Great Bass

Undertones of Continuous Influence

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OVERVIEW

This essay proposes a link between Ezra Pound's lifelong interest in recovering voices of the past and his 1927 recondite theory of 'great bass'. By the end of the 1930s Pound referred to great bass as a seventh sense of artistic genius that governed rhythm – a marker of singular poetic and compositional voices that enabled and also identified lines of artistic continuity across centuries and cultures, as in Pound's favored medieval/vorticist axis of influence. From 1920 to 1933 he worked on an unfinished trilogy of operas on the theme of love. Only one, *Le Testament*, was performed in his lifetime. He did not set his own poetry to music, but rather, composed to revivify and recirculate the voices of earlier lyric poets, selected for their perceptions on love and for the way they shaped time with language. At the conclusion of this experiment, Pound 'recovered' the voices of François Villon (1431–?), Guido Cavalcanti (*c*. 1250–1300), Sordello of Mantua (1180–1255, chosen to contrast with Cavalcanti), Gaius Valerius Catullus (?84–54 BC), and Sappho (*c*. 7th century BC). The operas' themes are the same that inform *The Cantos* – the mystique of the individual, the city, passion, lineage, questions of truth content in history and myth, gods and goddesses, and the economy of words – their origins, function, rhythms, juxtapositions, and exchange from one language to another.

Representing a new approach to *dramatis personae*, every poem set to music played silent host to Pound's literary criticism. In 1919 Pound imagined the first Villon songs ready-made from the poetry itself, strung together with very few dialogic words. As scribe to Villon's 'music', Pound's presence in the actual sound (as distinct from his contribution to the writing of the music) was to be limited to criticism, beginning with the selection and ordering of the poems. The operas that ensued, with their overarching hyper-musical and hyper-poetical devices, also managed to convey an interior fixation on rhythm and frequency. That interiority, written as micro-rhythms, specific ratios, and overtones, gradually came to promote an occultism in several guises that stops just short of metempsychosis when the goddess Fortuna (a soprano) sings through the voice of a prison guard (a bass) in the second opera *Cavalcanti*. Of greater significance was Pound's desire to have the soul of the poet/protagonist inhabit the performance space, rather than a specific individual. The performer's mandate from the composer – to accurately transmit (rather than interpret) the original vitality of the chosen poet through specific frequencies – was contingent on an acute sense of rhythm, and on the exactness of the composer's music notation.

All three operas build to a sense of time that defies familiar divisions of past, present, and future, offering the listener instead an experience of Pound's alternatives: recurrent events ('the repeat in history') and eternal time.[1] Each of his sonic portrayals of voices of the dead, of gods, and of characters from centuries other than that of the poet-protagonist, depends for its full effect on an idealized audience member: willing comparatist of rhythm (*the* gauge of lyric excellence) and witness to Pound's dissolution of historical time. The intense application of one's critical faculties was to lead to

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new insights powerful enough to override the distancing effect of 'historical time' and 'unleash' time (Zumthor 1990: 121). Pound unleashes *and* reigns in such a moment: the truth of historical fact in his operas no longer depends on the past-tenseness of events but on the anticipated reception and memory of events. The audience, with limited experience of the earlier historic periods, was to bring their contemporary concerns to the task of processing the fictions, facts, revisions, commentaries, and dramatic gestures that Pound embedded as musical elements within the songs. In this respect, his operas treat 'history' as an interactive occasion.

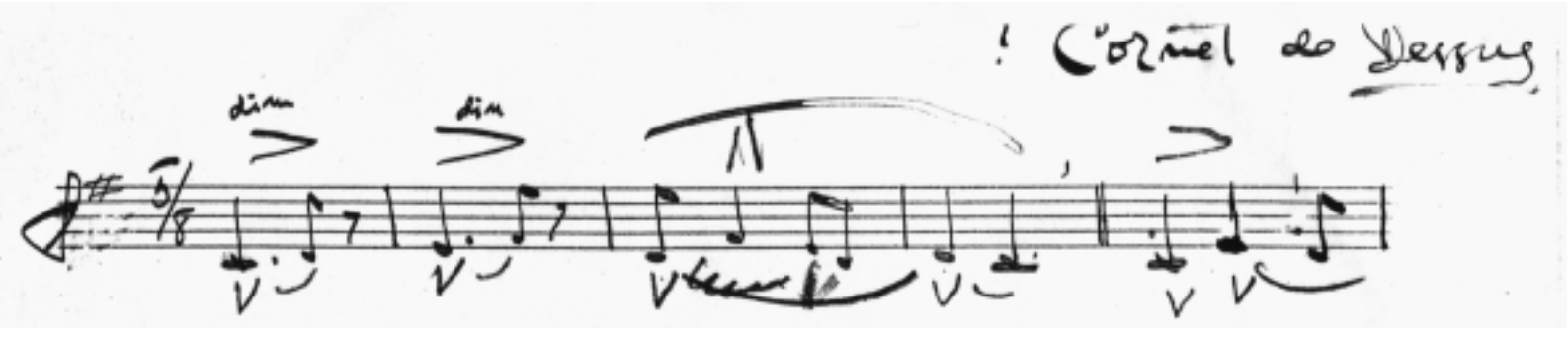
While a claim for an interactive history balances precariously between a philosophy of history and a study of the occult, my concerns are those of a director and designer: how to visually and acoustically stage historical subjects that refuse historical time; how to proportion a role for the complications of Pound's model of history to engage the audience as he envisioned them engaged; and, finally, how to unite these operas around their themes of sacred, unrequited, and profane love when all three lack the requisite love scene, and the love poetry itself takes center stage. This paper offers an explanation of why these approaches are necessary.

'A DAMN DEFINITE SYSTEM'
The Composer as Auto-didact and Literary Critic

As poet, translator, canon-builder, and teacher, Pound taught himself to compose to master the ancient art of joining words to music. His music activities functioned initially as a laboratory for rhythmic analysis and comparative study. Two complete operas (*Le Testament*; *Cavalcanti*) and one half-finished (*Collis O Heliconii*) share surrealism's reach backward into the recesses of culture and mind; they evidence futurist and dadaist tendencies to transgress disciplines, but refuse their lenient, aleatoric, or grab-bag methods. Pound described his advantage over the Paris avant-gardists as 'really having a damn definite system' and set himself in opposition to the iconoclast Eric Satie and his followers.[2] Pound's discontent ran much deeper, provoking him to reformulate a new theory of harmony, a field in which he was almost wholly untrained.[3] The result for *Testament* was a music rooted in the styles of earlier periods with a modern penchant for juxtaposition that, with its dissonant liturgical chant, cabaret-inflected emotionalism, and polyrhythmic revelry, was closer in spirit (though not in sound) to the American hybridism of Charles Ives, as Michael Ingham has pointed out, than to any of the European art movements of Pound's time (Ingham 1999: 240).

