

Piob Mhor Revealed : The Story and Music of the Great Highland Bagpipe

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The sound is unmistakable: like the starting whirr of a factory machine, the nasal hum wavers at first and then drops down to settle on its pitch. After a few seconds, high above the incessant droning, the distinctive melody begins. The tune and its accompanying hum carry on like this for some time, and when they finish, a ringing void lingers in the air. Together they are peculiar, vaguely unsettling, yet sonorous and substantial. They are part of a singular and well-planned marriage: they are the inseparable drone and chanter of the Great Highland Bagpipe.

Their tune is “Lament for the Children,” a *pìobaireachd* in the classical repertoire of the pipe. The *pìobaireachd* is nearly sixteen minutes long, starting out with a basic melodic *ground* and decorated gradually with variations. It croons, almost, dwelling on certain notes and then flipping impetuously to others, all the while singing of chilling loneliness, the death of one man’s seven sons in a single year. For solo pipers the *pìobaireachd* is the richest of all bagpipe music, and the most difficult to learn. Out of three hundred laments, gathering tunes, salutes, and battle pieces, the experienced piper is master of only sixty. The songs are rule-bound in construction, largely unchanging from piper to piper, and often based on abstract tonal relationships. They are difficult to perfect and are reputed to be abstruse and demanding. But the truth, say pipers throughout the ages, is that the *pìobaireachd* is what the pipes were made for. Altogether emotional, joyously expansive, and contemplative, to play a *pìobaireachd* tune is to experience a sort of magic.

Yet outside of piping circles, the Gaelic *pìobaireachd* is a foreign term. Non-pipers stereotype the bagpipe as a marching instrument showcased at parades, played by mustachioed, kilt-donning men and complemented invariably by drums. Non-pipers unfamiliar with the bagpipe may have never heard the glorious *pìobaireachd*, only the dancing music of the pipes, the *ceòl beag*. The untapped wealth of the *pìobaireachd* must mean that the bagpipes have dozens more secrets in store, waiting to leave the close-knit groups of bagpipers, itching to fly out of tutor books, pining to see the world. It would be a shame to ignore them.

The pipes did not originate in Scotland, though their sound is so firmly associated with that country that many people assume the instrument was invented there (Cannon 1). Explorations have unearthed illustrations of bagpipes from Algeria, Greece, Russia, and

India, and it is suggested that three centuries ago bagpipes could be found in virtually every European country. In 1926, earthen-grave excavations by Sir Leonard Wooley uncovered a pair of silver pipes in what 3000 B.C. would have been the Sumerian city of Ur. Wooley guessed that the silver pipes were a technologically advanced model of an earlier cane pipe, and that the bands near the ends of the pipes were stylizations of the knot at the end of the reed of its prototype (Collinson 10). It is impossible to pinpoint the age of these particular pipes. But the Ur discovery clears away part of the misty shroud over bagpipe infancy, for it gives strong credence to the antiquity of the reed pipe.

Without doubt, the reed-sounded pipe was a worldwide phenomenon from which, thousands of years after Sir Leonard Wooley's groundbreaking excavation, the modern bagpipes evolved. Even so, there is considerable contention over the true origins of the bagpipe, and literature on the subject is surprisingly contradictory. The musicologist Grattan Flood may have given up on the whole debate when in 1911 he wrote "The Story of the Bagpipe"; pipe experts cite the book as verging on fantasy. Far preceding Flood's questionable speculation, though, the bagpipe appeared in ancient writings and illustrations. In presumable reference to the Roman Emperor Nero, the scholar Suetonius wrote that

He can write, carve statues, play the *aulos* with both his mouth, and also with the armpit, a bag being thrown under it, in order that he might escape the disfigurement of Athene. Was he not a wise man?

(Baines 63)

The *aulos* are the reed-sounded, mouth-blown, double-pipes of ancient Greece often mistranslated in English as "flutes" or "double-flutes" (Collinson 22). However, the *aulos* are closer to an oboe or clarinet than they are to a flute, for flutes are not reed-sounded. The "disfigurement of Athene" to which Suetonius refers is the physical manifestation of the pre-bag method of circular breathing. In order to make a continuous sound, the ancient pipe-player blew into the reed pipe of his *aulos*, breathing through the nose when he ran out of breath while contracting his cheeks so that the air supply was not stopped. This required the cheeks to be puffed out and distended, often resulting in overstressed facial muscles and "disfigured," sagging skin. Today, in cultures where the bag is not a component of the reed instrument (Basque, Sicily, India) the piper is still required to breathe circularly: the Indian snake charmer in fact can fairly be described as

a human bagpipe (Cannon 4). The instrument Nero played in A.D. 115 is ostensibly similar to the basic bagpipes of today.

