had developed some of its lasting characteristics in the phase of seven-stringed lyres, seems to have favoured only a subset of keys at the expense of those that would not establish a tone in the centre of the octave and thus fall short of some of the best consonances;<sup>14</sup> this is still the case in Ptolemy's apparently exhaustive list of 2<sup>nd</sup>-century AD concert-hall accordaturas, which range only over four adjacent keys, while achieving modal variation also by adjusting the fine-tuning.

With only six strings, a maximisation of consonant string pairs restricts the possible tunings further, down to the one Hucbald actually quotes. This is most easily understood from the tuning procedure in alternating fifths and fourth that also lay at the core of the Ancient Near Eastern and the Ancient Greek tunings alike (cf. also Franklin 2002). From whatever string out of six one starts, such a tuning procedure will inevitably end up with Hucbald's symmetrical tuning (in Fig. 3 the lowest string serves as a starting point, but any other string may be chosen by inverting some of the arrows). Were the semitone to be placed anywhere else, it would actually be impossible to tune the whole instrument in the same manner, because this would always require a seventh string. And if such a tuning were realised in another way (e.g., by tuning one string to the missing pitch and later back), the number of perfect consonances in the resulting structure would always fall short of that of Hucbald's tuning. All in all, it is not difficult to see why medieval singers would have preferred to stay with a single optimal tuning, likely striving for variation rather in the manner of playing.

Thus the Guidonian hexachord reproduces precisely the structure of the instrumental tuning that had likely informed upper-class music-making

13 An extant Middle-Assyrian "song list", VAT 10101 = KAR 158, counts songs in each of the seven tunings.

14 Philolaus (late 5<sup>th</sup> century BC), fragment 6, obviously takes it for granted that *all* lyre tunings sported the central tone, cf. Hagel 2009a: 112–114.

throughout the dark ages.<sup>15</sup> Is it by chance that the hymn to John the Baptist that Guido based his solmisation on, apart from the fact that the beginnings of its half-verses rise through the gamut of the lyre, also confines its melody to the same gamut otherwise?

The origins of the melody are disputed. In a manuscript that probably postdates Guido's innovations by a few decades, a very similar setting (apart from the first line) is found for an Horacian ode which uses the same Sapphic metre as the hymn. But it is hardly conceivable that it represents an ancient tune, perhaps even Horace's own composition, transmitted orally for almost a millennium, and such ideas have been rightly rejected long ago (cf. Wälli 2002: 3–9; similarly, Lyons 2010: 101–131). Setting Classical texts to neumes is a well-known medieval practice.<sup>16</sup> That a melody composed by Guido would have spread northwards so fast, but only emerge applied to a Classical text, is also not very plausible; certainly less plausible than the alternative option that Guido used an existing melody that suited his purpose.<sup>17</sup> The idea that it was commonly known would also impart a much more natural meaning to his calling it a *notissima symphonia* (less likely he might only have emphasised the fact that the students would have to know the melody very well before learning to use it as the basis of solmisation).

Guido himself never mentions the lyre; the instrument that he depicts as a clumsy means for teaching and learning unknown melodies is the monochord, a scientific device sanctioned by philosophical tradition.<sup>18</sup> This need not mean that the lyre was not known or used at all within Guido's horizon; unlike the monochord

it would not have been suited to demonstrate the eight modes and would thus have fallen short of the basic requirements of monastic song schools. However, if the melody is older than Guido, as appears very probable, it would hardly have been created in the context of liturgical song. Composed for Sapphic metre, perhaps originally for the Horacian ode for which it is found notated, it belongs within the sphere of classical learning, the reception of ancient poetry including its re-performance as song. At any rate, Latin Sapphic stanzas would have been perceived as standing in a tradition that looks back to the 1<sup>st</sup>-century

15 Cf. Crocker 1972: 27; Cohen 2002: 318: "The resemblance of this intervallic structure to the later Guidonian hexachord is striking, and perhaps not entirely coincidental."

