

crafting clarity: the design of notation and process for *new dark art*

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abstract

The main elements of *new dark art* are the notation of the music, and the processes by which the music will be performed. The influence for each of these stems from music making in the medieval era in Europe, exploring if (and how) improvisation and extemporisation were suggested through notation or directing an ensemble. By examining three medieval notational systems and thinking about the aspects of performance in both modern and medieval contexts, this essay seeks to clarify the thinking behind the decisions I made in writing and presenting the works to a music ensemble.

a continuation of attempts

In 1964, the composer Earle Brown gave a lecture about notation in modern music in America and Europe¹. Brown argued that the contemporary approaches to "new" notation have analogues to the many methods and ideas before 1600; and that new notation has to have some measure of representing that which cannot be done using standard notation, or at least releases the performer from a usual practice. This had to have a connection to reflect a sense of the contemporary – to "express our time".

Brown's emerging thoughts on parallels between modern music notational approaches and methods in much earlier music have some weight in relation to his own work. For example, Brown's *December 1952* is meant to be read in any direction. Alden relates this to Machaut's *ma fin est mon commencement*, a thirteenth century rondeau that can be performed in retrograde². Both notations have clear instructions to the performer about the work: the lines in *December 1952* are no less clear than Machaut's notation, and for each piece, the performer makes a musical choice about the work according to a process designed by the composer.

1 Earle Brown, 'The Notation and Performance of New Music', *The Musical Quarterly*, LXXII (1986), 180–201.

2 Jane Alden, 'From Neume to Folio: Mediaeval Influences on Earle Brown's Graphic Notation', *Contemporary Music Review*, 26 (2007), 315–32 (p. 325).

In collections of modern music scores by Young³, Cage⁴ and Sauer⁵, several examples of non-standard notation are given. To a lesser or greater extent, they all rely on the performer to make choices about how the interpretation of the notation. This is usually framed in terms of *ambiguity*: Brown notes this as a contemporary indication, but argues that the matter is not quite settled and requires more musicological analysis. He then speaks of the necessity of *clarity* from the notation in order to allow the performer to make musical choices (emphases mine):

“{...}the notation and performance concerns of some of today's composers are not necessarily in the nature of a fortuitous revolt as much as they are a *continuation of attempts {...} to find a more accurate way of transcribing the nature of their aural image in graphics*, and {...} to develop and intensify the necessary (and complementary) relationship which must exist between the composer, the score, the performer, and the audience, in directions which are also conducive to the composer experiencing his image as sound.”

The concept of *transcribing the aural image* has direct relevance to medieval music in terms of how it was transmitted, composed, learned, and performed.

The Western medieval period inherited its educational system from the Romans⁶. The *trivium* (grammar, rhetoric, and dialectic) was taught first; then the *quadrivium* (geometry, arithmetic, astronomy, and music from a theoretical basis). The predominant methods for learning these subjects were by rote, where the student was expected to remember facts and formulae; and numerous examples of specific procedures applied to situations. Within rhetoric and dialectic (sometimes called logic) there were many principles to aid remembering this information, many of which were associated with reading ordered sets of text, images and charts and setting them to memory. In

3 La Monte Young, *An Anthology of Chance Operations...* (Bronx, N.Y.: L. Young & J. Mac Low, 1963).

4 John Cage, *Notations* (West Glover, Vt: Something Else Press, 1969).

5 Theresa Sauer, 'Notations21', 2009 <<http://www.notations21.net/>>.

6 Albert Seay, *Music in the Medieval World*, Prentice-Hall History of Music (Englewood Cliffs, N.J, 1965), p. 18.

modern psychology this is called chunking, but Hugo of St Victor was writing about it in 1130⁷. His text on dividing and grouping related sets of information was essential school reading⁸, so the roots of recalling all manner of information – including music – were set from an early point in academic life. Diagrams were extensively used to help form associations in the mind⁹: these were used in folios and teaching material, and the layout of the page was designed so that the musician could retain an aural image of the music in memory. So the format of medieval learning was aided by writing and drawing, even though information was still passed orally¹⁰. Originality was not the aim, but an immediate stock of formulae that could be applied to a musical situation. Music theory was taught in the same way as grammar: rules were repeated either by being read aloud or transcribed. To this end, medieval musicians wrote treatises to aid the memorization of music theory in practice, and tonaries to organise the chants and explain specific rules related to singing the melody and creating counter lines.