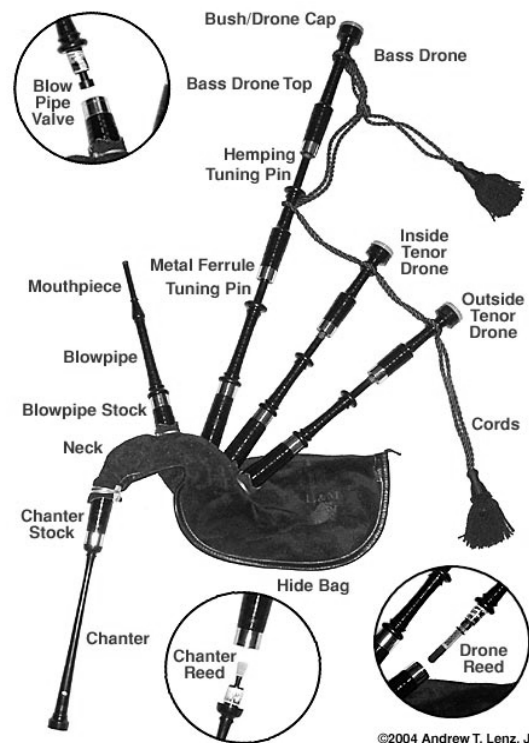
Like the primitive reed-pipes, the bagpipes are a woodwind instrument: sound is generated by sending air through reeds at the top ends of pipes. Yet unlike a clarinet player, the bagpipe player does not blow on the reed with his mouth. Such a task would be impossible, for the bagpipe player would need four mouths to blow on the reeds of four separate pipes at the same time. Rather, the piper sends air through one vessel, a wooden blowpipe connected to the sheepskin bag. The bag is in turn attached to three

drone reeds and pipes and one chanter reed and pipe by means of stocks pressed into the bag. The piper sends air through the blowpipe into the bag by a simple non-return valve of leather, and the reeds of all four pipes sound simultaneously.

In this way, he essentially keeps an entire wind section going single-handedly: the equivalent of three bassoons (drones) and an oboe (the chanter) (Donaldson 9). The Great Highland Bagpipe (GHB) is often called the “loud pipes” because of the high volume and pressure of air sent from the blowpipe to the bag. In certain European bagpipes (Lowland pipes) a

blowpipe is not used at all, but bellows controlled by the elbow drive air into the bag. Air flow in these bellows-filled bagpipes tends to be less forceful, and a lack of high harmonics provides a gentle tone quality. The late Angus MacPherson played the bellows pipe at weddings not so much for its sweet sound but for his belief that dry air (as opposed to moist, human breath) would keep the pipes in tune throughout the night (Cannon 21).

To use the bag, the piper blows it up with a few breaths through the blowpipe. Giving it a firm, quick push, he “strikes in,” or begins to sound the instrument.



Throughout playing, the piper presses upon the bag with his arm and slowly exhausts it of its air, all the while refilling the bag through the blowpipe. When a new breath is needed, the arm takes over for the mouth and uses its “reservoir” of air to sound the reeds while the piper’s lips have left the blowpipe. In this way, the bag is constantly being used and replenished in an ongoing cycle. The precise air flow control required for a steady cycle is difficult for a beginning piper to achieve, not for lack of lung capacity but for want of absolute coordination and rhythm.

Yet imagine the disbelief of the aspiring piper when he learns that he may study the bagpipes for up to two years without actually seeing the bag, much less blowing air into it. Before playing on the pipes, beginners learn finger placement on the chanter, or melody pipe. On the small-voiced practice chanter the beginner first learns the scale of the bagpipe:



The nine-note scale of the Scottish Highland bagpipe is the blueprint on which all of its tunes are based. Most bagpipe music is written in *bagpipe notation*, without sharps or flats, where *actual pitch*, as shown in the scale above, draws in the sharp signs on the C and F notes.

