Pipers' Canntaireachd and Scottish Gaelic: Basic elements and expressive variability

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EDITOR'S NOTE

Frans Buisman (1942–2002) was a Dutch linguist, archivist and voracious scholar of pibroch, the classical music of the Scottish Highland bagpipe, and its earliest printed sources. His research into piping and Scottish Gaelic music spanned thirty years of his life, culminating in 2001 with the publication of *The MacArthur-MacGregor manuscript of piobaireachd (1820): The Music of Scotland, Volume 1* (Universities of Glasgow and Aberdeen). Such was Buisman's drive that, despite consistent dissemination of his research in journals and symposia, much of his work remains unpublished; it is with pleasure therefore that *Scottish Studies* now presents one of the last papers Buisman produced before his untimely passing. No one, before or since, has brought such depth of expertise in linguistics and phonology to the study of pibroch's vocabelisation and verbal notation, making the present paper a work of singular importance and a fitting tribute to Buisman's zeal and unique erudition.

This paper has gone through many hands since Buisman submitted it in 2001. Our thanks go to those who have reviewed the work and offered invaluable input, including this journal's previous editor, Dr John Shaw; the late Dr Roderick D. Cannon, emeritus professor of chemistry at the University of East Anglia and renowned authority on bagpipe music; Dr Tiber Falzett, piper and folklore lecturer at University College Dublin; and Buisman's friend and colleague Barnaby Brown, University of Cambridge, who played the pipes at the author's funeral. Above all, our sincere gratitude to Prof. Joshua Dickson, Royal Conservatoire of Scotland, who has reviewed previous comments and overseen a complete re-editing of this article for publication. Thanks to the efforts of all of these, this work can at last serve as a memorial to an important scholar of Scotland's national music.

Abstract

Canntaireachd is an orally-devised method used by pipers to remember pibroch (*pìobaireachd*) compositions, the classical repertoire of the highland bagpipes, and to transmit the music to others. Canntaireachd began to be fixed in print from the early nineteenth century, but unlike tonic solfa and staff notation, the primary purpose of canntaireachd was not the recording of melody. Indeed, it was never intended as a written medium at all, but rather as a means of orally encoding a variety of stylistic features in the context of a tune, thereby providing an aural road-map for performers already familiar with the musical idiom. Based on the sounds of the language spoken by early Highland pipers – Gaelic – and thus subject to that language's dialectal variability, canntaireachd nonetheless has its own syntax and obeys its own semantic rules. In this article, the author explores the relationship between canntaireachd and the Gaelic language, and describes how canntaireachd as an oral medium is able to distinguish, in an ad hoc manner, agogic features and other details not normally differentiated when canntaireachd is written down – highlighting, in effect, the sung method's 'expressive variability'.

1.0 Scope

The Gaelic word *canntaireachd* (literally 'reciting', 'singing'), in its broadest sense, denotes techniques of vocalising instrumental music; that is, of giving a rendition of any music by means of singing expressive words or syllables. The traditional music of both Highland and Lowland Scotland has a rich variety of vocalising devices; in the former, the term canntaireachd prior to the mid-19th century seems to have been used to denote a variety of vocalisations, from 'doggerel verse' to syllables 'that meant nothing and could be made up as one went along'.[1] But canntaireachd as a technical term nowadays refers almost exclusively to one kind: the formalized, non-lexical 'vocabelising' that is used by pipers for expressing pibroch, a seventeenth- and eighteenth-century class of ceremonial music that was composed for the Highland bagpipes; and so in this paper the term 'pipers' canntaireachd' will be used in that specific context.[2]

The present paper deals with the way pipers' canntaireachd works, and analyses correspondences between speech sounds and musical meaning. It contains a description of the extent to which canntaireachd associated with pibroch was formalised in print in this respect, and outlines the ways in which canntaireachd reflects aspects of Scottish Gaelic phonology. Differences will also be shown, pointing out that, in these formalisations, phonetic oppositions as observed in Scottish Gaelic are often neutralised. At the same time it is demonstrated how, nevertheless, phonetic oppositions could be borrowed temporarily from language to make ad hoc differentiations in canntaireachd.

2.0 Sources

Our sources are the records in the Sound Archives of the School of Scottish Studies (hereinafter abbreviated in tables or figures as SA); the canntaireachd of John MacCrimmon (*Iain Dubh*, c. 1730-1822, abbreviated as MC) as notated by Niel MacLeod of Gesto, likely around the year 1800; the 'Specimens of Canntaireachd' (SP) as copied by Angus Mackay in approximately 1853; an anonymous source (AN) quoted by the Revd. Alexander MacGregor in 1872; a few letters and articles written by pipers in the first decades of the twentieth century; and the manuscripts of Colin Campbell (CC) begun in 1797 (but whose first draft is lost).

Much of what will be said in the next few sections will stress the importance of recognising canntaireachd as a purely oral technique. It does not mean that we must limit ourselves to sound records. In fact, the Gesto record (MC) arguably provides us with the most important data. This paper contends that modern piping institutions have neglected oral tradition when disseminating their use of Colin Campbell's adapted system of written canntaireachd, and that a critical comparative study of these written sources reveals a considerable amount of evidence regarding the particulars of the oral transmission that underlie them and, in the case of the Campbell canntaireachd manuscripts, of the oral system that underlies the scribal adaptations characteristic of his collection.[3]

3.0 Bagpipe music – technique and notation

The scale of the Highland bagpipe encompasses nine notes, running from what pipers call 'low G' to 'high A'; the tenor drones are pitched one octave below 'low A', and the bass drone is pitched an octave lower still. In our music examples we have omitted the drones, as is usual in pipe notation, but

[1] George Moss, 'Canntaireachd', *Piping Times* 12/1 (1959): 16–17.

[2] The Gaelic word *pìobaireachd* technically can refer to any genre of piping, but has come to be most commonly associated in English-language contexts with the ceremonial genre. For that reason, in the present English-language context of this paper, the word 'pibroch' is preferred instead of *pìobaireachd* to reflect this association. Similarly, the word canntaireachd (unitalicised) is preferred to *canntaireachd* to reinforce present-day, English-language association of the term among pipers specifically with the vocabelising of pibroch.

[3] Frans Buisman, 'From chant to script: some evidence of chronology in Colin Campbell's adaptation of canntaireachd', *Piping Times* 39/7 (1987): 44–49; 'More evidence of Colin Campbell and the development of the Campbell notation', *Piping Times* 47/11 (1995): 21–28 and *Piping Times* 47/12 (1995): 26–34; and 'Canntaireachd and Colin Campbell's verbal notation – an outline', *Piping Times* 50/3 (1997): 24–30 and *Piping Times* 50/4 (1998): 28–33.

they must be understood throughout. The notes C and F are sharp, and the respective sharp signs (#) are written on the stave in all examples containing these notes.

In respect of the notes which modem pipers call 'grace-notes' certain distinctions must be made, and my present notation reflects these, as follows. To articulate successive notes of the same pitch, and for some purposes of emphasis, extremely short notes are inserted which I call here *pseudo-notes*; these are necessary because the sound of the instrument cannot be stopped, and the volume cannot be altered. They are made with infinitesimally short flicks or strikes of the fingers, and do not sound as proper notes. In conventional pipe music they are written as ordinary notes with small heads and three tails. In this work, however, I distinguish them as *cuts*, when they are pitched higher than the true notes which precede and follow them, and *strikes* when they are lower; and I write them with the signs (**'**) and (**,**) respectively, placed on the stave at the appropriate pitch height.