According to Robert Hughes, editor and conductor of Pound's operas, the many musical drafts of the operas' numbers document a nascent musical skill in 1920 that evolved to the degree that Pound's 1932 preliminary sketches for *Collis* approach an experienced 'composer's' interest in the materials and a modicum of sophistication in the use of melodic and rhythmic cells, shifts of

•Pound's music for the *cornet de dessus*, 1926. © 1983 Mary de Rachewiltz and Omar S. Pound



tonal centers, and the treatment of musical structures as thematic content. His intellectual reach, not surprisingly, surpassed his technique, and the operas will remain curiosities of their time if examined solely for their musical achievements.

The language of music could transcend time barriers and national borders to demonstrate not only poetic excellence, but poetic influence. The setting of words to music permitted rhythmic systematization across diverse languages, important to a poet who worked within a comparative rather than a single language tradition. The operas' vocal numbers include 15 songs in Old French by Villon, one in Langue d'Oc by Li Viniers, 11 in Italian by Cavalcanti, and two in the Provençal of Sordello. *Collis* contains the Latin wedding poem 61 by Catullus and the Greek *Poikilothron* by Sappho. Theoretically, vocal music would allow Pound to map this literary canon as an evolving organism, still generative of lines of continuity. The three main lyric traditions treated in Pound's operas are reconstituted from erudite print traditions in the 20th century, sorely lacking an oral tradition in the public memory (save for Debussy's settings of three Villon songs – these sound more like Debussy than Villon; a decade later Carl Orff redefined the lyricism of Catullus as a rhythmic tradition). If convincing, Pound's dual-edged control over an ambitious performance and a forsaken tradition held the promise of redefining that tradition, and, in the long term, enabling him to establish himself heir to that tradition.

Armed mainly with literary theories, Pound focused on the potential of modern science to reveal new principles in music through mathematical measurement, while at the same time grounding his ideas in medieval doctrine that understood music as a natural science of proportion:

> Music is . . . pure rhythm; rhythm and nothing else, for the variation of pitch is the variation in rhythms of the individual notes [i.e. the frequency of vibrations], and harmony the blending of these varied rhythms. When we know more of overtones we will see that the tempo of every masterpiece is absolute, and is exactly set by some further law of rhythmic accord.
>
> (CAV 18–19)

In *Antheil and the Treatise on Harmony* (1924), Pound drew a parallel between the medieval philosopher contemplating form and the new breed of artist-philosopher, the vorticist: 'The other aesthetic [that which is not Wagnerian] has been approved by Brancusi, Lewis, the vorticist manifestos; it aims at focusing the mind on a given definition of form, or rhythm, so intensely that it becomes not only more aware of that given form, but more sensitive to all other forms, rhythms, defined planes, or masses' (ATH 44). If Pound's music furthers a vorticist art – a perspective first explored by Stephen Adams – it does so by intervention of the individual psyche rather than by intervention of an individual style.[4]

The *Treatise* was a radical approach to harmonic technique that eschewed the Western tradition of vertical or triadic harmony and relied solely on time constraints:

> A SOUND OF ANY PITCH, OR ANY COMBINATION OF SUCH SOUNDS, MAY BE FOLLOWED BY A SOUND OF ANY OTHER PITCH, OR ANY COMBINATION OF SUCH SOUNDS, providing the time interval between them is properly gauged; and this is true for ANY SERIES OF SOUNDS, CHORDS OR ARPEGGIOS.
>
> (ATH 10)

The time interval – a matter of local rhythms and overall tempo – determines the auditor's perception of relativity and continuing influence between and among tones: one basis of form. Schoenberg's 12-tone system, with its rigid rules of intervallic patterning for atonal construction, had not aspired to the structural freedom Pound sought for his harmonic system. Antheil's system of time–space organization, as a replacement for pitch, was inherently biased for complex, asymmetric and fast tempi, a kind of short-lived modernism, like futurism, which thrived on innovation and surprise. Pound, by allowing for any sequence of pitches, created an open system that could and did accommodate older musical techniques as well as newer methods.

Testing the viability of such a system, the two completed operas approach harmony and the question of time interval differently: *Testament* through local rhythms (note duration and meter) and *Cavalcanti* through tempo. *Testament* sought to reproduce a wide-ranging, wild experience of the body through speech rhythms, employing a sequence of continually-shifting fractional metrics unprecedented in their unpredictability. *Cavalcanti* sought to sustain a psychological and physical intensity with a melodic lyricism developed through the repetition of simpler meters.

The operas' markedly different musical styles are further explained by Pound's approach to song-setting. His goals were to conserve the proportions of the vowels and the verse lines, and to draw the tonal leadings directly from the words.[5] Poets representing a different epoch, country, and language for each of the lyric traditions heard in the operas can be expected to sound differently. Pound's further accomplishment was to set the words of poets of the same tradition with enough musical acumen to technically demonstrate their precise textual and extra-textual differences. These macro and micro comparisons are at the heart of his composing project to redefine poetic lineage in the lyric tradition.

All three operas explicitly treat the subject of artistic continuity. *Testament* revisits the bequest of François Villon to will his poetry to a circle of admirers and detractors. *Cavalcanti* recounts the poet's lack of control over the circulation and future of his poetry (Pound removes Cavalcanti from the shadow of Dante to align him with the troubadour tradition of Sordello.) The unfinished *Collis* measures the debt of Catullus to Sappho. The point is made in each case through comparisons within the poet's *oeuvre*, and to contrasting work by other poets.

Vocal music would train the ear to hear the cadence of words in a foreign language, lessening reliance on translation. Pound established two

vectors – interval (pitch or tonal leadings) and duration (rhythm) – to replace the single-vector prosodic systems of quantification, meter, or stress accent. It was to be the most effective means by which to demonstrate how a poem's movement (and emotion) could be increasingly refined and particularized (rather than generalized) by the varying durations of its vowels (and certain consonants) and their sequence: 'We will never recover the art of writing to be sung until we begin to pay some attention to the sequence, or scale, of vowels in the line' (ABC 206).

Catullus, Cavalcanti, and Villon receive mention repeatedly, and in consort, throughout Pound's prose to demonstrate the influence of Latin and the derivative Romance languages on English-language poetry. Pound frequently followed with a second point: music could preserve and communicate the vitality of these poets in a way that translation could not: 'The grand bogies for young men who want really to learn strophe writing are Catullus and Villon. I personally have been reduced to setting them to music as I cannot translate them' (104). In the context presented above, Pound's 'reduced' state refers to the silencing of his own poetic voice in the service of his recovered poets.

