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Timbral Use of the Handbell Ensemble: Background, Analysis, and Strategies

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Timbral Use of the Handbell Ensemble:

Background, Analysis, and Strategies

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by

Christian Nathaniel Guebert

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ABSTRACT OF THE DISSERTATION

Timbral Use of the Handbell Ensemble:

Background, Analysis, and Strategies

by

Christian Nathaniel Guebert

Doctor of Philosophy in Music

University of California, 2020

Professor Ian Krouse, Co-Chair

Professor David S. Lefkowitz, Co-Chair

With new technology, handbells can have a clear tone on which almost any melody can be played clearly. Despite a growing body of composers and repertoire for the handbell ensemble, the relative number of top-level contemporary compositions and truly professional ensembles is small. A recent necessary standardization of notation resulted in ubiquitous arrangements, misrepresenting the handbell ensemble's vast sonic possibilities and often diminishing its connection to its worldwide historical roots. However, the handbell is an instrument of "timbre;" it can produce many more sounds than are being used. This dissertation aims to convince musical communities that this composite instrument is capable of more than enough sonic expression to carry or support any contemporary composition. To do this, the study explores relevant history and early repertoire, presents new sounds in newer repertoire, and catalogues and analyzes the handbell's sounds (and the sounds of the related instrument, the handchime) into a Handbell and Handchime Timbre Dictionary. The study concludes by proposing eight strategies for the new handbell ensemble, including that composers should learn to use the handbell ensemble timbrally and combine it with other instrumentations. By doing so, the genre of the handbell ensemble can grow and mature into its promising potential.

The dissertation of Christian Nathaniel Guebert is approved.

Movses Pogossian

A. J. Racy

Ian Krouse, Committee Co-Chair

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University of California, Los Angeles

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There is no old instrument; only old thinking.

Lei Liang (b. 1972)[1]

COLESTAS TEMET SPHAERAS AUDIRE PUTARES
SI NOS AUDIRES PYTHAGORAEE SENEX
"If you heard us, old Pythagoras, you would think that you heard the heavenly spheres."

Inscription on the bells at Mapledurham, Oxfordshire (16th or 17th century)[2]

All music is what awakes from you when you are reminded by the instruments,
It is not the violins and the cornets, it is not the oboe nor the
beating drums, nor the score of the baritone singer singing his
sweet romanza, nor that of the men's chorus, nor that of the
women's chorus,
It is nearer and farther than they.

Walt Whitman (1819–1892)
A Song for Occupations, 4d[3]

Vita

Christian Guebert holds an MM degree in Music Composition from Cal State University, Fullerton (2013), and a Parish Music Certification (2015) and BA in Music Composition (2010) from Concordia University, Irvine, CA. He is an adjunct professor at Concordia University Irvine (2012–present), where he has served as Composer-in-Residence and jury adjudicator and participated in faculty projects to change textbook curricula for music theory and musicianship courses. He has taught university classes and lessons in theory, composition, ear training, singing, piano, counterpoint, orchestration, percussion, handbells, conducting, technology, and sacred music; he has built curricula for independent and small-classroom studies in musicianship, advanced music theory, orchestration, arranging, and percussion performance. He served on faculty for two National Seminars of the Handbell Musicians of America (2016, 2018), teaching four topics. His composer residencies include Choral Arts Initiative (2018–2019, ICON Choral Series) and Bethany Lutheran Church, Long Beach, CA (2017, 2019). Other commissioning organizations for original works include the John Alexander Singers, American Guild of Organists, New Dimension Fund for Concordia Orchestra Commissions, and the UCLA Chamber Singers. As a frequent artistic program director and conductor, he heads several yearly concert series including community handbell ensemble concerts and sacred music festivals and serves as Director of Music Ministries at Immanuel Lutheran Church, Orange, CA.

Guebert's writings include *Emerging, Not Constructed: A Time-Space Analysis of Pauline Oliveros' Double X as a Particle Field* (2017), and *Incorporating Professional Musicians into Your Church Ensembles* (Association of Lutheran Church Musicians, 2018).

Chapter 1. Introduction: Opportunities for a Young Genre with Old Roots

What is the meaning of the tolling of bells? Are bells suitable and flexible for music-making, or do they merely decorate music to evoke their historic functions? Since the Bronze Age, they have held functions of calling people together, summoning and dispersing spiritual presences, and demarcating ritual events. Pre-Han-dynasty China, medieval Russia, and the English Renaissance each saw swells in bell culture. The sound of these bells was not always conducive to music-making, however; their sound was mostly bright with high overtones and conflicting frequencies. New bell-casting technologies in the 20th century allowed for a clearer pitch, however, and for the first time, musical compositions with complex harmonies could be played on a set of bells. What was once a ritual artifact became a flexible musical instrument, but one that retained and evoked its cultural roots. The bell was thus revolutionized.

Newer still is the handbell ensemble, a performing instrumentation of about four to 16 players working as one, ringing one set of dozens of handbells. The ensemble acts upon the set of handbells and becomes a composite instrument unto itself. Though the handbell has existed as a cultural tool for over 2,000 years and was used to play organized tones in the late Middle Ages, it was not until 1962 that an American bellcrafting company achieved the acoustic clarity of the contemporary American handbell. A graded difficulty system in published American handbell music, for ensembles using bells resting upon and rung above padded tables, is just 16 years old,

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Opening Quote Sources:

[2] Lei Liang, masterclass Los Angeles 2017.

[3] H. B. Walters, *Church Bells in England* (London. New York, Toronto, and Melbourne: Henry Frowde, 1912), 332.

[4] Walt Whitman, *Leaves of Grass and Other Writings: Norton Critical Edition*, Michael Moon, ed. (New York: W. W. Norton & Company, 2001), 181.

and notation conventions are still being solidified by publishing organizations, who themselves refer to guidelines put forth by notation conferences held every few years.[5] [6] Notable early handbell ensemble performances have been documented, but they are few and far between and they occurred before standardization began. The handbell ensemble, as a musical genre, is in its infancy.

From the handbell ensemble's nascent development emerges new functional concerns. The recently standardized American handbell ensemble genre has a largely educational publishing base, and its music is in danger of being driven almost exclusively by amateur needs. Despite a growing body of composers and repertoire for the American handbell ensemble, the relative number of top-level contemporary compositions and truly professional ensembles is small. Furthermore, ubiquitous conservative arrangements may misrepresent the handbell ensemble's vast sonic possibilities and diminish its connection to its worldwide historical roots. These arrangements, while useful for teaching, encourage a reputation of the ensemble as an amateur "handbell choir." The field of established and potential techniques and timbres for the instrument, however, is large and promising.

Contents and Goal of This Dissertation and Its Monograph

This monograph demonstrates how contemporary composers using standardized handbell instruments overcome the above concerns by engaging with the global traditions of bells and their functions, including European tower change-ringing and carillon, ancient Chinese bells, and

[5] John Behnke et al., *Handbell and Handchime Notation, Difficulty Level System, and Solo and Ensemble Notation* (Cincinnati: The American Guild of English Handbell Ringers, Inc., 2017), 27–29.

[6] Robert Ivey, *Handbell Ringing* (Carol Stream: Hope Publishing Company, 1995), 10.

the practices of other ethnographic areas. I aim to provoke a reconsideration of this burgeoning instrument by exploiting its unlimited sound palette, and elevating it to the level of so many other privileged "canonical" instruments. The timbre (the quality of the musical surface) of a handbell is particularly variable and adjustable. I grew up immersed in the handbell ensemble genre, and when I entered academia I saw that the handbell ensemble was a resource largely untapped by many composers of concert music and other media. This study includes analyses of techniques used by several leading contemporary composers of concert music for professional handbell ensemble. One interviewee, James Meredith, tends to evoke various world musics, making his scores ideal for this study. Techniques which result in distinct timbres are catalogued, measured, and compared. The dissertation comprises the present study and an accompanying musical composition by the author, *Voyaging* for handbell ensemble, harp, and chorus.

The study is divided into the following chapters: traditional bell functions divided by ethnographic region, with a focus toward China, England, and Russia, and how each of their bell histories are evoked by contemporary handbell composers; acoustic innovations and properties of the handbell (compared to historic bells), and how these can serve composers; a defense against charges that the handbell ensemble lacks evocative power (using the handbell's uncommon techniques); and analyses of excerpts by composers in the genre which demonstrate the handbell's full variety of sound. The opening chapters will serve to lay historical groundwork and introduce definitions, while later chapters will explore contemporary composers and defend the need for contemporary music in the new and developing genre.[7]

[7] This study is not meant to be a guide for handbell music engraving and layout, nor is it meant to be instructional on how to play a handbell or handchime, operate or direct an ensemble. See the bibliography for suitable material on those topics. Definitions of these matters appear throughout the study only when necessary for the goal of using the ensemble timbrally.

The final aim of this study is to use these data to advocate for the handbell ensemble to be reconsidered as a viable medium of expression for contemporary composers rather than as a symbol of things amateur, educational, and publisher-driven. The handbell ensemble must be treated freely by a variety of composers so that its common tropes of evoking religiosity or background aura can be reconsidered. Furthermore, the handbell ensemble must be made free to evoke or not evoke any of its worldwide historical roots, depending on musical need. To achieve this, composers can treat the ensemble timbrally rather than reducing it to one pleasant "ring" sound. Bell sounds were once revered for their timbre over their melodiousness; they could be so again. This study aims to convince musical communities that this composite instrument is capable of more than enough sonic expression to carry or support any contemporary composition.

In an interview, composer Libby Larsen explains that her handbell stereotypes were subconsciously ingrained. She describes needing to "purge" these stereotypes when writing *Hell's Belles* for mezzo-soprano and handbell ensemble. This relearning helped her understand that handbells don't need to be "ding" or "dong," after which she approached the handbell as a flexible sound resonator. Ultimately, Larsen discovered that the handbell's sound is "its own property."[8]

Notes on Terminology and the Bibliographies

The term "American Handbell Ensemble" is used during the introduction of this study because the instruments tested are of American make, and because most of the involved parties,

[8] Libby Larsen, Interview with David Harris about Hell's Belles, commissioned by Sonos Handbell Ensemble, 2001.

including interviewees, are writing for these instruments. However, most of the conclusions made in this study can be taken generally for any instrumentation model called “handbell ensemble” so long as the instruments are high-quality. The handbell ensemble is largely an English export, and in the present day, bells of American and English make are played by ensembles around the world. In this study, I use the term “handbell ensemble” to refer to a composite instrument of several or many players acting upon a pitched set of bells. Handbell ensembles also often possess a set of handchimes as a secondary instrument. Handchimes are metal tone bars whose resonators are struck by an external clapper, and while their timbral and dynamic ranges are smaller than handbells, they are useful to provide contrast. Handchime timbres are therefore discussed alongside handbell timbres. Often in this study as in other writings and as commonly understood amongst handbell musicians, the general term “handbell ensemble” refers to an ensemble playing primarily handbells but sometimes also handchimes. A workable analogy can be made to an oboist whose nominal job is to play the oboe but also plays English horn. For Chapters 4–7, the handchime is sometimes referred to by its common abbreviation “chime,” which is not to be confused with the instrument known as orchestral chimes (which is also usually called “chimes”). In Chapters 2 and 3, however, “chime” means either a suspended bell set of ancient China, a small European tower bell set, or orchestral chimes, depending on context.

The bibliography is organized into two main categories: the historical function of musical bells, and the argument for the present-day handbell ensemble as an ideal acoustic expression and evocation of bell history. Among the notable book and music sources are: *Suspended Music: Chime-Bells in the Culture of Bronze-Age China* by UCLA Professor of Chinese Art and

Archaeology Lothar von Faulkenhausen, *Acoustics of Bells* edited by Thomas D. Rossing which compiles detailed articles on acoustics of almost every bell type; two concert works, *Kodo Tryptich* for handbell ensemble and percussion and *Natura* for treble chorus and handbell ensemble, both by James Meredith; the scores and recordings of unpublished and published contemporary pieces for handbell ensemble with input from some of the composers themselves, and several comprehensive catalogues of historically significant bells. Composers, particularly, should treat the study itself as a background, catalog of timbres, and set of ideas for handbells and handchimes. They should not treat the study as a complete notation guide for handbell engraving, nor as a guide to effective arranging for the ensemble, nor as a complete historical record of the instrument; for those topics, readers should refer to the bibliography.

Chapter 2. Early Bells in Pre-Han China, England, and Russia: Functions and Organology

The flowery and poetic tome "Legends O' the Bells" by Earnest Morris recounts many tales surrounding the world's bells, some of which have dubious authenticity. The folklore serves as a vivid portrait of how historical peoples heard and experienced various historic (or fictitious) bells, but it is Morris' foreword which contains the most impassioned evangelism for the instrument's power across time. Hyperbole notwithstanding, Morris powerfully claims that "throughout the ages, in all countries, and among all peoples, bells have been the subject of veneration, symbolism, superstition, emotion, and influence."[9] Why does this instrument, apparently so widespread throughout human existence, evoke such zealous ideas from hearers? The answers lie not only in tradition but also in the comparable construction, playing techniques, and communal practices within bell-heavy societies. To explore this question, I survey acoustics, archaeological data, and writings from several locales: Europe, the obvious subject due to its reputation for tower bells (although bells from other regions predated European ones); Russia, due to its contrasting construction and playing function; and ancient China, the Bronze-Age casting dominator, easily the first and possibly the most refined in pre-20th century bellcrafting.

Bells' Acoustic History: a Dilemma

A brief exploration of bell acoustics serves to highlight the difficulties that civilizations faced when casting metal into whole and pleasantly-vibrating shapes. Clarity of tone has not always been the desired result of bronze casting throughout human history. The gongs of Javanese gamelan sets were purposely not tuned to sound clear pitches; their timbre was

[9] Ernest Morris, *Legends O' the Bells* (London: Sampson Low, Marston & Co., Ltd., 1920), 1.

deliberately rich and complex.[10] Ancient bells were not always acoustically clear, and the practice of playing "tunes" on bells with clear tones evolved only relatively recently. The bell existed for thousands of years before enough technology was developed to play clear melodies. Bellcrafters sometimes attempted to eliminate bright overtones from the harmonic series, a particularly difficult feat in an instrument which by its very nature results in bright and complicated overtones. It is no accident that many bells sit atop European towers alone; combined with other bells, their sounds can overwhelm. Western-style polyphony, a musical texture not suited to bells for this reason, would not generally be played on bells until modern instruments were manufactured to eliminate overtones.[11] One possible exception to this is the carillon, discussed in Chapter 2b. In early European scientific experiments, bells tuned as pitch sets or scales were often done so using inaccurate mathematics. For instance, the octave frequency ratio 2:1 suggests that a bell sounding one octave lower needs simply to be twice as heavy, but this assumption leaves out the shape, curvature, and contours of the bell, all of which have more acoustic consequence than heaviness. Scholars in the Middle Ages thought a bell twice as large needed to be twice as heavy, among other inaccuracies. These inaccuracies caused mismatching timbres within bell sets. The inaccuracies were not mitigated until mathematical formulas were posited to solve them.[12]

The authoritative *Hornbostel-Sachs Classification of Musical Instruments* classifies all bells as idiophones, meaning the instrument itself is the physical substance which vibrates. This most basic category is labeled "1"; idiophones which are struck are labeled as the subcategory

[10] Judith Becker, "Earth, Fire, Śakti, and the Javanese Gamelan" (*Ethnomusicology* Vol. 32, No. 3, 1988), 389–90.

[11] Thomas D. Rossing ed., *Acoustics of Bells* (New York: Van Nostrand Reinhold Company Inc., 1984), 193–94.

[12] Ibid, 195.

"1." and objects struck directly with a single attack are also labeled "1" within that subcategory, resulting in the designation "111." A useful inference at this point is that bells are listed first in three respects, as they are a simple means of sound production (an object is struck). It is ultimately the complex shape and the properties of metal used which cause the timbres of bells to be varied and interesting. Across the world, this shape varies widely. Bells of the ancient Far East were typically stationary, hung, cylindrical and convex with a similar top and bottom diameter (like a barrel). By contrast, the iconic Western bell shape is like a cup with a flared, concave waist. Its ultimate ancestor was probably the crotal, a small enclosed metal jingle. Bells are defined by being open on one end (not enclosed like a jingle) and shaping inward to a rim (unlike cymbals and crotales), with their vibration weakest at the vertex (opposite of gongs).[13] When bells got larger, the internal striking mechanism was attached to the inner body to form a clapper. Early European bells were operated by shaking until the trend toward larger bells prohibited it. Russian bells, however, were stationary and were operated by manually swinging an internal clapper. Bells of the Far East were struck on the outside.[14] The large bells of Western and Eastern Europe were latecomers by comparison. The world's first known bells were in China.

2a. In Pre-Han China: The Zeng Bell Set

The construction of ancient Chinese bells has little in common with the construction of their European counterpart, so the differences are best described through their contrast.

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[13]Erich M. von Hornbostel and Curt Sachs, *Revision of the Hornbostel-Sachs Classification of Musical Instruments by the Musical Instrument Museums Online (MIMO) Consortium*, Jeremy Montagu and Margaret Birley, eds. (Paris, Île-de-France: The MIMO Project, 2011), 4.

[14] Edward V. Williams, *The Bells of Russia* (Princeton: Princeton University Press, 1985), 99.

Clappered handbells and mobile attachments did exist in China as far back as c. 1000 BCE, but the majority of detailed information from ancient history comes from suspended bell sets around 400 BCE in the later Zhou dynasty. The cross-sectional shape of the vibrating bronze casting of a typical ancient Chinese bell is almond shaped (an English bell is circular), and the rim is arch-shaped (an English bell is mostly flat). The casting does not flare outward, and is embellished with protruding bosses and ridges, and the bell, hanging down, has a flat top (the English counterpart has a mostly smooth flared casting which terminates at the rim, resulting in the iconic Western bell shape).[15] Unlike the European instruments, Chinese bells have a few purposefully cast properties which are theorized to reduce high partials and bring about a clear tone: they are always struck with a mallet on the outside, they have a flat top which does not itself vibrate, they have bosses and ridges which serve to further dampen, and the casting's walls are thin.[16]

Chinese Bronze-Age bell history exists within the first era of Chinese metallurgic complexity, craftsmanship, and prestige. Despite this, archaeologists did not discover some of the key information about bells until recently. In 1978, the tomb of the Marquis Yi of Zeng (c. 433 BC) was uncovered. Many Chinese traditional instruments were found such as zithers, *sheng, dizi,* and *paixiao* panpipes. These instruments are commonly found in tombs and are usually materially degraded. What made this finding remarkable was a complete bronze bell-chime assemblage (編鐘)[17] consisting of 65 individual bells suspended on racks. There was

[15] Ibid., 73.

[16] Ibid., 79–80.

[17] Faulkenhausen uses the term "bell-chime" to refer to the entire set of individual suspended bronze bells which comprise a musical instrument and which are held from the same scaffolding or nearby scaffoldings.

also a large multifaceted instrument consisting of 32 chime-stones (lithophones). Critically, the bells and stones bear perfectly preserved inscriptions of a note-naming system. The Zeng set is especially notable because its bells are playable and presumably sound the same today as they did in their time of use. Also, their inscriptions inlaid with gold are easily readable. Because the ancient ownership of such a bell set represented a high level of manufacture and cultural status, the artifacts now shed light on the pre-imperial period's intellectual history. Lothar von Faulkenhausen, author of the most thorough English language study on these findings, goes so far as to metaphorize the Zeng bells as the "Rosetta Stone of early Chinese music." No archaeological find before or since has provided both a cultural understanding and insight into an ancient music theory.[18]

Fig. 1. The Zeng set (Wikimedia Commons).

[18] Lothar von Faulkenhausen, *Suspended Music: Chime-Bells in the Culture of Bronze-Age China* (Berkeley, Los Angeles, Oxford: University of California Press, 1993), 5–12.

The Two-Tone Phenomenon and Tuning

Perhaps the Zeng set's most celebrated feature is the "Two-Tone Phenomenon." Though some scholars claimed to have already known about this from other Zhou bells, this set most clearly demonstrated (for the first time to most of the world) the phenomenon of some Chinese bells to have two distinct tones when struck in two different places (one in the bottom center, and another to one side). Notably, the two tones are not related by harmonic series; bells have the sonic reputation of brightness and high overtones, but Chinese bells were generally cast to clarify one tone (and in this case, two). Critically, the distinction between this two-tone property and the manipulation of a single tone by timbre is to remain clear; the two-tone property is far more unusual, and must have been deliberate, with many trials and errors before its success. A bell's harmonic spectrum is complex, with many overtones, and indeed most musical instruments have their distinct sound due to their overtone clarity and/or complexity. Rarely does a single vibrating body produce two distinct overtone series with relative clarity. Chinese casters found that this clarity worked only with almond-shaped cross-sectional castings; inscriptions bearing this knowledge are found on the Zeng set itself. A Zeng bell's two tones are not quite equal in their potential volume, and it takes formidable precision for a musician to mallet the bell in either spot correctly; inaccurate hits will result in the unwanted tone adding weakly to the sound. The two notes can be produced at the same time in equal volume if the bell is struck between the strikepoints of the two isolated pitches.[19]

The bells were not quite equally tempered in their tuning.[20] The mathematics of measuring tones with frequency ratios was known as early as c. 245 BCE. When calculating the

[19] Ibid., 80–83.