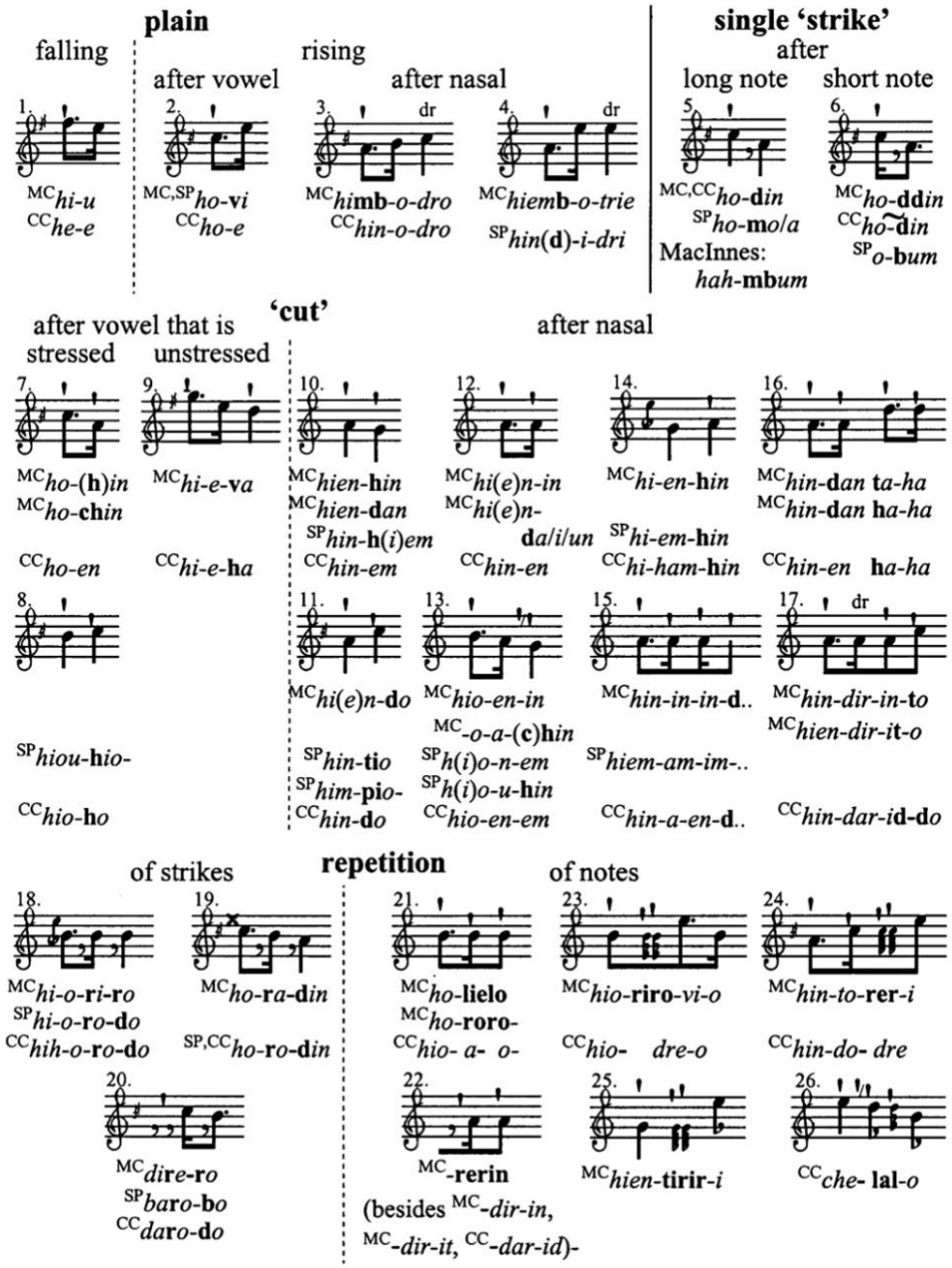

Table 1. Use of consonants in the middle of vocables, as found in written sources.

In the present notation I use notes with small heads and two tails for certain other notes which are parts of larger clusters (symbolised **dr**), and for true grace-notes, where these occur, as discussed later. I also use the symbol **x** at the pitch level E to denote an *introduction* which is a descending sequence of short notes featuring a relatively long E.

Table 1 shows various scribal presentations of canntaireachd vocables. It is not meant to be a complete overview, but it illustrates a number of those aspects that are described in this paper. At first sight, considerable differences appear between the various sources; but by showing the phonological structure of the system, this paper will make clear that many differences are merely superficial. As far as we encounter real differences, especially in the canntaireachd of John MacCrimmon (MC) and in Angus MacKay's 'Specimens' (SP), some of them do not really affect the system itself but are evidence of a wider application of a phenomenon that I call *expressive variability*.

By the term expressive variability, I denote the procedure of substituting sounds in canntaireachd with the aim of differentiating, in an ad hoc manner, details that normally are not differentiated systematically. Such substitutions go beyond the kind of changes that may result from phonetic context. Expressive variability is discernible in some sound recordings of canntaireachd relating to pibroch as collected by researchers at the School of Scottish Studies.[4] It is not to be seen in the adapted canntaireachd of Colin Campbell, but it is obvious in John MacCrimmon's canntaireachd as recorded in print by Gesto and, to a lesser extent, in MacKay's 'Specimens', where it is applied to both vowels and consonants (*Table 1*).

Apart from the PhD thesis by Kim Chambers, the main value of which lies in its treatment of other instrumentalists' vocabelising, pipers' canntaireachd has not been subjected to a study in which linguistic and musicological aspects are viewed together.[5] Discourses on canntaireachd are often seriously hampered by overreliance on the Campbell Canntaireachd, and by taking Campbell's system as the norm from which to view other sources. One must understand that Campbell did not give his own canntaireachd in its original form, but had adapted it to make it suitable as a system of graphic notation. Some writers have, however, looked in a purely mechanical way at the congruencies between musical meaning and vocable or syllable; this attitude betrays itself by the frequent use of the term 'pipers' solfa' as a characterisation of canntaireachd.[6] But unlike the abstract syllables of the various solfa systems that are found worldwide, there is a direct relationship between a syllable's phonetic shape in canntaireachd and its musical meaning.

4.0 Musical transmission and communication

As musicians, we find that a theory of music and appropriate terminology help us communicate with each other. In addition, more or less abstract forms of music enable us to reflect on music and to disclose something about it in a musical form. Playing a fragment of music as a kind of illustration may be called the most direct form of communicating or reflecting on music. The most abstract form is the use of notational systems like the stave. Hardly less abstract are systems of verbal solmization.

Another form of musical abstraction is an oral technique by which instrumental music is translated into expressive words or syllables. Such an imitation may serve several purposes: it may be used as a mnemonic device, as a vehicle of communication, and sometimes as a medium of performance. One manifestation of instrumental music's vocalisation as a medium of performance in

[4] E.g. the singing of pibrochs by piper Calum Johnston and a detailed discussion of Calum's 'expressive variability' relating to specific notes on the bagpipe scale between Calum and researchers Francis Collinson and Robin Lorimer. School of Scottish Studies Sound Archives, SA 1964.145, and SA1964.146. (Many of these recordings are now available online; see under 'Johnston, Calum' in references below. –Ed.)

[5] Christine Knox Chambers, 'Non-lexical vocables in Scottish traditional music' (Phd diss., University of Edinburgh, 1980).

[6] See, for example, J. P. Grant, 'Canntaireachd: the old pipers' notation for pibroch music', *Music and Letters* 6 (1925): 54–63. This is a typical example of how one may be led down the wrong path by expecting canntaireachd to express distinctions in the same way as solfa systems do.

Scottish Gaelic tradition is *puirt-à-beul* ('tunes from the mouth' or 'mouth music'), in which words are set to tunes and sung for the purpose of rhythmic accompaniment to traditional dances. In this manner, *puirt-à-beul* serves, among other things, as a vehicle of expressing the agogic dimensions of instrumental music. Similarly, a highly expressive form of pipers' canntaireachd is associated with the light music tradition of Highland piping – for example, in the singing of Mary Morrison, Barra.[7] Such singing acquires thereby the nature of an independent performance, disregarding the vocalisation's role as a method of transmitting something else: that is, as a way of illustrating particulars of a performance as it may be executed on the instrument.

A certain degree of formalisation may occur in vocabelising because of the need to be specific on certain occasions; pipers' canntaireachd distinguishes itself in that respect by a greater formal regularity in the relationship between sound and meaning. But it should be stressed that formal regularity does not diminish the imitative nature of the technique. Formalisation is not absolute: the system still derives its effectiveness from the principle of *phonaesthetic association*—the meaning of speech sounds as applied in canntaireachd being recognised by association with musical sounds.

The more articulate forms of imitative singing basically express in their phonetic structure only those musical elements considered relevant to retention or transmission. 'Relevant' in this matter does not mean musically more or less important than other elements, but relevant in respect of the musical choices made in cases where several choices are possible. Even distinguishing melody notes from each other in a precise way was clearly thought to be of less relevance – again, without implying that the notes themselves are irrelevant (an example of this will be given in the next section). All vocabelising is focused on those elements that are considered to be essential for a systematic transmission of the music.

4.1 Orally transmitted learning

In a 1924 letter to the *Oban Times*, piper Malcolm MacInnes described pipers' canntaireachd as a 'mimic chant'; in a 1920 letter, he had explained that 'each vocable roughly represents in its sound the sound produced on the chanter'.[8] In both observations, MacInnes demonstrates his precise understanding of how canntaireacht communicates the elements essential to a piper's retention and communication of the music.

Other descriptions have been less to the point than MacInnes's. Too many authors miss the point about the nature of pipers' canntaireachd entirely, describing it as a kind of solfa, thereby overlooking basic differences between solfa as a scribal (and reading) method, and canntaireachd as an oral method of transmission (or instruction). What pipers call a 'double beat' motif on E is shown here to illustrate the difference between canntaireachd as an expressive imitation of instrumental music and a mechanistic solfa approach (*Fig. 1*):

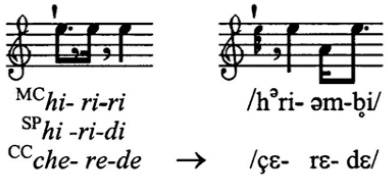

Fig 1. 'Double beat' motif on E

On the left, we see how the double beat, or *crathadh*, was represented in piping's earliest printed sources. The vocables used in Campbell (CC), Gesto (MC), and MacKay (SP) express this way of playing perfectly. At some stage, however, double beats came to be played predominantly as shown to the right, with the first note reduced and with compensatory lengthening of the second strike (,). Later sources express the double beat on E by inserting another vowel or a vocalised nasal as a regular

[7] Mary Morrison, 'Mouth music and canntaireachd'. *Scottish Tradition* 2: *Music from the Western Isles*, Greentrax CDTRAX9002, 1992, compact disc.
[8] Malcolm MacInnes, letters to the *Oban Times*, 13 July 1920 and 16 August 1924.

expression of low A.[9] But an incongruence has developed: the modern piper, reading Campbell's *cherede* and knowing that it represents the double beat on E, sings the motif in imitation of modern performance style, pronounced as shown on the right of Figure 1; a vocalisation of the lengthening of the second strike is inserted between *re* and *de*; and so the simple syllable *de*, which normally expresses E preceded by a single strike in this motif, is now interpreted to mean something else.[10] Such dissonance betrays a breakdown in the expressive relationship between speech sound and musical meaning.