On the piano, the nine notes of the bagpipe scale constitute an A major scale with a “flatted seventh” (the scale is in a *Mixolydian* mode where two out of the three sharped notes for A-major are sharp but the third, G, remains natural). Even so, the precise frequencies of the notes on the chanter do not match those of a piano, for the piano is tuned in equal temperament to facilitate the changing of keys without great tuning problems. Pipe music does not require this ability to change keys, because the nine available notes are fixed, and the chanter melody is played against the unchanging drone tones (Macpherson). Also, the bagpipe does not use the standardized A₄ at 440 Hz of most orchestral instruments. Rather, its key note A is around 470 Hz, close to concert B-flat at 466 Hz. This discrepancy creates no little confusion for musicians concerned with naming keys and scales. Oliver Seeler calls the relationship between the bagpipe A₄ and

the concert B-flat “purely coincidental.” He assures that since bagpipes are primarily solo instruments, the consequences of being out-of-tune with mainstream orchestral instruments are minimal. Needless to say, the idiosyncrasies of the bagpipe scale might render it best left in a classification of its own.

a' b' c' d' e' f' g' a''

BAGPIPES

<i>sums</i>	<i>0</i>	<i>197</i>	<i>341</i>	<i>495</i>	<i>703</i>	<i>853</i>	<i>1009</i>	<i>1200</i>
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<i>intervals</i>	<i>197</i>	<i>144</i>	<i>154</i>	<i>208</i>	<i>150</i>	<i>156</i>	<i>191</i>
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PIANO

<i>sums</i>	<i>0</i>	<i>200</i>	<i>300</i>	<i>500</i>	<i>700</i>	<i>800</i>	<i>1000</i>	<i>1200</i>
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<i>intervals</i>	<i>200</i>	<i>100</i>	<i>200</i>	<i>200</i>	<i>100</i>	<i>200</i>	<i>200</i>
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(average sums and intervals of GHB and piano scales in cents, Podnos 39)

The Great Highland bagpipe with its unusual tuning scheme thus consigns itself to a sort of self-imprisonment. The unique scale of the bagpipe makes most standard tunes impossible to play, and bagpipes are seldom heard in conjunction with any other instrument, although there have been comparisons made between the pipe and the fiddle. The piper Oliver Seeler says with disdain of the accordion and Continental European pipe duo that “the equally-tempered whining of these [accordion] machines invariably destroys the inherent subtle harmonic sweetness of the pipes, no matter how skilled the driver is.” It is really no great wonder that as today’s trends tend toward an (arguably unnatural and conformist) preference for equal temperament, traditional bagpipe music has become esoteric. It is in essence a catch-22: to manipulate common tunes to play on the pipes would be, according to piping purists, to compromise the real music of the pipes and let the history slip away. But to play the unknown *pìobaireachd* tunes would be to dispirit the stubborn public ear and render the pipes obsolete in the non-piping world.

It is possible to construct pentatonic scales from the bagpipe’s nine notes. The pentatonic scale, taking five notes to move from the bottom of an octave to the top, can be adequately represented by playing just the black keys within a piano octave. There are a few non-bagpipe tunes based on the pentatonic scale that can be played on the pipes without causing any ill feelings to the listener (Podnos 41). Songs that are truly pentatonic (“The Farmer in the Dell,” “Mary Had a Little Lamb”) would sound perfectly

agreeable on a Scottish Highland pipe but are probably not appropriate for the piping style.



Depending on the starting note, selections of notes in the bagpipe scale correspond to parts of several pentatonic scales. To correspond to the notes of the bagpipe, the pentatonic D scale shown above would begin at the fourth note of the scale (A₄) and end one octave later, at A₅, on the ninth note. Bagpipe players often capitalize on the pentatonic tendencies of the bagpipe scale at public performances, and it is for this reason that “Auld Lang Syne” and “Amazing Grace,” both based on but not adhering exactly to pentatonic scales, are heard so often on the pipes.

Piping purists argue that the only music deserving of the bagpipe’s attention is the traditional “big music”; *ceòl mór*, or *pìobaireachd*. Players of the Highland pipe regard the *pìobaireachd* with both wistfulness and reverence; for thousands of years it was the only music bagpipers played. Evidence of the bagpipe in the Gaelic Scottish Highlands does not surface until 1549 after the instrument had been popularized in England and central Europe and had even begun to die out in certain areas. Traditionally, the piper fulfilled one of two roles: that of the village piper who played at fairs and weddings, or that of a shepherd or swineherd who played in the fields to call his animals in. In Gaelic Scotland and Ireland, though, the bagpipe was used as the incitement to battle and for lamenting the dead—no doubt this is where the slow, nostalgic *pìobaireachd* was born. In time the Scottish piper came to be highly esteemed and earned “gentlemen’s” status. As the famous 1714 portrait of the piper to the Laird of Grant shows, he could be proud and sometimes imposing.