16 Cf. Wälli 2002 (with discussion of Guido's melody on pp. 279–287); Ziolkowski 2007; Bobeth 2013.

17 For a discussion of the various opinions: cf. Moberg 1959. Moberg's suggestion that Guido transformed a melody that is otherwise attested with the hymn beyond recognition does not seem very convincing to me, cf. p. 201: "Guido was forced to create a new melody based on the character of the old one" (transl. from German by author).

18 *Epistola de ignoto cantu* PL 141.425b; 426c–427b.

BC Roman poet Horace as its founder and archetype. Horace, in turn, stylises his poetry as lyric in the full sense of the word: meant to be sung to the lyre.<sup>19</sup> This adds an interesting perspective to its medieval musical revival. When learned clerics who apparently believed in a musical performance of classical Latin poetry in general and Horace in particular and who embarked upon restoring the musical aspect to this poetry, doing so in a society where lyres were still around, would we not a priori expect that they would sing poetry that announced itself to be lyre-accompanied to the accompaniment of the lyre? This is an argument from probability, but I think it delineates the most plausible setting for the creation of a melody that reproduces the scale of the early medieval lyre in a metre that was associated with the lyre. This melody, attached either to one particular poem or applied to various poems in the same metre, would then have spread through the Benedictine network and become a *notissima symphonia*. At some point it was transferred to the hymn to John the Baptist, perhaps by Guido himself who was careful not to base his liturgical teaching on pagan verse (cf. Lyons 2010: 126–131), or prior to Guido by somebody who reused the Sapphic melody for performing Christian poetry in Sapphic stanzas.

On balance, it appears perfectly plausible that the observed identity between the lyre tuning and the hymn scale reflects a direct historical connection. If not, one would have to assume that both reflect the same musical paradigm – preferences that may have been quite old, as the long tradition of six strings suggests.

Is there anything more that we can know about that musical world? Firstly, it is paramount to acknowledge that it was not a continuation of the music of antiquity as we know it from Greek and Latin literature and the extant ancient melodies. The Northern lyre appears with its distinct characteristics as early as in the 4<sup>th</sup> century BC in the hands of a Scythian (e.g., Rolle 1989: 95), demonstrating that the historical separation from the Mediterranean and southwest Asian strands of lyre culture dates from much earlier than the Middle Ages. Secondly, while church chant and its modes in some way continue ancient music, Western European music as it emerges from medieval times is very different. Instead of the intervals that, as far as we see, governed harmonic progression in ancient times, we find the use of chords consisting of three different notes within the octave, with their inherent duality between major and minor. As written elite music always looked back to ancient and church music as their precursors, such “triads” were not acknowledged by theorists before the 17<sup>th</sup> century. However, there is reason to believe triad-based music may have been around much earlier.

19 E.g., *Epode 2.2.*: “verba lyrae motura sonum [words that would stir the sound of the lyre]”.

The use of triplepipes, which have apparently enjoyed an unbroken tradition in Sardinia from at least the earlier 1<sup>st</sup> millennium BC on, is attested at the Western fringes of early medieval Europe, notably the British islands (cf. e.g., Brown 2006). It is reasonable to assume that the latter were essentially similar to the surviving Sardinian types, called *launeddas*, in consisting of a drone and two melodic pipes. Such a design makes the use of harmonic triads practically inevitable, since it makes no sense to restrict usage of the melodic pipes to one of them always playing in an octave relationship to the drone. The lyre, being part of the same musical culture, might therefore be expected to have played some chords as well. Indeed its comparatively restricted number of strings, while still being heptatonic instead of pentatonic, supports such an hypothesis, because with fewer playable intervals being available, harmonic triads add a valuable resource of musical expression.