We must not regard these early written forms of canntaireachd as representing a fixed, 'pure' or 'original' standard to which later oral records merely add evidence of a process of erosion. Even Kim Chambers' valuable thesis at times seems to accept the view that writing naturally presents something close to a fixed standard that in due course falls victim to the 'creeping in' of expressive nuance:

> Since it is written down, manuscript *canntaireachd* must be considered to be as 'congealed' as any vocables can be, but when *canntaireachd* is sung it tends almost invariably to become less systematic than in its written form as idiosyncratic vocables and musically expressive nuances creep in.[11]

The same author affirmed the essential nature of canntaireachd elsewhere:

> It is considered to be essential that the *canntaireachd* be sung. [...] Written *canntaireachd* is useful to remind one of a tune once learned and then forgotten, but it cannot, unaided, pass on a 'meaningful' interpretation; or such is the view of most pipers using *canntaireachd* today.[12]

The problem with regarding 'manuscript' canntaireachd as the norm may be further appreciated from the example of the *Criùnnludh Geàrr* variation of *Ceann na Drochaide Bige* ('The End of the Little Bridge') as it is recorded in MacLeod of Gesto's book (tune no. 12). This is presented as a sixteen-fold repetition of the vocable *hientiriri*. It can only be interpreted as expressing an alternation of low As and low Gs; both notes are regularly expressed as *hien-*, but the difference can only be heard in the sung form of canntaireachd. The printed transcription of the vocables gives no clue at all which of the possible schemes of alternation is meant (*Fig. 2*):

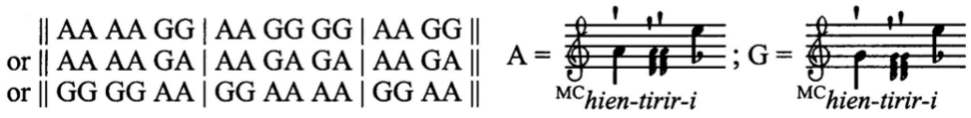

Fig 2. Possible schemes of alternation between low A and low G in the *Criùnnludh Geàrr* variation of 'The End of the Little Bridge'.

In a culture that relies on oral transmission, the lack of widespread literacy in the verbal and musical arts was compensated for by 'precision in oral retention', to paraphrase James Ross, which, naturally, is impossible without a great amount of expert knowledge:

[9] E.g. the singing of William MacLean, School of Scottish Studies Sound Archives, SA 1953/4/B7. (Buisman's source for this item is not listed in Tobar an Dualchais, but see references for similar recordings. –Ed.)
[10] E.g. the singing of Andrew Wright, 'Canntaireachd and Piobaireachd: Singing of Ground with Piping Exposition', Northern Ireland Piping and Drumming School, *Whispers of the Past* 1, n.d. Compact disc.
[11] Chambers, 'Non-lexical vocables', 11–12.
[12] Kim Chambers, 'Concepts of canntaireachd: an analytical evaluation of Scots pipers' perceptions of their solmisation system', in *Studies in Traditional Music and Dance: Proceedings of the 1980 Conference of the United Kingdom National Committee of the International Folk Music Council*, ed. Peter Cooke (IFMC Committee, 1981), 23.

> The literary in Gaelic tradition may be said to be based on a scientific attitude to oral transmission rather than on the written word. In a society in which for a considerable period the most detailed subtleties of bardic metrics and the complexities of canntaireachd notation depended in practice upon absolute precision in retention and subsequent delivery, this scientific attitude was a necessity.[13]

Precise retention is possible only if there is a great deal of inherent formulaic structure in the texts – ideally applied in such a creative way that it does not stop capturing the mind. The same internal formulaic consistency and similar spheres of knowledge relating to it are required in the domain of instrumental music. But here the situation is somewhat more complicated because, unlike the rehearsal of a poetic text, which uses the same tools as during a proper recitation, rehearsal of an instrumental work may be possible using some sort of substitute for the instrument itself – potentially, an external technique such as vocabelising.

When interpreting techniques of retention within an oral culture as a sign of literacy, we would be wrong to assume that oral tools of transmission and retention are concerned with the same particulars as scribal tools of transmission, such as staff notation, or that they convey basically the same thing, only to a different degree. Because of its greater communicative directness and because of its greater flexibility, pipers' canntaireachd is in many respects less laborious than staff notation. But it is not a substitute for it: in some respects, one mode of transmission works more efficiently, and in other respects it may be the other way round.

All the same, pipers' canntaireachd, to fulfil its purpose, must necessarily have been embedded in the theory of pibroch at one time. The way it represents music cannot be understood without a minimum knowledge of the principles of pibroch ornamentation. Indeed, the relationship between canntaireachd and theory is so close that, to those who are familiar with the various types of melodic figures that are used in pibroch, every type is easily recognisable, provided that the user of canntaireachd observes in the consonantal system the three principal distinctions in the finger-techniques that determine part of the musical expression (see section 6.0). But canntaireachd represents more than music: it is also used as a musical tool to orally illustrate a point, theoretical or practical, relative to the ultimate instrumental performance.

The example of the Gesto record of *Ceann na Drochaide Bige* reminds us that 'manuscript' canntaireachd is not to be regarded as a fixed or 'original' standard, and makes it clear that the intelligibility of oral transmission is not preserved in all respects just because one transcribes the phonetic elements on paper. It was precisely because of this imperfect relationship between oral transmission and its written transcription that Colin Campbell, in making a collection of pibroch in written canntaireachd form, found himself forced to adapt the system in ways that often turn out to be unsingable. He was quite successful in his efforts to adapt canntaireachd in such a way that it can be used as an effective alternative method of notation on paper, but it is wrong to consider it as 'standard' canntaireachd, fit – without needing any reconstruction – for use in an oral context.[14]

5.0 Linguistic and musical dimensions of canntaireachd

It follows that, when examining canntaireachd, one must be aware of both its linguistic and musical dimensions.[15] Pipers' canntaireachd is not about using speech elements that, like the syllables of solfa systems, are purely lexical insofar as they are merely the names of notes; rather it reveals a pattern of

[13] James Ross, 'The sub-literary tradition in Scottish Gaelic song-poetry – part 1', *Eigse* 7/4 (1955): 217.

[14] An interesting case is Calum Johnston's canntaireachd rendition of *Bodaich Dhubha nan Sligean*, 'The Old Men of the Shells', on the album *Pibroch: Volume 1*, Waverley Records/EMI Records ZLP 2034, 1964, LP. Having been requested to follow Colin Campbell's system, he did not sing it in his own usual canntaireachd, but still could not help allowing some of its characteristics – his own expressive variability – to 'creep in', as Chambers would have put it.

[15] For a sociological account see Chambers, 'Concepts of canntaireachd'.

close relationships between speech sound and musical meaning. These relationships work by phonaesthetic association; and for that reason, a degree of variability can be expected that would not be permissible in speech other than in the domain of onomatopoeia. However, while the system cannot be called a form of abstract solmisation, calling it onomatopoeic may obscure the fact that there is a certain degree of formalisation. The more general term 'phonaesthetic' seems preferable.

Like other forms of vocabelising, pipers' canntaireachd as an oral mode of transmission differs from written modes of transmission in that elements of the music that become automatically apparent in the singing, such as pitch, need not be expressed by speech symbols of their own. This may surprise those accustomed only to ordinary solmisation, but it explains why even basic information conveyed in the oral imitation of instrumental music is often lost in transcriptions that deal with the phonetic representation of the syllables. Similarly, those elements of performance that follow automatically from convention need not be differentiated in a concrete way in canntaireachd. As we noted earlier, the more formal aspects of vocabelising are concerned only with those musical elements that are considered to be essential for a systematic transmission. We need not, therefore, expect to find special linguistic symbols for elements that are less essential in this respect.

5.1 Phonology in speech and in canntaireachd

The sounds of canntaireachd do not cover the whole spectrum of sounds in the Scottish Gaelic language. Indeed, distinctions that are essential in the language may be ignored in canntaireachd. The most remarkable example is the near absence of a semantic distinction between dental and labial consonants in many pipers' canntaireachd. On the premise that language requires clear-cut boundaries between various classes of sounds, it would be improper to assume that the same clear-cut boundaries exist automatically in the phonetic realisations of the phonemes of canntaireachd. When one articulatory realisation happens to be clearly different from another, it may be so because of a certain prerequisite that is dictated by the inner phonological structure of canntaireachd; secondarily, it could also be due to the influence of articulated speech.

Like language itself, pipers' canntaireachd arranges speech sounds in such a way that a formal meaning becomes apparent. But the way that the sounds of canntaireachd are arrived at is quite different from the way words are formed in language. The arrangement of sounds in language is based on phonetic oppositions by which differences of meaning are implied when these sounds become part of a structure. Such structures may be nearly identical; e.g. English /dʌn/ 'dun' : /hʌn/ 'Hun'. However, the semantic difference does not extend to the opposing phonemes themselves (/d/ : /h/). Nor does the lack of phonetic opposition in the remaining element (/ʌn/) suggest any partial coincidence of meaning. Phonemes have no meaning by themselves; meaning begins only when they are combined to form morphemes.

While some sounds or combinations of sounds may be given an aesthetic value, the presence of sound-symbolic units, or *phonaesthemes*, affects but a small part of the vocabulary of any language. Canntaireachd, on the other hand, can be said to be built up entirely from phonaesthemes. Unlike the English words *dun* and *Hun*, the meanings of the canntaireachd syllables *din* and *hin* are identical to the degree in which they agree with each other in sound. Thus, meaning exists in canntaireachd on the level of individual phonemes or a few biphonemic units (e.g. /iɴ/, /ɴd̥/ and /d̥r/). It follows that the structure of the sounds of canntaireachd is very different from the structure of the words of language. This is why, in discussing canntaireachd, we refer to 'vocables' instead of 'words'.