ABSOLUTE RHYTHM AND GREAT BASS

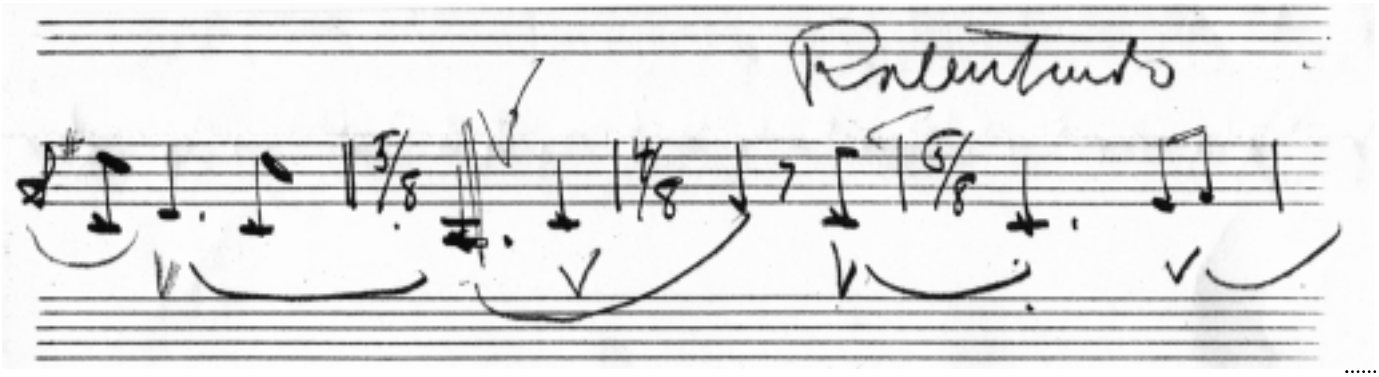
Working first with the concept of 'absolute rhythm', and later with the idea of 'great bass', Pound came to understand tonality and pitch as conditioned by rhythm, meter and tempo.[6] He used the term 'absolute rhythm' to describe a rarefied sense of proportion found in select works of a canon of poets who shaped time from the inner necessity of the words, thereby signaling a transition – a new energy or pulse – in the expression of their native language (LE 23). *Le Testament*'s difficult metrics were an exercise in 'absolute rhythm' – an attempt to traduce one set of marks – the applied precision of language – to another, music. Pound dissociated but did not discard the aura of mysticism attached to the Hegelian 'absolute', conceptualizing truth not as a spiritual Whole but in terms of relations between things. He set forth his credo in 1910: 'I believe in an ultimate and absolute rhythm as I believe in an absolute symbol or metaphor. The perception of the intellect is given in the word, that of the emotions in the cadence' (CAV 18). Pound's cadence was 'the aural equivalent of Eliot's "objective correlative", [which] required that there be a rhythm that was exactly appropriate to the emotion at each point in a poem' (Kirby-Smith 1996: 7). Pound's theory of rhythm, as it developed into great bass, pitted precision against aesthetic suggestiveness. It strove for what Demetres Tryphonopoulos, in a study of Pound's occultism, has called a more ' "real" or esoteric' symbolism (Tryphonopoulos 1992: 73), in which the specific correlation could not be generalized; the rhythmic function could 'not obtrude' (LE 9).

In his seminal essay 'The Developing Theories of Absolute Rhythm and Great Bass', R. Murray Schafer asks us to consider Pound's theories in

relation to the parts and the whole of a work of art: '*Absolute rhythm* governed the proportions of the elements of masterpieces; *Great Bass* links the elements into an indivisible whole' (EPM 479). Robert Hughes understands great bass as a division and analysis of a work's components to arrive at a basis for proportion in the work, expressed as a lowest common denominator – a dynamic pivot which influences everything else, and on which everything balances. As the lowest common denominator, the great bass of a work of music is its primary trend, vibration or pulse, which leads to 'compounds of pitches and overtones [to] be fitted into it' (MAOW 80). Hughes imagines this pictorially as an inverted cone, the bass being the point at the bottom; all multiplications of the bass, such as overtones, could then be graphed on the three-dimensional space of the cone in relation to the bass.

The paradigm I propose for understanding great bass is that of 'just intonation', a system of tuning that respects the natural divisions of sound waves into tones and their overtones, deducible by physical laws. Great bass proposed that all acoustic elements already exist in the fullness of their relation to each other, and in their proportional relationship to a fundamental rhythmic basis. The theory acknowledged not only emanation of sound from vibration, or multiplication of that fundamental vibration, but also continuity of influence. The 'base' given by Pound is that of frequency, the fundamental unit of both tempo and pitch: 'Let us say that music is a composition of frequencies' (ATH 24). Implicit in this theory of emanations is a dismissal of the need to locate unity a second time in the resulting diversity of elements or commit them to a culminating sense of completion. The theory could potentially account for, even demand, a technique of fragments, interruptions, and juxtapositions as one way of satisfying its preconditions, and as such fits well with Pound's ideogramic method overall. Emphasis is on the process of being or coming into being as form from division: 'Rhythm is nothing but the division of frequency plus an emphasis or phrasing of that division' (27).

Pound intimated that the new theory was to have ramifications for art beyond music, and on a new scale: 'The artist is very gravely concerned with the bases of his art, and with the relations of that art to everything else. . . . Hence the permanent resemblances of masterwork, the "revolutionary" nature of genius, the returns to the primitives, and so forth' (55–6). His article 'Workshop Orchestration' for *New Masses* (1927) advocated coordinating factory machine work to shape sonic environments. The main objective was to experiment with rhythms of very long time durations and the resulting buildup of overtones produced by the factory's concrete and metallic surfaces (21). Distancing himself from the futurists, Pound explained: 'It is not for me a question of taking an impression of machine noise and reproducing it in the concert hall or of making any more noise, but composing, governing the noise that we've got'

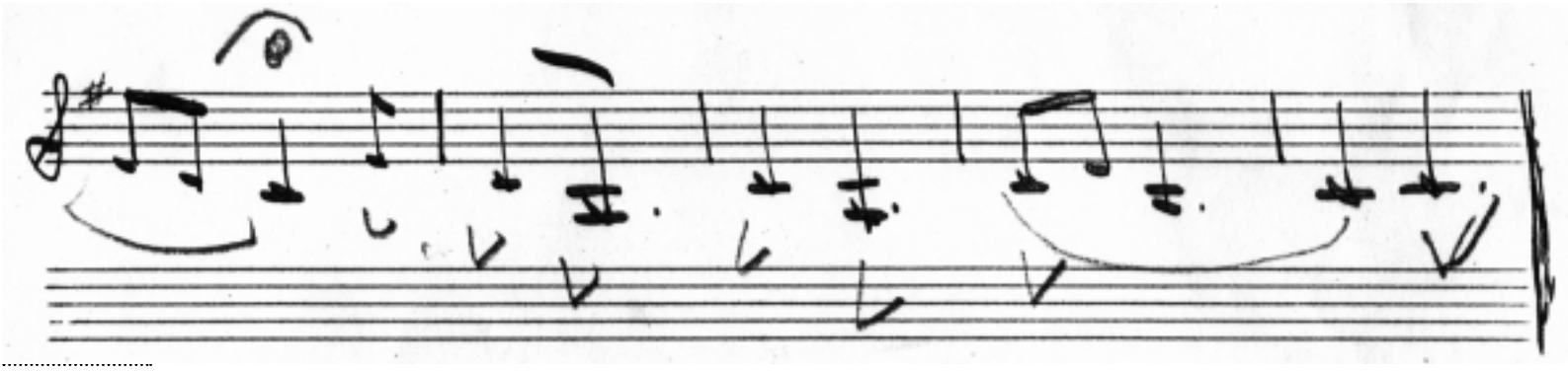


(MAOW 76). He claimed the necessary math was 'easy enough to find out how many times an asphalt drill hits the pavement per minute, and to work out its octaves and fifths, etc.' ('Workshop Orchestration' 21). A footnote clarified that these were 'octaves *lower*, for what we will come to call the "great base" ' (21). The proposal noted that the organization of sound would be beneficial to the workers' nerves and promote productivity.[7]