(Photo courtesy of Clan Grant Society :
<<http://www.clangrant-us.org/art-poems-songs.htm>>)



Yet aristocratic piping in Scotland entered into a steep decline around the middle of the eighteenth century when the Jacobite Rising of 1745 abolished the legal power of chiefs and prohibited the possession of bagpipes. According to a heavily debated myth, one piper was hanged on the grounds that his pipe was an “instrument of war” (Collinson 170). By the 1770s there was concern that bagpipe playing was in danger of extinction, and as a response, a group of gentlemen founded the Highland Society of London. In an attempt to preserve the piping custom, the society sponsored the first *piobaireachd* competition at Falkirk in 1781. The competition continued annually until 1826 when it lapsed and gave way to the lighter, dancing music (*ceòl beag*) of the pipes. The height of *piobaireachd* performance and composition (1800-1840) is long past; barely any *piobaireachd* has been written since the tradition was at its peak.

The decline of *piobaireachd* was dismaying for piping masters of the nineteenth century and is still lamented today. In the preface to a 1990 *piobaireachd* tutor from the College of Piping in Glasgow, Seamus MacNeill asserts that “[*piobaireachd*] is the true music of the pipes...this is what the instrument was made for” (2).

MacNeill compares the relationship of *ceòl mór*, “big music” and *ceòl beag*, “little music,” to that of Beethoven’s 5th Symphony and “She’ll be Comin’ Round the Mountain.” Indeed, the two types of bagpipe music are distinctive. But in a larger sense, the music of the bagpipe is defined by its unique polyphonism, and by the indissoluble bond of the chanter and the drones. The chanter and drones are mutually dependent; the piper’s job is to facilitate their relationship. It is a case of the sum being greater than the parts—a drone heard alone is hardly impressive, and most chanters played alone don’t sound like much either (Seeler). Put them together, though, and revel in brazen musical interplay.

The Great Highland Bagpipes typically feature 3 drones playing in unison with the key note A₄ of the chanter. Two tenor drones play at A₃, an octave below the key note, and one bass drone rumbles at A₂. Octave-apart drones are characteristic of the Scottish pipes, but other drone intervals persist in non-Highland pipes. The bellows-blown Lowland pipes feature two drones with a size ratio of 3:2, a musical interval of a fifth. Some sixteenth-century illustrations indicate bagpipes with two drones approaching equal length. These depictions stump Anthony Baines, as he says of them,

“Whether they are casually drawn drones in fifths, or in fourths, or whether one is a dummy, one can hardly say” (120).

To tune the drones to one another the bagpipe player first tries to minimize beats. Beat frequencies in bagpipes result when two notes having two close frequencies (typically within 10 Hz of each other) sound simultaneously, producing a pulse at the difference frequency between the two notes. The piper sounds his drones, listens for these pulses, and then adjusts the sliding jointed sections of his drone bores. By changing the length of the air column inside, the piper alters the pitch of the drone. In lengthening the drone, waves propagating through the bore are lengthened, and pitch drops. Likewise, shortening the drone shortens wavelengths and raises the pitch. As the jointed sections are adjusted and the drones get closer in tune, beats become slower until they are imperceptible. The piper can also choose to adjust the drone frequency by moving the *bridle*, a tight-fitting cord on the reed that determines the length of the vibrating tongue (Harris, Eisenstadt, & Weiss 3). To hear a particular pair of drones or to focus on chanter tuning without the sound of all three drones sounding at once, the piper can silence a drone by quickly clapping a hand over a drone outlet. The drone can be restarted by popping a finger out of the outlet, which creates a momentary negative pressure in the drone bore (Seeler).

The tenor drone is tuned to twice the frequency of the bass drone, so beats are second-order beats of a mistuned octave rather than first-order beats of near-identical frequencies.