Modern musicians experimenting with reconstructions of such lyres have independently taken to chordal techniques. My first encounter with such playing was an impressive performance of passages from *Beowulf* by Scott Wallace twenty years ago. Much more recently, Barnaby Brown (2014) has described his own experience:

*“I tuned my lyre to the pipe scale and stopped alternate strings with the fingers of one hand. With every second string thus damped, I strummed with a plectrum like a guitarist. By moving my fingers between adjacent strings, like weaving on a loom, I could switch between two contrasting chords. This is the easiest technique for a lyre beginner and the musical effect brings to mind hundreds of traditional tunes from across the British Isles.”*<sup>20</sup>

Whence these specifically British associations? As becomes evident from Fig. 4, the two available triads are a minor and a major chord, the latter situated one whole tone below the former.<sup>21</sup> Interpreted as the chords above the tonics in terms of the Western church modes, the major chord would belong to the Ionian (C) and Mixolydian (G)

modes, the minor chord, to the Dorian (D) and Aeolian (A), to the exclusion of the Phrygian (E) and the Lydian (F). Even on a very general level, Brown’s observation appears corroborated by this list, if we compare it with a general assessment of one of the arguably older British musical traditions:

20 Peter Greenhill (2015: vi) also imagines chords having been used on the six-stringed lyre. See Greenhill, Peter 2015, *A technique for ancient solo lyre*: <https://petergreenhill.wordpress.com/ancient-solo-lyre-2/>

21 These are at the same time the only available chords in their non-inverted form, and those between which the player can switch in the simple manner Brown describes.

“In Traditional Gaelic music, the Ionian, Dorian, Mixolydian and Aeolian modes dominate.”<sup>22</sup> More specifically, the two triads give rise to the rudimentary chordal progression of i-VII-i (d-C-d / a-G-a), which are at the very heart of many melodies in that tradition. Some of these may be accompanied just by this simple alternation, and the same is true for many songs that do not seem specifically to belong to a Celtic background. By the way, such an accompaniment is quite convincing for the hymn to John the Baptist as well – notably the hymn’s melody finishes with *c-e-d*.

It may be relevant here that the usual modern conception of major versus minor modes is historically misleading, as it focuses on the Aeolian scale (A) besides the Ionian (C). When theorists first acknowledged that music had effectively come to be restricted to only those two modes which the English tradition terms “major” and “minor”, they were however associated with both possible positions of the hexachord within the natural scale (as displayed in Fig. 4). This is the stance of eminent theorist Andreas Werckmeister (1686: 124):

*“But since the music [...] of nowadays is completely different / and only about 4 modes are in use / that is, Ionian together with Mixolydian, and Dorian together with Aeolian, mixed together mostly within the ambitus of the fourth / it is therefore not possible to postulate more than 2 current modes / and this is by no means peculiarly strange / as long as we take care to treat the matter properly.”* (Transl. from German by author)

It becomes clear from his wording that Werckmeister regards Ionian (C) and Dorian (D) as the conceptually primary instances. Johann Sebastian Bach, on the title page of his celebrated avant-garde *Well-Tempered Clavier* from 1722, still clings to the same paradigm, relating his minor modes to the major modes within the start of Guido’s hexachord: “[...] so wohl *tertiam majorem* oder *Ut Re Mi* anlangend, als auch *tertiam minorem* oder *Re Mi Fa* betreffend [...] regarding *tertiam majorem* or *Ut Re Mi* as well as *tertiam minorem* or *Re Mi Fa*]”.

According to our hypothesis, the six-stringed lyre is optimally suited to express this major-minor dichotomy, with only two triads being at the player’s disposal. Apart from Brown’s general observation about British traditional tunes, is it possible to pinpoint other traces of music building on such a binary distinction? Indeed Welsh harpers, in the 15<sup>th</sup> and 16<sup>th</sup> centuries, wrote down musical patterns in binary notation consisting of strokes and circles, tantalisingly