6.0 Basic articulatory elements in pipe music and basic speech elements in canntaireachd

Pipers' canntaireachd consists of vocables, each forming a single melodic figure by combining syllables or by presenting a subdivision within such a figure. Aside from phonological developments and variants, the syllables are basically constructed using one or more consonants plus a vowel or nasal, as illustrated below (*Fig. 3*):

1	A single consonant… • /h/ (often replaced by a dental or labial stop after a nasal) • /d/ or /r/ • /l/ used loosely instead of /h/ or /r/ *or*	+	…a vowel *or*
2	Combined consonants… • Dental or labial stop + /r/, sometimes /l/, sometimes with an intrusive vowel between the two consonants *or*		…a nasal, usually preceded by an auxiliary vowel
3	A labial glide or spirant /w,y/, used to avoid hiatus in vocables that express rising figures…		

Fig. 3 The construction of vocables in canntaireachd

The elements associated with consonants reflect basic distinctions in the embellishments that determine part of the musical expression – embellishments characteristic of the bagpipe (*Fig. 4*):

A single consonant: single pseudo-note (/h/ = 'cut'); (/d̪/ or /r/ = 'strike')	Combined consonants: cluster of pseudo-notes (/t^{h}, d̪, b̪/ followed by /$^{(ə)}$r/ or /d̪$^{(ə)}$l/)	A labial glide: absence of a pseudo-note in a rising figure

Fig. 4 How consonants are expressed as bagpipe embellishments

True grace-notes – which, in contrast to cuts and strikes, have a definite musical pitch – are rarely represented in written sources of canntaireachd. Although taking noticeable time, they were apparently so short in most cases that, like grace-notes in song, they do not require a syllable of their own.

While pseudo-notes like cuts and strikes are indispensable and can be distinguished according to the fingers that are involved, sung canntaireachd distinguishes these pseudo-notes from each other only very imprecisely. Because the choice of fingers for realising a particular pseudo-note or cluster of pseudo-notes is already governed by theory, convention or convenience, it does not need to be expressed specifically. Broad distinctions, together with the formulaic nature of pibroch in respect of the distribution of types of figures, suffice to allow the piper to understand the finer performing aspects of an entire piece. What canntaireachd actually does on the formal level is not much more than indicate (1) the regions, within the gamut of the Highland bagpipe, to which the main notes belong; (2) whether a note is plain, or preceded by a single pseudo-note, or preceded by a cluster of pseudo-notes; and (3) how the notes are grouped. Indeed, apart from Colin Campbell's adaptations for the purpose of a graphic notation system, canntaireachd does not tend to differentiate more than this. Where expressive variability does occur in its oral medium, this is partly because the inventory of sounds is larger in Scottish Gaelic than is required for canntaireachd; partly for reasons of euphony; and partly because of the occasional need to make ad hoc differentiations beyond the broad system.

6.1 Inventory of sounds in canntaireachd and Scottish Gaelic

Pibroch – and, consequently, pipers' canntaireachd – were developed in the Gaelic-speaking parts of Scotland. Of the Gaelic inventory of sounds, the diphthongs /i̯a/, /i̯ɔ/, /i̯o/ and /i̯u/ seem to have been considered in the context of canntaireachd as simple vowels following a consonant (/h/, /t^{h}/ or /p^{h}/) that was modified by the addition of consonantal /^{j}/. Other diphthongs, like /au/, /ei/, and /^{j}u(:)/, develop only before nasals, and are found only in John MacCrimmon's canntaireachd (MC) as a means of expressive variability. Velar stops and the unvoiced fricatives /f/, /s/ and /ʃ/ are not used.

Apart from these restrictions, the whole range of Scottish Gaelic sounds appears to be used, although many of the phonetic oppositions inherent in the linguistic sound system are, characteristically, neutralised in canntaireachd.

While we may refer to the phonology of Scottish Gaelic being used in canntaireachd, we must realise that the relationship between sound and meaning is different in canntaireachd from such relationships as they exist in Gaelic. For instance, changes that historically affected vowels that occurred before long sonorants could also be reflected in canntaireachd in the treatment of an auxiliary vowel before a nasal, as will be demonstrated in a later section of this paper. But vowel mutations as they occur in language, such as /i^{+SON}/ becoming /i̯u:$^{+SON}$/, are apparently only imitated. Furthermore, the fact that canntaireachd sounds are based on (Scottish Gaelic) speech sounds should not imply that they are subject to mutation, because mutations as they operate in contemporary language relate to grammatical differentiations that cannot exist in a non-lexical system like canntaireachd. Once the interchangeability of /hʲo/ and /ho/ or /hʲa/ and /ha/ is accepted on the premise that palatalisation of consonants does not have any primary meaning in canntaireachd, even /hʲauɴ/ and /hʲuɴ/, deriving from /hiɴ/, could be replaced with /hauɴ/ and /huɴ/.

6.2 Neutralisation of phonetic oppositions in consonants

In spoken Gaelic, the distinction between an aspirated ('lenited') and a non-aspirated consonant is fundamentally important; likewise the distinction between a non-palatal ('broad') consonant and a palatalised ('slender') one. In canntaireachd, however, these distinctions are meaningless, and the oppositions are neutralised. Thus /tʰ/, /tʹʰ/, /d̥/, and /d̥ʹ/ are entirely interchangeable, as are b̥ / and /pʰ/. Similarly, there is no difference between /h/ and /hʲ/.

Theoretically, *hia-* and *hio-* (as found in Gesto and in MacKay's 'Specimens') can be read as two syllables, whereby /hi/ would represent pibroch's introductory E figure, and this is certainly the case in vocables expressing double beats:

	MacCrimmon (Gesto)		MacKay's 'Specimens'		Campbell
… on D:	*hiavirla*	=	*hiaradalla*	=	*hiharara*
… on B:	*hiorero*	=	*hiorodo*	=	*hihorodo*

In most other cases, such a reading is less probable. Between vowels, /hʲ/ may be realised as [ç] in Gesto: *h*(*i*)*o*(*i*)*chin* in addition to *h*(*i*)*ohin* and *h*(*i*)*oin* (Table 1, no. 7). Intervocalic /h/ is usually weakened in Scottish Gaelic, hence Gesto's *h*(*i*)*oin* and Campbell's *h*(*i*)*oen*. Articulating /h/ as [ç] in vocables that express figures descending to low A (*-in*, *-en*) must be regarded as a more emphatic way of signaling that low A or low G is not played 'plain', but that a cut is played to separate it from the preceding note in a musically more articulate way. Curiously, this distinction was lost in Colin Campbell's system; Campbell did, however, use the alternative realisation of /hʲ/ as a scribal means of differentiating the note E, preceded by a cut from F, preceded by a cut (*che-*: *he-*); and, at some later stage, to distinguish high G (*chi-* : *hi-* = /hʲ/), which is not reflected in other sources.

In the Gaelic of Barra, Borgstrøm found /h/ sometimes very loosely articulated as [w] after /u/.[16] This fact may explain the occasional appearance of *v* instead of *h* after a neutral vowel (written *i*, *e* or *o*) in Gesto's representation of John Dubh MacCrimmon's canntaireachd:

- *ri-i-va* and *hieva* in tune no. 18, 'Lament for the Laird of Ainapole' (high G descending to D via E)
- *bitriova-o* in tune no. 7, 'Kiaunidize', but *bitrioha-vi* in tune no. 13, 'Lamentation of Mac Vic Allister' (F sharp descending to D via E)
- *diu viu … hieo vio* in tune no. 17, 'Lament for King James' (high A descending to E and then rising to F sharp

[16] Carl Hjalmar Borgstrøm, 'The dialect of Barra in the Outer Hebrides', *Norsk Tidsskrift for Sprogvidenskap* 8 (1937): 119.

The linguistic opposition between dentals and labials is neutralised to a great extent as far as stops are concerned. But in this case sources differ. MacCrimmon's canntaireachd is the only variant that does not consider labials as random variants of dentals. The labials that it contains derive from transferring its occurrence in one particular phonetic context to another case, as will be discussed further in section 8.3. Colin Campbell used labials freely, but preferred dentals; by contrast, later sources mostly prefer labials. In the case of Colin Campbell and the later sources, the choice of a dental or a labial does not depend on phonetic context and does not make any difference otherwise. It is non-expressive and therefore does not qualify as a case of expressive variability.

6.3 Labialisation in MacKay's 'Specimens of Canntaireachd'

The matter is different, however, in the case of MacKay's 'Specimens'. While dental stops are the norm in the 'Specimens', a labial stop is always used when a stop is combined with a following /r/ and an intrusive vowel is developed before that /r/, as in *-bar-* vs. *-dr-*. (In the handwriting, *b* cannot be discerned from *h*, but the evidence of other canntaireachd sources indicates that *b* is meant.) Apart from the occasional combination *-mp-* occurring besides *-m-*, *-nt-* and *-nn-*, other uses of labial stops depend on phonetic or musical context.

The alternative forms *-din* and *-bin* express low A preceded by a strike. In the 'Specimens' they are both found after unstressed syllables only: *hiaro***din** and *dallaro***din**, but *hioro***bin**-*dalla* and *hioro***binn**-*um* (*Fig. 5*):

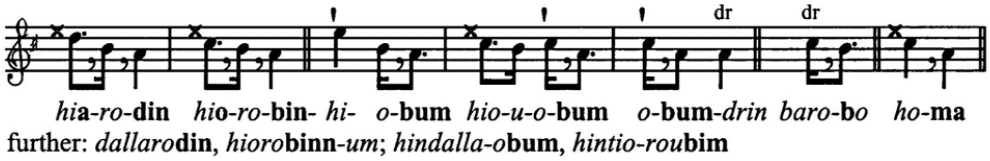

Fig. 5 Forms *-din* and *-bin* following unstressed syllables in MacKay's 'Specimens of Canntaireachd'.