From the beginning Pound linked great bass to the sentient body while simultaneously claiming an authority in mathematics and acoustics. Referring to the ability to measure frequency as a human sense, the *Treatise* compared musicians with perfect pitch, or a 'sense of absolute frequency' to those with perfect rhythm, or sense of 'proportional frequency' (ATH 31). To musicians lacking this sense of perfect rhythm, Pound added an injunction to develop an 'inner metronome' through rote learning (133). 'Workshop Orchestration' and the more extensive essay 'Machine Art' (1927–30) attempt to scientifically objectify this rhythm sense. In the latter essay Pound wrote: 'I use the term "*great bass*" to designate the frequencies below those which the ear has been accustomed to consider as "notes" ' (MAOW 74). Withholding the math to substantiate his claims (or unwilling to submit it to scrutiny), time and again Pound returned discussion of great bass to the sentient body: 'This art is not yet past the midwife. A definite result demands, like any other definite result in the arts, the genius. . . . I am talking of the awakening of interest. This usually starts from an unusual perception or stimulus' (75).

Guide to Kulchur (1938) continued to promote great bass as an objective basis for art by declaring in 'Great Bass: Part One' that the mathematical proof of 'the ratio between these [lower] frequencies and those written to be executed by instruments' was 'OBVIOUS' (73), and in 'Great Bass: Part Two', that the tempo, or beats per minute, is the great bass: 'The 60, 72, or 84, or 120 per minute is a BASS, or basis. It is the bottom note of the harmony' (233). While there are problems with Pound's claim that an 'obvious' mathematics could produce a ratio between the bottom note of the harmony, the undertone, and the notes actually executed by voices and instruments, his naiveté makes transparent the thought driving these exertions over ratios. There is also the physical difficulty of hearing undertones and the questionable function for such a ratio. What does it do, and how can the composer make use of it? Pound's process of composing and adjunct theorization attempted to relate perception to physics, but examination of great bass in the music will show that, by the time he finished the second opera, he was using mathematics to relate perception to metaphysics.

Only the chapter 'Canti' gives a specific example of great bass function, and this as personal testimony rather than mathematics. Relating an anecdote about Gerhart Münch's father (a musician), Pound described great bass as a human



•Toyoji Tomita, performer and instrument builder, with the *cornet de dessus* he constructed for the 1983 reconstruction of the 1926 Salle Pleyel concert of Pound's *Le Testament*. Photo: Hank Bergeron, from the collection of Robert Hughes

measure of 'absolute frequency', and wrote he was 'pleased at . . . confirmation of my own theory. . . . The really fine musician has this sense of time-division and/or duration' (197).

The extension of this thought argues against variation of the 'sense of time-division' in a piece of music when performed by different, competent performers. Nor should the work significantly change from one execution to the next if the performer embodies a sense of great bass. This perspective contradicts the natural inclination of performers to interpret music differently, and on different occasions – differences which the public expects and appreciates. And it recommends qualification of the Imagist tenet learned by all students of Pound: 'Compose in the sequence of the musical phrase, not in the sequence of the metronome' (LE 3). In 1932 Pound exhorted the imagined performers of *Cavalcanti* to avail themselves of mechanical support: 'If there is any doubt about "interpretation" of the time anywhere, GET a metronome' ('Notes on Act III', *Cavalcanti* score).[8] Reconsideration of metronomic time followed the discussion of Münch's father in *Guide*: 'Rubato, is compensated. [Pound's punctuation here demonstrates the point.] In the direction for "rubato" the composer could indicate the limits wherein he intends the compensation to occur. Strictly speaking this is supposed to be inside the bar' (GK 198). Pound's observation – local time intervals should adhere to the governing time intervals of tempo – echoes Boris de Schloezer's axiomatic, Stravinsky-inspired respect for the measured bar: 'There is no rhythmic diversity without stability' (de Schloezer 1929: 108). But one page later in *Guide*, Pound again restored, as he had done in 'Machine Art', the supremacy of the individual's inner sensibility over mathematical limits: 'The simplicity of the arts is mysterious and inviolable' (GK 199). Schafer has concisely noted much of the above; my review tracks the occult trend of great bass.

Pound did not return to the subject of great bass during or after the war – a silence that begs the question of the larger role great bass was to play regarding the inner sense of temporal proportion that seemed destined, at the least, to confirm his ideas on continuity of influence, if not unlock the mystery of the 'simplicity of the arts'. Nor did he pursue great bass outside the paradigm of music despite its promise to rationalize the necessity of a literary art of fragments. He referred to the theory in an undated note (possibly 1968) filed with his late papers; this is a cursory account of his failed attempt 'to pick particular heretics to combine into a continuity' as a corrective to 'cheap blasphemy' (YCAL 53). Blasphemy to Pound was 'monism, monotheism, monomania' (Pound's footnote to de Schloezer 1929: 107n). The note describes a search for 'historic cases representing a theory then finding they do not'. Wanting to salvage various figures, Guido Cavalcanti among them, for their different points of view, he reconsidered them an exemplar of a 'mechanism instead of principle'. The value of this note for our purposes is its confirmation that Pound did build toward a theory about recurrence in history and sought a governing principle to account for select heretics.[9] His choice of poet-protagonists for the operas presents one theater of select heretics. The mechanism alluded to would be great bass, operating within a certain kind of heretic-genius. To Pound, genius required a

refinement of the physical senses operating in consort with an active will, a vigorous body and lively spirit, and honesty; it manifested as 'an inevitable swiftness and rightness in a given field' (GK 105–6).[10] Music was the seminal ground on which great bass was tested as one measure for genius. In the absence of mathematical proof, it was destined to become the 'absolute symbol' for a continuity of genius, represented by the voices of Villon, Cavalcanti, and Catullus.

Meanwhile, the war interceded, expanding into a different kind of theater in which to test the notion of absolute. The combination of Pound's imprisonment and the post-war climate rendered the subjects of heretics, race consciousness, genetic disposition, and genius difficult at best. The ensuing silence also enveloped the *Cavalcanti* and *Collis* operas.