So the works are not composed in the conventional sense of one person writing all the music for the performers beforehand: the medieval musician is likely to have composed counterpoint spontaneously by recalling the rules and formulae for melodic concordance from memory.

Everything else, from the page layout to the illuminations; chironomic signals from a director; and even the rhythmic modal patterns, were designed to trigger and aid the memory in performance¹¹. It was only later, after the *Ars Nova* period, that pre-composition and reading to perform started to become the dominant practice.

The focus on memorizing material has special significance to the jazz or improvising musician. If the

7 Hugues de Saint-Victor, 'De tribus maximis circumstantiis gestorum', *Mondeca - Leçons de Choses*, 2007 <<https://mondeca.wordpress.com/2007/05/01/de-tribus-maximis-circumstantiis-gestorum-hugues-de-saint-victor-vers-1135/>>.

8 Anna Maria Busse Berger, *Medieval Music and the Art of Memory* (Berkeley: University of California Press, 2005), p. 51.

9 Berger, p. 102.

10 Berger, p. 81.

11 Berger, p. 254.

musician's focus is on playing the so-called standard repertoire, it is expected that the jazz musician can and will play the majority of these songs from memory. Some musicians, like the tenor saxophonist Dexter Gordon, could remember the first lines of the songs they played. The ability to learn and recall songs has been linked to activity in the basal ganglia and cerebellum, which are normally associated with motor function¹². The cerebellum works with the prefrontal cortex for improvisation¹³, possibly to recall musical phrases to combine and arrange.

In simple terms, the model for performing in this way would be to have a melody that everyone learns thoroughly; then in performance, one of the ensemble creates a line derived from the original melody, using a common set of musical rules. There are no separate "parts", and all the information for extemporization/improvisation is contained with the melody and the rules.

From this, I decided that *new dark art* should have a set of processes that would allow a musician to play appropriate harmonic agreements within a piece; and use clear forms of notation and direction that could be memorized readily.

forms of writing

Before the advent of the musical stave in the late eleventh century, melodies were described using different systems to indicate the flow of the music and trigger the memory. The new developments in notation from the ninth to the twelfth centuries perhaps can not be viewed as rapid, but they can be seen as radical in terms of the various forms of purely functional notation. Some used letters or symbols to represent each note; others applied contour symbols above or below the text to be sung or chanted. Examining different sources revealed three main forms of notation, which I considered for use in the compositions.

12 'This Is Your Brain on Music: Researchers Discover Two-Part Process', *Georgetown University: News*, 2012 <<http://www.georgetown.edu/news/music-brain-research-2012.html>>.

13 A. L. Pinho and others, 'Connecting to Create: Expertise in Musical Improvisation Is Associated with Increased Functional Connectivity between Premotor and Prefrontal Areas', *Journal of Neuroscience*, 34 (2014), 6156–63 <<http://dx.doi.org/10.1523/JNEUROSCI.4769-13.2014>>.

Letter notation

Letter notation was a format found in a few tonaries: it was mainly used in treatises. It was rarely used after the eleventh century, and the combination of letter and neume notation can be found primarily in French manuscripts from the ninth to eleventh centuries¹⁴. Initially they were written in one line, but later they were notated at different heights (diastematically) to show pitch register.