This is not a random phonetic variation like the interchangeability of dentals and labials in other varieties of canntaireachd. The syllable appears as *-bin* when the main stress at the beginning of a vocable is sung to the vowel *o*, but it appears as *-din* in other cases. Even though the same thing is not reflected in language, being governed by phonetic context it seems to be a case of proper 'free variation' in linguistic terms. The labial stop also appears after a vowel that expresses a stressed or secondarily stressed shortened note. In nasal syllables, both consonants are labialized, normally with the rounding of the vowel. The use of the syllable *-bum* in the 'Specimens' is an example of expressive variability because it depends on musical context; in the above cases, the shortness of the note represented by *-o-*. In addition to MacKay, John Dubh MacCrimmon had a special articulation here, which was expressed by Gesto by doubling *d*: *-oddin*. For the development within the 'Specimens' by which the syllable became *-ma* or *-mo*, see section 8.1.

7.0 The system of vowels and nasals in Scottish Gaelic and in canntaireachd

Before discussing the vowels as they are used in canntaireachd, it may be useful to explain the vowel system of Scottish Gaelic. The points of articulation of Gaelic are schematised in *Table 2*.

	front	unrounded	back
close (high)	i	ɨ	u
half-close	e	ɘ	o
half-open	ɛ		ɔ
open (low)		←a/ɑ→	

Table 2: Scottish Gaelic vowels

In many dialects the distinction between /ə/ and stressed /ɨ/ is abandoned. Southern dialects make both sounds coincide with /ɛ/. In his spelling of MacCrimmon's canntaireachd, Gesto opposed *i* and *ie*. He used the digraph *ie* for three different sounds in tune names: 'Ch**ie**gch' = *Chaogaich* /xɨkiç/ and 'Cogh**ie**gh nha Sh**ie**' = *Cogadh no Sìth* /kʰɔkə(ɣ) ɴ′o ʃi:/. In his representation of canntaireachd, *ie* undoubtedly represents /ɨ/, but before nasals probably /ə/.

In *Table 3* we see the distribution of vowels and nasals as they are used for expressing stressed notes in the written nineteenth-century sources of canntaireachd. The table indicates how the gamut of the Highland bagpipe chanter is divided into three (or two) regions. From B, the range of notes from low to high is reflected by a range of articulations from mid-back to low (open) and then to front.

The table also applies to unstressed notes in rising figures. The vowels used for notes in descending and level figures follow the same scheme in Campbell's manuscript, but in Gesto's the colour of an unstressed note is often indefinite, appearing variously as *i, e, ie, u, o* or *a* (for some examples, see *Table 1*, nos. 1, 4, 9, 18–25). In MacKay's 'Specimens', the letter *u* is commonly used to express unstressed B and even low A after a higher note (e.g. *Table 1*, no. 13).

Northern				Southern (/ɨ/ > /ɛ/)		
MacCrimmon (MC)		*Specimens* (SP)		*Campbell* (CC)		*Anon.*(AN)
high region: high notes → high vowels				high notes → front vowels		
A (a″) G (g″) F (f#″)	*i, ie* (= /ɨ/)	A G F	*i, ie*[a] (= ?)	A G F	*i, I* *i, e*[b]	F
E (e″)	*i, ie, u*	E	*i, ie, I*	E	*e, i*[c]	E *i*
middle (lower) region: lower notes → low and mid-back vowels						
D (d″)	(*i*)*a* (= [a], [ɔɑ]	D	(*i*)*a*	D	*A*	D
C (c#″) B (b′)	(*i*)*o*	C B	(*i*)*o, ou*[d]	C B	(*i*)*o*[e]	B *a*
bottom region: bottom notes → nasals						
A (a′) G (g′)	*n*[f], *ie*	A G	*n, m, a*/*o* *m, n*	A G	*n* *m*	A G *o, n*
Twentieth-century sound records show mixtures of the canntaireachd of the 'Specimens' and that of the anonymous source in respect of the presentation of the middle and bottom regions						

[a] also *e, ee, ei*, which may be copying errors for *i* and *ie* or *u*, unless they are scribal differentiations;
[b] *e* preserved in very few instances;
[c] use of *i* limited to introductory E;
[d] also *oo*, perhaps as a copying error for *ou*; diacritic marks were also used for making a differentiation between B and C or between E and other top hand notes, but these undoubtedly were added by the last copyist of the texts;
[e] use of *io* limited to B;
[f] *n* + *v* > *mb*

Table 3 Distribution of vowels and nasals in stressed syllables as spelled in written sources of canntaireachd

In principle, the evidence afforded by Campbell's notation might allow for a one-to-one representation of notes using /m/ and /n/ for the two lowest notes and using /o/, /ɔ/, /a/, /ɛ/, /e/, /i/, /ɪ/ for the notes B to high A successively – i.e. a gliding scale of vowels proceeding from half-close back via open to close front. However, the evidence afforded by the singing of John Dubh MacCrimmon is proof that such tendencies did not affect all users of canntaireachd, and that vowels and nasals were not associated with one particular note each – rather, with a region within the Highland bagpipe chanter's range.

7.1 Ad hoc differentiations in the vowel system

The 'Specimens' sometimes opposes *ou* and *o* to differentiate between the notes B and C sharp. This may be merely a scribal device. MacCrimmon opposed vowels written as (*i*)*o* and *uo*, though not

consistently, in Gesto no. 14, 'Caugh Vic Righ Aro [*Cumha Mhic Rìgh Aro*], a Lament'. This is a case of expressive variability, as is the way the higher notes were often differentiated from each other in MacCrimmon's canntaireachd as shown in Table 3. The fact that the same note can be expressed by different vowels (if they belong to the same register of articulation), as well as the fact that the nasals may be accompanied by various vowels as an auxiliary, gives the system a flexibility that makes it possible to express musical oppositions in an ad hoc way. Furthermore, I define this as a method of adapting the phonetic shape of a vocable in order to distinguish either agogic features or differences of pitch that normally are not distinguished in canntaireachd. This peculiarity is not as evident in modern sound recordings, but it can be extracted from the earlier written records – particularly Gesto's record of the canntaireachd of John Dubh MacCrimmon.

One case illustrates how the three high or close vowels were distributed. The following example (*Fig.* 6) is MacCrimmon's canntaireachd for the first half of the last line of the *ùrlar*, or opening theme, of tune no. 17 in Gesto, 'Lament for King James' (but which is known in other sources as 'Colin Roy MacKenzie's Lament'):

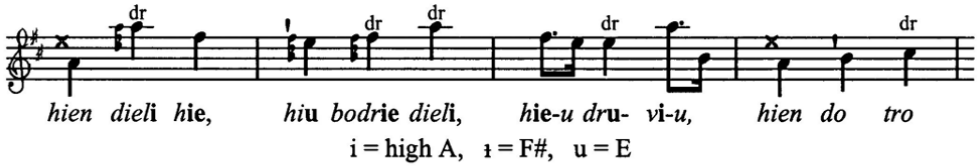

Fig. 6 High vowel distribution in Gesto No. 17, 'Lament for King James'

Although the three high vowels are used here to express one specific note each, this cannot be taken as a rule, as earlier in the same tune the distribution of the high vowels is not so neat, and no semantic opposition is evident.

The high vowels are contrasted in various different ways in the last line of the *ùrlar* of tune no. 16 in Gesto, 'Isabel Nich Kay' [*Iseabail Nic Aoidh*] (*Fig. 7*):

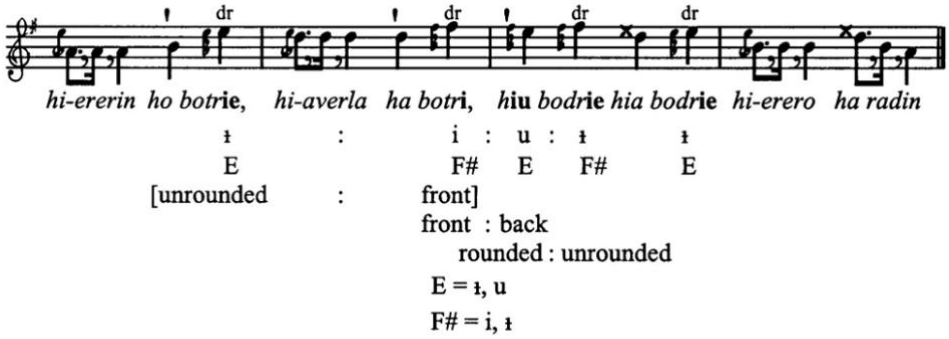

Fig. 7 High vowel distribution in Gesto no. 16, 'Isabel Nich Kay'

The whole range of Gaelic high vowels is used here to contrast E and F sharp from one another, but it is done in such a variable way that the same vowel may stand for different notes. This, then, is a further example of expressive variability as it applies to vowels.

8.0 Nasals

Something similar happens with the auxiliary vowels of the nasal syllables.

In most varieties of canntaireachd, the two lowest notes of the gamut of the pipe chanter are expressed by nasals, usually preceded by an auxiliary vowel (see *Fig. 3* above). It is no accident that these low notes are expressed with a humming sound, given the fact that the drones are identified with the second note of the chanter, low A, to which they are tuned one and two octaves lower. Sometimes, however, the nasal is weakened or lost; see section 8.2.

Section 8.3 describes a treatment of the auxiliary vowel characteristic of MacCrimmon's canntaireachd. The variation between *m* and *n* in other varieties of canntaireachd parallels in one aspect MacCrimmon's typical rounding of the auxiliary vowel for the sake of expressive variability. The possible relationship between the rounding of the auxiliary vowel and the use of the labial nasal also appears from the shape of the syllable *-bum* in MacKay's 'Specimens' (see section 6.3), although the context there is different.