<sup>22</sup> Wikipedia, s.v. Traditional Gaelic music: [https://en.wikipedia.org/wiki/Traditional\\_Gaelic\\_music](https://en.wikipedia.org/wiki/Traditional_Gaelic_music)

similar in shape to the binary numbers now so well known from computing. The two signs referred to alternative harmonic domains, one conceived as primary (*cyweirdant*, “key note”), the other as providing contrast (*tyniad*, “stretching”). The famous collection of Welsh harp music in the Robert ap Huw Manuscript from the early 17<sup>th</sup> century transmits harmonic patterns associated with each of these two domains in individual compositions. Tab. 1 presents a compilation of these by Paul Whittaker, described in functional note names. It emerges that eighteen out of twenty-one configurations (86 %) realise precisely the same patterns as can be played on the six-stringed lyre (though augmented by an additional high third), with the primary focus on the “minor chord” (A-C-E / D-F-A) and the “major chord” as the contrasting domain (G-B-D / C-E-G). Only three pieces employ combinations that deviate from the general line that we have observed running through from the medieval lyre tuning up to Werckmeister’s and Bach’s conceptions.

This is harp music, albeit doubtless with medieval roots. The harp had gradually replaced the lyre during the Middle Ages, so one might think its players were still only slowly breaking free from the inherited harmonies. However, the six-stringed lyre is broadly associated with the Germanic area including the continent (although British finds can rarely be attributed securely). That Celtic regions had once maintained a lyre tradition which was clearly distinct from the Germanic is indicated by the famous verses of Latin poet Venantius Fortunatus in the later 6<sup>th</sup> century: “Romanusque lyra, plaudat tibi barbarus harpa, Graecus Achilliaca, crotta Britanna canat [Let the Roman praise you to the *lyra*, the Barbarian to the *harpa*, the Greek to the *Achilliaca*; let the Briton *crotta* sound]” (7.8.63–4).

Lyres on Irish stone crosses are indeed broader and more markedly rectangular than the “Germanic” ones. Their shape doubtless fits the reference to the Dagda’s lyre in the *The Second Battle of Mag Tuired as coir-cethar-chuir*, “four-side harmony”, much better.<sup>23</sup> Given its greater breadth, it seems more likely that this north-western type of lyre had more than six strings; literary references indicate a number of nine.<sup>24</sup> With so many unknowns, speculation about the precise relation between an Irish lyre shape and a Welsh tradition of playing on an instrument that is first attested on

Pictish stones may appear futile.<sup>25</sup> At any rate, the Robert ap Huw Manuscript testifies to the dominance of the particular harmonic dichotomy that suits the six-stringed lyre.

23 *The Second Battle of Mag Tuired* 163.

24 Cf. the discussion in Greenhill 2015: 1–3.

25 Greenhill (2015) makes a case for *piobairreachd* imitating music for a nine-stringed lyre. See Greenhill, Peter 2015, *A technique for ancient solo lyre*: <https://petergreenhill.wordpress.com/ancient-solo-lyre-2/>

It has been proposed to interpret the *piobaireachd* repertory for the highland bagpipe as a continuation of a similar tradition (Brown 2014). When applied to the bagpipe, the notion of tension and relaxation associated with two harmonic domains is necessarily enhanced: since only one of them can always blend consonantly with the drone, the other will stand out in a way unprecedented on the discussed stringed instruments.

A search for the old harmonies in these very dissimilar circumstances is however encumbered by the divergent tunings: unlike stringed instruments, the pipes used to feature a neutral third, thus obliterating the major-minor dichotomy in certain places – a dichotomy that is in any case much less relevant on an instrument that cannot play the notes of a triad simultaneously. How then to project the nine pitches of a highland bagpipe chanter onto the C-based hexachord in the first place? The conventional notation with two sharps emphasises the sharpness of the neutral thirds, but is likely misleading as regards the original conception of the tonality. From a viewpoint informed by Aristoxenus, at least, the earliest specialist on European pipes we can read, one would certainly equate the neutral tone with F and C, second from the lower end of the regular tetrachord.<sup>26</sup>