Being able to read letters is a basic skill of literacy, so it is ideally suited to a transferable form of notation, with minimal learning required. Although a melody is in a sense fixed by letter notation, there is still freedom: if the letters are not notated diastematically there are no register indications, meaning that the notes can be played in any octave, so how the melody rises or falls is not set. If the rhythm of the melody is not set, this would allow an ensemble to create changing textures from the same line, and I found this an aesthetically appealing factor. Using letters also has the advantage of being able to write chord symbols within the same melodic line, enabling the composer to construct polyphonic compositions on one line. The performing musician can then use his or her own idiomatic practice to expand on the line.

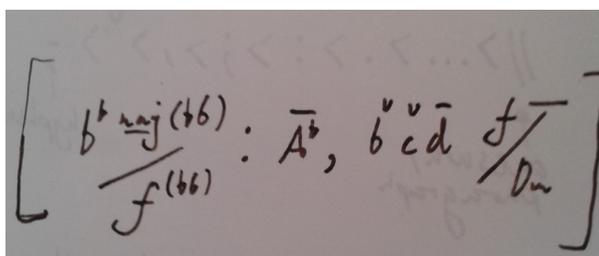


Figure 1: combining multi-note structures within a single line in letter notation.

Ecphonetic signs

In early Byzantine cantillation, ecphonetic signs were used. These signs are prosodic in nature: they

¹⁴ Willi Apel, *The Notation of Polyphonic Music, 900-1600*, 5th ed. (Cambridge, Mass: Mediaeval Academy of America, 1953).

originate from the rules of grammar as first set out by Aristophanes in 180B.C.E.¹⁵ The markings made reference to tone (rising or falling), syllable length, type of breath, and phrasing. These signs were applied to phrases in the solemn lecture part of a pericope; towards the end of the lecture, the signs were doubled to show a increase in intensity.

The solemn lecture was more chanted than spoken, and by the tenth century there is evidence that the use of neumatic notation and ecphonetic signs overlapped¹⁶. They look similar, but were applied differently: neumes give contour and timing to words and syllables, while ecphonetic signs give a contour, timing, and character to a phrase as a unit. No precise indication of rhythm was given: the mensuration was indicated either through prior knowledge of the piece or direction by a “conductor” called a *domestikos*. The *domestikos* used hand signals to help people remember the phrasing and the melodic mode for the chant: with the move away from memorization this developed into a conducting of the whole melody, as we see in Gregorian chironomy¹⁷. Ecphonetic signs also had symbols for whether or not words were said with an rough “h” sound added from the back of the throat, thus changing the timbre of the voice. In ancient Greek language and Byzantine cantillation, this “rough breathing” was shown by beginning a phrase with a *daseia* mark, ^ˆ. Smooth breathing was shown by a *psilé* mark, ^ˆ. As ancient Greek language changed over the years, rough breathing evolved into the letter H¹⁸ and the general marking fell into disuse.

In its original form, rough breathing exists in Hebrew cantillation as *dagesh* marks within letters¹⁹: but this marking has no real symbolic equivalent in common practice notation, although it could be likened to the jazz technique called “growling”, which is notated like a tremolo²⁰ or just written as a

15 Egon Wellesz, *A History of Byzantine Music and Hymnography*, 2nd ed. (Oxford: Clarendon Press, 1961), p. 249.

16 Wellesz, p. 257.

17 Carlos E. Martinez, ‘Gregorian Chant Chironomy’, 2000 <http://interletras.com/canticum/Eng/Rhythm_chironomy.htm>.

18 Herbert Weir Smyth, ‘Greek Grammar’, 2005 <http://www.ccel.org/s/smyth/grammar/html/smyth_1a_uni.htm#14>.

19 anonymous, ‘Pronunciation – Hebrew – Part 3: Syllabification, Etc.’, 2014

<<https://readingwithphilology.wordpress.com/2013/05/16/pronunciation-hebrew-part-3-syllabification-etc/>>.

20 Barry Kernfeld, ed., ‘Notation: Notational Symbols, Timbre and Articulation’, *The New Grove Dictionary of Jazz*

word near the measure. Usually it is left to the performer to decide when and where to use this technique. Similarly, the indicators for intensification (the signs were doubled) are now usually written as words, although modern forms of notation have created new symbols for this.