Colin Campbell exploited the variation between *n* and *m* to distinguish clearly in writing between low A and low G. In chanted canntaireachd this method of differentiating the two notes was a tendency at most, and was not consistently pursued, as can be seen from the evidence of MacKay's 'Specimens' and later sound recordings. The distinction was not there at all in the singing of John Dubh MacCrimmon: in Gesto's record of MacCrimmon's canntaireachd, *n* is the norm for both low A and low G, and *m* appears only in specific cases, without necessarily signalling low G.

8.1 Reduced notes

Sometimes low A is played so short that, like a true grace-note, it is not expressed syllabically. The 'Specimens' omit the auxiliary vowel in such cases. Campbell's notation omits both the auxiliary vowel and the nasal itself after a stressed note and before a following *d* (but eventually the form of the vocable was revised in the manuscript). After an unstressed note, the auxiliary note alone was sometimes omitted by Campbell and MacCrimmon (*Fig. 8*):[17]

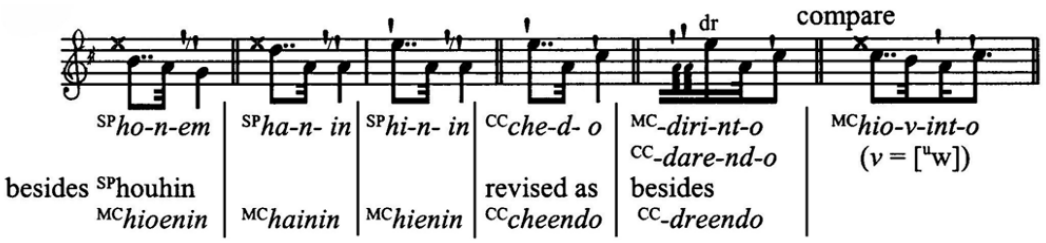

Fig. 8 Omission of auxiliary vowels and notes

8.2 Anticipatory nasalisation and denasalisation

In two sources of canntaireachd, nasalisation occurs in the initial consonant of a syllable that ends or originally ended in a nasal. The vocables appearing as *h*(*i*)*odin* in MacCrimmon and Campbell were written *hah**mb**um* and *hoh**mb**um* by Malcolm MacInnes.[18] In the 'Specimens' the nasal at the end is weakened, and the anticipatory nasal suppresses the original stop: *h(i)o-**mo*** or *h(i)o-**ma***, *-dalla-**mo*** (see Table 1, no. 5 and the illustration in section 6.3).

The letter *m* in *h(i)o-mo* or *h(i)o-ma* may stand for [m^{b}], which is one dialectical realisation of /-m b̥-/ in Scottish Gaelic. One may compare the spelling 'Hanurich orst' for *Tha 'n daorach ort*, one of the tune titles in the 'Specimens', which features the same phenomenon in the case of /-N d̥-/. The difference is that [m] (or [m^{b}]) appears only after long stressed notes.

For low A preceded by a strike, the 'Specimens' have *-bum* after a short stressed note and *-bin* and *-din* after an unstressed note (see section 6.3). In the canntaireachd of many later sound recordings, *-din*, *-bin*, *-bum* and *-mo* may all appear as *-bo*.[19] MacCrimmon and Campbell have *-din* in all cases.

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[17] Buisman's use of the word 'besides' in Figure 9 is meant in the sense of 'alternatively', 'secondarily', or 'in addition to'. –Ed.

[18] Malcolm MacInnes, letter to the *Oban Times*, 16 August 1924.

[19] E.g. P/M Robert Urquhart Brown and P/M Robert Bell Nicol, 'John MacDonald's Teaching Methods', interview by Robin Lorimer, School of Scottish Studies Archives, 1953, SA1953.256.B5/B6/B7, audio tape.

That is not to say that denasalisation does not occur in John Dubh MacCrimmon's canntaireachd, as recorded by Gesto. Nearly all of the examples are found in one tune— 'Kilchrist', or *Cill Chrìosda* (Gesto no. 20), viz. ***hin****dr****ie***, (*c*)***hin****dr****in*** and *hi****ie****dr****ie*** for **hi-en-drin*; ***hiehie****dr****ie*** for **hin-in-drin*; and *hindirind****ie*** for **hin-dirin*(*d*)*-an*. In addition, tune no. 7, 'Kiaunidize' (*Ceann na Dèise*, 'the tip of the ear of corn', known predominantly today as The Earl of Ross's March), has *hinderint****a*** for expressing a low A-based figure as a coda. Tune no. 18, 'Lament for the Laird of Ainapole', has *haine* and *hi*(*e*)*ndan* as well as *hienhi*[*n*] for expressing low A and low G preceded by a cadence, but it is unclear whether this represents *hain-****e*** /hɛnə/ or ***ha****-ine* /ha-iɴ(′)/. As in later *-bo*, there seems to be no phonological reason for the loss of the nasal in these cases.

Alexander MacGregor's anonymous canntaireachd record of *Fàilte a' Phrionnsa* ('The Prince's Salute') shows a considerable decrease in the use of nasals for expressing low A and low G, in addition to considerable erosion of the system of consonants, at least as MacGregor presented it on paper:[20]

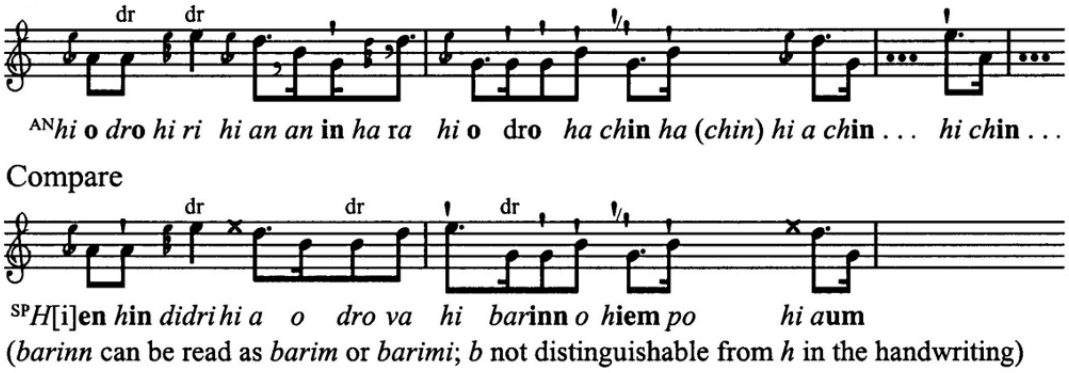

Fig. 9 Fàilte a' Phrionnsa ('The Prince's Salute')

Other cases of denasalisation follow phonetic context. A nasal may disappear before /ʀ/ in many dialects; e.g. Barra: /b̥ãːʀiɴ′/ *banrighinn*, meaning 'queen'.[21] In all varieties of canntaireachd, it disappears both before and after /r/ or /ʀ/: MC*-dir-*, CC*-dar-*, and CC, SP*-bar-* as well as MC, SP*-drin* for */d̥əʀɴ and b̥əʀɴ/; we also find MC*hie*(*re*)*rin* and CC*hiharin* for */hi-ənrənrin/, but the nasals are restored in SP*hianana*. In Gesto alone, we find *hia-rerin*(*e*), *hiu-rerin*(*e*), and *hie-rerin*(*e*) for */hʲaɴ-/hʲuɴ-/həɴ-rərin/ and, analogously, *hia-dirin* as well as *han-dirit, h*(i)*un-dirit,* and *hien-dirit*.

The combination */ʀɴ/ disappears altogether before another consonant in the syllable of the vocable expressing pibroch's *criùnnludh* embellishment: for example, MC*-da-t*(*i*)*ri*, MC*-die-dru*, and CC*-ban-dre* (with *n* reintroduced, which is, however, less convenient to sing). Before a vowel that expresses a top hand note (E or higher), MacKay's 'Specimens' insert /d̥/ after */ʀɴ/: SP*hi-bar-inn-* accords with CC*che-bar-em-*, but SP*hi-bird-i-* accords with CC*che-bar-e-*, whilst MC*hie-dir-ie* and SP*hi-bord-ee-* accord with CC*che-bar-e*.

A nasal has also disappeared before the dental stop in MC*-dirieto*, a variant of which appears as *-dirinto*. Similarly, one finds *-dirie todirie t-*. On this basis, MC*-dirin,* MC*-dirit* and CC*-darid* have all been generalised as vocables expressing the *taorludh* finger movement. In all these cases *-it* or *-id*

[20] Alexander MacGregor, 'Piobaireachd agus ceol nan Gaidheal', *Transactions of the Gaelic Society of Inverness* 2 (1872/73): 21, quoted by W. L. Manson, *The Highland Bagpipe* (Paisley, 1901), 105. MacGregor is not entirely reliable as a source. He was much given to stretching the data he had to suit his own views on tradition.

[21] Carl Hjalmar Borgstrøm, 'The dialects of the Outer Hebrides: a linguistic survey of the Gaelic dialects of Scotland – Part 1', *Norsk Tidsskrift for Sprogvidenskap*, Supplement 1 (1940): 224.

probably expresses some degree of reduction in the final low A of the *taobhludh* finger movement in opposition to *-in*.

8.3 The sounds /h/ and /v,w/ in contact with nasals

The sound /h/ is rarely used independently in Gaelic; e.g. *na Hearradh*, 'Harris'; *na Haf*, 'the Atlantic', but *an tabh*, 'the ocean' (< Old Norse haf). Otherwise, /h/, written *sh* and *th*, is a mutation of /s/ and /t^{h}/. Similarly, /v/, written *mh* and *bh*, is a mutation of /m/ and /b̥/. Mutations are mostly neutralised after a homorganic consonant; hence *caile thana*, 'lean girl', but *cailin tana*, idem. The opposition radical versus mutated sound developed into grammatical oppositions; e.g. *a theud*, his string, and *a teud*, her string; *ga bhualadh*, striking him, and *ga bualadh*, striking her.