Bass-bass drone beat frequency:

$$f_b = f_2 - f_1$$

Bass-tenor drone beat frequency:

$$f_2 = f_1(n/m) + \delta$$

where (n/m) is the intended frequency ratio
(2/1 for bass-tenor octave)

$$f_b = m \delta$$

Drone tuning is a complicated business, for subtle movements of hand and small discriminations of ear have to take place while physically winding the instrument (Donaldson 4). Moreover, since the piper’s air flow drives four separate reeds, the same air pressure must produce the desired pitch of the chanter and of each drone. If pressure fluctuates, the effect on one reed is not the same as on another, and the bagpipe falls out of tune with itself—that is, one or more of its individual pipes is no longer in tune with one or more of the rest. To practice air pressure control, some eager players learn the

pipes on a *goose*, a simplified version of the bagpipes including the chanter, blowpipe, and bag. The advantage of learning the pipes on a goose, of course, is that the bag forces the student to get accustomed to sending constant air through the chanter reed, thereby producing ongoing sound as in the real pipes. Unfortunately he does not get the practice of maintaining the proper pressure to send to *four* reeds. For this he waits to graduate to a full-size set of bagpipes.

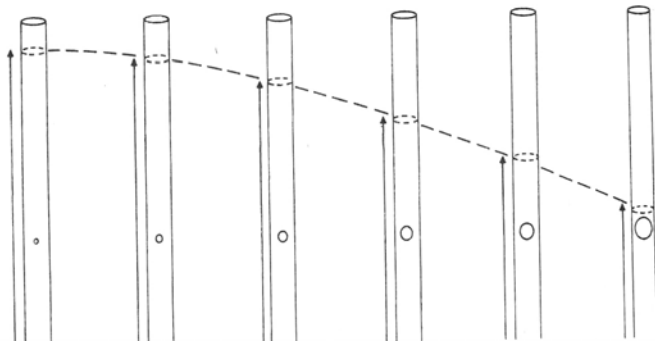
Oboe and clarinet players touch the reed with the mouth and send direct pulses of air through the reed and into the instrument bore. In this way, pitch adjustments ranging from a microtone to a minor third can be made with the lips. But in the bagpipe the reeds are tucked away out of reach of the piper, and the potential for lip-to-reed pitch adjustment does not exist (Seeler). The smug bagpiper might brag that he has no need of tuning devices, for the *fixed* intonation of the bagpipes renders them unnecessary. The practical bagpiper knows better than to put on airs about pipe tuning, for it is an arduous and unpredictable dealing.

Tuning the drones is only half of the battle, for bagpipe chanters are ultra-sensitive devices that require meticulous tuning. The length and shape of the chanter's bore, the size, shape and position of the chanter's fingerholes, the chanter material (most pipers prefer African Blackwood), the thickness of the bore walls, and not least the design of the reed all determine what notes a chanter produces at a particular operating pressure (Seeler).

To change the overall pitch of the chanter, the piper removes the entire pipe from its stock, pushes the hidden reed further into the chanter bore, and replaces the pipe. If the chanter is severely flat, he can cut a bit of the reed off. Yet tuning is not as simple as this: the piper must realize that pushing the reed in sharpens the notes fingered at the top of the chanter much more dramatically than those at the bottom. Wavelengths in the bore only extend from the reed to the first open fingerhole (wavelengths have negative pressure amplitude when they meet atmospheric pressure at the air-exposed holes, and the higher on the bagpipe the first open fingerhole, the shorter the effective length of the pipe), so the proportion of shortened wavelength to entire wavelength is much greater in higher-fingered notes. This makes tuning with the chanter reed especially complicated, for the same adjustment alters each note by a different frequency.

The true trick to cultivate great bagpipe sound is to get the drone and chanter well in-tune with one another. Because the chanter plays a full two octaves above the bass drone and its conical bore gives it a loud, bright timbre opposed to the mellower tone of the cylindrically-bored drones, the drone and chanter sound quite distinct. It is obvious when they are not in tune, not just to the trained musician but to the average listener who has a hunch that something is “off” in the music.

To tune the chanter to the drones, the piper plays each of the nine scale notes individually and ensures that each pitch sounds decent against the drones. If not, adjustments are made to change the relative pitch between notes. Anthony Baines suggests that pipers traditionally put bits of wax inside the finger holes to make subtle frequency changes (117). If the piper found he needed to lower the pitch of a particular note, he would fill in part of the upper edge of the fingerhole to effectively move that hole down the length of the chanter. When the next further-up hole was closed, the wavelength was lengthened and the pressure inside the bore was extended for an extra length past the open, shrunken hole. A little ways past the open hole, atmospheric pressure from the open hole caused a pressure node, forcing the wavelength to end. The resulting note was flatter than with normal-sized fingerhole. Today, the same technique is used for fine tuning adjustments. Rather than using wax, pipers cover the fingerhole with thin black plastic tape (Seeler).