If combined with non-diastematic letter notation, these symbols, or symbols like them, could provide timing and character information to a musical line. General punctuation already gives timing information: these are the descendants of the prosodic markings. At school, I was taught that the full-stop had a time value of four; the colon, three; the semi-colon, two; and the comma, one. This is something I had always accepted without questioning: but it would seem to relate to a section of a mnemonic poem by the writer Cecil Hartley, written in 1818²¹. Using these rules, a sense of meter can be developed in a phrase.

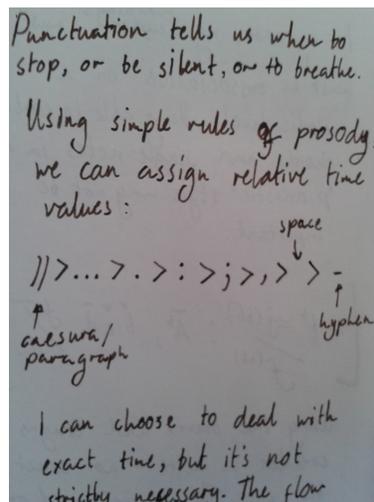


Figure 2: notebook extract showing relative values for punctuation

Such a phrase would not have a set quantitative rhythm, but a "pulse"; a feeling of periodicity.

(Macmillan, 1994), p. 927.

21 "The stop point out, with truth, the time of pause
A sentence doth require at ev'ry clause.
At ev'ry comma, stop while one you count;
At semicolon, two is the amount;
A colon doth require the time of three;
The period four, as learned men agree."

General punctuation can also be used for denoting intensity, using exclamation and question marks. The effect of these signs on a phrase would modify, depending on the mood set for the overall piece: for example, a phrase that ends in an exclamation mark could be performed with an increase in volume and slight sharpening of the end, to give the impression of an angry shout. Although the pieces as written do not use these fully, in future works I can explore how they would work.

Neumes

There is some evidence that neumes developed from ecphonetic signs, certainly in the Byzantine tradition as it moved into its Middle period around the late eleventh to the early twelfth centuries: the signs began to be ascribed to each syllable²² and contained more accurate rhythmical information. As they contained more information, The neumes were placed at heights relative to an imaginary pitch axis: then over time, one and then more lines were actually drawn on the page, forming the musical stave²³. The phrasing elements from the ecphonetic signs became bar lines: the tone elements evolved into the *virga* (a higher note), *punctum* (a lower note) and the ligatures (note groups); and from there to notes on the stave.

Literature that looks at the reading of neume notation focusses on the neumes from the perspective of composition, that is to say the piece being written and then performed. This gives the neumes a position of precisely describing the melodic flow, which they did at a later date; but if we think of them as transcriptions of performance to aid the memory, then the nature of the neumes can be seen as being more suggestive than prescriptive.

²² Wellesz, p. 269.

²³ Carl Parrish, *The Notation of Medieval Music*, Distinguished Reprints (New York: Pendragon Press, 1978), p. 9.

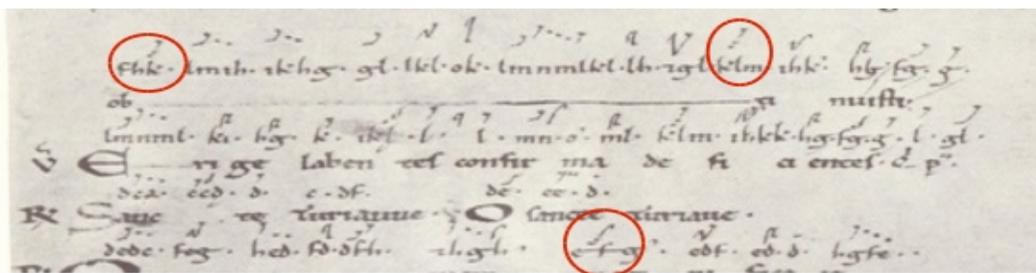


Figure 3

Figure 3 above is from a late tenth century manuscript from Dijon²⁴ that uses letter notation. The *scandius* neume appears over the notes *fhk* (*fac'* in modern usage) at the beginning, as well as over *klm* and *efg*, indicating that it was used as a suggestive marker for three notes ascending, rather than a symbol that denoted a specific interval ordering. On memorizing the folio, the medieval musician would have understood the contour of the melody by context.