Tab. 2 presents Brown's classification of the tonal material of nine *piobaireachd* tunes into a primary and a secondary domain. Five of these appear to reflect the harmonic domains that were most prominent in the Robert ap Huw pieces and are compatible with the six-stringed lyre: A-C-E-(G) versus G-B-D-(F) – in the case of the bagpipe, neutral versus “major”. Two seem cognate with the first pair in Tab. 1, apparently introducing an (inverted) E-G-B triad that was not available on six strings, and contrasting primary “major” with neutral. The last two, finally, invert this pattern, as seems in better accord with a drone on A.<sup>27</sup> This analysis is of course based on a very small sample, albeit one whose selection is grounded in exemplary knowledge of the material. Others will be much better equipped to investigate the position of *piobaireachd* music within the interwoven strains of musical traditions; suffice it to state that so far as I can see the evidence does not contradict an affiliation with the same musical mindset that had for many centuries remained perfectly content with a hexachordal instrument.<sup>28</sup>

26 Aristoxenus' analysis of tetrachords, while pursuing general applicability, is also informed by the ancient piping tradition of the aulos. All early aulos finds exhibit neutral thirds as well, and the three-quarter-tone scale provided an important model for pre-Aristoxenian music theory, cf. West 1992: 96–100; Hagel 2009a: 379–387, 397–429.

27 Note that Brown himself regards all as variations of the same principle of interlocking stacks of thirds identical with the Robert ap Huw material; this would support my hypothesis, but I would not want to beg the question.

In the ages-old cultural tug that has exposed Europe to influences from the east and the south, the British Isles were perhaps one of the best places to search for relics of musical tastes that had been more widespread in earlier times. The survival of triplepipes and lyres side by side made them particularly interesting for this small study, which I halt here. In matters where proof is impossible, I hope at least to have shown that the European lyre is exceptionally suited to support a harmonic dichotomy that may have quite ancient roots. The insistence on having only six strings in contrast to the Hellenistic and pre-Hellenistic Mediterranean worlds may point to this dichotomy being at the heart of an ancient northern musical strand, current among Germanic tribes and Celtic peoples, and perhaps further east towards the steppe, as the singular Scythian lyre depiction might suggest.

Being associated with a hexachordal instrument and ultimately giving rise to Guido's hexachord and the post-Guidonian hexachordal paradigm, most probably mediated by re-composing music for Horace's songs on the contemporary *cithara*, this tradition takes the importance of *C=ut* – as well as its hexachordal sibling *G* – as the basis of the scale back into European music prehistory. Originally *C* may rather have been part of the “contrasting” harmonic domain, a leading note to tonal *D=re*. But even then it was important enough to warrant the extension of the ancient Perfect System, which starts from *A*, downwards to a low *G* notated as Greek *Γ*. Only much later, when the major mode had become dominant and a semitonal leading note accepted, would *C* finally achieve its present status.

28 When working from modern pipes and the conventional transcription with two sharps, many of the primary domains would become “major” chords; in this way even more pieces would accord with the lyre hexachord, but in different ways, and mostly contradicting the Robert ap Huw harmonies.



## References

Bobeth, Gundela

- 2013 *Antike Verse in mittelalterlicher Vertonung: Neumierungen in Vergil-, Statius-, Lucan- und Terenz-Handschriften*. Bärenreiter, Kassel etc.

Brown, Barnaby

- 2006 Launeddas e triplepipes: Uno strumento che attraversa i secoli e le civiltà. *Quaderni dell'Associazione culturale Italia-Inghilterra*, Vol. IV, 43–54.
- 2014 What do Is and Os mean? *Piping Today*, Vol. 71, 3–7.

Cohen, David E.

- 2002 Notes, Scales, and Modes in the Earlier Middle Ages. In *The Cambridge History of Western Music Theory* (T. Christensen, ed.), 305–363. Cambridge University Press, Cambridge.

Crocker, Richard L.

- 1972 Hermann's Major Sixth. *Journal of the American Musicological Society*, Vol. 25/1, 19–37.

Franklin, John Curtis

- 2002 Diatonic Music in Greece: A Reassessment of its Antiquity. *Mnemosyne*, Vol. 55/6, 669–702.