In pibroch, the sound /v,w/ fills a hiatus between vowels in vocables that express melodic rising motifs. In Gesto this sound was transferred to vocables in which a nasal occurs in the position of the first of the two vowels, after which a shift of articulation takes place: for example, [-nw-] becomes [-mb-] or [-m^{b}-], with vocables like *hi**o**va* and *hie**mb**o-* reflecting the opposition found grammatically in ***a' bh**àird* and *a**m** **b**àrd*. This would explain the peculiar distribution of /m/ in John Dubh MacCrimmon's canntaireachd, found only in this context and in the vocable *hie**md**odin* in Gesto's nameless tune no. 15.

The 'Specimens' have *himtoma* and *hintoma* for MacCrimmon's *hiemdodin*, differentiating initial low G from low A. In MacCrimmon's form of the vocable, /-mḍ̥-/ must be a result of dissimilation of /-mb-/. The replacement of [b] with /ḍ̥/ may be caused by the wish to express a stronger accent on the note that is sung on the vowel *o*. The labial nasal would still be required to indicate that the next note is plain i.e. that it does not take a cut. It makes the use of /-mḍ̥-/ another case of expressive variability.

We also find a certain 'creep' appearing in cases in which an element with a clear structural purpose in one type of vocable becomes used in other types, despite less of a functional basis. In Gesto, for instance, the element /*bo*/ in *hiembotrie* expresses the hiatus when moving vocally from /*hiem*/ (low A or low G) to /*trie*/, an embellishment on E, F sharp or high G known as a 'throw', but we find that the same element becomes used to precede the throw even when it follows other notes, e.g. *hobotrie* (a throw from B). Something similar occurs in the corresponding vocables of the 'Specimens' where *hindidri* (a throw from low A) inspired *hiodidri* (a throw from B).

Etymologically, /t^{h}/ and /b̥/ are radicals and /h/ and /v/ are derived sounds in Gaelic. But in canntaireachd the relationship is the other way round: /h/ seems to be the radical sound. Since, as a consequence of neutralising mutations after a homorganic consonant, /h/ rarely occurs immediately after /n/, /ɴ/ or /ɴ′/ in Gaelic, it is only to be expected that /h/ is replaced by something else after a nasal and that the replacement would follow the same procedure by which, in an earlier stage of the language, Norse ***h**af* became ***t**abh*. This was a back-formation prompted by the development **ant haf* > **an t-haf* that was caused by regular projection of the dental. The variation /h/ : /t^{h}/ ultimately follows the same pattern as ***th**ig* (/hik′/ 'come') and *gun **t**ig* (/g̥əɴ ḍ̥′ik′/ 'that … will come').

Table 4 suggests some parallels between canntaireachd and features of Scottish Gaelic. Of course, the use of /h/ after a nasal in canntaireachd must primarily be explained as a more emphatic way of expression that may be appropriate in a rhythmic context, such as found in Gesto's *hienhin*, especially in the rising melody motif. But even though /h/ as seen at the beginning of the second vocable in Gesto's *hindin hoho* occurs more frequently in that context, it is essentially a restoration of the original sound, following the example of other vocables found in both Gesto and Campbell, such as *haha hoho*. The example of Gesto's *hindin toho* clearly shows a tendency to follow normal Gaelic phonological mechanics and is therefore strong evidence that the occurrence of *-nd-* too must be related to Gaelic /h/ : (nasal +) dental stop.

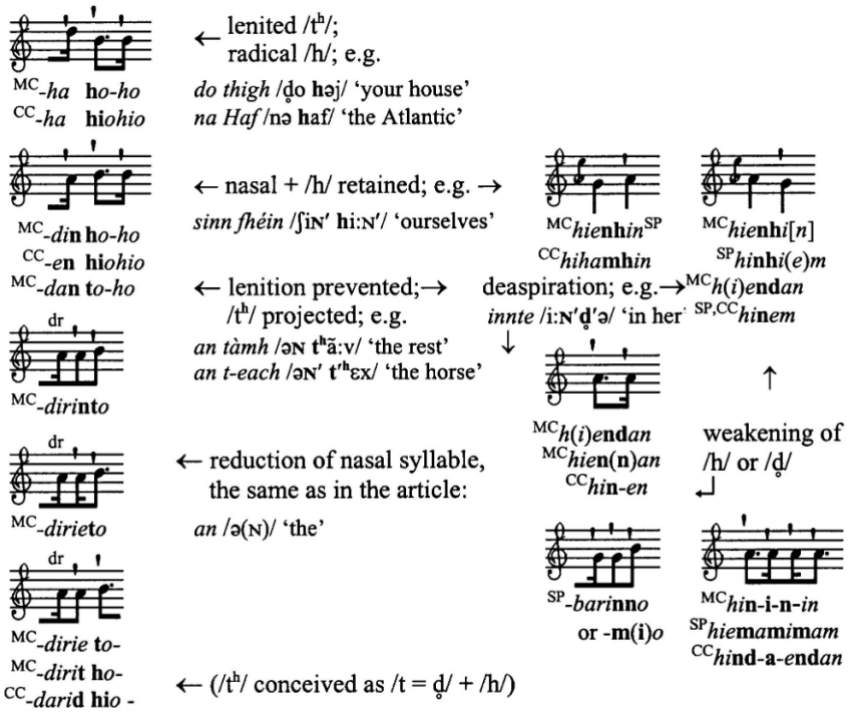

Table 4 /h/ : /tʰ/, /d̥/ in canntaireachd and in Scottish Gaelic

8.4 Vowel differentiations in nasal syllables

John Dubh MacCrimmon's canntaireachd, as it was presented in print by MacLeod of Gesto, shows a predilection for *-an* after *-nd-*. Otherwise, the two basic vowels that he used as auxiliaries for the nasals were /i/ and /ə/ (or /ɨ/), spelled *i* and *ie*. These are also the spellings for the two principal sounds in MacKay's 'Specimens', whereas Campbell uses *i* and *e*. Campbell's manuscripts use the letter *a* as a scribal device to indicate that the preceding cut is made by a flick of the D finger. MacKay's 'Specimens' suggest the same intent, but may use it to express a rhythmic difference, but not the specific fingering of the cut. The evidence of MacCrimmon's canntaireachd contradicts the view that cuts were differentiated in canntaireachd by either a specific consonant or a specific auxiliary vowel.

MacCrimmon shows a greater variety of vowels in the nasal syllables. The variation between *in* and *ien* seems to be meaningless, whereas the use of other auxiliary vowels signals, with few exceptions, some kind of contrast. Contrasts are not always expressed but, when they are, they are more consistently given than in the case of the ad hoc vowel differentiations that express the top hand notes (see section 7.1). This is because in the case of the nasal syllables there is never more than one pitch opposition involved at a time. Nevertheless, the various vowels are used for expressing more than one kind of opposition.

In Gesto's tune no. 10, 'Lassan Phadrig Chiegch' (*Lasan Phàdruig Chaogaich*, 'A Flame of Wrath for Squinting Patrick'), we find *hiento*, or *hiendo*, used in opposition to *hieinto*, or *hieindo*. The spelling *hieinto* or *hieindo* clearly points to introductory E being expressed by a syllable of its own and, consequently, *hien-* in the contrasted form must also be read as two syllables. Therefore, it is unlikely that the introductory E was expressed syllabically in *-chinto*, or in *hiendo* in the later variations. In the *ùrlar* and in the beginning of the first variation of the tune, *-ento*, or *-endo*, stands for low A followed by C sharp, whilst *-einto,* or *-eindo*, stands for low G followed by B. The contrast is expressed by the different colours of the auxiliary vowel of the nasal syllable, or rather, the diphthong is used in the second form as a means of expressing a difference – in this case, distinguishing low G from low A.

The difference between a simple vowel and a diphthong is also recognized (though realised differently in the later variations) in Gesto's tune no. 4, 'Mac Vic Horomoid *alias* McLeod Gesto's

Gathering' (*Mac Mhic Thormoid*), where we have the opposition *hia*(*n*)- : *haun*-. Again, the diphthong in *haun*- expresses low G, and it is possible to relate /hauɴ/ to /hɛɴ/ in line with Gaelic phonological developments. The diphthong that is heard in /eiɴ′/ occurs in Scottish Gaelic only before a palatal sonorant. Otherwise, /ɛɴ/ is diphthongised as /ɛuɴ/ in some dialects, and develops into /ʲau/ in a number of others (compare Gesto's spelling *kiaun* for *ceann* /kʲiauɴ, k′auɴ, k′ɛuɴ/). The expected form of the canntaireachd syllable would be *hiaun*-, but since, unlike Gaelic, *hio*- and *hia*- are interchangeable with *ho*- and *ha*- in canntaireachd, *haun*- may have developed as a free variant of *hiaun*-. From there it takes but a small step to arrive at *han*- as the monophthongised contrasting form. Again, the intrusive palatal element in *hian*- would be an option generally available in canntaireachd.