This tendency to suggest rather than state continues in rhythmic notation. For “measured” music, *virga* and *punctum* came to represent relative time values: the *virga* being long (*longa*) and the *punctum* being short (*brevis*). Combinations of these were set as rhythmic modes, which were related to poetic meter. These can be represented using common linguistic prose markings: the macron (ˉ) is long and/or a strong (i.e. louder) stress, and the breve (˘) is short and/or weak. Additionally, Greek and Latin prosody added the anceps (for which I will use °), which is a purely ambiguous stress; and the *brevis in longo* (˘ˉ) in which a short sound is “felt” as long because of a implied pause at the end of a phrase. How these are felt and thus interpreted can be related to an individual's pattern of speech. So for spoken English, the time between word stresses tends to be the same length, no matter where the stresses are found in a phrase²⁵, so for ˘˘˘˘ / ˘˘˘ and ˘˘ / ˘˘˘˘, the timing between the stresses is roughly equivalent. The stresses combined with punctuation can be used to create a feeling of pulse

24 Parrish, Plate X.

25 P. H. Matthews, ‘Stress-Timed’, *The concise Oxford dictionary of linguistics*, Oxford Paperback Reference (Oxford; New York: Oxford University Press, 2005), p. 355.

that is relative to the performers – allowing for either an interpretative, “free rhythm” approach, or a more precise beat if absolute time values were assigned to stresses. A selection of stress patterns can be set as rhythmic modes for a piece for a musician to use within a piece.

Neumatic notation could be used to show a contour, with or without pitch indications. This would create a line suitable for performance by electronic musicians or instruments without a fixed pitch; or one could apply a general pitch declaration or a harmonic axis at the beginning of the line. I experimented with creating a modification of neumes, simply by drawing contours on the page and not using the square heads. Drawing these contours was not difficult, but a decision had to be made as whether a line or a vertex represented a discrete sound. I opted to count the vertices, as (for me) they were easier to spot.

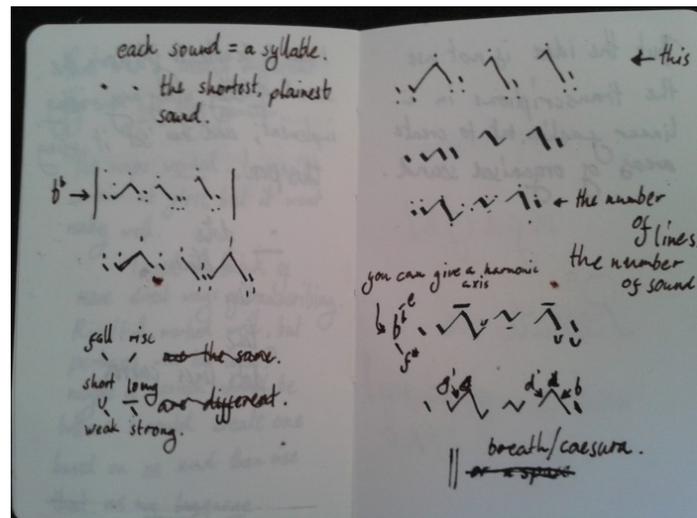


Figure 4: experiments in modified neume notation

Although they are not related, I found the figuration with a harmonic axis (shown near the bottom-right of the above image) very similar to Dasian notation from the ninth century, especially as transcribed by Coussemaker²⁶:

²⁶ Apel, p. 207.