[20] Ibid., 281.

relationship of more than two pitches, an ever-widening interval series results (what is known in Western music theory as the Pythagorean comma); this is described in the *Lushi Chünqiu* compilation from that year. True equal temperament, on the other hand, was not calculated in China until the Ming dynasty prince Zhu Zaiyu did so in the later 16th century.[21]

T-shaped mallets were excavated from the site, for hitting medium and small bells, and long bars were found, for hitting the largest bells. The single bell's two tones were roughly a minor or major third apart, so to play a scalar passage, one would alternate between two bells. The bells were played in concert with the rest of the ensemble at ceremonies.[22] The prominence of its musical role is inconsistent across ethnic groups, but we know that the bell set was seen as an accentuating percussion instrument rather than a timekeeper or melodic instrument; it did not play an ornamented or even simplified melody nor did it keep time, but its tones connected musical sections and punctuated dramatic moments.[23]

The numerous and fanciful epigraphs on the Zeng set are peerless in the archaeological record. Inscriptions on other bells found are exclusively messages to ancestors, prayers for prosperity, and indulgent status symbols, but the Zeng set names its tones. The inscriptions for these tone names are facing the wrong way for performers to use during play and too small for listeners to read.

How were the bell tones chosen? Wind instruments found at burial sites contain enough holes for many more notes to be possibly played than scholars presume were commonly used. This is not the case for individual bells, where many sets were small. Fortunately for

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[21] Ibid., 301.

[22] Reenactments of performances of Bronze-Age music have taken place using a replica of the complete Zeng set.

[23] Ibid., 211–17.

archaeologists, centuries of stagnation will hardly change the frequency and timbre of bronze. Therefore it is assumed that the selection of tones that were cast, especially the tones when the bell is struck in the center, are musically significant. The ancient Chinese considered octave equivalency the same way it is considered in Western music, and it is often generalized that Chinese traditional music uses the pentatonic scale as its pitch collection, with some non-pentatonic ornaments. It is therefore surprising that the Zeng bell chime set contains a fully chromatic pitch collection over three and a half octaves, with a lower and higher range less complete. The bells' two tones serve to fill gaps in what we would call a musical "scale." Therefore, the casting process for this composite instrument necessitated that not only all primary strikepoints be tuned in chromatic relation to other bells, but that each secondary strikepoint be sufficiently close to an equally tempered interval from the primary.[24] The tuning is not equal throughout, except for the octaves. It is also evident from the archaeological record that bell sets trend from simple to complicated (such as the Zeng set) from the pre-imperial Shang (c. 1700–1200 BCE) into the later pre-imperial Zhou, not including tiny bells (not part of sets) which are thought to have doubled as grain scoops.[25] These early findings were often simple pairs of bells set apart by a fourth or fifth and containing secondary strike tones a minor third from the primary, thus forming four notes (*la*+*do*, *mi*+*sol*) of a five-note pentatonic scale. But as technology became more advanced, chromatic experiments were clearly favored, allowing for musical transposition of pentatonic scales, as found in the Zeng set.[26]

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[24] Ibid., 254.

[25] Percival Price, *Bells and Man* (Oxford, New York, Toronto, Melbourne: Oxford University Press, 1983), 1.

[26] Ibid, 264–65.

Even without the exponential coefficient in their mathematics, the Chinese metallurgists cast a graduated set of bells with pitches that sound in tune with one another. To make up for the fact that the bells are not different enough in size alone, the thickness of the casting wall is the main factor in determining pitch of the ancient bells. It seems likely that the casters made slight adjustments after casting, much like in Europe. When contrasted with bells nearly two thousand years later (like a Qing dynasty set from 1764 CE), the Bronze-Age bells are superior in design. The craftsmanship and metallurgy of these suspended instruments are of such a high order that they are impressive by contemporary standards.[27] Comparable European objects do not appear until the late Middle Ages; China, by contrast, had been casting bell-like objects since the oldest known artifact of c. 2000 BC.

Social Function and Ownership of the Zeng and Other Sets

The patrons of these 5th century BCE instruments were aristocrats, and the ownership of such a set was a high status symbol. This social status is why such care and technological resources were devoted to the bells, and why they eventually fell out of use.[28] Research suggests that these instruments shaped the ways people used music (rather than people deliberately innovating their instruments to suit their religious framework or ceremonial needs).

Scholars have inferred the existence of a lost notation system since the Zeng bells are inscribed with note names, but the inscriptions on such Chinese bells are primarily about the social and religious implications of bell music. This ancient culture's cosmology or social

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[27] Ibid, 92–95.

[28] The early dynasties Shang and Zhou featured ritual court music, and parts of the ritual court ensemble did not survive the transition at the end of the Warring States period into the Qin and Han.

structures were expressed with and tied to their music theory.[29] Music was used to affirm the social hierarchy and explain the universe by embodying the concepts of harmony and discord. The c. 3rd century BCE writing "Records on Music" (*Yue Ji*) ties court music to the organization of society: "Ceremonies and music, punishments and regulations—their ultimate aim is one: they are that by which the hearts-and-minds of the people are unified and the Way of order is produced." But the *Yue Ji* warns that government and music are so inexorably linked that the quality and accord of a state's music is principally a measure of the state's wellness. This admonishing passage also manages to describe a genesis of music: "[a]ll musical tones are born in the hearts-and-minds of humans. The sentiments stir within and thereupon take shape as sounds, and when the sounds assume a pattern, they are called musical tones. Therefore, the musical tones of a well-ordered age are calm and full of joy about the harmony of its government. But the musical tones of an age in disorder are resentful and full of anger about the perversity of its government." To go a step further and assign what is called "correlative cosmology" to this early of an era is not historically confirmable. Certainly later writers by the time of the First Qin Emperor in 221 BCE did correlate the five musical tones to the numerous other sets of cosmological "fives," but it is more likely that this was just one of many ways that these ancient peoples conceptualized music.[30]

In Bronze-Age China, the bell-chime was the most respected instrument used in divine ceremonial music performance and the instrument thought the most suitable for communication between humans and deities. Though the Zeng bell set is peerless in many ways, the Shang and Zhou dynasties were periods of plentiful bronze casting, during which many other metal objects

[29] Faulkenhausen, 16–19.

[30] Ibid., 1–5.

were made, including many other bells. Such bells, especially Zhou bells, feature perfectly-preserved poetry and inscriptions detailing how to prepare the food sacrifice and invite spirits into a chamber with bell music.[31] The noble owners would have been occupied with feasting when the bells were played, so the players must have been specialist court musicians. Bell ownership was tied to the subjugation of servants, rendering the meaning of the character *zhong* (鐘) ambiguous as both "bell" and "bell-player."[32] The Zhou societal makeup became a stable space for bell music, and the more noble the owner, the more likely the court was to own numerous bells or chime-stones. The popularity of the bell-chime instrument declined as this framework failed and as the Warring States era began; almost no bronze bells come from this unstable period, as iron overtook bronze.[33]

2b. In Western Europe

One tends to associate European bells primarily with hanging tower bells of the Christian church, but this association is erroneous for several reasons: (1) old records mentioning "bell" may not refer to instruments we now call "bells," (2) mobile bells in this continent preceded the church bell tower, and (3) bells were used in Europe before organized Christianity. St. Anthony of Egypt (c. 250–355) is depicted with a bell and the ability to cast out demons by ringing it, but depictions of his character are much more recent than his life, sometimes by over a thousand years. Bells were in use during those early church periods, and the Coptic Museum in Cairo proves this. The jingle-like crotal, a smaller and cheaper instrument, was in use even more

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[31] Ibid., 25–27.

[32] Ibid., 62–63.

[33] Ibid., 55.

frequently. As is the cyclical pattern of church music rules and regulations, bells (like other instruments) have suffered many bans in various churches around the world, only to reappear later or elsewhere. Before congregations settled into church buildings, early Christian hermits carried handbells from town to town, imbuing the instruments with a religious significance, and drawing from their loud sound the power to drive out demons. These clappered instruments are distinct from suspended bell-chimes which are stationary. Even in these early centuries, missionaries reached far north into France, Ireland, and Scotland. These Celtic fathers owned simple but beloved handbells which still bear inscriptions and sometimes descriptive titles ("Singer," "Sweet-Sounding").[34] Handbells and large bells were probably used to call people to attention for a ceremony or market in this period. Irish bells were the earliest; the Bell of St. Patrick's Will (*Clog-an-eadhacta Phatraic*) mentioned in 552 was probably cast in the previous century.[35] The first known reference to a bell as a call for worship is by a Carthaginian deacon named Fulgentius Ferrandus. The letter in Latin implores a Roman monk to make calling worshippers easier by ringing a bell (*campana*). The bell was promised to be sent to Naples.[36]

The Irish bell design, which spread to England, Wales, and Scotland, was riveted and made into the four-sided shape we now associate with a cowbell. They were made from sheets of iron or copper. When this design reached continental Europe in about 600 CE, bell shape gradually became rounder and larger, and many bells were dipped in molten bronze to prevent rust. The first recorded instances of bells being hung in church towers date from this period. The circular collar, a thicker band of material, was added near the strikepoint to prevent cracking.

[34] Price, 78–80.

[35] Williams, 24.

[36] Williams, 20.

Some primitive bells from these later centuries in the first millennium CE are fashioned in a beehive-like shape with a convex casting, but by about 1200 CE, Italian bells were approaching the iconic shape we now associate with them: their shape was now conical and concave with a flared rim.[37] The bellcrafting hub shifted in the 1400s to Holland, and the Low Countries remained the casting masters for two centuries; in this period, better tone quality was achieved by casting a thinner wall, and the first post-casting tuning was attempted by chipping metal off the casting rim.[38] The European bell timbre is characteristically complex. Sources do not agree on how to label the constituent pitches of a bell's composite timbral spectrum, but clearly, different sections of the bell's shape contribute to different overtones. Up for debate is whether some bells contain multiple fundamentals and harmonic series, and whether there is a distinct pitch separate from the fundamental called the *strike-tone*.[39] [40]

From Hands to Towers

Bells in Christian history were not always relegated to church towers. In fact, the shift from handheld small bronze and iron instruments to large tower bells and carillons was a long transition. This transition is entirely due to the monastery. Monks needed the most technical expertise on bell-making because they used bells often in their daily ceremonial devotion. In a shift from public to private, what was once an instrument played by any layman became the

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[37] The charming Latin compound *campaniform,* meaning bell-shaped, is appropriate here, though is mainly used in architecture and biology.

[38] Williams, 24–26.

[39] Ibid., 99–100.

[40] The varieties of bells in the world and in Europe alone are too numerous to warrant a generalization here, so, a discussion of organology will be limited to handbells in chapter 3.

private property of a growing singular institution in its quests to explore and proselytize. It was the monks who possessed the facilities and tools needed to make the best bells. From around the 10th century, the size of bells increased as did the likelihood that they would be hung with the bell facing down. It was not a new idea to attach small bells to fixtures, as with a door bell, but now bells were growing beyond that size. New inventive methods of ringing fixed instruments sprang into being; bells on a building's exterior could be rung from outside the building by a rope, though the rope was sometimes stolen. Bells inside a tower could have their clappers activated by an indoor rope protected from thievery, or bells could be fixed to an axle and rotated. In churches with multiple bells, the largest (called the *signum,* or signal bell) was chimed the most frequently, announcing the most common of daily assemblies; across Europe churchgoers knew that the sound of the *signum* meant they must hasten to the chapel. This largest bell resounded the farthest across the countryside. The smallest bell kept in the chapel quarters was the *tintinnabulum*, a Medieval Latin term for handbell; this was used to alert people indoors in various rooms. Cast bronze was the rarest metal used, with most churches owning only one (with the rest iron).[41]

Aside from calling assemblies to religious service and distinguishing various festivals, bells were known to appeal to divine assistance against bad weather, to increase the people's happiness and joyfulness, and to ornately decorate the entry and procession of important figureheads.[42] After the Protestant Reformation, the Reformed churches allowed church bells to be used in services but removed some of their function; newly cast bells could not be ceremonially baptized (Martin Luther despised the baptism of inanimate objects). The Reformers

[41] Price, 87–89.

[42] Ibid, 107.

also derided the use of bells to drive out demons and pray for good weather. But bell use as an aspect of the average European's daily life was far too ingrained a practice to be stamped out entirely. In a historical period where people quite literally portioned out their daily lives according to the regularity of chimes, the Protestants found that the continued use of chimes helped comfort churchgoers accustomed to Catholic practices.[43]

As technology progressed over the centuries, English towers became known for a style of bell-playing based on patterns called "change-ringing," the permutative process of ringing all possible orderings of a bell set. One ringer was assigned to each large bell, and each bell assigned a number. The bells would ring in order, then the order of numbers would change. The pattern of this changing order would continue until it was exhausted. Three bells would finish after six "changes." [44] The completed pattern is called a "peal" (but strictly only if seven or more bells are involved). Ringing became a recreational sport of endurance, and ringing societies sprang up. Neighboring towns competed, and the increased activity promoted more bell casting and installing.[45] A primary example of bell peal instruction via a 19th century source, W. T. Maunsell's 1861 article *Church Bells and Ringing* from a June 1861 magazine *The Ecclesiologist* is itself a historical piece as a dated manuscript on church bell ringing from the mid-19th century. The article presents some brief mathematics on how many permutations are possible given an increasing number of tower bells. A directory in the back of the article shows a mathematical table, including bell peals which are so big as to be only theoretical: with four bells, twenty-four changes are used lasting one minute; with seven bells, 5040 changes take over

[43] Ibid, 130.

[44] Ivey, 60.

[45] H. B. Walters, 83–85.

three hours; with twelve bells, 479,001,600 changes take thirty-eight years. A list of obscure figures from 1800s London bell lore follows, but then the source describes a simple "campanology," or the study of ringing, with descriptive instructions on technique. The article ends with the author humorously replying to several accusations that bell-ringing invariably leads to drinking and smoking and other such disreputable habits.[46] There was at least some truth to this accusation; one bell at Walsgrave in Warwickshire from a set cast in 1702 reads:

HARKEN DO YE HEARE OUR CLAPERES WANT BEERE

Large jugs for holding drinks have been found in ringing chambers, suggesting that these ringers (claperes) often got what they hoped for.[47] Another bell of the same set is inscribed in broken Latin with this message, suggesting the ringers had at least to put in good effort:

QUANTUM SUFFIIFIT BIBERE MOLO CLANCULA VOS MUSICA TONE
(Ring tunefully and you shall have as much beer as is good for you)[48]

Ownership of Bells

Rights over who could ring a bell were strict, and in the Roman Catholic church, the papal authority governed them. Since 610 CE when a Frankish invader king approached the town

[46] W. T. Maunsell, *Church Bells and Ringing* (London: Joseph Masters, Aldersgate Street, and New Bond Street. 1861), 19–26.

[47] H. B. Walters, 94.

[48] Ibid., 333; source translation uses the word "tuneably" rather than "tunefully."

of Sens near Paris and the bishop and rang the bell in the belfry to summon defending soldiers, the importance of bells could be extended beyond the religious and the political. This importance now gained an even more literal relationship with military affairs; Italy and Russia bell foundries were taken over in large part by the need to cast cannons instead. Records show some towns' bells were restricted by the pope to be rung only by appointed bishops and sometimes only in the most dire cases (one church had a bell played only in case of fire or murder). In towns where a Roman Catholic bell tower was near an Eastern Orthodox population, the Orthodox citizens would simply ignore all church-related chimes but would learn to recognize the chimes' regularity for civic reasons. The ownership problem became more and more pronounced over the centuries; first it was clear that the clergy presided over the bells, but in many small towns, the largest bell "belonged" to the city. In fact, some inscriptions show clearly that a bell was meant to be used for secular and sacred purposes. This Zurich bell with a clever rhyme has such an inscription and, like many bells, "speaks" from the first person perspective:

PULSOR PRO SIGNIS	I am struck to signal
MESSE POPULARIS ET IGNIS	public mass and fire.
ANNO MCCLXII	Year 1262[49]

Secular sites for bells also arose naturally; non-church structures would be suitable hosts, such as gates and defense towers, which most cities possessed. Geneva had a civic hall built that included a chapel with a tower, usable by the church and thus usable by the city also; St.

[49] Price, 135–36.

Michael's at Oxford had a tower that was both a belfry and a watch tower, and indeed when the city was attacked the bells rang, summoning archers to position themselves in the tower and attack the enemy (and also summoning devoted non-combatants to go into the safety of the church and pray for victory). These arrangements show the inextricability of the secular and sacred architectural spaces (and by extension bells). This idea was taken to an extreme when the town's cathedral was recognized as the most strategically defensible location in the town—it was often the highest place in town affording the best view of the enemy, and it had the thickest walls in town to protect people and valuables. But most churches, being city centers, were not at the city gate because townships generally grew around them; they also generally had the role of chiming when the city gates opened in the morning and closed at night. Thus was devised a warning alarm bell on the gate itself. Warning bells are indeed found across Europe from Middle Ages architecture, often on hilltops.[50]

Bells in the Middle Ages also took on some domestic uses. In this period bright and shiny objects were quite fashionable, and little bells found their way on to all manner of clothing, girdles, purses, and table ornaments. The rural use of the cowbell is also associated with this time, though in all manners materially and functionally (even down to superstitions) it is the same as its ancient root. A narrow-mouthed bell is used because it jingles with each turn of the cow's head as it grazes. Laws against stealing animal bells go back to Emperor Justinian. The cowbell was thought to ward off demonic enemies, keep the flock together, and warn of the oncoming approach of other dangerous animals. Around this period we see writings and find evidence that pet owners preferred tiny enclosed crotals when outfitting smaller pets, especially

[50] Ibid., 137–39.

dogs (in contrast to a cowbell, which is categorically a true bell, forged and open on the bell end and having a clapper rather than a rattling object inside). The animal “bells” were cast or hammered metal, or sometimes wood, and were status symbols; owners showed their wealth by the rareness of the metal around their pet’s neck.[51]

Clock Towers, Chimes, and Carillons

Before 1300, clock mechanics lacked precision and dependability, and an automated system could not reliably strike a bell. By 1309, Sant’ Eustorgio in Milan had a clock with sufficient technology to move a hammer to strike a bell; no artifacts survive, but the chime is mentioned in written record. In 1335, the oldest clock chime which still survives was installed in the Visconti palace chapel in Milan. After 1300, a second bell of a different pitch than the first was placed in some towers. After 1400, as both bells and clocks evolved, clock chimes began to expand to use several bells and became able to produce musical intervals.[52] A *chime*, with respect to bells in towers, is a small collection of about eight to twelve bells fixed on beams or scaffolding. By the sixteenth century, sophisticated chimes could be found in clock towers, and some were operated manually: the player pulled levers which activated hammers to strike the bells. A chime’s pitches were generally tuned to the notes of a major scale.[53] An example of a chime in use in 2020 shows that the levers are arranged roughly in keyboard order and the eleven bells are tuned to notes which can adequately produce most singable melodies.

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[51] Ibid., 161.

[52] Williams, 70–71.

[53] Williams, 81.


Figs. 2 and 3. Eleven-bell chime leverboard and the bell scaffolding one floor above.[54]

As Dutch bellmaking grew even more sophisticated in the 1500s and 1600s, much larger bell sets, called carillons, were made. The carillon was a mounted set of chromatic bells spanning three or four octaves. Such a large musical range was made possible with more precise tuning. The player sat at an organ-like console with levers arranged in keyboard order playable by the hands and levers arranged into a pedal keyboard played with the feet. Carillon music could therefore contain more complex musical texture. Both chimes and carillons could function mechanically as clocks. Dutch carillon-making flourished from about 1642–1680, but by 1800, about two-thirds of the carillons in Europe had been destroyed, most of them melted down during the French Revolution for gun metal. Despite the loss, many historic chimes and carillons

[54] The levers are arranged in an incomplete keyboard order, corresponding with nine of a piano's consecutive "white keys" but only two "black keys" dispersed among them. The keyboard notes from low to high are C, D, E, F, F#, G, A, Bb, B, C, D. The bells do not sound as written; the lowest sounds as G. The levers have numbers rather than letter names written on them, and the old music is notated with numbers. The set was founded by John Taylor & Co. of Loughborough, England in 1938 and was subsequently installed at Orange, California.

remain in use; carillons continued to be constructed into the 20th century.[55] A typical modern carillon has a minimum range of written G3–G5 and may have a second keyboard to operate a second set of bells with a contrasting timbre.[56] [57]

2c. In Russia

Russian bells offer their own unique historical interest due to their florid inscription methods, rhythmic playing technique, lack of tonal organization, and grand size. The Ancient Christian East tended to favor struck wooden planks called *semantra* (σημαντρα) to the metal bell as a tool to call worshippers,[58] so Russia's bellcrafting period begins in the Byzantine era. Similar to the origin of European bells in the early church, bells made their way to Russia through Byzantine rulers. Later, improved technology in bell-founding from Italy in the late-15th century was brought to Moscow and produced an especially rich bell history. The capital has since rung with plentiful bell towers. Architecturally and organologically speaking, Russian bells differ in two ways from their Western counterparts: they are mounted into a stationary position, and most are untuned.[59]

The purpose of Russian bells is to emit rhythmic patterns. A player stands inside or reaches inside and activates the clapper; these rhythms come from the early Byzantine church

[55] Williams, 81.