Vowel mutations, as they occur in the declensions of Gaelic nouns, originally had a phonetic base. But in the practice of language, etymology plays but a minor role, and in canntaireachd etymological awareness cannot replace expressive functionality. Moreover, the mutations gradually acquired new linguistic values signalling different grammatical functions. Because such functions do not exist outside language, mutations can serve only as a model for variability in canntaireachd, and no exact correspondences between the occurrence of mutations in language and in canntaireachd should be expected. Still, it is a curious fact that we do have some kind of match between a paradigm that has ceased to be part of the living language and the different ways in which the vowels of nasal syllables are varied in canntaireachd. On the basis of i- and u-umlaut, caused by vowels that were dropped at the end of words, Gaelic developed a paradigm /ɛ$^{+\text{NON-PAL}}$/ : /i$^{+\text{PAL}}$/ : /i$^{+\text{NON-PAL}}$/. However, the opposition /ɛ$^{+\text{NON-PAL}}$/ : /i$^{+\text{NON-PAL}}$/ was abandoned in later language, so that we now find nom. *fear*, 'a man', gen. sing. *fir* (< *firi), dat. sing. *fear* (instead of *fior < firu). On a lexicographical level, the nominative form either agrees with the expected form (e.g. *meadar*, milk bowl) or with the expected form of the dative (*miodar*, idem). It seems that regional predilections in this matter are more consistent than decisions made by lexicographers. Before an originally long sonorant, the paradigm would appear in modern language as /ɛu/ or /(ʲ)au : /i:$^{+\text{PAL}}$/ : /ʲu:$^{+\text{NON-PAL}}$/. Again, this paradigm has not been retained in full. On the lexical level we find either the variant *tionndadh* or *teanndadh* ('turning'); *sionnsar* or *seannsar* ('chanter'); and so on. The full paradigm occurs only in rare instances like nom. sing. *ceann*, 'head', nom. plural *cinn*, adv. *os cionn*, 'above'.

Being a remnant from an earlier stage of the language, it is the more curious to find the vowel alteration /i:/ : /ʲu:/ reflected in the canntaireachd of John Dubh MacCrimmon around the year 1800. As we have seen, the later variations of Gesto's 'Mac Vic Horomoid … Gathering' show the opposition *hia*(*n*)- : *haun*-, contrasting low A and low G. But in the first variation, the same contrast is expressed by the opposition *hi*(*e*)*nd*- : *hiund*-. Depalatalised *hund*- also occurs in the same variation. Depalatalised *u*-forms are further used in Gesto's tunes no. 6 ('The Union of Scotland with England') and no. 14, 'Caugh Vic [*Cumha Mhic*] Righ Aro, a Lament'.

In all these cases, the diphthongised syllables and *h*(*i*)*u*(*n*)- express low G in opposition to low A; the only exception is at the beginning of the *taorludh* variation of Gesto's tune no. 5, 'Mac Vic Horomoid … Lamentation', where *hiurerine* expresses low A. In the same tune, where *hiurerin* is used to express the double beat on low A– similar to *hiererin* – it takes the *u*-vocalism for no apparent reason. The opposition between *u*-vocalism and *i*-vocalism is not always consistent, and in some cases the inconsistency may be due to printing errors. In Gesto no. 14, 'Caugh Vic Righ Aro', we encounter a gradual decrease of low G being specified. With the exception of *hieinto*, all cases where low G is specified appear in the variations of tunes. In most tunes the opposition between low A and low G is not expressed at all.

Although Colin Campbell's manuscripts contain no traces of the *u*-vocalism itself, Campbell's use of *m* to express low G may be related to something similar. But the oppositions described above are not exclusively used for contrasting low G to low A. The *u*-vocalism is also used when a movement ends with a repetition of four figures based on low A. In the first variation of Gesto no. 1, 'Luinagieh *alias* Auiltich', both syllables are affected; but elsewhere the first syllable of a vocable is

affected only when the last syllable cannot be affected. Otherwise, the last syllable takes the special vocalism.

In the later variations of Gesto's 'Mac Vic Horomoid … Lamentation', low A is expressed as *hiu*(*n*)- when it occurs at the beginning of a line. By contrast, when it occurs at the end of a movement, we have *hindan* and *hinderin* (= *hindrin*) in the earlier variations (except in the very first instance, where we find *hundin*); and at the end of the two last variations, we have *hindun*.

Curiously, the evidence presented in *Table 5* indicates that the vocable for the double beat on low A (*hiererin*) is never affected at the end of movements:

– double beat on low A in the Ùrlar:					
4.	*h***ie***rurine*, *h***iu***rerin*				
final versus non-final					
1.	*h***iun***dun*, *hiend***un**	*hiendirind***un**	*h***iun***dirit*	*h***iun***datri*	
	hiendatrieri				
	*hind***in**, *hiend***in**		*h***ien***dirie t-*	*h***ien***datri*	
	hiendatrieri				
3.	*hanin***un**	*h***un***dirit*	*h***un***dat*(*i*)*ri*	*h***iun***dratatateriri*	
	*hanin***in**	*h***an***dirit*	*h***an***datri*	*h***ien***datatateriri*	
			*h***ien***datri*, *h***in***datiri*		
7.	no special vocalism				
11.		*hiendaderin***un**			
13.	no special vocalism				
– expressing low A in metrically important positions versus other positions:					
5.	*h***un***din*, *hind***un**		*h***iu***rerine*	*h***iun***datri*	
	*hind***an**				
– Apart from one occurrence in Gesto no. 14, Gesto no. 1 is the only tune that has *hi*(*e*)*nd***in** instead of *hi*(*e*)*nd***an**. Gesto no. 20 uses *hiend***un** throughout instead of *hiend***an**. *-nd***un** also seems to replace *nd***an** in the first variation and its doubling in Gesto no. 14.					
– low G versus low A					
4.	*h*(**i**)**un***dan*	*h***aun***inin*	*h***aun***inin*	*h***aun***datiri*	
	*h***iun***dratatirirri*				
	*h***in***dan*	*h***ia***rerin*	*h***ia***dirin h***ian***datiri*		
	*h***ian***dratatirirri*				
6.	*h***un***dan*	*h***ur**(*i*)*erin*	*h***un***dinin*	*h***un***datiri*	
	*h***ie***rerin*	*h***in***dirin*	*h***in***datiri*		
10.	*hi***ein***to*, *hi***ein***do*				
	*hi***en***to*, *hi***en***do*				
14.	*h***un***dun*, *hind***un**		*hindirit,*	*h***un***dirit*	
	hindatri				
	*h***in***dun*, *hind***in**		*h***in***dirit hindatri*		
1, 8, 12 and 20: no vowel contrast					

Table 5 Contrasted vocalism in nasal syllables

Our conclusion must be that expressive variability signals something definite, but that a variety of phonetic oppositions can be utilized, and that one can also choose not to differentiate at all.

9.0 Structural equivalence

In cases where a figure is played on notes that do not allow the normal motion of fingers for executing cuts and strikes, vocables may still be formed as if normal fingering were possible. We find this peculiarity in three different contexts.

The sound /h/ is customarily used before a vowel in cases where the note would be preceded by a cut – usually the high G cut. High A, as the highest note in the range of the chanter, cannot be preceded by a cut. We find, however, particularly in Gesto, that /h/ is often used before a vowel that expresses high A, even though a cut cannot be played before high A. Only Colin Campbell left out *h-* in this case.

The second case is the use of *-nd-* or *-nt-* in vocables that express figures that normally take a D-cut after low A or low G, but must omit the cut before D and higher notes. Evidently, rhythmic congruence was considered more important than the exact method of execution. Even Colin Campbell retained the dental stop in cases where no cut was played, even extending its use to cases in which the preceding note is B; for example, *hiodi* (instead of *hiovi*) following *himdi*. The constructions *-bird-i-* and *-bord-ee-* in MacKay's 'Specimens' may represent something similar.

The third case is the most peculiar. It does not occur in the Campbell manuscripts, because it would go against Campbell's evident aim to create, out of canntaireachd, a precise and prescriptive notation system. Here is how Gesto uses the vocable *-oradin* for two melodic figures (*Fig. 10*):

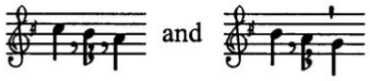

Fig. 10 Melodic figures expressed in Gesto by the vocable *-oradin-*

The construction *-rad-* normally expresses a note that takes a strike before and after it. Being the lowest note in the range of the chanter, low G cannot be preceded by a strike. The explanation appears to be that the vocable is used for both figures because they are structurally equivalent to each other, because they present the same motif beginning on different notes. Nevertheless, both *-oa*(*c*)*hin* and *-oradin* may be used in the same tune for denoting the figure when it descends to low G.

10.0 Conclusion

Canntaireachd's imitative nature makes it an inherently vivid and musically expressive form of vocalisation. But it is not in canntaireachd's nature to distinguish every aspect of instrumental performance in fixed and formal detail: one only distinguishes what one thinks important enough to be distinguished in terms of retention, transmission, and communication. In essence, the formal distinctions made in canntaireachd concern the following musical oppositions:

1. separating notes from each other with a single cut, single strike, or a cluster of pseudo-notes, or not using pseudo-notes at all
2. repeated strike versus single strike, including repeated notes separated from each other by strikes or cuts (the use of repeated *l* and *r* needs to be analysed further)
3. regions within the gamut of the Highland bagpipe, making it possible to express consonant or dissonant sonorities within a given tune.

The aim of canntaireachd is not achieved with the help of purely abstract symbols; rather, like any expressive vocabelisation, it is a method of *exchanging information about music through music*. The finer elements of melody such as the exact position of the notes in a scale are normally not part of the phonetic level of expression; instead, distinctions are involved that are subtler than distinctions between pitches. But one may differentiate the use of vowels or nasals and other consonants for the sake of expressive variability in order to indicate other subtleties, or an exact note. In this way, a failure to recognise that variability's function is of an expressive nature risks missing out musical nuances that the singer may be attempting to convey in their vocabelisation of an idealised performance on the pipes.

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