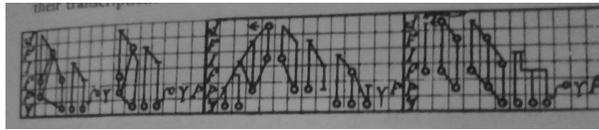


Figure 5

and in turn, this bears strong similarities to the totally unrelated Turnablist Transcription Method designed by John Carluccio in 1997²⁷.

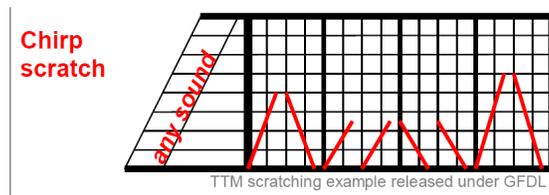


Figure 6

I considered that at this point the music may as well be notated using common notation: but by giving an exact contour to the music I was removing a degree of freedom that I required in the music. If the contour can be seen, it is possible that it will be played, even if there are directions to play the pitches freely. Displaying a specific contour when one is not required is actually more ambiguous than not writing a contour, so I chose not to notate using this method unless I needed a contour; or if I wanted to work with wholly unpitched (or flexible pitch) material, which is outside the scope of my current study.

I then began to work on combining letters and neumes, and thinking of configurations that could be quickly read and learned.

²⁷ John Carluccio, 'TTM', CARLUCCIO <<http://www.cinqua.com/ttm/>>.

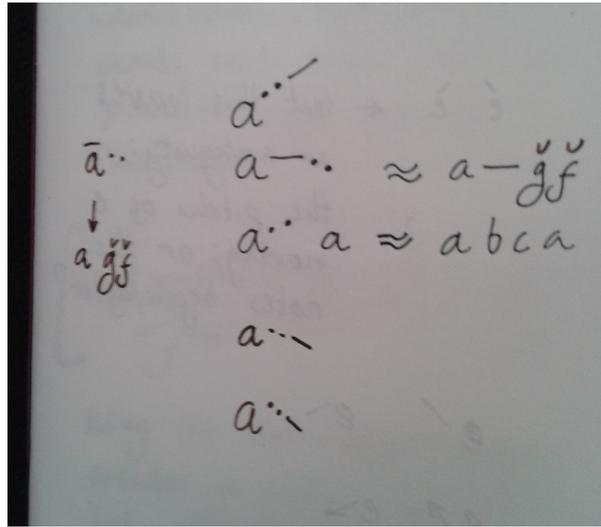


Figure 7

The above page from one of my notebooks shows that I had originally conceived the neumes as having exact pitch contours. With the realisation that I wished to be more general, I worked on modifying this method so that the final pitch could be set, but how to approach that pitch was suggested rather than prescribed.

Before they had rhythmical connotations, the *virga* and *punctum* were used to mark a rise or fall of pitch respectively. The *virga* originates from the grammatical *acutus* sign (´) which is similar to the modern acute accent, and *punctum* from the *gravis* (`) which evolved into the grave accent²⁸. The circumflex (^) is a combination of the two marks; the caron (ˇ) is perhaps not related²⁹, but all of these can be used to mark general indications of melodic contour. These markings are easy to apply to the letters, and also compact the information for the melody around one note: for example, on seeing $\tilde{g} c$, a musician would perform a rising melody starting from *g* and finishing at *c*, with a stress on the initial *g*.

To aid the performance of the pieces I would need an accompanying text, with a key to the symbols

²⁸ Parrish, p. 4.

²⁹ Various contributors, 'Caron', *Wikipedia* <<http://en.wikipedia.org/wiki/Caron#Origin>>.

and suggested methods. But more importantly, I would have to consider how to lay out the pieces on a page.

setting the work

To find a suitable form of setting the pieces, I looked at three methods:

1. writing the pieces by hand;
2. Gregorio³⁰, a Gregorian chant notation parser/generator; and
3. using a word processing application. In my case, this was LibreOffice³¹.

All the pieces start their lives as hand-sketched pieces. I sit at a piano or keyboard and sketch the work out by playing a string of associative ideas, all related to the planned aspects. Those ideas that hold are then written in a separate notebook.