[56] Such second sets are often "harp bells," softer and milder instruments invented in the 20th century with less overtone complexity and offering a good contrast to the older, brighter "English Bells" or "Flemish Bells."

[57] Paul Bartholomew, *Hymn Arrangements for the Contemporary Carillon* (Delaware Water Gap: Shawnee Press, Inc., 1974), Foreword.

[58] Williams, 15.

[59] Ibid., xv.

where priests struck percussion instruments in a rhythmic pattern during procession down the aisles. Also, since these bells are fixed into their host structures without swinging, they can be large; indeed the largest bells in the world are found in Russia. A 72,226-pound bell was cast for Boris Godunov in 1599, and the record stands with a 1735 casting of a roughly 440,000-pound "Tsar Bell" made for Empress Anna Ivanovna. It cracked in a fire and was never played. The deep and spacious tones of such giants rang across the country until a gradual fade and sad demise after 1919 when the two world wars saw either their destruction or the repurposing of their materials.[60]

Fig. 4. The Tsar Bell (Wikimedia Commons).

Early Russian bell records are sketchy, and little was recorded during the 11th century Christianization period and the following Mongol occupation. When the Russian metropolitan

[60] Ibid., xvi.

center was transferred from Vladimir to Moscow in 1326, Moscow became the hub of Russian orthodoxy, a change which was to make a profound impact on bells. Records begin to appear in a productive time of bell casting in Moscow between 1475 and 1500. Three bells survive from this period into the present day.[61] Inscriptions on Russian bells typically include the year, month, and founding day, the founder and foundry name, the name of the building in which it will reside, and a measurement of the bell's weight. The general uniformity of Russian bell inscriptions in this regard is remarkable. Sometimes they also include a biblical passage. Any dates to be included in the mold were set long in the future when preparing the casting materials so that the craftsmen could wait for that date to forge the bell. One Zvenigorod tower chime even bears a coded script; its secret alphabet lay unsolved for over a century. In the end, it had the typical content of an inscription, but still serves as a curious exception.[62]

By the 18th century, Moscow housed at least three privately owned bell foundries and was a bell-making hub. Some notable projects were more about Westernization than nationalism: in 1720, Peter the Great ordered the commission and installation of a Dutch carillon in the monumental Cathedral of Saints Peter and Paul in St. Petersburg. It cost a correspondingly monumental 45,000 rubles, and it had thirty-five bells with a keyboard and pedals attached to a clock mechanism which chimed the half-hour and quarter-hour and played tunes on the hour. It was destroyed in a lightning fire and rebuilt in 1776.[63] Records show that in 1811, Russia produced 4,220 bells, but only 1,726 in 1812 due to the disruption caused by the French invasion. On September 2, 1812, the Ivan Velikij Bell Tower ringers tolled for the evening

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[61] Ibid., 39.

[62] Ibid., 111–12.

[63] Ibid., 82–83, 87.

service for the last time; people were scattered, and soon after, Napoleon ordered many bombs to be detonated at Moscow sites. This was the end of the prosperous bell-making period in Russia. After the October Revolution of 1917, the casting of new instruments stopped completely. Some existing bells were protected as historical sites, but many were sold for scrap metal in the Soviet period. Many more were lost during World War II, but a bell set in Novgorod protected by burial was an unlikely exception. When the Germans came in 1941, two large bells were buried and some citizens attempted to escape by boat with three smaller ones. The boat was sunk, and during the German occupation of the city, nobody divulged the buried bells' secret location. After the Germans left in 1944, the citizens managed to dig up the two buried bells and raise up the three sunken bells.[64]

A Blend of the West and East

Russian bells serve as a microcosm of the Russian condition of straddling two worlds; the bells are designed like European instruments, with the same signature shape and overall design, but they are cast and placed architecturally in the manner of many Asian bells. The iconic shape, the tuning system, and the clapper are distinctly European in origin. The manner or performance is a Byzantine-era relic. And yet, the great size and mounting methods hearken back to Asian bells.[65] Meanwhile, the adornment of florid text and imagery is comparable with bells all around the world; Mexican bells, for instance, often feature reliefs on their castings of saints, religious

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[64] Ibid., 60–65.

[65] Ibid., 112.

symbols, legendary figures, and the date and founder.[66] Between 200 and 600 CE, the largest instruments in the world were the ambitious bells of Korea, China, Japan, and Burma; their great size and indefinite pitch seem to suggest an ancestral relationship to Russian instruments.[67]

2d. A Brief Survey of Bells in Early Western Musical Compositions

Composers before the 20th century almost never included bells (large or small) in their concert works; the role of bells in concert music was relatively rare. There are exceptions such as carillon performances and early handbell performances, but the Western percussion section was mostly limited to timpani (and some drums and cymbals of Turkish influence). Bells as members of the percussion section are still limited to a few instruments which are convenient to the stage.[68] The set of orchestral chimes, sometimes called tubular bells, is the only instrument among these which even contains parts shaped somewhat like bells.[69] [70] Some instruments themselves are handbell-like but designed for orchestral or marching use. Staff bells are handbell sets in one or two octaves which are fastened to horizontal supports and played with mallets. Staff bells were used in the late 19th century by early touring handbell ensembles.[71] Alternatively, some

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[66] Abelardo Carrillo and Gariel Carrillo, *Campanas de México* (Mexico City: Universidad Nacional Autónoma de México, 1989), 16.

[67] Williams, 112.

[68] The commonly used glockenspiel is sometimes referred to as "orchestral bells," but its sound emits from metal bars, not from true bells.

[69] The orchestral chimes are closest to bell-shape, but their brass tubes lack a curved casting and internal clapper. However, they do adequately emulate the sound of tower bells. In the context of orchestral instruments they may also be called "chimes" or "tubular bells."

[70] Samuel Adler, *The Study of Orchestration, Fourth Edition* (New York: W. W. Norton & Company, 2016), 480.

[71] James Walters, *Historic Handbell Techniques* (2020), 3.

composers call for handbells or handbell-like sounds, but as only one option of others.[72] Below is a small collection of compositions which use bells and will serve to narrate a progression of bell use in Western composition and bridge the gap between historical bell roots and the contemporary handbell ensemble.

The baroque aria *Schlage doch, gewünschte Stunde* (early 18th century), wrongly attributed to J. S. Bach (BWV 53), was probably written by Georg Melchior Hoffmann. It is a peculiar case of bells in a baroque piece. It calls for just two bells, written E4 and B4, which were probably small considering the logistics of performance in the same room as the ensemble. The bells may have been operated by an organ console, but may conceivably have been rung by hand by choirboys since the part is so simple. The title text "Haste to strike, oh longed for hour" is the rationale for the strange instrumentation. Most curiously, the final note is sounded by a bell alone, concluding the piece even as the orchestral harmony does not resolve.

Figs. 5 and 6. Georg Melchior Hoffmann, *Schlage doch, gewünschte Stunde* (Leipzig: Breitkopf und Härtel, 1863), m. 1 and mm. 90–93.

[72] Percy Grainger's *Lincolnshire Posy* calls for a part to be played on "Tuneful Percussion: Glock, Xylo., Hand Bells *[sic.]* (in 2 octaves if possible), Tubular Chimes, etc.," but "if these Tuneful Percussion instruments are not available, play on piano (in 4 octaves)" (*6. The Lost Lady Found,* rehearsal 130).

Charles Ives' *Psalm 90* (revised 1923) for mixed chorus, organ, and bells shows a lack of specificity of what bell-like instrument(s) the composer intended. Bells were not standard concert instruments at this time, so any such specificity would have appeared fussy. In this piece, no instructions are given other than that the lowest part be played on Low Gong (even though that is not technically a bell). The editors mention that Ives' note "as church bells in the distance" suggests an instrument of unclear type but with deep timbres, rather than the glockenspiel that would have more commonly been available.[73]

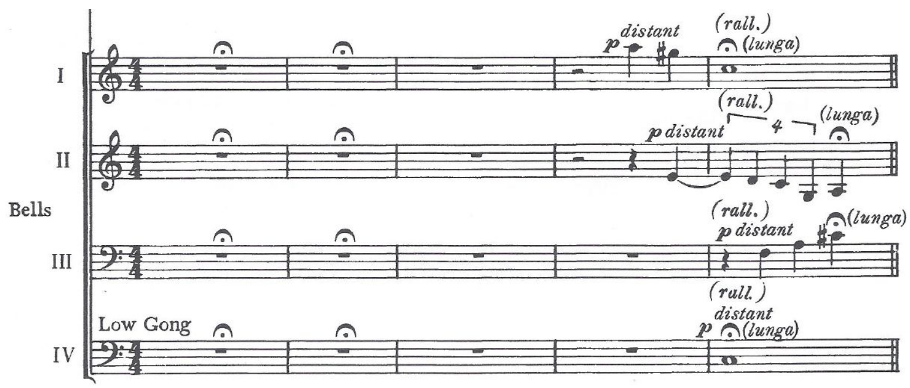

Fig. 7. Charles Ives, *Psalm 90* (Bryn Mawr: Marion Music, 1970), mm. 1–5 (bell parts).

Edgard Varèse's *Ionisation* (1934) for 13 percussionists marked a 20th century landmark: it was the first significant work for percussion ensemble. This new genre continued Varèse's trend of using a wide variety of uncommon percussion instruments, but when pitched bell-like instruments are part of the instrumentation of a percussion ensemble work, the most common ones are those which are already part of the orchestral percussion section: glockenspiel, vibraphone, and orchestral chimes. In *Ionisation,* Varèse included orchestral chimes (*cloches*, player 10) but saved them for the end of the piece when pitched instruments are heard. He treated

[73] Charles Ives, John Kirkpatrick and Gregg Smith, ed., *Psalm 90* (Bryn Mawr: Marion Music, 1970), 4.

the chimes timbrally, and their dissonance creates a purposeful indefinite quality to the pitch. This dissonance emulates the complex overtone qualities of large bells.

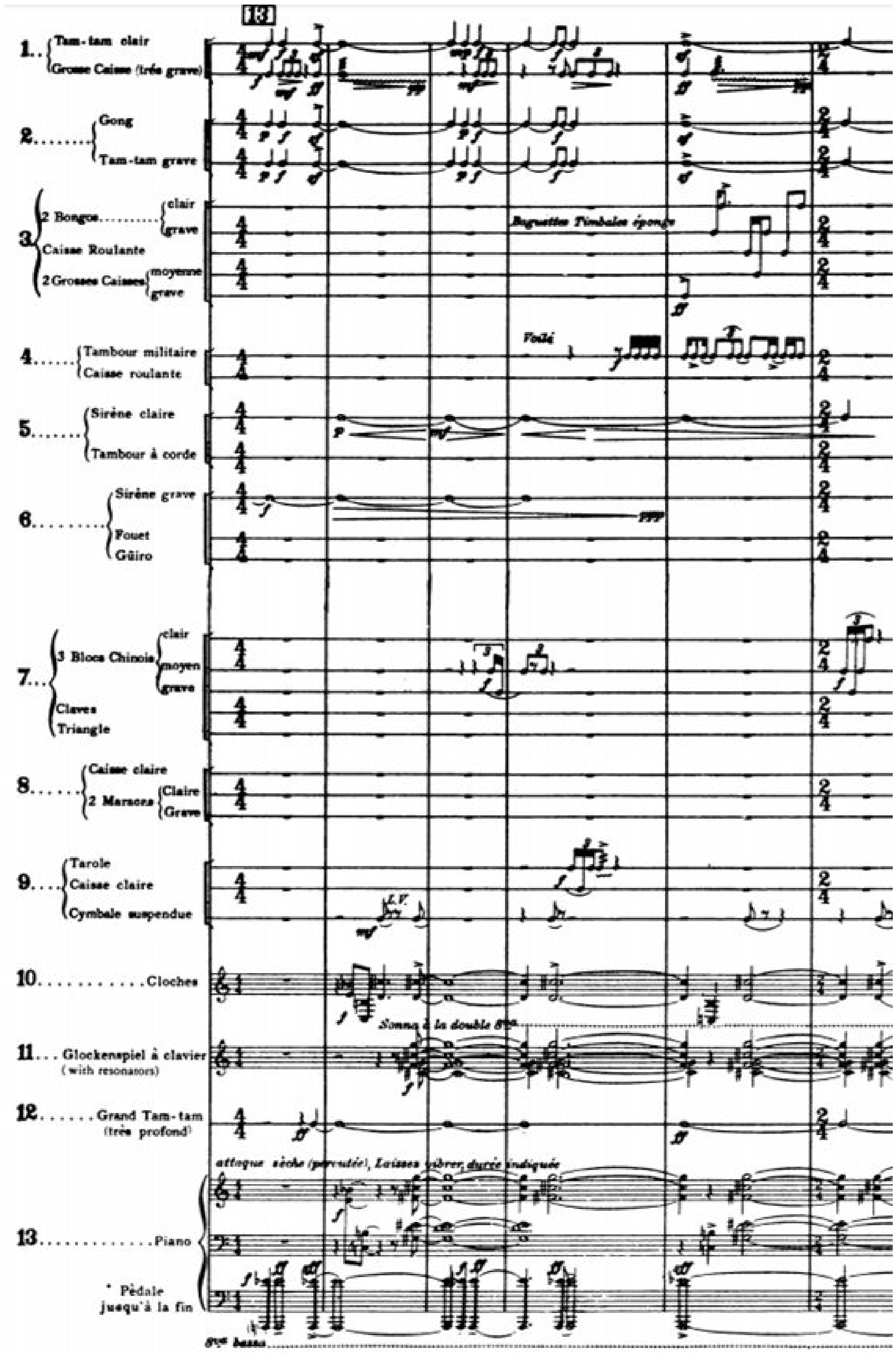

Fig. 8. Edgard Varèse, *Ionisation* (New York: G. Ricordi & Co., 1958), rehearsal 13.

Listeners of Benjamin Britten's *War Requiem* (1962) may recall the orchestral chimes[74] in the opening *Requiem Aeternam*, chiming the quintessential tritone which pervades the masterwork. The chimes introduce religious symbolism, and the tritone interval suggests the unresolved dissonance of the atrocity of war. Also notable is the opening of the *Sanctus* for its bold bell orchestration. Britten channeled his influence of gamelan music here, scoring a composite sound of glockenspiel, chimes, high piano, vibraphone, and "antique cymbals" and using an invented notation which asks for an accelerating roll/tremolo. The result is a bright and brilliant sound.

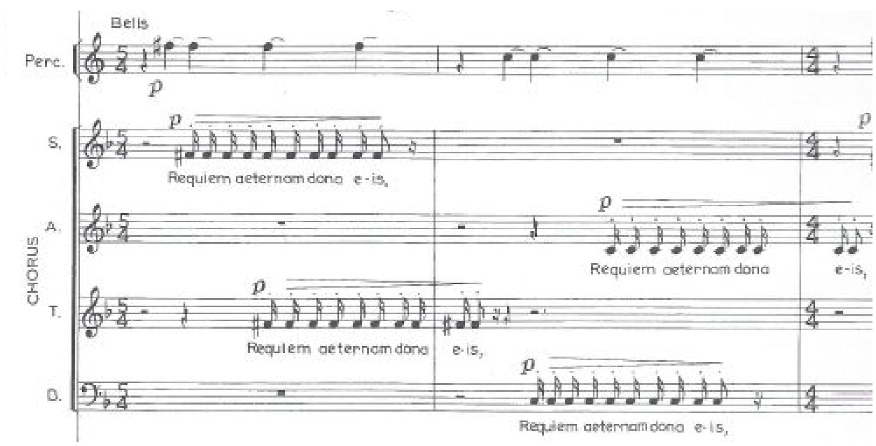

Fig. 9. Benjamin Britten, *War Requiem*, *I. Requiem Aeternam* (London: Boosey & Hawkes Music Publishers Ltd, 1962), bells and chorus, mm. 1–3 (excerpted from the full score).

[74] labeled "bells" in this score.

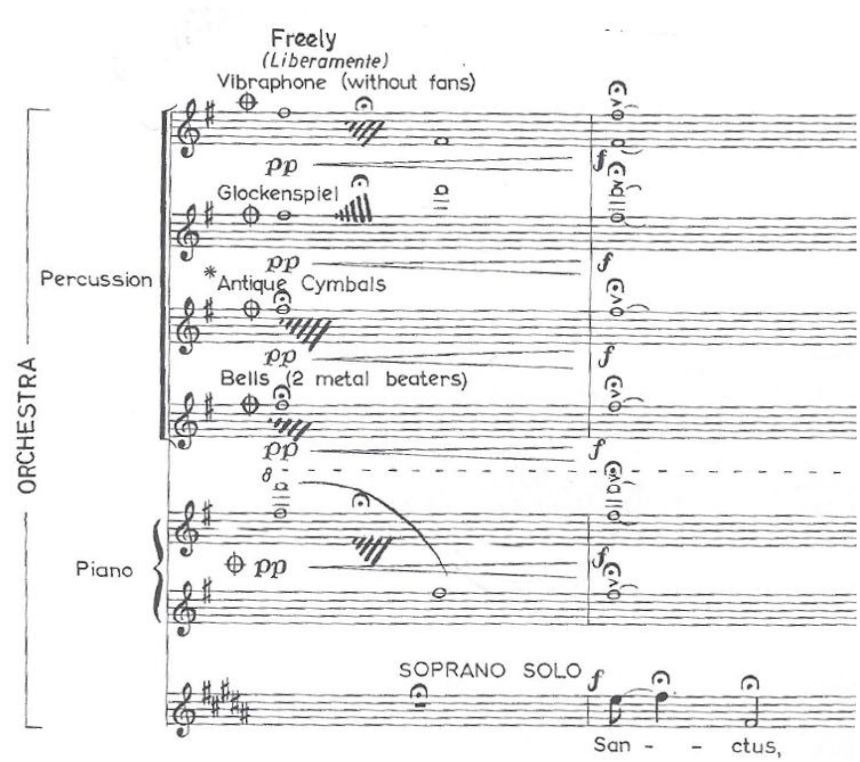

Fig. 10. Benjamin Britten, *War Requiem*, *III. Sanctus* (London: Boosey & Hawkes Music Publishers Ltd, 1962), percussion and soprano, mm. 1–2 (excerpted from the full score).

John Tavener's *Kyklike Kinēsis* (1980) for soprano and cello soloists, chorus, and chamber orchestra features bells as a haunting aura appearing only near the end of a large work. The bells appear in this piece in the final movement "Theosis," subtitled "the ultimate state" or "deification," with a performance note in transliterated Greek reading hesychia (ησυχία), meaning "stillness, tranquility; guarding the mind." This implies the use of bells to evoke spiritual contentment, a common role for the instrument. The type of bells used here is not given in the score. The range later extends to a written G#5, exceeding the range of most orchestral chimes.[75]

[75] John Tavener, *Kyklike Kinēsis* (London: Chester Music, 1980), Front Matter.

Fig. 11. John Tavener, *Kyklike Kinēsis* (London: Chester Music, 1980), rehearsal N.

Chapter 3. Handbells: Functions, Organology, and Early Repertoire

Early Handbells

One curious underlying thread that can be followed through major bell-producing cultures is the hand-held clappered bell. To trace the instrument we now call the handbell serves to summarize the way these cultures considered bells across time and how bells shaped their music-making. Unlike large suspended bells, early handbells were inherently interactive and adaptive. Like other portable instruments, their symbolism and function shaped their surroundings.[76] The Shang dynasty's *duo* fits the description of "handbell" and artifacts have been found, though it was a categorical addition and probably never a sacred ritualistic relic like the suspended chimes of the Shang and Zhou.

From Towers Back into Hands

The English would cast hand-held bells almost 1500 years later as small practice tools so that the change-ringers could see fit to practice their intricate permutation patterns whenever they liked without waking up the whole town; it was also the English who first made music from them, playing "tunes" and not just carillon patterns.[77] This melodic use of handbells likely began in the 18th century; ringing "bands" followed suit and the demand for handbells resulted in more foundries.

In September 1844, the Lancashire Ringers of England gave the first handbell performance in the United States. P. T. Barnum had discovered the group in England and

[76] Ali Jihad Racy, "A Dialectical Perspective on Musical Instruments: The East-Mediterranean *Mijwiz*" (*Ethnomusicology* Vol. 38, No. 1, 1994), 37.