Alas, nothing is easy in bagpiping, and much of the tuning of the instrument is left to the whims of weather and pipe temperament. Reeds tend to absorb moisture quickly, and after several minutes of playing, the pitch flattens. In

Effective length of bore changes as hole shrinks (Rossing 250)

recent years, pipemakers have developed synthetic (carbon fiber) drone reeds and blowpipe stocks with water traps to counteract this problem and extend playing time before reeds become wet. Needless to say, countless combinations of circumstances dictate the relative pitches of the chanter to the bore, the chanter key note to its eight other notes, and the pitches of the bores to one another. Though bagpipes are a fixed-

pitch instrument, the individual pitches of the chanter and drones in relation to each other are anything but constant, and an ill-tuned set of pipes can set the politest neighbors howling. Oliver Seeler holds that “bagpipes heard out-of-tune is the major reason why many people dislike the instrument.” Perhaps this is what Chaucer meant in The Canterbury Tales when he mentioned

A baggepipe wel koude he blowe and sowne,
And therwithal he broughte us out of towne.

Thankfully, tuning debacles are old hat in the piping world, and in competitions the piper is allowed ample time to get his bagpipe in good playing condition. Some twenty minutes of playing may pass before a stable sound plateau is reached. Therefore the first thing the listener will hear of the piper is a sequence of decorative tuning flourishes and spectacular arpeggios; these are highly elaborate, and it has been said of some pipers that “once you hear them tuning up you have heard the performance” (Donaldson 5).

Regardless, one thing is true: while a badly tuned set of pipes makes for painful listening, a well-tuned one is a delight to hear. The bagpipe stereotype is based on the idea that all bagpipes sound like a few mistuned ones; this is of course untrue, and would do well to be debunked.

“It’s only got nine notes. How hard could it possibly be?” asks the curious onlooker. At this, the bagpiper just shakes his head knowingly and laughs, for learning to play the nine chanter notes is only the first step down the long and perilously winding path of bagpipe finger technique. Since the reeds of the bagpipe are in constant vibration and the tongue has no control over articulation, pipers use an intricate system of grace notes and embellishments to repeat pitches and emphasize phrases. Roderick Cannon aptly calls grace notes “extremely short notes interposed between two notes of the melody, so short that they have a negligible effect on the timing” (31). To the non-trained ear, the grace notes sound like clicks or crackling sounds. Cannon wonders whether “cutting” is not a more suitable name for the technique: in classical music a “grace note” is an ornamental flourish added to the music; in bagpipe playing the tiny notes are not “ornamental” at all but entirely essential.



It seems hard to believe that the fingers could maneuver each infinitesimal note and finish the embellishment in time for the next note of the *ground*. Pipers need great coordination, concentration, and years of practice to perfect their fingering, which William Donaldson calls the “glory and challenge of piping” (9). Throughout at least three centuries as *pìobaireachd* was developed, no system was known in the Highlands for writing music down; staff notation did not exist (MacNeill 5). Instead, bagpipe instructors used a form of chanting, *canntaireachd*, to teach tunes. The *taorluath canntaireachd* on A, *hin darid*, is indicated in italics above. Vowel sounds give the notes themselves while the consonants indicate grace notes, throws, and embellishments.

Canntaireachd is still widely used, though many pipers no longer adhere to a “true” *canntaireachd* system. It is in a way like its own language—otherworldly, obscure, yet familiar and vital for those who know the pipes. To let it slip through the fingers of the Great Highland tradition would be to lose a part of history.

Anthony Baines says in his definitive Bagpipes that “the days of the bagpipe as a purely musical instrument are numbered” (131). He believes that the art of *pìobaireachd* has been lost to the pipe band spectacle, that the old bagpipe has found its resting place among the hallowed crests of the great pipers, the MacCrimmons and McLennans. In a way he is right: publicity for bagpipe competitions and events is not good, and audiences are small but dedicated. William Donaldson laments in his introduction to Pipers that “public understanding exists at so low a level that players clamber into [their elaborate gear] with a kind of weary fatalism ready to trot out the half-dozen commonplace airs they think the audience might, possibly, know” (1). It seems there is an inherent need to dig the bagpipe out of the annals of time, to revive *pìobaireachd* and let it be known that pipe music is more than “Amazing Grace”; more even than “the deafening skirl of twenty Highland pipers above the hurricane of their drums” (Baines 131). Until we can do this,

it is those who truly appreciate the music, the rich history, and the supreme *challenge* of working the bagpipe for whom the pipes will always play.

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