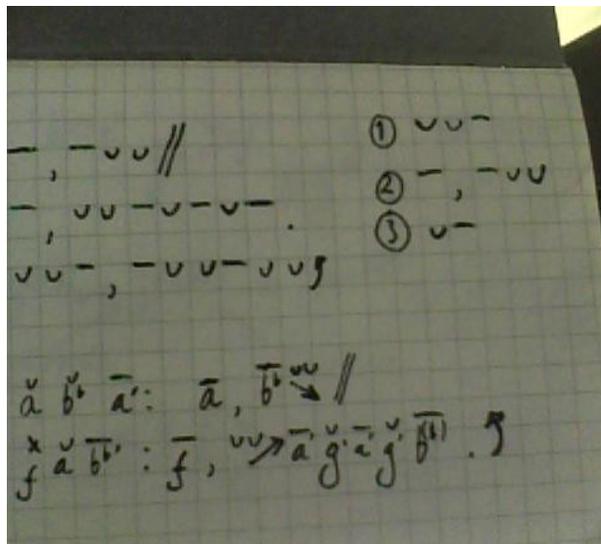


Figure 8: "the uns", initial sketch

The hand-writing process is long but enjoyable, and gives a real sense of freedom when thinking about layout, letter sizing, and weight. But copying the scores for others by hand would be slow, as I

³⁰ Elie Roux, *Gregorio*, version 2.3, 2006 <<http://gregorio.gna.org/>>.

³¹ Various contributors, *LibreOffice*, version 4.1.5.3 Arch Linux build-1, 2000 <<http://libreoffice.org/>>.

would have to be careful not to make any errors in transcription. I would have to scan the pages if I were to distribute them electronically, or post the copies: and if I wished to make any changes before rehearsal time, I would have to transcribe them again or ask the musicians to make annotations. It is very difficult to let go of writing by hand as an internal process though, and so I decided to use this solely for the composition process. This meant that I would use software for the transcription process.

In using Gregorio, it became clear that I needed to not use an exact representation of medieval notation. First, the many methods of medieval notation were functional for the methods of that time; and the idea behind *new dark art* is to learn from medieval ways of using and suggesting improvisation through transmission; not to copy those methods exactly. The syntax had a pretty steep learning curve, but has its roots in “Boethian” letter notation. After entering the syntax, the text file is parsed by Gregorio, which renders a TeX file; then the TeX file is converted into a PDF. Below is an illustration of the work flow, showing a terminal with the gabc notation file for a song called *jura*, and the resultant PDF behind it.



Figure 9

The main issue was that the program is specifically design to display plainchant scores. This is not quite the same as displaying medieval notation, which (as explained earlier) is diverse; and the program was not designed to use its notation in new ways. Although I could achieve staff-less

notation, it was more difficult to set the layout of the neumes as desired: so I chose to not use this program to notate the music.

LibreOffice has a component for writing mathematical formulae called *Math*. With this component, the user is able to build up a library of symbols to be re-used later. As I was creating a library of musical symbols, I found that the Symbola fonts had a section for Byzantine ecphonic signs³². I could have used these symbols to denote contours in the melody, but as I had previously decided not to adhere to older symbols when using Gregorio, I opted to use directional arrows instead. Using the *Math* component had a shallow learning curve and allowed for a flexible layout on the page.