[77] Ron Johnston, *Bell-Ringing: The English Art of Change-Ringing* (Hammondsworth, Middlesex: Penguin Books Ltd., 1986), 30.

marketed them to American audiences. For some performances, Barnum dressed the members in Swiss costume and called them the “Swiss Bell Ringers,” though the reason why is unknown. Inspired by the Lancashire Ringers and other English ensembles, an American ensemble known as the Dunbar Singing Bell Ringers[78] began touring in 1902. They were known for both singing and playing. An American named Margaret Shurcliff, who had acquired handbells from Whitechapel Foundry of England earlier in her life, organized the American Guild of English Handbell Ringers in 1954.[79] Most handbells being played in the United States in the early 20th century were from England or the Netherlands. The two American bellcrafting agencies would patent innovative castings and change the local landscape: Schulmerich Carillon company started making handbells in 1962, and Malmark started in 1974.[80] They both perfected a casting more acoustically pleasing and less overtone-ridden, a move similar to their pre-Han predecessors two and a half millennia ago and half a world away.

New Handbells

Contemporary composers using standardized handbell instruments are often influenced by the various world traditions of bells and their functions, including European tower change-ringing and carillon, ancient Chinese bells, and other ethnographic studies. Standardization of the handbell is a more modern development. Despite the fact that the handbell ensemble’s connection to its vast worldwide historical roots is diminished by ubiquitous overly

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[78] Not to be conflated with the handbell technique “Singing Bell.”

[79] Nancy Jessup and James Walters, *Building a Successful Handbell or Handchime Program* (Dallas: Choristers Guild, 2019), 6–9.

[80] Ivey, 10.

simplified arrangements (often focusing on practicality), leading contemporary composers of concert music for professional handbell ensemble do exist, James Meredith and John Tavener among them. In the latter half of the 20th century, handbells were occasionally used by composers such as Tavener for a shimmering effect or allusion to spirituality. But some standards of handbell ensemble notation are so new that some works from only a few decades ago do not use them. A level system of handbell music set forth by the organizing body HMA (Handbell Musicians of America), formerly AGEHR (American Guild of English Handbell Ringers),[81] sorts published handbell ensemble music by difficulty. Most traditional publishers assign a level to each piece, with Level 1 music limited to very common and simple meters, note values, techniques, dynamic levels, and tempo, and Level 6 music unlimited in these parameters.[82] [83] This system is even more recent than some notation. Composers of handbell ensemble music may work within the level system and standard notation in order to publish traditionally, or experiment outside it; composers experimenting outside these constraints tend to be more relevant for the present study on timbres.

Handbells and handchimes are generally not graduated in quality. There are simple educational types of handbells, handchimes, and the like, much like with other instruments. But unlike other instruments, entire bell sets tend to be too expensive for casual purveyors, and yet no elite tier exists either. It is not easy for a single performer to justify the purchase of a composite instrument on which they will often only play one part. Handchimes are more

[81] Ibid., 10.

[82] The term "traditional publisher" is used here to distinguish from the recent sheet music trend of distributors and self-publishers.

[83] In the handbell and handchime sense, "techniques" encompass the category "articulation."

affordable, but then only as a substitute to play simple handbell music. American handbell and handchime manufacturers (Schulmerich Bells and Malmark Bellcraftsmen) largely make their sets of instruments in one level of quality rather than in levels like beginner, intermediate, professional (etc.), because the bronze alloy and casting technology are not flexible in this regard.[84] The resulting casting quality is good. Since pianos, violins, flutes, etc. have such a wide variety of manufacturers and qualities of make, there are more subtle levels of players between the amateur and professional, as well as more professionals of those instruments. Due to the metallic alloy and the expense restrictions, the handbell ensemble is unfortunately disadvantaged in this respect. Handbell mallet quality is not so restricted, and has improved recently.[85]

Meredith's and others' period of flourishing experimentation continues to the present day. Meredith's concert works are often a result of a synthesis: the newest bell instrument the world has to offer, infused with the oldest bell sounds from around the world.

Organology of the Handbell, the Handchime, and Their Ensembles

Attempts to categorize handbells' place among musical instruments are divergent. In the updated version of the *Hornbostel-Sachs Classification of Musical Instruments* the handbell or handbell ensemble do not have their own explicit designation, but "Clapper bells" are 111.242.122 and "Sets of clapper bells" are 111.242.222. This means that the handbell and the handbell *ensemble* have different Hornbostel-Sachs numbers, favorable to the argument that the ensemble is a distinct instrumentation. However, the handbell and handbell ensemble are not

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[84] According to Kathy Shaw of Malmark, the company has to reject 40% of their castings due to inconsistencies in the casting wall, causing undesired "beating" and less-than-pure sound quality.

[85] The Greig Ashurst Artist Series of handbell mallets offers a top-tier representation.

made distinct from other clapper bells in this list. To do so, the revisors of the list would need to divide by some other aspect of clappered bells, such as size, shape, or playing style. While such division would be favorable, it may prove too granular for a list which aims to encompass all musical instruments in existence.

Handchimes, like handbells, are not called by name in the Hornbostel-Sachs system, but their closest fit is in 111.242.143 (Bells with attached external clappers). The same distinction between handbells and handbell ensembles can be made between handchimes and handchime ensembles; 111.242.243 contains all *sets* of bells with attached external clappers. Using the Hornbostel-Sachs system shows a connection between handchimes and two other instruments of history which were discussed in Chapter 2: the *semantron* of the early Christian church and the lithophone sets like the one uncovered in the Zeng tomb with suspended bells. The list has 111.211, Individual percussion plaques (*semantra*) and 111.222, Sets of percussion plaques (ancient Chinese lithophone sets).

Textbooks tend to place all bells in a pitched-percussion category and use “bells” to mean the standard orchestral options rather than the handbell or handbell ensemble.[86] The 1998 Alfred *Essential Dictionary of Orchestration* does have an entry on handbells. It describes their relative warmth compared to many other bells as “clear bell tones.” The entry is mostly useful to composers using handbells as an adjunctive percussion instrument rather than as an ensemble.[87] Henry Brandt’s *Textures and Timbres* also mentions handbells, listing them in the percussion under “Group III” (Bell-Like Instruments), defined as metal percussion with carry-over. This

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[86] Many Western music textbooks do not mention handbells at all. This is true even of orchestration guides like Samuel Adler’s *The Study of Orchestration*.

[87] James Black and Tom Gerou, *Essential Dictionary of Orchestration* (Los Angeles: Alfred Publishing Co., 1998), 261.

division of percussion instruments by material and by quality of sound decay can be useful for composers; however, when applied to handbells it leaves out stopped techniques which, with such variety, are a great strength in handbell writing. Music written for the handbell ensemble often demonstrates a propensity for contrast between stopped and unstopped techniques. Also, textbooks like Brandt's do not explain the difference between a handbell (or a few handbells) and an ensemble of handbells.[88] This is normally because these textbooks try to explain how the *percussion section* works, and while those instrumentalists could certainly execute a percussion part which includes a few handbells, they do not have the personnel to fill out a medium or large handbell ensemble. Percussionists often make the best handbell ensemble recruits because of their superior timing and rhythm reading, but they need to learn a new set of skills to play with an ensemble. The literature on this learning is largely different from the textbook literature on Western composition, orchestration, and music history.[89] Brandt does, however, aptly inform the reader that handbells have a dynamic range which is relatively soft when compared to most orchestral instruments. He calls this range *p–mf*, implying that a *forte* or *fortissimo* section of handbell writing will blend at *mezzo-forte* with other instruments. This is fair, but to clarify, it is the lower range of handbells which will be covered up by other instruments. The high overtones of the higher range of handbells will tend to cut through other instruments (though not as strongly as the glockenspiel, orchestral chimes, or crotales).[90]

[88]Henry Brandt, *Textures and Timbres: An Orchestrator's Handbook* (New York: Carl Fischer, 2009), 120.

[89] The reader is referred to Robert Ivey: *Handbell Ringing* for such a source.

[90] Brandt, 122.

Introduction to the Excerpts from 1950–2000

The European and American handbell ensemble's history of repertoire can be subjectively divided into three periods, chosen by the author of this monograph to be general and uncomplicated. According to this division, the first period was before the advent of modern casting technology in the mid-20th century. Before this modern technology, instruments and notation varied widely and without standard. The second period of about 1950–2000 is defined by the use of these modern instruments, but the continued lack of most notation standards.[91] A small 1985 handbell composing guide offers a few, but is more helpful in admitting that the genre's standards are new and encouraging composers to "not hesitate to footnote any musical or technical effect which you feel may not be understood clearly by conventional notation devices."[92] In the 1980s and 1990s the AGEHR solved many of the issues of notational standards with American ensembles. Music of the 21st century benefits from a more complete set of notational standards and a growing body of educational handbell and handchime ensemble repertoire; this is the third historical (and present-day) period. This period is the focus for the larger goal of the present study; now that basic notation and good instruments are in place, the stage is set for composers to experiment more. But how did the second period connect the oldest bells and handbells described above to the present day handbells and ensembles? The following is a brief

[91] Composers of concert music occasionally used handbells as a percussive background or an additional decorative part. Among these composers not in this excerpt section are George Crumb (*Star Child*) and Libby Larsen (various works). The notation of some works like Samuel Adler's *Let Us Rejoice* highlight the lack of standardization for handbells in the late 20th century. See the musical score bibliography.

[92] Donald E. Allured, *Handbell Composing and Arranging* (Tustin: National Music Publishers, 1985), 16.

collection of music, either written for or including a handbell ensemble from this second period, which demonstrates some truths about the ensemble that still hold true.[93]

Excerpts from the Handbell Ensemble's 1950–2000 Period

Benjamin Britten's one-act opera *Noye's Fludde* (1957) includes a handbell ensemble, which, along with some recorder, string, and voice parts, was meant to be performed by children. The "intergenerational" opera based on an old play about Noah's Ark was intended for a church audience and included some congregational singing. The idea of handbells as a church instrument is due more to the English analog between handbells and tower bells and less to any specific composition like this one, but the imagined link persists. Britten knew that handbells would not be available for every performance, and considered the use of them as "exotic" as the bugles and beginner double bass players the work also required.[94] Handbells are not used very much in the work, and appear for the first time only after the climactic section. Handbells represent the image of the rainbow which signifies God's promise to Noah.[95]

Lou Harrison's *A Joyous Procession and a Solemn Procession* (1965) is scored for high voices, low voices, two trombones, eight "large handbells," tambourine, gong, and bass drum with optional festive jingles and other percussion. The written pitch of the gong is indefinite and without clef, suggesting that a tam-tam is preferable. The handbell part is also notably without

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[93] In this section and all following chapters, I make no claim about who "invented" or first published a piece with a new technique. The inclusion of an excerpt or note about a piece of music or musician here does not imply the *only* origin of the technique or its timbre.

[94] Philip Reed and Mervyn Cooke, ed., *Letters from a Life: The Selected Letters of Benjamin Britten, vol. 5* (Woodbridge, Suffolk: Boydell Press, 2010), 56.

[95] Joshua Hawkins Nannestad, *Benjamin Britten's* Noye's Fludde: *An Analysis and Repositioning for Contemporary Use* (DMA Thesis, Boston University, 2014), 39.

pitch or clef; performing instructions denote that handbell pitches are chosen to fit the musical mode. The handbells are used only in the second part, *A Solemn Procession.* Hand-drawn figures holding instruments appear to the left of the two scroll-like score pages. These figures suggest a typical arrangement of each handbell ringer playing two bells, one in each hand. Music would be memorized so the players could process across the hall. This piece is unusual in not specifying the handbell pitches. It is also unusual in its use of only large handbells; practically, small handbells pierce a musical texture better.

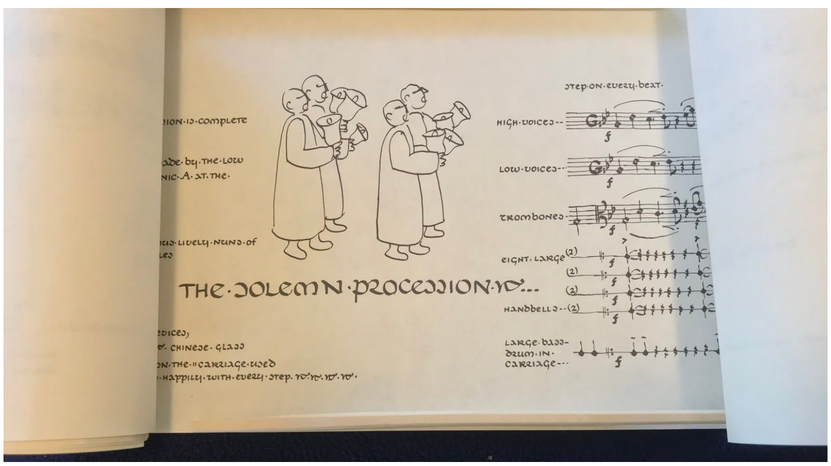

Fig. 12. Lou Harrison, *A Joyous Procession and a Solemn Procession* (New York: C. F. Peters Corporation, 1965), opening of the second procession. The score is a narrow and long scroll.

Daniel Pinkham's *Song for the Bells* (1969) is a short piece "For Handbell Choir." This terminology introduces a small dilemma: is the handbell ensemble the same thing as a handbell "choir?" To this day, most amateur handbell musicians themselves do not distinguish between the two words and tend to use "choir" as a simpler way to explain the group. But "choir" suggests multiple performers on the same part, and this is not the case with a single handbell or handchime group. "Choir" is also a term that does less to promote professionalism.[96] In

[96] In Great Britain, this problem is mostly moot; the ensembles are called "teams."

Pinkham's piece, the writing is not at all like a modern score. Bells out of range on the low end are bracketed *8va* (a symbol not used for modern ensembles in this way) with a footnote of explanation. The texture is not chordal and thick, as would be expected for effective modern writing. Instead, it is mostly linear with not even two bells ever striking at once. This difference from the modern style suggests that the instruments Pinkham worked with could have been more classically loud and had bright high overtones. Or, he may have simply preferred the thin texture. It is unclear if the slurs denote legato playing, gradual damping, or let-vibrate sections. Expression and tempo markings and dynamic changes across the score, however, support the idea that Pinkham had good-quality instruments which may have been modern handbells, capable of a range of dynamics. Published pieces this old for the handbell ensemble are rare.

Fig. 13. Daniel Pinkham, *Song for the Bells* (New York, New York: C. F. Peters Corporation, 1969), mm. 45–50.

John Tavener's *Innocence* for soprano, tenor, and cello soli, chorus, handbells, and organ (1998) uses some handbells in a common way with a common approach to notation; unconnected ties show that the instruments should not dampen (a technique now standardized with one **LV** marking and no unconnected ties necessary). As in other Tavener works like Tavener's *Kyklike*

Kinēsis, bells are saved until the delicate ending. The performers are positioned antiphonally, with a "group of Angels" as sopranos, altos, and handbell players which should be "stationed at a great distance." *In Memorium* [sic] *Igor Stravinsky* for two alto flutes, chamber organ, and handbells (1971) has a similarly written handbell part, also seen here.

Fig. 14. John Tavener, *Innocence* (London: Chester Music, 1998), rehearsal O.

Fig. 15. John Tavener, *In Memorium* [sic] *Igor Stravinsky* (London: Chester Music, 1971), mm. 19–23.

Chapter 4. Handbell and Handchime Timbre Dictionary

Foreword to the Handbell and Handchime Timbre Dictionary

The following is an aggregation of possible techniques for single handbell or handchime (currently used by and conceivable to the author and interviewees in this study[97]), which result in timbres distinct from those of any other technique. The Handbell and Handchime Timbre Dictionary is not a notation guide, but rather a timbre guide arranged by technique.[98] For a notation guide which catalogues standard techniques and engraving rules, the reader should seek the *Handbell and Handchime Notation, Difficulty Level System, and Solo and Ensemble Notation* guide published by Handbell Musicians of America. Notations and techniques which are considered standard are those which appear in the HMA guide.[99]

The Handbell and Handchime Timbre Dictionary contains a list of handbell and handchime techniques organized by how the sounds are physically made, and a following discussion to clarify points about the sounds and their techniques. In the list (Chapter 4a), techniques are sorted within subcategories by commonness in the repertoire. Part 1 lists the handbell sounds by technique, and part 2 lists the handchime sounds by technique. Both Parts contain five Sections divided by sound type. Section I of both parts contains discrete timbres which result in sustain made by striking a handbell or handchime on the casting or tines, Part II is as Part I except with sounds on parts other than the casting or tines, and Part III contains

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[97] With the help of suggestions by many professionals, credited in the acknowledgements.

[98] It is also not a performance guide; it is not intended to teach proper technique, but rather to describe the general means of sound production. Readers must seek other sources for imagery and video examples of standard techniques (such as those by Sharik and Berry in the bibliography).

[99] Behnke, John et al, *Handbell and Handchime Notation, Difficulty Level System, and Solo and Ensemble Notation* (Cincinnati: The American Guild of English Handbell Ringers, Inc., 2017), 27–29.

timbres which are made through continuous sound production. Part IV contains sounds distinguished by their modulation during sound emission and after a typical attack. Part V contains sounds distinguished by their damping method after a typical attack. The following description sections (4b and 4c) are brief and simple explanations of the timbres (in order of their appearance on the list) geared toward composers. Readers may use the dictionary's two parts to refer to each other; readers may look for the method of production of a technique and then find its timbre in the description section, or they may look for a timbre in the descriptions and go back to find its technique.

Notes on Similar Sounds, Measurement Assumptions, and Octave Terminology

It is expected that a padded table is present. All other foreign objects are indicated. When no bell position, movement, or technical application is noted, a neutral state is assumed: static, with the casting upright, held well above the table. These conditions are set so that all techniques can conceivably be performed by a member or members of an ensemble. Note that some of the uncommon techniques, if applied with too much force, could damage the instruments. All sounds were measured on instruments which were adjusted in a typical manner; the clapper, which is on a spring, comes to rest off of the casting and not touching it even when the clapper is at rest; the clapper is set to a moderate tightness so that ringing forward is easy. Ringing backward must be possible to perform a shake, and the clapper's beater is set on a moderate hardness. Therefore, distinctions on the physical orientation of the casting are important; the casting emits sound primarily outward from its walls. Also important is the bell's position with respect to the table. The effectiveness of all timbres is measured by their quality from a listener's perspective in front of the table. Regarding movement during sound emission, many standard and nonstandard techniques are defined by the handbell's motion after a strike; in measuring the sound from these techniques, it is assumed that a strike was originally performed **R** (ring; the default playing technique). It is assumed that the ring was performed above the padded table and in the open air. Playing the handbell or handchime inside a resonating chamber or while pointing it or holding it in a different position are all labeled as distinct techniques and timbres. The measurements here and in Chapter 6 were mostly made on Schulmerich handbells. When a technique produces different results on a Malmark handbell, the results are noted.

Some pairs or groups of standard techniques have associated timbral characteristics which are related, but other pairs or groups of sound-producing methods result in the same or scarcely distinguishable sounds. Therefore, only methods which result in distinct sounds are included. The difference between two related techniques may exist on a technique gradient with infinite shades in between; in these cases, two or more sufficiently contrasting techniques were selected. In other cases, a single technique spins out into many possible timbres depending on the material of an object, or the exact place of the casting struck; when a second field of possibility intersects, the duplicated technique is not described twice. For example: though different mallet types make different timbres on the same bell, and malleting a bell partially submerged in water produces a distinct timbre, using *different* types of mallets to strike a submerged bell is not discussed since the mallets are discussed in their most common setting.

All preceding pitch labels in the historical sections (Chapters 2–3) used the octave designation from the Acoustical Society of America (middle C = C4). It is not always clear in historical sources what the sounding octave of some bell parts were meant to be, so in those chapters the referenced pitch is always the written one. However, when referring to contemporary handbell and handchime notation, the rest of the chapters use the HMA system in standard use (written middle C = C5). Handbells and handchimes are transposing instruments which sound an octave higher than written.[100] In this system, all pitches will be labeled as they would be referred to by handbell musicians. Written C5 is written as middle C, and this is the handbell and handchime which has “C5” printed on its handle. Incidentally, this does mean that the *sounding pitch* of a handbell or handchime matches the Acoustical Society of America label on its printed handle.

Fig. 16. Handbell and Handchime octave designations for written pitches.

What Is Not in the Handbell and Handchime Timbre Dictionary

The Handbell and Handchime Timbre Dictionary is designed to catalogue only distinct sounds playable on a single instrument. Not included are the composite sounds possible only through a combination of these distinct single-instrument sounds. So, no “orchestrational” effects related to the ensemble combination of multiple handbells, handchimes, or both are included (such as Trill, Rolled Chord, Handbell Trees, Selective Damp for chord notes, and nonstandard

[100] This notion is acoustically arguable, but, for all present purposes, accurate.

combined effects).[101] Such inclusions would need their own lists. Also, sounds made by executing two or more techniques consecutively are not included (such as **RSB**, which denotes a Ring immediately followed by Singing Bell).[102] Furthermore, sounds made possible by using other objects to strike the nearby padded table or other objects (or bodies!) are not included, because in these cases the handbell or handchime is left out entirely. Finally, sounds made via amplification are not included. Only acoustically produced sounds are included, though it will be demonstrated in Chapter 6 that some interesting techniques, being naturally too soft for projection, are probably underused in compositions, and could be used more effectively with amplification. The issue of amplifying handbells in recording or performance is fraught with complications, however, and not discussed here. The topics of amplifying and electronically manipulating handbells and handchimes for timbral effect are promising but too broad for the scope of this study, and are thus not discussed here.