EXAMPLES IN THE MUSIC

Schafer identified two strategies in *Testament* to indicate the 'practical application' of ideas leading to great bass, but discouraged pursuit of Pound's assertions about harmonics, ratios, and the metronome (EPM 295, 475–6). The strategies include the 'incorporation of percussion directly into the fabric of the arias' and 'megaphonic pedal tones on double bass [notes sustained below the changing harmonies] and trombone [fundamental notes of the harmonic series]' (295). Schafer suggests that Pound used these 'palpable' lower frequencies to help define the underlying form of the music (295). Analysis of the trombone parts shows the second trombone playing the pedal tone or fundamental note ($B\flat_2$) for two bars in the entire opera. Because the pitches we hear from brass instruments are overtones above an unheard fundamental, Schafer's remarks suggest that the inclusion of two trombones in the opera's orchestration gestured toward the implied fundamental tones, which lie below the range of hearing.

If this was Pound's thinking, then he became more specific about the role of the brass by the summer of 1926 when he added an overture for 'cornet de dessus'. This was to be a long tube devoid of finger holes or valves and capable of playing five overtones in the range A to f# (a span of six notes of which middle c was the third note). Pound's inclusion of the instrument at this date in *Testament*'s performance history was an explicit, if hypothetical, experiment in great bass. Virgil Thomson described the actual instrument used in the concert as 'a *corne*, or animal's horn, five feet long, that could blow two notes only, a bass and the fifth above it . . . with a raucous majesty evocative of faraway times' (Thomson 1966: 83). In 1983, Toyoji Tomita built and performed a brass instrument to Pound's specifications. Nearly 15 feet long, its fundamental tone was D_2 (five ledger lines below the bass clef).

The use of pedal tones in the double basses is restricted to 'Dame du ciel', the mother's prayer in *Testament*. The orchestration produces the greatest dissonance in the whole opera, a sustained 'wide even strip [of sound] like back of a frieze',[11] into which Villon's mother hammers the shapes of her words into an extraordinary 'futurist' plainchant. Pairing alto voice to cello in an organum of fourths and fifths, and double basses to piano and bass bells [sic][12] sounding unison two octaves below (in sustained, controlled chaos), Pound demonstrated a systematic approach to harmonic structure and the overtone series. The potential for dissonance is always present in an acoustic ambiance dense in overtones. Its source in 'Dame' is the combination of different timbres of vibrating wood and metal (bells, pedaled piano, and basses). Pound builds his medieval/vorticist aesthetic out of unrelenting disturbance generated by this potential for dissonance and notated pitch intervals. A span of two octaves separates the fundamental tones of all the bass instruments – plus their first, second, and third overtones – from the fundamental tones of the cello and voice. This facilitates (at least theoretically) hearing the buildup of overtones unobscured by fundamental tones in the same frequency range. Additionally, the 'three or four' basses (Pound's phrase), instead of sustaining their pedal tones, play vibrato and tremolo (i.e. rapid reiteration resulting in non-synchronization of sound

• *Dame du ciel*, bars 6–7

waves of the same frequency). This kind of playing produces a scratchy, almost percussive sound because of the way the bow must be held to the strings to make them vibrate. It is an example of how a percussive rhythm 'can enter the harmony exactly as another note would' (ATH 27). The scratchy sound itself is pitched and derives from overtones. The vibrato and tremolo introduce another source of potential dissonance arising from pulsing or phase disturbance. Pound insisted the intersection or combination of sound waves was determined by time interval, 'where one wave-node meets another, or where it banks against the course of another wave to strengthen or weaken its action' (17). Finally, the basses follow a changing horizontal line limited to a gamut of the diminished fifth, or tritone (the tritone is discussed in more detail below), as well as occasionally playing the tritone in the vertical intervals.

The sustaining power of 'Dame's' dissonance has yet another source: the relationship between the bass partials and the cello's fundamental tones. These shift unpredictably between consonance and dissonance, most often as a tritone, minor third, second, or unison, giving the listener no opportunity to adjust to the sensation of dissonance and thereby diminish its power to disturb.

The metrical sequencing in 'Dame' approaches harmony through rhythmic control – a radical idea and carefully plotted experiment that found later expression in the taut theories of the *Treatise on Harmony*. Pound's contemporary, the American pianist and composer Henry Cowell, also theorized the relationship of rhythm to tone through overtone ratios in his book *New Musical Resources*. Cowell's proposal 'to apply the principle of the series of partials to musical metre' (Cowell 1996: 67) conveniently justifies an investigation of the theoretical correspondence between 'Dame du ciel's' unique metrical construction and its 'tonal combinations'.

Pound treated each verse line of 'Dame' as one measure, on an as yet undetermined time basis, to be parceled among the syllables, occasional rests and slurred notes. He probably spoke or sang to Antheil, who calculated the duration of each syllable, the smallest unit being the 30-second note. The sum of the durations was tallied to arrive at the total note value superimposed over its common unit of division. For example, bars 6 through 10 in the vocal line bear the unusual time signatures 11/8, 27/16, 31/16, 33/16, 21/8.[13] The meters in the vocal line have a correspondence to harmonic ratios, the 11/8, 27/16, and 31/16, for example, represent the 11th, 27th, and 31st harmonics. It does not appear that Pound or Antheil attempted to

systematize the horizontal progression of harmonics beyond the act, described by Schafer, of graphing 'the breath-pattern of the master artificer [Villon], . . . an ideal . . . above analysis' (EPM 473).

There exists, however, a controlled experiment in vertical systematization of the harmonics between the voice and accompaniment. For the same bars 6 through 10 the instruments play time signatures of 5/4, 6/4 (3/2), 4/4 (1/1), 8/4 (2/1), 8/4. The meters of the instrumental lines correspond, respectively, to the harmonic ratios of the major third, the fifth, the unison, and the octave (or fourth partial), followed by its repetition. Independently, Cowell proposed that the function of such a correspondence is 'to combine meters by mathematical ratios into metrical harmonies, just as tones are combined into tonal harmonies' (Cowell 1996: 67). He prescribed a method for applying these metrical rhythms to harmony: 'The simplest way of using metrical rhythms on the analogy of musical tones is to keep shifting the metrical units in successive measures. If the changes be made, as is often done in the work of Stravinsky, in all the parts at the same time, the result is analogous to a simple melody in tone' (69). Advising against 'metrical monotony' (69), Cowell recommended building counterpoint from parallel 'non-haphazard' meters (71). Cowell's description is so apt that we can rationalize the construction of an instrumental counterpoint to the vocal line in 'Dame' with his words: 'In order to emphasize to the ear the relationship between parts, it is well for the accents of both parts to coincide with reasonable frequency' (72). This is exactly what we find in the mother's prayer, where the bass accompaniment coincides with the voice at syllabic stresses selected by Pound for each measure.

Given the tremolo marking, it is difficult to know how much should be made of the harmonic component of the metrical counterpoint in 'Dame'. The highly unusual scoring is interesting for its documented theoretical concerns and performance limits. 'Dame' certainly had its origins in Pound's literary theory: 'In 1910 I was working with monolinear verbal rhythm but one had already an adumbration that the bits of rhythm used in verse were capable of being used in musical structure, even with other dimensions' (ATH 13–14). In turn, the experiment of 'Dame' helped define Pound's second premise in the treatise on harmony: 'The limits for the practical purposes of music depend solely on our capacity to produce a sound that will last long enough, i.e. remain audible long enough, for the succeeding sound or sounds to catch up, traverse, intersect it' (10). But a theory of harmony derived from the systematization of 'Dame', if pushed further in the direction of Cowell's proposals to convert time signatures to corresponding ratios of partials, would state no more than that time is the crucial consideration of pitch. Pound warned as much: 'Fortunately this theory of harmony can never be reduced to an academicism. At least it seems unlikely that any mathematician will bother. The mathematics of the case might prove discouraging' (15).