Hagel, Stefan

- 2005a Twenty-Four in Auloi Aristotle, *Met.* 1093b, the Harmony of the Spheres, and the Formation of the Perfect System. In *Ancient Greek Music in Performance* (Stefan Hagel / Christine Harrauer, eds.), 51–91. Verl. d. Österr. Akad. d. Wiss., Vienna.
- 2005b Is *nīd qabli* Dorian? Tuning and Modality in Greek and Hurrian Music. *Baghdader Mitteilungen*, Vol. 36, 287–348.
- 2006 The Context of Tunings: Thirds and Septimal Intervals in Ancient Greek Music. In *Studien zur Musikarchäologie*, Vol. V, *Music Archaeology in Contexts* (Ellen Hickmann / Arnd Adje Both / Ricardo Eichmann, eds.), 281–304. Leidorf, Rahden / Westf.
- 2009a *Ancient Greek Music: A New Technical History*. Cambridge University Press, Cambridge.
- 2009b Reconstructing the Hellenistic Professional Aulos. In *La Musa dimenticata: Aspetti dell'esperienza musicale greca in età ellenistica* (M. C. Martinelli, ed.), 227–246. Edizioni della Normale, Pisa.

- 2010 Understanding the Aulos Berlin Egyptian Museum 12461/12462. In *Studien zur Musikarchäologie*, Vol. VII, *Musical Perceptions: Past and Present* (Ricardo Eichmann / Ellen Hickmann / Lars-Christian Koch, eds.), 67–87. Leidorf, Rahden / Westf.
- 2016 'Leading Notes' in Ancient Near Eastern and Greek Music and Their Relation to Instrument Design. In *Studien zur Musikarchäologie*, Vol. X, *Sound – Object – Culture – History* (Ricardo Eichmann / Jianjun Fang / Lars-Christian Koch, eds.), 135–152. Leidorf, Rahden / Westf.

Hillberg, Julia

- 2015 *Early Lyres in Context*. Master's thesis. Lund University.

Krispijn, Theo

- 2002 Musik in Keilschrift Beiträge zur altorientalischen Musikforschung 2. In *Studien zur Musikarchäologie*, Vol. III, *The Archaeology of Sound: Origin and Organisation* (Ellen Hickmann / Anne Draffkorn Kilmer / Ricardo Eichmann, eds.), 465–479. Leidorf, Rahden / Westf.

Lawson, Graeme

- 2005 Ancient European Lyres: Excavated Finds and Experimental Performance Today. In *Ancient Greek Music in Performance* (Stefan Hagel / Christine Harrauer, eds.), 93–120. Verlag der Österreichischen Akademie der Wissenschaften, Vienna.

Lyons, Stuart

- 2010 *Music in the Odes of Horace*. Aris & Phillips, Oxford.

Mengozzi, Stefano

- 2010 *The Renaissance Reform of Medieval Music Theory: Guido of Arezzo Between Myth and History*. Cambridge University Press, Cambridge.

Moberg, Carl-Allan

- 1959 Die Musik in Guido von Arezzos Solmisationshymne. *Archiv für Musikwissenschaft*, Vol. 16/1–2, 187–206.

Rolle, Renate

- 1989 *The World of the Scythians*. University of California Press, Los Angeles.

Wälli, Silvia

- 2002 *Melodien aus mittelalterlichen Horaz-Handschriften*. Monumenta Monodica Medii Aevi Subsidia, Vol. 3, Bärenreiter, Kassel.

Werckmeister, Andreas

1686 *Musicae mathematicae hodegus curiosus, oder richtiger musicalischer Weg-Weiser.*  
Calvisius, Frankfurt.

West, Martin L.

1992 *Ancient Greek Music.* Oxford University Press, Oxford.

Whittaker, Paul

2007 Harmonic Forms in the Robert ap Huw Manuscript / Ffurfiâu harmonig yn llawysgrif  
Robert ap Huw. *Welsh Music History / Hanes Cerddoriaeth Cymru*, Vol. 7, 1–54.

Ziolkowski, Jan M.

2007 *Nota Bene: Reading Classics and Writing Melodies in the Early Middle Ages.* Brepols,  
Turnhout.