Legend and Disclaimer

All possible timbrally-distinct techniques are shown with underlined terms preceded by leaders (.......). These terms represent sounds and techniques for which there is (or may be invented) graphic notation and/or a written technique direction in a musical score. When a technique and its notation are standardized, **boldface abbreviations** and their symbols indicate their notation(s) in the most common form, and its *term is italicized*. Standardized terms appear with the capitalization that they receive in the *Handbell and Handchime Notation* guide.

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[101] Behnke, 10–26.

[102] Lists of such items would become exponentially large, so in lieu of them, score excerpts of notable ensemble techniques and two-or-more-in-a-row techniques are used in Chapter 5, Part 3. One exception is a Rim Brush which follows a Rim Damp; this is a technique which produces a different timbre than a Rim Brush alone.

Nonstandard techniques are <u>underlined and not italicized</u>; when these techniques are rarely found in the repertoire, their names are either given or assumed by the author of this study or other composers. These techniques are not given title capitalizations when their titles are long and descriptive, but they are given title capitalizations if the name sounds titular (<u>Table Damp</u>, for example). It can be assumed that techniques without standardized notation in the Handbell and Handchime Timbre Dictionary are not commonly employed. Techniques which are described [in brackets] rather than underlined are those which produce sounds too negligibly different from others, where the others are used for greater ease. These techniques, therefore, do not produce a distinct sound. References (completely inside parentheses) denote sounds which fall almost in that place in the list but are better categorized according to the reference. Techniques which can damage the instrument if performed forcefully or incorrectly are marked with the symbol ⚠. This symbol is not used for techniques like martellato which cause less danger when done incorrectly, very harshly, or on bells of the wrong size (often too large); the symbol is reserved for techniques which are limited by how few dynamics or bell sizes on which they can be safely used. Note that *standard* handbell and handchime technique safety (both for mechanical and human wellness) is not discussed for standard techniques (this is not a guide for performance of standard techniques!).[103] The reader is warned that this chapter raises concern with the symbol ⚠ (and explains the concern in the description sections) for only nonstandard techniques with concerns, and the reader is advised to use the HMA guide for healthy performance descriptions. <u>*Disclaimer: proceed with extraordinary caution when attempting all nonstandard techniques. They are not sanctioned by the handbell manufacturers*</u>. Techniques with multiple names are

[103] The highlighted ⚠ denotes techniques which can easily cause damage to the instrument and must be done extremely softly to avoid damage, but are included because of their timbral colorfulness.

referred to by their most recently standardized name. The components of the handbell and handchime referenced in the next chapters are labeled below:

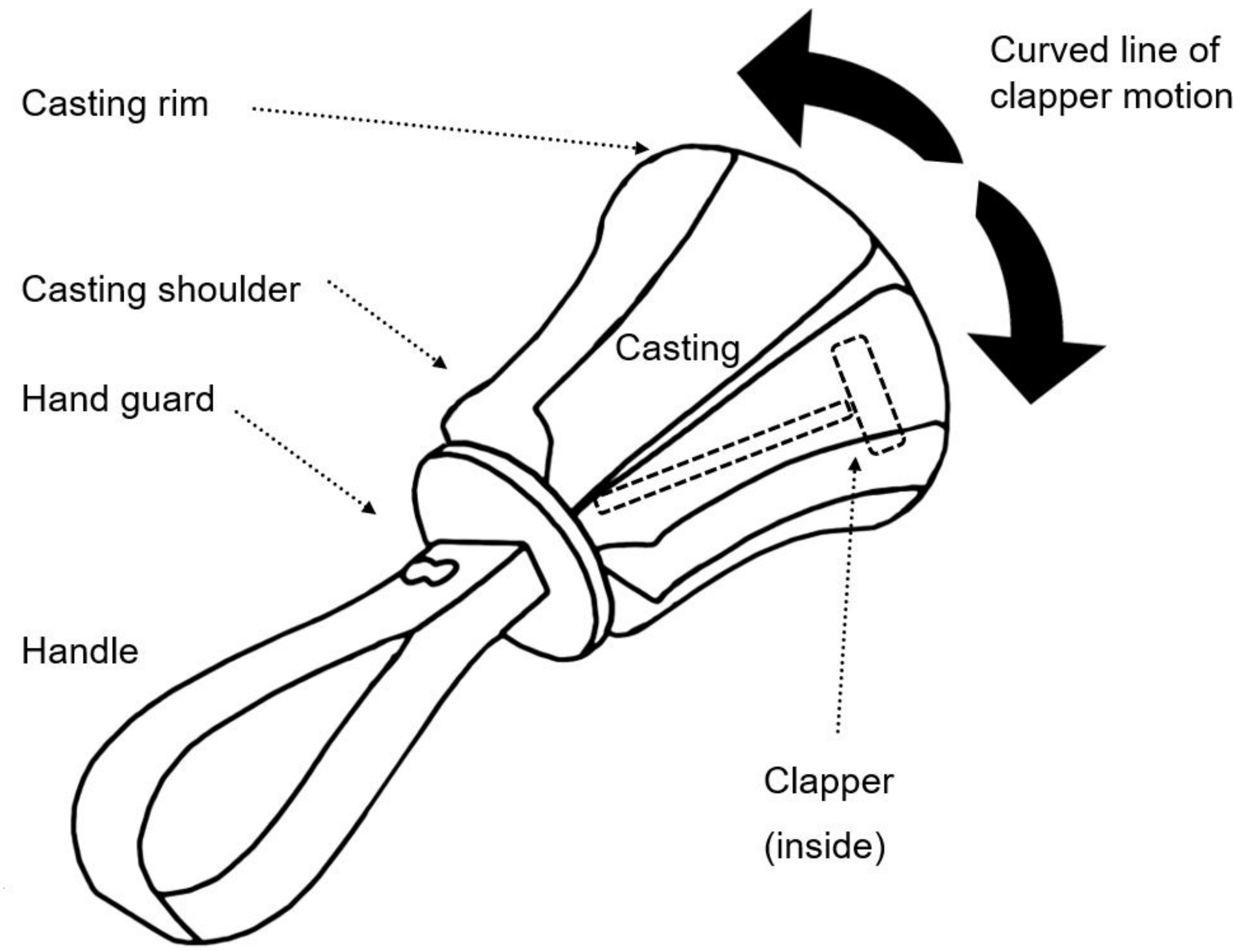


Fig. 17. Handbell model (A Familiar Ring, 2012) with labels added. Used with permission.

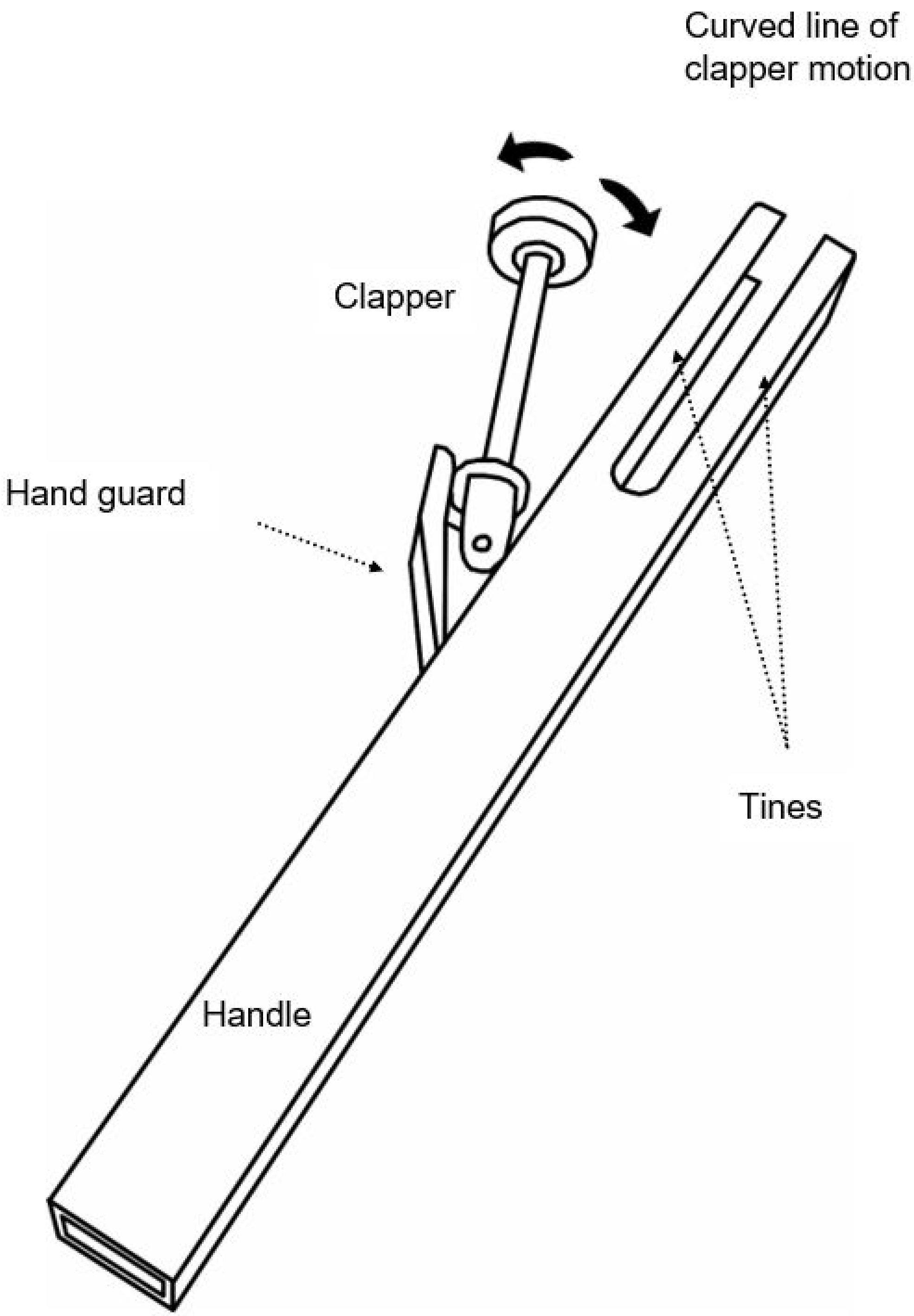


Fig. 18. Handchime model (A Familiar Ring, 2012) with labels added. Used with permission.

4a. List of Sounds and Associated Techniques Possible on a Handbell and Handchime by Method of Sound Production, Sound Modulation, and Sound Damping

Part 1: Sounds and Associated Techniques Possible on a Handbell

I. Discrete and undamped sound production of a handbell by striking the casting
   A. Clapper strikes casting
      1. From clapper inertia forward
         a) Via arm movement, without touching the clapper
            (1) Upright (default playing technique): **R**, **LV** ……..……….. *Ring*
            (2) Parallel and close to padded table…..….. Ring near table, parallel
            (3) Obscured behind table……………………….... Ring behind table
         b) Via arm movement, without touching the clapper, hand on the handle pressing casting into soft surface (and away, to avoid immediate damp)
            (1) Into a padded table, lifting quickly (*martellato* with lift back off padded table): ▼↑……..…………………. *Martellato (Mart) Lift*
            (2) Into a padded table, lifting slowly (*martellato* with lift back off padded table)…………..………… Slow Martellato (Mart) Lift
            (3) Into clothing on the body………..Martellato (Mart) Lift on body
         c) Via flick of the clapper with finger
            (1) [suspended clapper-flick, as a pluck in the air, negligibly different from **R**]
            (2) One hand on the handle pressing casting into soft surface (and away, to avoid immediate damp), and the other hand flicking the clapper
               (a) Into padded table: **Pl·**↑ (or ·↑ with footnote) …………………...……..…….…….…….….. *Pluck Lift*
               (b) Into performer's clothing…………e.g. Pluck Lift on leg
      2. From clapper inertia backward..…..…..…..…..…..…..…..…..…... Back Ring
      3. With clapper forced to remain against casting by finger (see section V)
   B. Mallet strikes casting (and bell is not immediately damped)
      1. Mallet strikes casting in the center, equivalent to the clapper strikepoint: **+** , **Mallet**…………………………………………... *Mallet Suspended Handbell*[104]
         a) Soft yarn (mallet size appropriate to very large bells)
         b) Medium/medium-hard yarn (mallet size appropriate to medium-large bells)
         c) Medium/medium-hard rubber or acrylic (mallet size appropriate to medium-small bells)
         d) Hard rubber or acrylic (mallet size appropriate to small bells) ⚠

[104] The standard malleting technique is to strike roughly the area of the casting on the outside where the clapper hits on the inside. Though there are many timbres listed here with the use of different mallets and the striking of other parts of the casting, there is only one technique underlined at the top of each section in I.B.1–4. For I.B.1, using the appropriate mallet size for each handbell is standard; using mallet sizes which do not correspond to bells is not standard. In each subsequent technique that uses mallets, assume that most of the wide timbral variety is possible and doubled through combination with the subsequent technique.

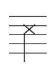
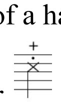
2. Mallet strikes casting on the rim (lip)..……..…. Mallet directly on the casting rim
    a) Soft yarn
    b) Medium/medium-hard yarn
    c) Medium/medium-hard rubber or acrylic
    d) Hard rubber or acrylic ⚠
3. Mallet strikes casting NEAR the rim (lip)..............….....….... Mallet near the rim
    a) Soft yarn
    b) Medium/medium-hard yarn
    c) Medium/medium-hard rubber or acrylic
    d) Hard rubber or acrylic ⚠
4. Mallet strikes casting at the shoulder (by the handguard) .... Mallet at the casting shoulder
    a) Soft yarn
    b) Medium/medium-hard yarn
    c) Medium/medium-hard rubber or acrylic
    d) Hard rubber or acrylic ⚠

C. With bell on table, mallet strikes casting and lifts up (mallet size, casting location: I.B.1–4): +↑ , **Mallet Lift** .... *Mallet Lift Handbell on Table*[105]

D. Other foreign object strikes casting
1. ......…......………... Strike casting with hard thin wood or like material (chopstick)
2. ......….... Strike casting with hard thin plastic or like material (butt end of mallet)
3. ......…......…..........…......….........…......…............ ⚠Strike casting with thick dowel
4. ......…......….........….........….......…......…..........…....... ⚠Strike casting with cymbal

E. Casting strikes another musical instrument
1. .....…......…..........…......….........…........... ⚠ Strike two handbell castings together
2. .....…......…..........…......….........…......... ⚠ Strike casting with handchime handle
3. Mallet strikes dry part of a handbell casting partially dipped in water[106] (bell must not be vertical)⚠
4. ....…......…......…......…....... Strike partially-submerged bell with mallet; leave in
5. ....…......…......…......….......….... Strike partially-submerged bell; then pull out
6. .... Strike partially-submerged bell, then move up and down for a vibrato

II. Discrete sound production of a handbell by striking other areas

(suggested notation:  or )[107]

A. .... Strike the handle with a soft object
B. .... ⚠Strike the handle with a hard object
C. .... Strike the handguard with a soft object
D. .... ⚠Strike the handguard with a hard object

[105] For this sub-category on malleting handbells on the table, assume that a standard size mallet was used. Refer to I.B.1–4 to see that all strikepoints on the casting and all varieties of mallet sizes relative to bell sizes are also possible here.

[106] For this sub-category on striking a dipped casting with a mallet, assume that a standard size mallet was used. Refer to I.B.1–4 to see that all strikepoints on the casting and all varieties of mallet sizes relative to bell sizes are also possible here.

[107] But still requiring a footnote in the score, explaining A–F in the sub-category.

E. Strike the clapper top with soft or hard object [produces a less distinct version of A–D, and can possibly damage the clapper]

III. Continuous sound production of a handbell

A. With its clapper, hitting the front and back inside of the casting via wrist shake

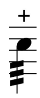
1. As fast as possible: **Sk,** …………………………………………*Shake*

2. Slower (results in same timbre as **R**)

B. With two alike objects in a single-stroke roll (see I.B–E for all mallet timbres)[108]

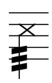
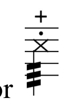
1. On the casting

a) With the handbell suspended, not on table …….……….……….……….……….*Mallet Roll on Suspended Handbell*



b) With the bell resting on a padded table…….……….…….……. *Mallet Roll*

2. On the handle……………………………………………………… Roll on handle

(suggested notation:  or )

C. Shaking ("stirring") one mallet or stick around in the inside of the casting, bouncing off inner walls (footnote recommended in score)[109]........ Roll with single mallet inside casting

D. Rubbing a wood or hard rubber dowel around casting rim

1. Smoothly to produce no attack or the illusion of none: **SB**…………..*Singing Bell*

2. Allowing the dowel to produce a buzzing sound…...….Singing Bell with buzzing

E. Bowing the casting rim with a string instrument bow: **arco**…....……..... Bowed Handbell

F. ……………………………..… Rub/scrape a soft superball (on a stick) or very soft rubber mallet back and forth along the inside of the casting from near the shoulder to near the lip

G. Metal object rolling/sliding

1. ……………………………………………….. Spin coin around inside the casting

2. ……………………………………………..... Spin paper clips around in the casting

3. …………………………………………...… Slide a coin slowly out of the casting

4. ……………………………………….... Slide paper clips slowly out of the casting

IV. Modulation of the sustain sound of a handbell after a discrete **R** attack (after clapper strikes casting)

A. Performer moves handbell through the air

1. Without tipping the casting more than a few degrees

a) In a fluid, vertical circle (typical stylistic ring for a pleasing tone quality)[110]…………...…………………………..... *(Typical ringing shape)*

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[108] For this sub-category on rolling, assume that a standard size mallet was used. Refer to I.B.1–4 and I.D for variables.

[109] For this sub-category on rolling, assume that a standard size mallet was used. Refer to I.B.1–4 and I.D for variables.

[110] This technique is not typically notated in handbell music; it is up to the musicians to choose movements which suit their default ringing style.

b) Wiggling side-to-side: ***vib.*** ……………………………………... *Vibrato*

2. Sagittally and vertically[111]

a) Full-arm, back behind the performer, then out front again: **Sw** , ↓↑ ………………………………………………………………...….*Swing*

b) Beginning below the table line, then elevating out front (attack note needs asterisk, swing-up note needs the symbol ↑ vertically aligned)…………………… Ring (down and) behind table, then swing up

c) Start the stroke over the head................................ Ring straight overhead

3. In a circle, rotating the upper arm and wrist, pointing the clapper outward

a) Horizontally: ………………………………………………….…...….*Gyro*

b) Vertically: **§** ……………………………………….......…. *Spiral Gyro*

B. Thumb, fingers, or some of the hand alters the timbre (but does not immediately damp)

1. Already applied before attack, muting quickly (see Thumb Damp, V.B.1.b)

2. Already applied before attack, muting slowly to allow sound …………………………………………………….…Low-Pressure Thumb Damp

3. Gradually applied after the attack: **CD**………….………..Controlled Diminuendo

C. A resonant field alters the timbre

1. Mouth "wah"s near casting rim to produce vibrato……………...... Mouth Vibrato

2. By playing (or playing then dipping) inside a resonant cavity

a) Inside a large ceramic pot[112]……………….... Ring inside a hollow pot...etc.

b) (Inside another bell or bell-shaped cavity[113])

D. Applied foreign object alters the timbre

1. The object is applied after the attack

a) Table pad

(1) Pressed in then immediately lifted ……..……...……..*Echo*

(2) Brushed gently then lifted, for a ***fp*** effect…… Table Brush Damp

(3) Rim pressed lightly into pad……….……….…...…... Rim Damp

(4) Rim brushed across pad, toward performer

(a) After Rim Damp................Rim Brush (after Rim Damp)

(b) Not after Rim Damp......................................Rim Brush

(5) Rim and shoulder pressed into pad (see V.D.1.a.1)

b) The performer's clothing

(1) Pressed in then immediately lifted (with footnote) ……………...………………………………….. Echo on clothing

(2) Brushed gently then lifted, for a ***fp*** effect…….……. *Brush Damp*

(3) Rim pressed lightly into clothing....……...Rim Damp on clothing

(4) Rim and shoulder pressed into clothing (see V.B.1)

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[111] Note here that endless variations could be made (for example, swinging back but not forward, back and forward twice, etc.), but two contrasting combinations of actions are chosen.

[112] The resulting sound is more muted than "resonated."