As related thus far, the practical realization of great bass did nothing that would specifically help to identify the poetic voices Pound recovered. And if Pound was not after a new application of mathematics to drive composition, what remained and why did he continue to compose? The example of 'Dame' prepares us to consider *Cavalcanti*'s contrasting simplicity of line and to anticipate the kinds of questions to ask regarding its very different approach to great bass.

The practicality of the idea of great bass is itself fraught with problems because of the theory's reliance on the principle of undertones in music, the generally unheard presence of the octave(s) below the fundamental tone. Undertones are produced by multiplication of a wavelength, starting with its exact doubling. The barrier to accepting undertones as a factor in composition is the questionable proposition that a string or the tubing of a brass instrument can of its own accord multiply in length. The answer lies in the production of sympathetic vibrations in proximal surfaces that exceed the string or tube lengths. True bass bells could send proximal surfaces into sympathetic vibration.

When a vibration descends below the limit of human pitch perception, about 16 vibrations per second, it is felt as toneless pulse or rhythm. Because not all undertones descend below this threshold, some can be heard as pitch (Cowell 1996: 22). Cowell was as enthusiastic as Pound about the inherent possibilities of a new theory of harmony based on undertones, but was careful to discuss the subject as a speculative endeavor:

> If undertones as well as overtones are *hypothetically* taken as a working basis, the richness of polyharmonic material that can be formed by the combination of relationships with *inexorable logic* is surprising, for the reason that every tone may be made the base of both major and minor triads. Thus, on the overtones of C we can base the major triad of C, and on the undertones we can base a minor chord, called by its lowest tone, F minor.
>
> (Cowell 1996: 27, emphasis added)

Following a different inexorable logic, Pound formulated a strategy for relating the undertone to the voices of act 3, *Cavalcanti*. It is necessary to begin analysis in act 2, however, to show how Pound, now a self-sufficient composer, adjusted his rhythms and pitched intervals to focus on the underlying influence of tempo. Villon's heretical approach to language had to be heard aloud for its range of vigorous surface qualities and unpredictable rhythms. Cavalcanti's love poetry needed to be heard in all its conflicted psychological and physical subjectivity – the melodramatic excesses of juvenilia, the technical vocabulary of a philosophical treatise on love ('Donna mi prega'), and the secure melodic expression of compromised maturity. The opera builds upon that subjectivity to anchor the philosophical turn of the late poems of act 3 within the sea of Cavalcanti's changed psyche. To convey the nervous edge of a philosopher-poet who draws on personal experience to warn of the unbearable suffering in store for those who try to reconcile the needs of the 'possible' intellect with those of the 'sensible' intellect, Pound invoked the tritone.

The Tritone

The theorists of the middle ages called the tritone the *diabolus in musica*, their proscription a mere formality given the tritone's long record of grave offense. The Akkadians (mid-second millennium BC) singled out the tritone (third tone) for the discomfort created in the ear and tuned their lyres accordingly (cuneiform tablets, U.7/80, British Museum).[14] Stimulating the world's tuning of music ever since, the tritone's unsettling relationship to the tonic and its resistance to conventional harmonic resolution retains a musical interest in its necessary resolution outside its own boundaries. Ancient adjustments in tuning to deal with the tritone yielded the most promising compositional strategies – the music modes. The literary point of interest is that recognition of the tritone as an irritant is as old as the record of human writing, and that the inclination toward a new aesthetic has its basis in the physical world. As such, it is an enduring symbol of one kind of influence and artistic impulse. In his 1914 essay 'Vorticism', Pound described a 'belief in a sort of permanent metaphor . . . "symbolism" in its profounder sense. It is not necessarily a belief in a permanent world, but it is a belief in that direction' (EPVA 205–6).

Antheil's neatly penned half-page lesson on the tritone, found among Pound's music papers in the Beinecke, demonstrates that Pound's use of tritones was not entirely naive. He had the example of Stravinsky who used the tritone to represent the dual nature of the puppet hero of *Petrushka*, and the supernatural 'other' in *Firebird*. He could refer to the opening lines of his own poem 'Hugh Selwyn Mauberley' (1920), in which the tritone defines the aesthete 'out of key with his time', disabled by his ultra refinement of perception: 'For three years, diabolus in the scale' (P 185).

At the central number of *Cavalcanti*, 'Donna mi prega' (act 2), Pound's tritone marks Guido's voice at each moment of his most 'dangerous thinking, [and] proof by experiment' (LE 158). From the first bars of the canzone, the tritone interjects into this treatise on love an edginess that mildly disturbs the flowing line of the melody; it prepares the listener to

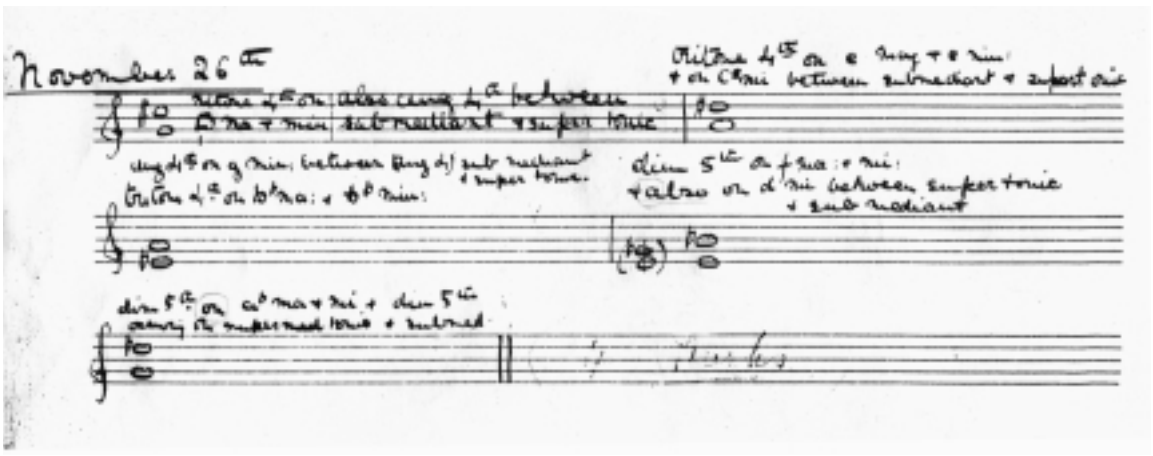
distinguish Guido's 'dangerous thinking' from the borrowed terminology, method, and logic of other philosophers referenced in the poem. Where contemporary scholarship about the poem identifies these philosophical voice(s) as entirely 'secondhand' (Cornish 2000: 171), Pound disagrees. The subject of Cavalcanti's heretical promulgation of averroist interpretations of Aristotle within the poem is beyond the scope of this paper, but suffice to say here that Pound isolates key moments in the poem that he recognizes as Cavalcanti's adjustment to an otherwise secondhand philosophy: 'Guido is eclectic, he swallows none of his authors whole' (LE 159). To dramatize the restive tritone, Pound has Guido physically strain against the pull of his coattails nailed to a bench, jokingly referred to by friends as his 'cantus firmus'.