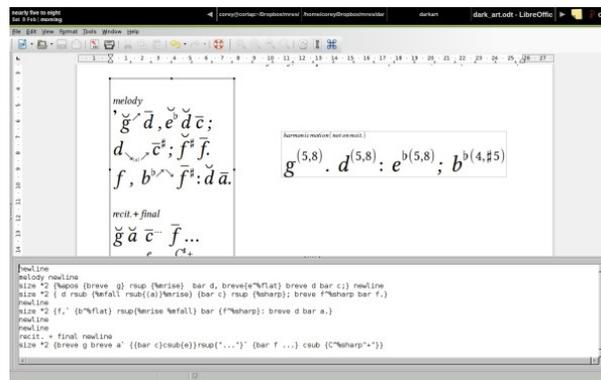


Figure 10

The above figure shows an early work flow for *jura*, but using LibreOffice. The formula syntax is entered in the bottom pane and the result appears on the page. This yielded very satisfactory results in the transcription of the hand-written pieces; and as LibreOffice can generate PDF documents from its own open source file format, I would be able to distribute the pieces by e-mail or by storing them on a web server for later access.

conclusions

The diversity of notation markings in the medieval era would seem to counter Sauer's notion of the 1950s being the “age of the self-invented score”³³. Perhaps a truer interpretation would be that the so-

32 George Douros, *Unicode Fonts for Ancient Scripts*, version 7.5.1, 2013 <<http://users.teilar.gr/~g1951d/>>.

33 Sounduk and Theresa Sauer, ‘Graphic Scores - Celebrating the Art of Music (programme Notes)’ (Sounduk, 2013).

called modernist period allowed composers to express their ideas using a visual language related to the music, but – as Earle Brown noted – not always specifically functional to it³⁴. Medieval notation was thoroughly functional, and its visual aspects were necessary to the identity and process of the music³⁵. It was clear that my set of notational devices should aim for that same level of functionality and necessity. The notation for *new dark art* thus has the following core aspects:

1. exact pitches/sonorities are notated using non-diastematic letter notation, with a maximum of two phrases per line;
2. punctuation and prosodic stress signs are used suggest rhythm; *and*
3. accent marks are used to suggest melodic contour.

By setting a maximum of two phrases per line, I am dividing the piece into sections visually to aid memorizing the pieces. The phrases also act as formulae to recall within each piece: thus any melodic improvisation comes only from the melodic material of the work and a set of idiomatic rules for melodic harmonization, adhering to the processes of medieval performance³⁶ but allowing for a contemporary context. The final series of symbols is shown below.

x note/pitch	\nearrow rising melody (non-specific note)
$x_{maj/min, etc.}$ scale	\searrow falling melody (non-specific note)
$x^{(y)}$ x with y interval	\acute{x} rising melody starting from x
X chord (tertian system)	\grave{x} falling melody starting from x
${}^n X$ n th inversion of chord	\hat{x} melody rises from , then falls to x
$\frac{X}{y}$ chord X with bass note y	\check{x} melody falls from , then rises to x
$\frac{X}{Y}$ chord X over chord Y	

³⁴ Brown.

³⁵ Berger, p. 77.

³⁶ Wulf Arlt, 'The "Reconstruction" of Instrumental Music', in *Studies in the performance of late mediaeval music* (Cambridge University Press, 1983), p. 75.

\bar{x} stressed / strong / long (longa)
 \breve{x} unstressed / weak / short (brevis)
 \bar{x} longer than short (brevis in longo)
 \hat{x} either strong or weak (anceps)
 x''' repeat note three times
 $\curvearrowright \dots \curvearrowleft$ cycle phrase
 $//$ pause (caesura)
 prosodic durations:
 $\dots > . > : > ; > , \equiv ,'$
is longer than

As described, *new dark art* uses letter notation as the main representation of music. Letter notation has had its place as a teaching notation since the ninth century³⁷; it was usurped by the use of the stave, but it made various reappearances, most notably in tonic sol-fa³⁸, which is still used to teach singing: there are many solmization techniques still in use around the world. In this sense the notation for *new dark art* is a clear method, potentially suitable for learning. As a primary task of the improvising musician is to learn material to recall, the format used for *new dark art* may be suitable for transcribing other material for rapid memorization.

37 Hugo Cole, *Sounds and Signs: Aspects of Musical Notation* (London: Oxford University Press, 1974), p. 99.

38 Percy A. Scholes, 'Tonic Sol-Fa', *The Oxford Companion To Music* (Oxford University Press, 1939), p. 939.

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