[113] Ringing a handbell inside another larger handbell's casting or inside a drum seems not to produce much sympathetic vibration from the larger instrument.

c) Water ⚠
   - (1) ……….Casting rim and part of side is dipped in water and left in
   - (2) ………Casting rim and part of side is dipped and lifted back out

d) Casting rim touches a string or membrane
   - (1) ⚠Casting rim touches a piano string with damper pedal applied
   - (2) ………………Casting rim touches a drum until sound is damped
   - (3) …………………………… Casting rim Brush Damps on a drum
   - (4) … Casting rim touches a drum or container with loose parts (rice, snares)

2. The object was previously applied to the casting

a) Rubber band is wrapped around casting
   - (1) Wrap a firm and wide rubber band around and across casting rim
   - (2) ……..Wrap a firm and wide rubber band around casting shoulder

b) Elastic cloth or gauze fastened (around casting)
   - (1) …………………………. Fasten elastic gauze around casting rim
   - (2) …………….. Fasten elastic gauze around casting close to the rim
   - (3) ………….……….... Fasten elastic gauze around casting shoulder

c) Coins are placed inside ………………....… ⚠Place coins in the casting

d) Paper clips are used
   - (1) ....Place paper clips in the casting
   - (2) ……....... String paper clips together and tie string around casting

e) Spring-type wooden clothespin(s) (pegs) are applied to the casting rim
   - (1) ………………... Apply the end of a clothespin on the casting rim
   - (2) …….. Apply a clothespin tightly on the casting rim, without buzz
   - (3) ………………………..…………………………Apply a clothespin on the casting rim, allowing the metal spring to buzz

f) Aluminum foil…..Apply foil around entire casting or much of the casting

V. Damping of a handbell sound after or during sound production (sounds defined by damping method)

A. After ring (**R**), sound releases passively: **LV** [114] (or very long note duration).... *Let Vibrate*

B. After ring (**R**), upright casting touches performer's clothing

1. Standard damping technique: precisely after written note duration, or at ⌖ or //, or after duration of a note with the symbol attached to its stem during an **LV** section (⌖) ...………………………………………………………… *Damp*
2. Slowly……………………………………………………………...…… Gradual Damp
3. As quickly as possible after attack: **RT** (or staccato articulation(s) with footnote) …..…..…..…..…..…..…..…..…..…..…..…..…..…..…..……..*Ring Touch*

C. Casting is damped by finger(s), hand(s), cloth

1. Finger damp
   - a) Slowly (see Low-Pressure Thumb Damp, IV.B.2)
   - b) Ord.: **TD** (or staccato articulation(s) with footnote)….……. *Thumb Damp*
2. Hand damp
   - a) Whole hand (after letting ring) ……………… Hand Damp after duration

[114] Note that in handbell notation, the LV sign often still results in active damping if cancelled by an **R** sign or new **LV** sign.

b) Whole hand (completely stopped): **HD** …………..……….. *Hand Damp*

3. Cloth damp [negligible from Damp on shoulder]

D. After ring (**R**), casting is damped by padded table

1. Casting comes down to touch table

a) After a discrete **R** attack, to end vibration

(1) To rest on a padded table……..………...……….... Table Damp

(2) Touching rim to pad only (see rim damp, IV.D.1.a.2)

(3) To rest on wax paper...…...….. Damp onto wax paper on table

(4) To rest on a sheet of foil on wax paper ……………….. Damp onto aluminum foil on wax paper on table

2. Casting is turned clapper-down and pressed into table

a) Quickly: **TLD**…...…………………..………………..... *Table Land Damp*

b) Slowly…….…………………….....……….…... Table Land Damp, slow

c) Very slowly…….…………………....….. Table Land Damp, very slow

E. Sound is caused by clapper forced to remain against casting by finger of other hand ……………………………………⚠ Press clapper into casting and hold against casting

F. Sound is caused by clapper inertia into damping surface (without lifting after)

1. Clapper inertia is caused by inertia of the whole bell falling down parallel to table

a) Via arm movement, without touching the clapper, hand on the handle pressing casting into soft surface (and leaving it there, to damp)

(1) Into a padded table

(a) Not using the other hand: ▼…………*Martellato (Mart)*

(b) Muting the casting with one or more fingers of the other hand ⓿ …………………… *Muted Martellato (Mart)*

(2) Into clothing on the body……..……..... Martellato (Mart) on body

2. Clapper inertia is caused by flick of the clapper with finger

a) While resting on table

(1) Firmly, with the pad of the thumb: **PL** (or staccato articulation(s) with footnote)..…... *Pluck*

(2) Lightly and swiftly, with the edge of the thumb: **TPl** (or staccato articulation(s) with footnote)……………...……….... *Tap Pluck*

(3) While resting on performer's clothing…………e.g. Pluck on leg

3. Clapper is forced to remain against casting by finger (bell on table) ……..⚠ With bell on table, press clapper into casting and hold against casting

G. Mallet strikes casting while bell is on table (mallet size, casting location: I.B.1–4): + , **Mallet** , **Mal.** (or staccato articulation(s) with footnote)..........*Mallet Handbell on Table*[115]

H. Other foreign object strikes casting while bell is on table (+ with footnote)

1. ......…....................Strike casting with hard thin wood or like material (chopstick)

2. .... Strike casting with hard thin plastic or like material (butt end of mallet)

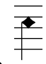
3. ......…....…........…....…........….................... ⚠Strike casting with thick dowel

[115] For this sub-category on malleting handbells on the table, assume that a standard size mallet was used. Refer to I.B.1–4 to see that all strikepoints on the casting and all varieties of mallet sizes relative to bell sizes are also possible here.

Part 2: Sounds and Associated Techniques Possible on a Handchime

I. Discrete and undamped sound production of a handchime by striking the tine

A. Clapper strikes tines from clapper inertia via arm movement

1. Upright (default playing technique): **R**, **LV**,  notehead if distinguishing from handbells ……..........…..…...…...…...…...……………………………….…....... *Ring*
2. Parallel and close to padded table………….......... Ring near table, parallel
3. Obscured behind table…………………………................. Ring behind table

B. Mallet strikes tine (and chime is not immediately damped)

1. Mallet strikes tine in the center, equivalent to the clapper strikepoint: **+** , **Mallet**………………………..……....... ⚠Mallet Suspended Handchime[116]
   a) Soft yarn (mallet size appropriate to large handchimes)
   b) Medium/medium-hard yarn (handbell mallets[117]) ⚠
   c) Medium/medium-hard rubber or acrylic (handbell mallets) ⚠
2. Mallet strikes tine on the side.....……………….... Mallet the side of the tine
   a) Soft yarn ⚠
   b) Medium/medium-hard yarn ⚠
   c) Medium/medium-hard rubber or acrylic ⚠
3. Mallet strikes tine over the edge......... Mallet over the top of the tine edge
   a) Soft yarn ⚠
   b) Medium/medium-hard yarn ⚠
   c) Medium/medium-hard rubber or acrylic ⚠
4. Mallet strikes tine near the split of the tines .... Mallet on body near handguard
   a) Soft yarn ⚠
   b) Medium/medium-hard yarn ⚠
   c) Medium/medium-hard rubber or acrylic ⚠

C. Other foreign object strikes tine

1. ......…..... ⚠Strike tine with hard thin wood or like material (chopstick)
2. ... ⚠Strike tine with hard thin plastic or like material (butt end of mallet)

D. Tine strikes another musical instrument: ⚠ Strike tine with handbell casting (See Handbells, I.E.2)

E. Mallet strikes dry part of a handchime tine partially dipped in water[118] (then pulled out)⚠…....…………...... Strike partially-submerged handchime; then pull out

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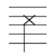
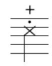
[116] Though there are many timbres listed here with the use of different mallets and the striking of other parts of the tines, there is only one technique underlined at the top of each section in I.B.1–4. Many mallets are not designed to strike handchimes, so most results must be measured only softly.

[117] Since medium and small sizes of handchimes are rarely malleted, handbell mallets or other like percussion mallets are used.

[118] For this sub-category on striking a dipped handchime with a mallet, assume that a standard size mallet was used. Refer to I.B.1–4 to see that all strikepoints on the casting and all varieties of mallet sizes relative to bell sizes are also possible here.

II. Discrete sound production of a handchime by striking other areas

(suggested notation:  or  [119])

A. .... Strike the handle with a soft object

B. ....⚠ Strike the handle with a hard object

C. .... Strike the handguard with a soft object

D. ....⚠ Strike the handguard with a hard object

III. Continuous sound production of a handchime

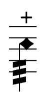
A. Shaking ("stirring") one small hard mallet or stick around in the inside of the tines, bouncing off inner walls (footnote recommended in score)

B. .... Roll with single mallet inside tines

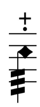
C. With two alike objects in a single-stroke roll (see I.B–E for all mallet timbres)[120]

1. On the tine(s)

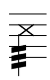
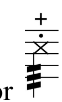
a) With the handchime suspended, not on table
..…………….…………..…….Mallet Roll on Suspended Handchime



b) With the chime resting sideways on a padded table
……..…..…..…..…..…..…..…..…..…..…..…….. ⚠Mallet Roll



2. On the handle……………….……….…….…….. ⚠Mallet Roll on handle

(suggested notation:  or )

D. By bowing the end of the tine with a string instrument bow: **arco**
…..….. Bowed Handchime

E. …..Gently spin a soft superball (on a stick) or very soft rubber mallet head on the axis of the handle of the mallet, lightly bouncing the ball around inside the tines

IV. Modulation of the sustain sound of a handchime after a discrete **R** attack (after clapper strikes tine)

A. Performer moves handchime through the air

1. In a fluid, vertical circle (typical stylistic ring for a pleasing tone quality)[121]……………………..…………………..... *(Typical ringing shape)*

[119] But still requiring a footnote in the score, explaining A–D in the sub-category. If handbells are used in the same piece of music, the footnote must clarify this notehead to denote handchimes.

[120] For this sub-category on rolling, assume that a standard size mallet was used. Refer to I.B.1–4 and I.D for variables.

[121] This technique is not notated in handchime music; it is up to the musicians to choose movements which suit their default ringing style.

2. Sagittally and vertically[122]
   a) Full-arm with handchime turned to the side, then swung back behind the performer, then out front again: **Sw** , ↓↑....….. <u>Swing</u>
   b) Beginning below the table line, then elevating out front (attack note needs asterisk, swing-up note needs the symbol ↑ vertically aligned)……...…… <u>Ring (down and) behind table, then swing up</u>
   c) Start the stroke over the head.................... <u>Ring straight overhead</u>
3. In a circle, rotating the upper arm and wrist, pointing the clapper outward
   a) Horizontally: ↻ ………………………………...…...…. <u>Gyro</u>
   b) Vertically: **§** ………………………………......…. <u>Spiral Gyro</u>

B. The forefinger or some fingers alter the timbre (but sound does not immediately damp)
   1. One finger (or several for very large chimes) near or on the split of the tines
      a) Repeatedly pressed: ***vib.*** …………………… <u>*Handchime Vibrato*</u>
      b) Pressed and held down…………………………... ⚠<u>Soft Mute</u>
      c) Already applied before attack, then lifted ……………………………………….. ⚠<u>Handchime Crescendo</u>
      d) Already applied before attack, muting slowly to allow sound ……………………………………………...…⚠<u>Finger Mute</u>
   2. The other hand or fingers of the other hand
      a) Gradually applied to the middle of the tines after the attack: **CD**
      b) ……………… <u>Controlled Diminuendo with other hand on tines</u>
      c) Muting quickly (see V.C.2.a)
      d) Already applied before attack, muting quickly (see Hand Damp, V.C.2.a)

C. A resonant field alters the timbre
   1. Mouth "wah"s near the split of the tines to produce vibrato ………………………………………...……………...<u>Mouth Vibrato</u>
   2. By playing (or playing then dipping) inside a resonant cavity
      a) Inside a large ceramic pot[123]…..... <u>Ring inside a hollow pot</u>...etc.
      b) (Inside a handbell or bell-shaped cavity[124])

D. Applied foreign object alters the timbre
   1. The object is applied after the attack
      a) Table pad
         (1) Pressed in then immediately lifted ⤴ …….......... ⚠<u>Echo</u>
         (2) Brushed gently then lifted, for a ***fp*** effect ………………………………………<u>Table Brush Damp</u>

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[122] Note here that endless variations could be made (for example, swinging back but not forward, back and forward twice, etc.), but two contrasting combinations of actions are chosen.

[123] The resulting sound is more muted than "resonated."

[124] Ringing a handchime inside a large handbell's casting or inside a drum seems not to produce sympathetic vibration from the larger instrument.

(3) Tine edge very softly brushed across pad, toward performer ....Brush Tine Edge on Table

(4) Horizontal length of bottom tine pressed into pad (see V.D.1.a.1)

b) The performer's clothing

(1) Pressed in then immediately lifted (with footnote) ……….……...………………………. Echo on clothing

(2) Brushed gently then lifted, for a ***fp*** effect ……..………………………………………. *Brush Damp*

(3) Horizontal length of bottom tine pressed into clothing (see V.B.1)

c) Water ⚠

(1) ……………..….. Bottom tine is dipped in water and left in

(2) ………..…...… Bottom tine is dipped and lifted back out

d) …...…. ⚠Tine touches a piano string with damper pedal applied

2. The object was previously applied to the instrument ⚠

a) Rubber bands, elastic gauze, or tape

(1) ... Wrap rubber bands or elastic gauze around one or both tines

(2) ……..Wrap lots of elastic gauze around one or both tines

(3) ...….Wrap tape across the outer length of the bottom tine

(a) …….and play with paper clip(s) bouncing inside

b) Spring-type wooden clothespin(s) (pegs) are applied to the tine edge

(1) …...……...... Apply a clothespin on the bottom tine edge

(2) …. Apply a clothespin on the top tine edge so it is struck by the clapper

(3) …….. Apply a clothespin tightly to the tine, allowing the metal spring to buzz

c) Aluminum foil or a tight paper collar (similar sound)

(1) ………Apply foil around both tines or much of the tines

(2) ...Apply foil around bottom tine near the split of the tines

(3) …....Apply foil around top tine near the split of the tines

(4) …...…… Apply foil around bottom tine all along the tine

(5) ……………..……….. Wrap foil around the clapper head

d) Paper clips attached to string

String paper clips together and tie string with paper clips inside tines

V. Damping of a handchime sound after or during sound production (sounds defined by damping method)

A. After ring (**R**), sound releases passively: **LV** [125] (or very long note duration) ………………………………………………………………………… *Let Vibrate*

B. After ring (**R**), upright tines are turned to the side and touch performer's clothing

[125] Note that in handchime notation, the LV sign often still results in active damping if cancelled by an **R** sign or new **LV** sign.

1. Standard damping technique: precisely after written note duration, or at or , or after duration of a note with the symbol attached to its stem during an **LV** section ([126]) ...…………………………...*Damp*
2. Slowly……….……….……….………...…….………...…… Gradual Damp
3. As quickly as possible after attack: **RT** (or staccato articulation(s) with footnote)…..…..…..…..…..…..…..…..…..…..…..…….. *Ring Touch*

C. After ring (**R**), casting is damped by finger(s), hand(s), cloth
   1. Damped by a finger
      a) Slowly (see Soft Damp and Thumb Damp, IV.B.1.b and e)
      b) Ord., analogous to handbell Thumb Damp………... Finger Damp
   2. Damped by the other hand
      a) Whole hand (after letting ring) ……..... Hand Damp after duration
      b) Whole hand (completely stopped): **HD** …………... *Hand Damp*
   3. Cloth damp [negligible from Damp on shoulder]

D. After ring (**R**), tines are damped by padded table
   1. Bottom tine comes down to touch padded table
      a) After a discrete **R** attack, to end vibration
         (1) To rest on a padded table………..…..……... Table Damp
         (2) To rest on wax paper…... Damp onto wax paper on table
         (3) To rest on a sheet of foil on wax paper ...……..Damp onto aluminum foil on wax paper on table
   2. Handchime is turned clapper-down and the tine ends are pressed into table
      a) Quickly: **TLD**…...…………………………... *Table Land Damp*
      b) Slowly [negligible from Table Damp V.D.1.a.1]

E. Sound is caused by clapper forced to remain against tine by finger of other hand ………………………………….⚠ Press clapper into tine and hold against tine

4b. Handbell: Description of Sounds of the Associated Techniques

I. Discrete and Undamped Sound Production of a Handbell by Striking the Casting

I.A.1.a.1: *Ring* (**R**, **LV**): the default technique assumed with unmarked notation. This timbre is the default one of the (American) handbell: it is bright, with a fair amount of attack amplitude, attack noise, and brightness in overtones. Its natural sustain duration represents the longest it can have without methods of continuous production, and when damping techniques are applied to it,

[126] If handbells were used in the same piece of music, this note may have a diamond-shaped notehead.

the release audibility can be complex. There is a very low natural degree of pitch interference from other harmonic series or inharmonicity, but there is some (as there is with most bells). A Ring technique contains no instructions on how to move the handbell in the air, yet it assumes the player positions the arm far enough away from their body so that their body does not absorb any sound. Most performers will add a movement technique after it. Therefore, a truly isolated Ring is a special effect.[127]

I.A.1.a.2: Ring near table, parallel: a muted and artificially distant sound. When the casting walls are perpendicular to the floor, the sound projection forward is diminished because the greatest amplitude emits outward from the walls of the casting, not up and out of the opening. Also, the padded table absorbs some sound.

I.A.1.a.3: Ring behind table: aurally and visually veiled and muted technique. The table absorbs much of the resonance. Without a following movement technique, this is rather colorless. Movement immediately before is somewhat constrained by the setup, and movement afterward aside from lifting back to default height is restrictive.

I.A.1.b.1: *Martellato (Mart) Lift* **(▼↑)**: loud thumping attack followed by a "whump" as the table absorbs some kinetic energy, followed by a colorful sustain sound remnant. Brash and possibly violent at *forte*.

I.A.1.b.2: Slow Martellato (Mart) Lift: slow version of the above, which creates an even-less-controllable thud attack, longer "whump," and less perceptible and less useful remnant.

I.A.1.b.3: Martellato (Mart) Lift on body: comparable to Martellato but with the variables of casting direction and possibly harder surface than a pad. Most likely, the leg is used, since the

[127] James Meredith named the technique of a ring with no following motion a "Robot Ring," calling for handbells to do it in "Sonics."

technique would bruise or hurt hard parts and sensitive parts of the body. The effect is softer if there is a table between sound and listener.[128]

<u>I.A.1.c.2.a:</u> <u>*Pluck Lift*</u> (**Pl·**↑ (or ·↑ with footnote): colorful *pizzicato*-like attack with bright decay and sustain profile. Very effective and mostly unlimited with respect to size of bell and dynamic range.

<u>I.A.1.c.2.b:</u> <u>Pluck Lift on leg</u>: much like Martellato Lift on body.

<u>I.A.2:</u> <u>Back Ring</u>: mostly like Ring, but a little less powerful and somewhat harder to control.

<u>I.B.1–4:</u> <u>Mallet Suspended Handbell</u> (**+**, **Mallet**) (*x16 timbres*): most variable timbral palette for a single technique. Three variables produce considerable range in discrete timbres: mallet size/composition,[129] dynamic force of strike, and strike location on the casting.[130] The number of timbres possible using mallets is approximated here as sixteen timbres: four mallet sizes (soft yarn, medium/medium-hard yarn, medium/medium-hard rubber or acrylic, and hard rubber or acrylic) multiplied by four casting strike locations (<u>*ord.* in the center of the casting</u>, <u>directly on the casting rim</u>, <u>near the casting rim</u>, and <u>at the casting shoulder</u>).[131] One exception is the technique group of <u>malleting a partially-submerged bell</u>; the timbral variety of bells there is reduced from sixteen to four, since only about one strike location produces interesting sounds. Another exception is the mallet roll categories; for these, assume that the sixteen timbres are the same, but the musical texture is a continuous roll of each of those timbres.

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[128] William Payn's *Spires* calls for "strike bell on hip" James Meredith's *Sonics* calls for "Mart Lifts "struck against player's body" (performance notes).

[129] Handbell mallet size and composition are effectively inextricable.

[130] In this Chapter, a technique applied to different handbell sizes or at different dynamics counts as one technique; variations of timbre by dynamic and bell size are explored in Chapter 6.

[131] This formula is applied to the <u>Mallet Lift</u> and the <u>Mallet Handbell on Table</u> techniques also.

I.C: *Mallet Lift Handbell on Table* (⸸↑ , **Mallet Lift**) (*x16 timbres*): analogous to Mallet Suspended Handbell, even in all of the latter's many permutations. If the bell casting sides are brought parallel with the listener, there is an interesting amplitude modulation.

I.D.1: Strike casting with hard thin wood or like material (chopstick): thin, cold, and tinny sound which is not possible at *forte*.

I.D.2: Strike casting with hard thin plastic or like material (butt end of mallet): piercing, very cold, overtone-rich sound much like finger cymbals or crotales at *piano*.

I.D.3: Strike casting with thick dowel⚠: overtone-rich mix between a thin and cold sound and the "bong" of beehive-shaped Eastern bells. Probably not safe at medium and loud dynamic, considering size and hardness of wood.

I.D.4: Strike casting with cymbal⚠: dramatic clash of high, cold tones, though mainly emitting from the cymbal and overshadowing the pitch of the handbell. This can break a handbell casting, especially if done loudly. Only feasible very softly.