Three examples from the music follow. The slow-paced canzone, marked '*Con baldanza*' (with boldness and daring), begins in the key of F, but with a tonal center on E. The sound of the tritone in the opening half-note between the voice and English horn sustains through 'Donna mi', the resolution 'prega' moving away from E to settle on F. The tritone reappears between the cello and voice, cello and flute, toward the end of this first stanza at bars 37–38, 'disturbing' the '*piacimento*' just sung in the previous bar. Guido here is singing of love in its verb form, '*amare*', which will be revealed throughout the course of the canzone as the second stage of love's hold on the lover, and the most destructive.

At the end of the second stanza Pound modulates to the key of C major, but not before using two tritones as passing tones (bars 78, 81) and one low-grade tritone (bar 83) to prepare the ear for the reinforced tritone (bar 86) between the cello and voice, voice and flute, at the launch of Stanza III. To lend importance to the tritone at the phrase '*Non è virtute*' ([Love] is not virtuous), Pound again dramatizes: Guido leaps the octave, F to f, as he cries, 'Non!'

Where, in act 2, Pound marked the emergence of Guido's philosophical voice with tritone intervals in the melody and its accompaniment, in act 3 Pound conceived of his tempi as having a pitch component that would exert subterranean influence on the vocal line. He runs into some trouble with 'obvious' numbers, but his intentions seem apparent enough. He assigned quarter note = 88 to Sordello's 'Ailas', and Cavalcanti's 'Quando di morte' and 'Perch'io non spero' (numbers 1, 2, 3 in the act). Though Sordello was inserted for surface contrast, the governing tempo permits Pound to create underlying 'permanent resemblances' between 'voices' of the lyric tradition. His tempo for the final number of the act, 'Io son la donna', is quarter note = 84. In need of some variety, Pound relies on a four-octave range sung by five singers with distinct vocal

•George Antheil's tritone lesson for Ezra Pound. © 2002 George Antheil estate, reprinted with permission



characteristics (in order of appearance): lyric tenor, baritone, boy soprano, bass-baritone, and soprano. The use of octaves to locate harmonic interest in the timbral qualities recalls the experiment of 'Dame'.

Derived from two primes, the eleven and the two (the octave, or 2: 1) in music, Pound's strict mark of 88 has symbolic significance for his musico-poetic explorations toward great bass in the 1930s. We can convert a tempo mark of 88 to a ratio that looks like a tritone, with the caveat that a tritone may encompass a range of numeric values (it's a name, not a fact, while each ratio represents a kind of fact). One way to determine a pitch analogue for this tempo is to divide 88 (beats per minute) by 60 (seconds per minute) to obtain frequency: 1.466 (vibrations per second or vps).[15] To hear this frequency as a tone within Cavalcanti's median baritone range, multiply it by 2^7: 187.648 (each doubling represents the tone an octave higher). Taking C_3 at 16 vps as a base (ATH 23–5), the implied pitch component of quarter note = 88 is F#, sometimes written *for convenience* as the eleventh overtone, 11/8. The 11/8 tritone is the relationship between the eleventh harmonic and the eighth harmonic (between an $F\#_1$ and C_1, in this case). Pound probably took a more direct approach: 11/8 (1.375 vps) multiplied by $2^6 = 88$. While his governing tritone may be accommodated to either the F# or the 11/8, the near-coincidence achieved by these different approaches is, in fact, arbitrary. Quarter note = 84, treated similarly, has a pitch component of F (179.2 vps). While third-act tempo markings appear on early drafts of each number, I have not found indications that Pound had a system for applying the metronome mark, its implied tritone ratio, or pitch of F# to the changing key centers that characterize his settings of Cavalcanti's three poems.[16] In the late 1950s, he used these tempi on the Caedmon recordings of selected *Cantos*, maintaining a remarkably steady tempo of 84, 88, or 92 throughout each reading.

Except for Sordello's 'Ailas', these tempi are too slow for effective musical expressivity of Pound's settings. The 'Perch'io non spero' for a boy soprano with limited breath capabilities, and the first refrain of 'Io son la donna' for the bass register especially beg for livelier tempi. Yet Pound added a note to the score urging performers to obtain a metronome if they had any doubt about the tempi. Did he believe that the tritone or 11/8 of the tempo could affect the local movement and harmony of the music in a way that could be heard or felt? He undoubtedly wanted to preserve these tempi at least until he could hear the works in performance. My analysis shows only that Pound's tempo choices implicate the tritone in a larger conception about poetic voices forming a continuity. I need to backtrack in time briefly to reinforce this conclusion.

In 'How to Read' (1929), Pound fine-tuned the categories of his preferred literary canon. He distinguished one of 'three kinds of poetry' as '*melopoeia*, wherein the words are charged, over and above their plain meaning, with some musical property, which directs the bearing or trend of that meaning' (LE 25). In 'Melopoeia' (1930), an essay on the value of Greek verse and its

• ***Donna mi prega*, bars 1–4**

• ***Donna mi prega*, bars 36–9**

• ***Donna mi prega*, bars 83–7**

• ***Collis O Heliconii***, opening theme

renaissance in the poetry of Provence, Pound noted critical differences: 'Roughly speaking the emphasis shifts from the sound to the meaning, and from the strophe to the individual line' (MAOW 95). He continued, 'When it comes to our knowledge of the union of *motz el son*, word and tune, we are not superlatively rich in models' (95–6). I've presented this quotation rather late to allow it to reflect on the above detailed analysis of Pound's shifting emphasis of musical technique – on poetic line in *Villon*, on line and meaning in *Cavalcanti*, and ultimately to an overall movement of sound, expressed as a consistent tempo, in *Cavalcanti*'s act 3.

We could predict that Pound's emphasis for his third opera would be on the sound. I have recovered enough sketches to proceed with a cursory analysis of his setting of Catullus's epithalamium *Collis O Heliconii*. Scored in the key of B (but avoiding the G# in descending lines until the naming of the bridegroom Manlio), the opera opens with celebratory incantations to Mount Helicon and Hymen, the god of marriage. As might be expected, the tritone plays a vital role in this ascending motif, built on the combination of major second and major third intervals: E, F#, A#.

A recurring descending melodicle outlines the tritone with two contiguous minor thirds: E, C#, A#. The tempo mark of 88 works well here, slow enough to allow the ear to discover Greek hexameter endings interpolated into the accentually derived contour of Catullus' lines. With tempo constant, we could say that Pound's music models his words of 1930: 'In the case of Greek hexameter rhythm the quantity is supposedly the constant and the position of the accent, the variant' (MAOW 93). Catullus' accent-driven line both comments on and is influenced by the Greek verse tradition preceding him *and* great bass. For 50 lines of poetry Pound imbues the bass voice of Catullus, wedding host, with a sense of inner power derived from this scheme.