I.E.1: Strike two handbell castings together (*x3 timbres*)⚠: rich, strong and bright colors despite two fundamental pitches and extreme softness. The least interesting of the three possibilities is two casting rims touching; the result is bright and crowded.[132] More intriguing is to strike one rim to another casting wall; this produces even more complexity. The handbell that was struck on its rim dominates the lower partials, and the other bell provides the illusion of those lower tones' high harmonics. For a third, slightly darker timbre, turn the castings perpendicular to each other and touch their walls. For all of these, this experiment is only safe with very light attacks at *piano*.

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[132] Directors of children's ensembles recognize this dreaded sound as when a student clangs together two bells by accident during playing, unpacking, or packing.

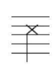
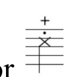
I.E.2: Strike casting with handchime handle⚠: (*x2 timbres*) as above, but the handchime handle makes a darker clang, especially on the casting wall. The second choice is to touch it to the rim, which is brighter. The very fragile handchime tines are not used.

I.E.4: Strike partially-submerged bell; leave in (*x4 timbres*): lower pitch, softer amplitude, abbreviated sustain. Sound traveling through the denser water is rendered lower in pitch when it hits the less-dense air. Effective at most dynamics except very loud.[133]

I.E.5: Strike partially-submerged bell; then pull out (*x4 timbres*): lower pitch which slides smoothly up to the handbell's natural frequency when lifted. Very effective.

I.E.6: Strike partially-submerged bell, then move up and down for a vibrato (*x4 timbres*): initially lower pitch, which modulates during "vibrato." A softer amplitude and abbreviated sustain are inevitable.[134]

II. Discrete Sound Production of a Handbell by Striking Other Areas

(suggested notation for these four sounds:  or )

II.A: Strike the handle with a soft object : bassy "thunk" without pitch and without clapper vibration. Somewhat muddled but powerful.

II.B: Strike the handle with a hard object⚠: clear snare-drum-like rap without pitch and without clapper vibration. Very effective.

II.C: Strike the handguard with a soft object: like striking the handle with the same object, but higher in overall tone and knock-like.

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[133] Michael Glasgow notes that the term "aquabend" is sometimes applied.

[134] Note that the term and marking ***Vib.*** ordinarily applies in handbell music not to this but to a movement (amplitude-modulating) technique, even though this is the only truly pronounced frequency vibrato.

II.D: Strike the handguard with a hard object⚠: like striking the handle with the same object, but higher in overall tone and somewhat less crisp.

III. Continuous Sound Production of a Handbell

III.A: *Shake* (**Sk,**): iconic and idiomatic; clamorous, not effective softly. Best when handled carefully and combined with techniques of movement, attack, and damping. Speed of shaking is flexible, but not so effective at low or medium speeds.

III.B.1.a: *Mallet Roll on Suspended Handbell* ( ): single-stroke roll upon the casting at the height parallel to the internal clapper's strikepoint. Full, undefined, and somewhat vague on the larger bells and the softer mallets; celesta-like, serenely peaceful, yet hard to control for smaller bells and harder mallets.

III.B.1.b: *Mallet Roll* ( ): single-stroke roll upon the equivalent outside point of the clapper's strikepoint for a Back Ring, with the handbell resting on the table. Warm and smooth for larger bells and softer mallets; harsh and choppy for smaller bells and harder mallets.

III.B.2: Roll on handle (suggested notation: or): akin to a roll on a snare drum rim. Many shades are possible with different sticks or mallets; softer mallets are thumpy and may depress the handle into the pad too much, while tiny chopsticks make only a soft rattle.

III.C: Roll with single mallet inside casting: indistinct, blurry and soft, but effectively imitates random bell tolling at a distance. Can only be done on large bells.

<u>III.D.1:</u> *<u>Singing Bell</u>* (**SB**): warm (warmest possible on the instrument), notable for its lack of attack profile. Pure and rich, organ-like in timbre but not in dynamic growth and dissipation. Named after the instrument "singing bowl." Very effective.[135]

<u>III.D.2:</u> <u>Singing Bell with buzzing</u>: alternation and strong contrast between cold "zing"s and warm continuous tone. The buzzing component must be conceived of, notated, and/or performed deliberately; it is avoided during typical **SB**.

<u>III.E:</u> <u>Bowed Handbell</u> (**arco**): an unpredictable, often high tone which is much like a bowed crotale or bowed cymbal. The resulting pitch is not always obviously related to the handbell's fundamental pitch. The effect is powerful and strange.[136]

<u>III.F:</u> <u>Rub/scrape a soft superball (on a stick) or very soft rubber mallet back and forth along the inside of the casting from near the shoulder to near the lip</u>: weak door-creak sound with slight pitch bend lower than bell tone, only possible extremely softly and on Schulmerich or other bell with grooves inside the casting; a Malmark bell's smooth inside walls are not conducive.

<u>III.G.1:</u> <u>Spin coin around inside the casting</u>: rather unpredictable and loud scraping of high and indistinct overtones mixed with faint fundamental pitch. Difficult to control starting and stopping.

<u>III.G.2:</u> <u>Spin paper clips around in the casting</u>: as above but lighter and somewhat more controllable; a delicate but unpredictable sparkling sound.

<u>III.G.3:</u> <u>Slide a coin slowly out of the casting</u>: effective yet soft "zing" as coin leaves the casting, with very smooth start, and high overtones much like bowed tam-tam edge but much softer.

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[135] James Meredith's *Smirti* features one of the first uses of the technique.

[136] The technique was used in Daniel David Feinsmith's *Yahweh* for Kronos Quartet and Sonos Handbell Ensemble.

III.G.4: Slide paper clips slowly out of the casting: as above, but softer and less smooth as the paper clip(s) may turn or flip, causing some faint hits.

IV. Modulation of the Sustain Sound of a Handbell After a Discrete *R* Attack (After Clapper Strikes Casting)

IV.A.1.a: *(Typical ringing shape)*: ordinary handbell tone with pleasing quality, caused by circular motion out through the air. Subtle gradations are possible with size, shape, and speed of circle, and if long duration, the number of circles. Mostly not notated; composers must note any specifics if desired. Performers may have strong opinions on "correct" form(s) of the circle.

IV.A.1.b: *Vibrato* (***vib.***): standard "shimmer" in perceived amplitude as bell rocks side-to-side.[137]

IV.A.2.a: *Swing* (**Sw** , ↓↑): very strongly contrasted amplitude modulations, with a dip in sound as the casting walls point away and some sound is lost behind the table, but with a powerful spike when the casting rises up and the walls are parallel to the listener again. Can be repeated several times per ring with success, especially in larger bells. Subtle variation is possible with speed and direction, but the most effective (and default) way is fast and with the wrist moving.

IV.A.2.b: Ring (down and) behind table, then swing up (attack note with an asterisk, swing-up note with the symbol ↑ vertically aligned): as above but with weaker attack and growth afterward. Not truly like a crescendo, but with an amplitude profile as close as possible with a handbell.

[137] Subtle variation produces a small timbral range. Robert Ivey calls a twisting rotation (rather than a wiggle side-to-side) an "Ivey Twist" (Ivey, 84).

IV.A.2.c: Ring straight overhead: a variation of Ring which produces an accent that is more visual than aural, but can be combined with other movement techniques to great effect.

IV.A.3.a: *Gyro* (↻): periodic waves of perceived amplitude (siren-like in amplitude modulation but not in timbre; lighthouse-like spin of sound). Speed affects timbre.[138]

IV.A.3.b: *Spiral Gyro* (§): as above but slightly more complex amplitude variation and harder to perceive.

IV.B.2: Low-Pressure Thumb Damp: as a Ring but with added attack noise and the sound of the clapper seeming hardened and partly deadened, and with some more overtones and less sustain than a Ring.

IV.B.3: Controlled Diminuendo (**CD**): almost identical to a Ring but with less sustain. This sound modulation technique, unlike most others, results in almost no change to the frequency spectrum.

IV.C.1: Mouth Vibrato: "wah-wah" effect like Echo but smoother. Only effective very softly.

IV.C.2.a: Ring inside a hollow pot (*4x timbres*): similar options to ringing behind table but with much faster amplitude variation as to allow three timbres. The four corresponding techniques are much like the water-dipping techniques, but they are combined under this heading. Large rounded pot walls of porcelain or metal work best; open or flared walls and ceramic flower pots are not effective.

1. Ring inside chamber; leave inside: muted and dulled Ring. Pot must be big enough.
2. Ring inside chamber; take out: much like IV.A.2.b (Ring behind table and swing up), but stronger in amplitude change and weaker in visual effect and aural perception "moving."

[138] *The Lion King Medley* (arr. Kevin McChesney) calls for exaggerated gyros.

3. Ring outside chamber; put casting in: much like IV.D.1.a.2 (Table Brush Damp) but somewhat more sudden.
4. Ring outside chamber; move in and out for amplitude vibrato: much like IV.A.1.b (Vibrato) but somewhat more sudden.

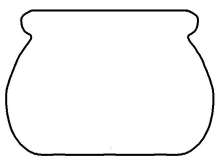

Fig. 19. Suitable pot shape for this technique.

IV.D.1.a.1: *Echo* ( ): effective timbre and amplitude modulation with slight softening before loud "whump" when the table absorbs some energy. The remaining sustain is mostly that of a soft Ring, and the technique is repeatable a few times per ring on larger bells.[139]

IV.D.1.a.2: Table Brush Damp: a loud-soft effect but without the "whump" of the Echo, while maintaining the amplitude variation of the clapper wall coming down perpendicular to the listener.

IV.D.1.a.3: Rim Damp: harmonic at roughly the third partial. The Rim Damp takes advantage of a property of partial dampening in large handbells where the application of a damping force on the rim of the casting removes the first two partials and leaves a strong remnant third partial as the lowest sounding pitch. This is the closest that the handbell can come to playing isolated harmonics; the result is a strong third and sixth partial, while the first and second partials are

[139] The upturned arrow symbol applies to all sounding handbells in the same staff or staves and can only show basic rhythms; composers must devise other solutions if the Echo is to apply to a more complex rhythm (as in Sondra Tucker's *Sierra*).

mostly eliminated. However, the attack noise and some of the first and second partials in the initial attack and decay are inevitable.[140]

IV.D.1.a.4.a: Rim Brush (after Rim Damp): much like the buzz of a dowel around the rim (III.D.2, Singing Bell with buzzing), but only in the third, sixth, and higher partials due to the Rim Damp. Corduroy pad covers make this technique very effective.

IV.D.1.a.4.b: Rim Brush: as above, but more muted and with the full overtone series.

IV.D.1.b.1: Echo on clothing (with footnote): as an Echo on the table, but with the same limitations and options as Martellato on body. Not very effective.

IV.D.1.b.2: *Brush Damp*: a loud-soft effect but without the "whump" of the Echo, and without the amplitude variation of the Table Brush Damp.

IV.D.1.b.3: Rim Damp on clothing: comparable and almost as effective as Rim Damp, but with the body damping much of the sound.

IV.D.1.c.1: Casting rim and part of side is dipped in water and left in: very effective frequency lowering and amplitude drop as sound begins to travel through the water. A softer amplitude and abbreviated sustain are inevitable.

IV.D.1.c.2: Casting rim and part of side is dipped and lifted back out: as above, but the frequency rises to normal as the bell is lifted, and the remaining weak sustain continues.

IV.D.1.d.1: Casting rim touches piano string(s) with damper pedal applied: sudden and twangy resonance from the string(s) outweigh the bell's sustain sound remnant. More effective in causing sound from the string(s) and less in modulating the sound of the bell.

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[140] Michael Glasgow uses Rim Damp overtones for their resultant pitches in *Lux Aeterna*.

IV.D.1.d.2–4: Casting rim touches a drum until sound is damped, Casting rim Brush Damps on a drum, Casting rim touches a drum or container with loose parts (rice, snares): varieties of buzzing. The first two are short and delicate; the last is brash and electric.

IV.D.2.a.1: Wrap a firm and wide rubber band around and across casting rim: colorful "thunk" with colorful sustain timbre afterward.

IV.D.2.a.2: Wrap a firm and wide rubber band around casting shoulder: as above but much darker and warmer, and slightly longer sustain.

IV.D.2.b.1: Fasten elastic gauze around casting rim: much like above rubber band around rim, but more muted and noisy.

IV.D.2.b.2: Fasten elastic gauze around casting close to the rim: as above, but somewhat less noisy.

IV.D.2.b.3: Fasten elastic gauze around casting shoulder: much like above rubber band around shoulder, but more muted and dark.

IV.D.2.c: Place coins in the casting: harsh, loud, jangling, bright, and effective buzzing. The coins stop vibrating abruptly, and the end of the sustain of the buzz is not very controllable; a faint sustain of the handbell outlasts it. Different sizes and amounts of coins are possible in different bells, but the timbre is about the same.

IV.D.2.d.1: Place paper clips in the casting: As above, but much more subtle and controllable, though still not easy to determine duration.

IV.D.2.d.2: String paper clips together and tie string around casting: much like placing paper clips inside, but less harsh or loud, and more subtle.[141]

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[141] This experiment has been used by Sonos Handbell Ensemble under James Meredith.

IV.D.2.e.1: Apply the end of a clothespin (peg) on the casting rim: muted, heavy, dark plunk with a slight frequency decrease. More clothespins are needed for larger handbells. Clothespin(s) may fall off after hard or repeated ringing. Only clothespins with springs (A) will work; old-fashioned clothespins (B) do not fit onto the concave casting.

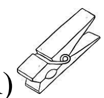
(A)  (B) 

Fig. 20. Two types of clothespins (pegs).

IV.D.2.e.2: Apply a clothespin (peg) tightly on the casting rim, without buzz: as above, but more effective as more of the clothespin touches the casting , and less likely to lose clothespin(s). Buzzing will only occur if the metal spring comes in contact with the casting rim (see below).

IV.D.2.e.3: Apply a clothespin (peg) on the casting rim, allowing the metal spring to buzz: as the above clothespin muted sounds, but with some fast and bright metallic buzzing. The duration of the buzzing is unpredictable and may come off as part of the attack or may linger for a second.

IV.D.2.f: Apply foil around entire casting or much of the casting: fast metallic sizzle or buzz, much like a sizzle cymbal but with pitch. Of the buzzy timbres, this one has the most effective sustain.

V. Damping of a Handbell Sound After or During Sound Production (Sounds Defined by Damping Method)

V.A: *Let Vibrate* (**LV**): [the lack of a technique after Ring, and the longest a handbell can sustain unless an object is applied after Ring.][142]

[142] The LV, or *laissez vibrer*, was borrowed from harp notation in the 1950s when very early handbell notation standardization was explored. Some writers advocated for LV to be the default style so that the traditional bell sound was preserved (J. Walters, 1).

<u>V.B.1:</u> *<u>Damp</u>* ⌖ or **//**, or after duration of a note with the symbol attached to its stem during an **LV** section ( ): distinct brief sound of vibrations bouncing and transferring to the clothing. Can be made subtle and virtually unheard by the performer, and is done so by default. Can be made heard purposefully, to create a subtle color at the moment of damp. Otherwise, performers will mask this timbre by default.

<u>V.B.2:</u> <u>Gradual Damp</u>: distinct longer sound of vibrations bouncing and transferring to the clothing, but softer than Damp.

<u>V.B.3:</u> *<u>Ring Touch</u>* (**RT**) (or staccato articulation(s) with footnote): fast and brightly accented muffle. The speed of the movement required to bring the bell from the Ring position to the damp position quickly enough to achieve the Ring Touch creates an amplitude effect.

<u>V.C.1.b:</u> *<u>Thumb Damp</u>* (**TD**) (or staccato articulation(s) with footnote): as a Ring but with added attack noise and the sound of the clapper seeming hardened and partly deadened; also, with some more overtones and no sustain compared to a Ring. Otherwise similar to Low-Pressure Thumb Damp.

<u>V.C.2.a:</u> <u>Hand Damp after duration</u>: as Damp, but in extreme exaggeration of the vibrational bouncing effect and usually done either for its brevity or its timbral exaggeration of Damp.

<u>V.C.2.b:</u> *<u>Hand Damp</u>* (**HD**): as Thumb Damp, but in extreme exaggeration of attack noise, sustain brevity, and hardness and deadness.

<u>V.D.1.a.1:</u> <u>Table Damp</u>: timbre and amplitude modulation with slight softening before loud "whump" (like Echo but lasting much longer) when the table absorbs the first brunt of energy and then more slowly dissipates the rest of the energy. This takes longer than an average Damp but is shorter than a Controlled Diminuendo. It is difficult for the performer to mask this timbre, and it is often done either for effect or out of necessity.

<u>**V.D.1.a.3:**</u> <u>Damp onto wax paper on table</u>: as a Table Damp, but with less “whump” and with the addition of a bright white-noisy tap and buzz much like a snare drum’s snare being engaged.

<u>**V.D.1.a.4:**</u> <u>Damp onto aluminum foil on wax paper on table</u>: as above, but combined with a lower and smoother buzz from the foil, much like the buzz from IV.D.2.f (applying foil around the casting).

<u>**V.D.2.a:**</u> <u>*Table Land Damp*</u> (**TLD**): more like Damp than Table Damp; sound is extinguished very quickly. The bell is inverted so that the handle is above the casting.[143]

<u>**V.D.2.b:**</u> <u>Table Land Damp, slow</u>: much like a Table Damp, but with brighter colors during the “whump.”

<u>**V.D.2.c:**</u> <u>Table Land Damp, very slow</u>: an exaggerated damp to bring out high overtones during the extinguishing of sound.

<u>**V.E:**</u> <u>Press clapper into casting and hold against casting⚠</u>: an initial buzz as the clapper is pushed into the casting, then a dull, dead “thunk” as it stays against it (then in some bells a residual colorful sustain sound remnant). Possibly not good for the spring.

<u>**V.F.1.a.1.a:**</u> <u>*Martellato (Mart)*</u> (▼): as a Martellato Lift, with the same “thump” strength, but without the colorful sustain sound remnant.

<u>**V.F.1.a.1.b:**</u> <u>*Muted Martellato (Mart)*</u> ▼: combination of Martellato and Hand Damp; causes very exaggerated sustain brevity and dryness.

[143] Ensembles as early as the mid-19th century are pictured with their bells sitting upright on tables. Players may have rung using an “upstroke” off the table, and damped with <u>V.D.2.a</u> (J. Walters, 1).

V.F.1.a.2: Martellato (Mart) on body: analogous to a Martellato Lift on body, without the sustain.

V.F.2.a.1: *Pluck* (**PL** or staccato articulation(s) with footnote): as a Pluck Lift, with the same *pizzicato* and colorfulness, but without the sustain sound remnant.

V.F.2.a.2: *Tap Pluck* (**TPl** or staccato articulation(s) with footnote) as a very light *pizzicato*; brighter and deader than Pluck.

V.F.2.b: Pluck on leg: analogous to Pluck Lift on leg, without the sustain.

V.F.3: With bell on table, press clapper into casting and hold against casting⚠: an initial buzz as the clapper is pushed into the casting, then a quick stronger buzz as the casting is squeezed on both sides by the clapper and the table pad. Possibly not good for the spring.

V.G: *Mallet Handbell on Table* (**+**, **Mallet**, **Mal.,** or staccato articulation(s) with footnote) (*x24 timbres*): like Mallet Suspended Handbell, even in all of the latter's many permutations, but with less projection, more muddiness, more amplitude (despite casting orientation and because of favorable casting angle and amplification help from the table), and sustain entirely dampened by the table. Notably, in large bells the frequency is lowered slightly. Variables in mallet size and strike location produce about 16 sounds with the bell resting on its handle. Furthermore, the bell can be struck while inverted so that the handle is above the casting,[144] or the bell can rest on foil, wax paper, or notebook paper above the table.[145] These combination techniques produce about four more sounds each, according to mallet size.

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[144] Michael Glasgow notes that this can be called mouth-down malleting. Members of Sonos Handbell Ensemble have experimented combining this technique with IV.D.2.d.2.

[145] This technique is sometimes called "Klocken Carta," and an early use is seen in Tim Waugh's *Reperqussio*.

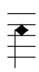
V.H.1: Strike casting with hard thin wood or like material (chopstick) (∔ with footnote): muted thin, cold, and tinny sound which is not possible at *forte*.

V.H,2: Strike casting with hard thin plastic or like material (butt end of mallet) (∔ with footnote): muted piercing, very cold, overtone-rich sound much like finger cymbals or crotales at *piano*.

V.H.3: Strike casting with thick dowel⚠ (∔ with footnote): muted overtone-rich mix between a thin and cold sound. Probably not safe at medium and loud dynamic, considering size and hardness of wood.

4c. Handchime: Description of Sounds of the Associated Techniques

I. Discrete and Undamped Sound Production of a Handchime by Striking the Tine

I.A.1: *Ring* **(R**, **LV**,  notehead if distinguishing from handbells): the default technique assumed with unmarked notation. This timbre is the default one of the handchime: it is warm and relatively dark and full, with less clacking attack amplitude and noise than a handbell, and a strong fundamental tone. The tone is purer than a bell and has no interference. It makes for an effective timbral contrast to the handbell. Its natural sustain duration represents the longest it can have without methods of continuous production (Section III), and when damping techniques are applied to it, the release audibility may be complex. A Ring technique contains no instructions on how to move the handchime in the air, yet it assumes the player rings far enough away from themself so that their body does not absorb any sound. Most performers will add a movement technique after it. Therefore, a truly isolated Ring is a special effect.