Sketches for the opera's setting of Sappho's *Poikilothron* show Pound restricting his intervals in the first four strophes to preclude the tritone within the pentatonic scale: A, C#, D, E, F. At the fifth strophe he adds G to his scale to form a tritone with C#. The notation ends abruptly in the middle of the sixth strophe, which appears to be a return to the pentatonic scale.

CONCLUSION

When, at the end of *Testament*, six young men strung from a gibbet pray for their redemption, they sing through voices that cannot possibly be theirs – the hangman's noose strangles their vocal cords and they have no breath. At the end of *Cavalcanti* when the seneschal sings that he is Fortuna at her wheel of destiny, he is not in possession of his own voice. Pound pushes the allegorical potential of oral performance into a metaphysical dimension: voice is not only free to move from one body to another, in doing so, it escapes mortality. Great bass is the constant – a mechanism that permits influence and interaction in all directions between living and dead, mortals and immortals. It is a mechanism that replaces death with action as the main fact of historical record, mediated by memory. Pound makes a specific correlation between the voice of genius and the tritone, unique among intervals because it has identical pitches, whether moving up or down the scale (e.g. F#, C, F#). Its voicing potential in either direction mirrors the interaction between poets in Pound's alternative to historical time.

Pound also had solid reasons to concentrate on a tempo mark of 88. Divisible by eight, the resulting

prime number eleven points to a poetic practice first identified in Alexandrian hendecasyllabic verse of classical antiquity, later taken up by Catullus, Cavalcanti, and Villon, on occasion (as in much of the 'Dame du ciel').[17] Divisible by eleven, the resulting number eight represents the eight steps of the octave in a diatonic scale. The octave, whether as eight divisions or as a 2: 1 ratio, is fundamental to Pound's predication of Great Bass on harmonic divisions. Multiplication of the numbers eight and eleven, like the tremolo basses of 'Dame' scratching relentlessly at their tritonic litmus strip, sets things vibrating. Schafer used the word 'megaphonic'. Pound's operas reconstitute the movement, energy, and personalities of those who unite music and words. Because influence is bi-directional, Pound inherits the tradition of *motz el son* and his poets inherit the vorticist dynamic. And what about love? These operas are about lyric love poetry and their record of the 'quality of the affection' (Canto 77, 466).

Each prime, the eleven and the two (or octave), implies a generative power, 'either at top or bottom of its generated sequence; it does not imply "root", and it does not necessarily imply a bass locus' (Partch 1949: 72). Pound strings together the tritone geniuses of his operatic trilogy like a string of prime numbers, 'the repeat in history', their powers of irritation restored. Veering toward numerology to reinforce the 'inexorable logic' of his system, he tried to model how one prime joins with another in a continuum. That project now rests with the operas' future directors and designers.

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NOTES

1 Letter, Ezra Pound to Homer Pound, 11 April 1927 (L 210).

2 Unpublished letter, Ezra Pound to Agnes Bedford, n.d., but probably spring 1921 (YCAL 43, Beinecke).

3 Pound taught himself western score notation and orchestration, as well as medieval square notation and neumes.

4 Adams explains that Pound, by rejecting the 'structural function of tonality' in music, concentrated the attention on melody and rhythm – horizontality in music. Adams then goes on to tie that horizontality to vorticism: 'Melody requires synthesis in time by the form-perceiving intellect postulated by vorticism' (Adams 1980: 56–7). Pound looked to the overtone series as a kind of naturally occurring verticality in music that held the potential to supplant traditional harmony.

5 Pound describes his method of song-setting in three drafts of an unpublished essay 'Song' (YCAL 43).

6 Regarding the conditioning of pitch by rhythm, see his review 'Some Recent Concerts' in *The New Age* (3 January 1918: 189–90), reprinted in EPM 66.

7 The term 'great base' first appeared in this article, written to promote the music of George Antheil.

8 Stephen Adams suggests Pound's thinking about the metronome changed as early as 1920 when he had his speech measured by a phonetician in France (EPM 475 n. 21).

9 Pound's note also mentions the Neoplatonists and the Byzantine Platonist, Gemistus Pletho.

10 'Rightness' is borrowed from 'Authority comes from right reason', words of the 9th-century theologian and heretic Scotus Erigena, whom Pound extolled as one part of an ideogram for great bass (GK 75). This ideogram includes the philosopher and mathematician Gottfried Wilhelm Leibniz, portrayed by Pound as a heretic. Leibniz developed symbolic logic and theorized continuity, contingency, and pre-established harmony in nature (Russell 1967: 581–96). The third figure in the ideogram is the artist Gaudier-Brzeska.

11 Letter, Ezra Pound to Archie Harding (27 October 1931), BBC producer of *Le Testament* (YCAL 53).

12 The bass bells, added when Pound worked with

Antheil, are otherwise unidentified. All other orchestration appeared in the first music drafts of 1920 before Pound met Antheil. The required pitch-to-weight ratio for bells to sound in the bass range would be impractical. Schafer used tam tam (gong) for his 1962 BBC production of *Testament* and Robert Hughes used a prepared piano for his 1971 staged production of *Testament*.

Daniel Albright, writing of the importance of 'Dame du ciel' to Pound's theories, devotes two discussions to it in his book *Untwisting the Serpent* (2000: 147, 160–1). My technical analysis of the song differs significantly from his, and enters into the very discussion Schafer discourages (EPM 479). Robert Hughes's identification and compilation of a significant portion of Pound's music output, unavailable until very recently, has changed the nature of research in this field. Taking for his subject the biography of Pound's music, Hughes confirms Pound to be the author of the concept and overall design, instrumentation, orchestration, pitches, rhythms, and barring of the music. George Antheil, editor of a revised *Testament* score in 1923, transcribed the rhythms Pound dictated, developed the complicated metrics to accommodate them, and synchronized the polyrhythms in the accompaniment of the numbers 'Dame' and 'Père Noé'.

13 Antheil calculates several bars with a time signature based on the 30-second note, though the 16th note is correct for the measure. This was corrected (1) by Pound who copied instrumental parts of this number for basses and violin for the 1931 BBC performance, and (2) independently by Hughes for his 1971 performance edition of the Pound / Antheil score.

14 I am grateful to Lou Harrison for this information.

15 Pound wrote of vibrations, though the term 'cycles' is preferred for its denotation of periodicity.

16 Pound's work with vibrations and mathematical ratios is documented in the essay 'Machine Art'. Its chart of proportions of the major scale adopts a base for C at 24 (as did Helmholtz, to demonstrate principles with whole numbers) (MAOW 81).

17 Dante praised the eleven-syllable line as the most illustrious poetic line 'because it occupies more time and because it can contain more meanings, constructions, and words' (*De vulgari eloquentia*, II.5.1).

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