<u>I.A.2:</u> <u>Ring near table, parallel</u>: a somewhat muted and artificially distant sound, mostly because the padded table absorbs some sound. Not as effective as it is with a handbell.

<u>I.A.3:</u> <u>Ring behind table</u>: aurally and visually veiled and muted technique. The table absorbs much of the resonance. Without a following movement technique, this is rather colorless. Movement immediately before is somewhat constrained by the setup, and movement afterward aside from lifting back to default height is restrictive.

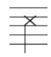
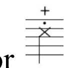
<u>I.B.1–4:</u> <u>Mallet Suspended Handchime</u>⚠ (**+**, **Mallet**) (*x12 timbres*): widely varied timbral palette within a single technique. Two variables produce considerable range in discrete timbres: mallet size/composition, and strike location on the casting (<u>at the strikepoint</u>, <u>on the side of the tine</u>, <u>over the top of the tine edge</u>, and <u>on the body near the handguard</u>). Dynamic force is not considered, because only soft attacks are safe. A fourth variable is added if considering all sizes of handchime. There are four attack locations on the handchime and three usable mallet sizes/compositions.

<u>I.C.1:</u> <u>Strike tine with hard thin wood or like material (chopstick)</u>⚠: thin, cold, and tinny sound which is not possible at *forte*.

<u>I.C.2:</u> <u>Strike tine with hard thin plastic or like material (butt end of mallet)</u>⚠: piercing, very cold, clangy sound.

<u>I.E:</u> <u>Strike partially submerged handchime; then pull out</u>⚠: lower pitch which slides smoothly up to the handchime's natural frequency when lifted. Somewhat less effective than on a handbell due to the water stopping the tines too quickly. (Leaving the chime in dampens it too immediately.)

II. Discrete Sound Production of a Handchime by Striking Other Areas

(suggested notation for these four sounds:  or )

II.A: Strike the handle with a soft object: tinny, metallic, noisy.

I.B: Strike the handle with a hard object⚠: xylophone-like, cutting, and piercing, but the resulting pitch is unpredictable. Different mallet hardnesses will bring out the range of pitch determinacy. Sometimes the sounding pitch does not match the series of the fundamental.[146]

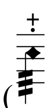
I.C: Strike the handguard with a soft object: clunky, tinny.

I.D: Strike the handguard with a hard object⚠: clunky, heavy and dull.

III. Continuous Sound Production of a Handchime

III.A: Roll with single mallet inside tines: soft but effective xylophone-like roll.

III.B.1.a: Mallet Roll on Suspended Handchime (): single-stroke roll upon the casting at the height parallel to the internal clapper's strikepoint. Marimba-like and serene on the lower handchimes; sparkling and metallic with somewhat clunky attack noises on the higher handchimes.

III.B.1.b: Mallet Roll⚠(): as above, but muted; however, the chime must be turned on its side, and even still, this may damage the tines.

[146] James Meredith's *Smirti* features one of the first uses of the technique.

III.B.2: Mallet Roll on handle⚠(suggested notation: or): like a xylophone roll.

III.C: Bowed Handchime: very effective and sustained technique which sounds at the pitch of the fundamental with pure, full, and warm sound, much like bowed vibraphone, and completely unlike bowed handbell.[147]

III.D: Gently spin a soft superball (on a stick) or very soft rubber mallet head on the axis of the handle of the mallet, lightly bouncing the ball around inside the tines: very soft but effective marimba-like roll effect.

IV. Modulation of the sustain Sound of a Handchime After a Discrete *R* Attack (After Clapper Strikes Tines)

IV.A.1: *(Typical ringing shape)*: ordinary handchime tone with pleasing quality, caused by circular motion out through the air. Subtle gradations are possible with size, shape, and speed of circle, and if long duration, the number of circles. Mostly not notated; composers must note any specifics if desired. Performers may have strong opinions on “correct” form(s) of the circle.

IV.A.2.a: Swing (**Sw**, ↓↑): contrasted amplitude modulations, with a dip in sound as the tines point away and some sound is lost behind the table, but with a powerful spike when the tines rise up. Not quite as effective as on a handbell.

IV.A.2.b: Ring (down and) behind table, then swing up (attack note with an asterisk, swing-up note with the symbol ↑ vertically aligned): as above but with weaker attack and growth afterward. Not truly like a crescendo.

[147] An example is found in Brenda Austin’s *Sakura.*

IV.A.2.c: Ring straight overhead: a variation of Ring which produces an accent that is more visual than aural, but can be combined with other movement techniques to great effect.

IV.A.3.a: Gyro ↻: periodic waves of perceived amplitude (siren-like in amplitude modulation but not in timbre; lighthouse-like spin of sound). Speed affects timbre. Not as effective as it is on a handbell.

IV.A.3.b: Spiral Gyro **§**: as above but slightly more complex amplitude variation and harder to perceive.

IV.B.1.a: *Handchime Vibrato* (***vib.***): effective and strongly audible amplitude vibrato. Speed affects timbre. Can successfully imitate and create the illusion of other instruments' frequency and amplitude vibrato techniques.

IV.B.1.b: Soft Mute ⚠: serves as a loud-soft effect by artificially interfering with the tines. Like a Handchime Vibrato but with the amplitude forced to stay low. Possibly not good for the tines.

IV.B.1.c: Handchime Crescendo ⚠: as above, but reversed, causing an effective opportunity for crescendo, but may not be good for the handchime.

IV.B.1.d: Finger Mute ⚠: as the above two techniques, but with the finger already depressed; muted sound overall, with less sustain.

IV.B.2.a: Controlled Diminuendo with hand on tines (**CD**): almost identical to a Ring but with less sustain.

IV.C.1: Mouth Vibrato: "wah-wah" effect like Echo; not effective unless very soft, and less effective on the handchime than the handbell.

IV.C.2.a: Ring inside a hollow pot...etc. (*4x timbres*): identical to handbell (see corresponding section in Chapter 4b.IV).

IV.D.1.a.1: Echo⚠ ( ): timbre and amplitude modulation but not as effective as it is on a handbell. It may not be good for the tines. The "whump" is somewhat louder and has some buzz when compared to the handbell.

IV.D.1.a.2: Table Brush Damp: a loud-soft effect but without the "whump" of the Echo.

IV.D.1.a.3: Brush Tine Edge on Table: analogous to the handbell's Rim Brush, but different in that it buzzes twice: first when the chime comes to the table (as in Echo), and second when the tine is brushed across. Corduroy pad covers make this technique very effective.

IV.D.1.b.1: Echo on clothing ( ): as an Echo on the table, but less effective.

IV.D.1.b.2: *Brush Damp*: a loud-soft effect but without the "whump" of the Echo, and without the amplitude variation of the Table Brush Damp.

IV.D.1.c.1: Bottom tine is dipped in water and left in: very effective frequency lowering and amplitude drop as sound begins to travel through the water. A softer amplitude and abbreviated sustain are inevitable. Not as effective as on a handbell, because the water forces the tines to stop rather suddenly.

IV.D.1.c.2: Bottom tine is dipped and lifted back out: as above, but the frequency rises to normal as the chime is lifted, and the remaining weak sustain continues.

IV.D.1.d: Tine touches a piano string(s) with damper pedal applied: sudden and twangy resonance from the string(s) outweigh the chime's sustain sound remnant. More effective in causing sound from the string(s) and less in modulating the sound of the chime.

IV.D.2.a.1: Wrap rubber bands or elastic gauze around one or both tines: dull, muted, yet colorful with some sustain. Subtle variations possible.

IV.D.2.a.2: Wrap lots of elastic gauze around one or both tines: noisy, bright, muted, very short.

IV.D.2.a.3: Wrap tape across the outer length of the bottom tine: almost a harmonic effect at the second partial, but otherwise a colorful muted sound.

IV.D.2.a.3.a: ...and play with paper clip(s) bouncing inside: as above but sustaining less and with added shimmer and sparkle of paper clips, though not easy to determine duration.

IV.D.2.b.1: Apply a clothespin (peg) on the bottom tine edge *(x2 timbres)*: muted, heavy, dark plunk with a slight frequency decrease. Clothespin(s) may fall off after hard or repeated ringing. Only clothespins with springs are reliable; old-fashioned clothespins may or may not slide off, and their effect has more buzz.[148]

IV.D.2.b.2: Apply a clothespin (peg) on the top tine edge so it is struck by the clapper: light, woody plunk with a slight frequency decrease and extreme attack noise. Very unlike the above.

IV.D.2.b.3: Apply a clothespin (peg) tightly to the tine, allowing the metal spring to buzz: as the above clothespin muted sounds, but with some fast and bright metallic buzzing. The duration of the buzzing is unpredictable and may come off as part of the attack, or may linger for a second.

IV.D.2.c.1–5: Apply aluminum foil (or a paper collar) around both tines or much of the tines, Apply foil around bottom tine near the split of the tines, Apply foil around top tine near the split of the tines, Apply foil around bottom tine all along the tine,[149] Wrap foil around the clapper head: all of these sounds are small variations of the fast metallic sizzle or buzz, much like a twangy string buzzing against an object.

IV.D.2.d: String paper clips together and tie string with paper clips inside tines: roughly the same sound as playing with paper clips loose inside, but without the attack timbre modulation from the applied tape of that timbre.

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[148] Refer to fig. 20 (page 79) for clothespin (peg) imagery.

[149] This experiment has been used by Sonos Handbell Ensemble under James Meredith.

V. Damping of a Handchime Sound After or During Sound Production (Sounds Defined by Damping Method)

<u>**V.A:**</u> <u>*Let Vibrate*</u> (**LV**): [the lack of a technique after Ring, and the longest a handchime can sustain unless an object is applied after Ring.]

<u>**V.B.1:**</u> <u>*Damp*</u> (or **//**, or after duration of a note with the symbol attached to its stem during an **LV** section ( )): distinct brief sound of vibrations bouncing and transferring to the clothing. Can be made heard purposefully, to create a subtle color at the moment of damp. Otherwise, performers will mask this timbre by default.

<u>**V.B.2:**</u> <u>Gradual Damp</u>: distinct longer sound of vibrations bouncing and transferring to the clothing, but softer than Damp.

<u>**V.B.3:**</u> <u>*Ring Touch*</u> (**RT**) (or staccato articulation(s) with footnote): fast and brightly accented muffle. The speed of the movement required to bring the chime from the Ring position to the damp position quickly enough to achieve the Ring Touch creates an amplitude effect. Not possible to execute quite as quickly as on a handbell.

<u>**V.C.1.b:**</u> <u>Finger Damp</u>: Analogous to handbell Thumb Damp.[150]

<u>**V.C.2.a:**</u> <u>Hand Damp after duration</u>: as Damp, but in extreme exaggeration of the vibrational bouncing effect and usually done either for its brevity or its timbral exaggeration of Damp.

<u>**V.C.2.b:**</u> <u>*Hand Damp*</u> (**HD**): a damp with extreme exaggeration of attack noise, sustain brevity, and hardness and deadness.

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[150] Finger-Damped chimes are called for in Michael Glasgow's *Bumping Noses*.

V.D.1.a.1: Table Damp: timbre and amplitude modulation with slight softening before loud "whump" (like Echo but lasting much longer) when the table absorbs the first brunt of energy and then more slowly dissipates the rest of the energy. This takes longer than an average Damp but shorter than a Controlled Diminuendo. It is difficult for the performer to mask this timbre, and it is often done either for effect or out of necessity.

V.D.1.a.2: Damp onto wax paper on table: as a Table Damp, but with less "whump" and with the addition of a bright white-noisy tap and buzz much like a snare drum's snare being engaged.

V.D.1.a.3: Damp onto aluminum foil on wax paper on table: as above, but combined with a lower and smoother buzz from the foil, much like the buzz from IV.D.2.c.1–5 (methods of applying foil or a paper collar on the tines).

V.D.2.a: *Table Land Damp* (**TLD**): more like Damp than Table Damp; sound is extinguished very quickly. The chime is inverted so that the handle is above the tines.

V.E: Press clapper into tine and hold against tine⚠: an initial buzz as the clapper is pushed into the tine, then a dull, dead "thunk" as it stays against it (then in some chimes a residual colorful sustain sound remnant). Possibly not good for the spring.

4d. Conclusions from the Handbell and Handchime Timbre Dictionary

Several useful implications about handbell and handchime sounds result from the list:

1. *The default "ring" sound of most handbell performers is not easily defined as a single sound.* Most handbell ensemble performers consider a good tone quality to be inseparable with movement. If they were to render a note on the page which has no markings except pitch and duration, they would ring "normally" (**R**). While sound I.A.1.a.1 (**R**) may be the default way to

ring, it is a sound defined only by its attack. The default tone quality combines **R** with IV.A.1.a, a type of movement. Many subtle variations are possible within this, and not only is the sound affected but the visual aspect of performance almost necessitates it. Rarely is I.A.1.a.1 used by itself in performance; the sound is less interesting because there is no amplitude modulation. The bells do not achieve any of the subtle amplitude modulation as they do when they are moving. So, when it is used alone, it is for special effect.

2. *Many effective handbell performance strategies use two or more of the timbres in rapid succession.* This point follows from the one above. Not only is a ring without movement sonically rather dull, but so might one be without other types of timbral variety as well. A damping method (Section V) or a method of sound modulation (Section IV) or even continuation (Section III) may be added, varied, or embellished upon, thereby serving the tone in a way that is different from and complementing the mere movement (IV.A).
3. *Many more sounds lack notation than sounds that currently have notation.* Most notably, this implies that most sounds possible are not being utilized very often, or at all. But it also suggests that some unused sounds may be unfit or of questionable value for ensemble performance in one or more ways. This will be explored in the sound measurements. A few sounds do not need notation, such as that of a pleasing circle while ringing and sustaining; these are the exception.
4. *The notation for many uncommon techniques is non-existent.* This causes some of their "names" to be rather long and descriptive because no short name has been popularized. Many of them are of such length that they would need to appear in a score footnote or foreword ("<u>With bell on table, press clapper into casting and hold against casting</u>," for instance), while

others would need a note to make even a simple explanation. A composer can utilize a score note which makes an articulation (staccato, for example) always stand for the same technique (mallets one size harder than standard for bell size, for example).

5. *There is no clear boundary between the effects of various techniques on sustain length.* For categorization, the Handbell and Handchime Timbre Dictionary considers most stopped techniques to be defined by their means of damping (in Section V) and most corresponding unstopped techniques to be defined by their attack (in Section I), while it considers timbres with sustain lengths of medium duration to be defined by the way that the sound of their sustain is modulated (in section IV). I have chosen to let the prevailing characteristic of the sound determine its place in the list of the Dictionary. Some sounds in Section IV cause the ringing to fade quickly, but unless the sound is characterized by its damp, it is in Section IV, not Section V with the damped sounds.
6. *The standard techniques appear widely spread across categories.* That is, techniques with official notation do not conform to or congregate in one section of the list. This suggests that these instruments (especially the handbell) are naturally diverse in their potential sound set. Some sub-categories prove this: IV.D.1.A and IV.D.1.B are essentially the fleshed-out versions of what is possible by using a pad (A) or the performer's clothing (B) to modulate sound after a ring, but while the Echo technique is only standard in (A) and the Brush Damp technique is only standard in (B), their opposites are also possible (an Echo can be done on clothing and a Brush Damp can be done on a pad).
7. *The nonstandard techniques have as much application to creative performers as they do to composers.* Sometimes a director or performer may decide to embellish a passage with various

techniques that are not notated in the score. The Handbell and Handchime Timbre Dictionary shows that many of those options are available in many different categories; players may move differently after ringing, damp differently, use different mallets than usual, etc.

8. *The use of timbre for handbells and handchimes is limited mainly by perceptibility of faintly-sounding timbres.* The list does not include timbres that are so soft as to be inaudible from several feet away. Even so, some of the timbres on the list only reach *piano* or *mezzo-piano.* This is also true of timbres which result from movement of the handbell; many tiny shades of timbral variety are possible but ineffective; therefore they are not distinguished in the Handbell and Handchime Timbre Dictionary. Aside from the above limitations, any other sounds are limited only by the musician's imagination.

9. *The Handbell and Handchime Timbre Dictionary shows that there are a total of 165 discrete timbres possible on a single handbell, and 74 discrete timbres possible on a single handchime.* This number does not count combinations of techniques, or handbells, or other instruments. It does not count different timbres from the same technique executed by different-sized handbells or handchimes, or at different dynamics. That being said, some techniques are ineffective on the lowest and highest handbells, some are safe only when performed softly, and some only produce sounds softly. These restrictions remain outweighed by the rest of the effective content. As suggested in Chapter 4a, the topic of amplified handbells is beyond the purview of this study, but the amplification of handbells opens up another vast field of timbral possibility, especially with regard to the timbres which are naturally too soft for purely acoustic concert performance. Simply put, there are many possible timbral uses of the handbell and handchime, even on their own.

Chapter 5. Excerpts of Techniques from the Contemporary Ensemble Repertoire

This chapter is a collection of score excerpts with handbell techniques which create distinct timbres. In many cases, the composer has suggested passages and provided first hand detail to the author in interviews.[151] This collection contains many of the techniques which are catalogued in chapter 4b. A prose description precedes excerpts which warrant one. Note that this collection will occasionally require explanation as to why some scores are notated as they are, yet is not intended to be a complete notation guide or a performer's guide. Rather, this collection is intended to serve composers and any other interested parties by showing how composers and arrangers are currently notating these techniques.

The collection is divided into three parts: Part 1 contains techniques that are standardized and create sounds which would be familiar to handbell musicians, but are still notable for their specificity to the handbell ensemble; Part 2 contains unstandardized techniques which create sounds less familiar to handbell musicians; Part 3 contains notable notations which result in a combination of two or more discrete timbres. Standardization is defined as it was in Chapter 4, as techniques which are listed in the *Handbell and Handchime Notation, Difficulty Level System, and Solo and Ensemble Notation* guide.[152]

Part 1 serves to lay the groundwork of how the handbell ensemble already thrives with its own substantial language of technical notation, so for this study's purposes it is primarily expository. Part 2, however, is the crux of the case for timbral use of the handbell ensemble; it shows how composers have begun to experiment beyond techniques which are themselves only

[151] The composers who were interviewed and graciously described their use of handbell and handchime techniques are listed in the Acknowledgements. Permission was sought to use the small excerpts for this academic purpose. Composer James Meredith's interview was the main catalyst for this chapter.

[152] Behnke, 27–29.

decades old. Part 3 expands more upon this by demonstrating how composers combine techniques.[153] Part 3 also introduces ensemble techniques (random ringing, for example) which are not in the preceding Handbell and Handchime Timbre Dictionary because they do not produce timbres distinct from others. Note the very recent nature of much of the musical source material.

Part 1: Notable Excerpts of Standard Techniques and Their Notation for Ensemble

<u>Martellato</u> and <u>Martellato-Lift</u>

This excerpt demonstrates that the martellato and martellato-lift are sufficiently distinct to be used in the same musical passage for two contrasting timbres and that they are both fluidly performable right after and right before standard ringing.[154]

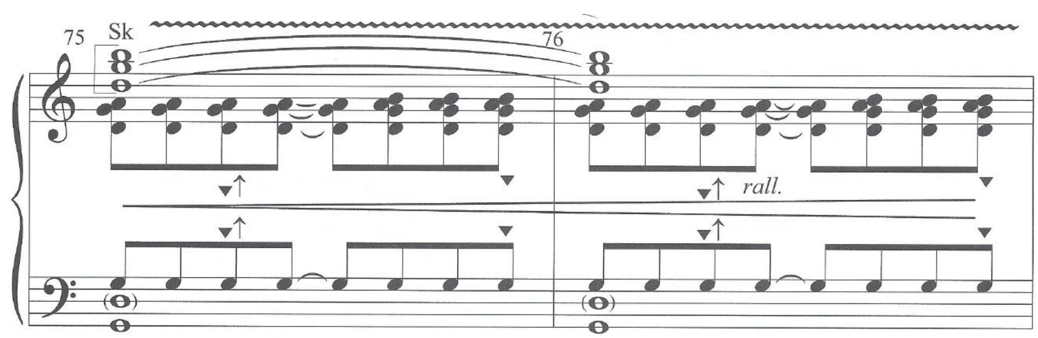


Fig. 21. William A. Payn, *Easter* (Dayton: AGEHR Inc., 2012), mm. 75–76.

<u>Mallet Suspended Handbells</u> (+)

This excerpt shows a musical texture where the attack timbres are made using mallets on suspended handbells. Compared to malleting handbells on a table (which is a technique akin to

[153] This study does not aspire to catalogue and analyze all possible combined ensemble techniques which produce an "orchestration" of combined timbres, but a study which does attempt this catalogue is ripe for exploration at the time of this writing!

[154] The martellato and martellato-lift are commonly called the "mart" and "mart-lift," respectively.

playing a marimba), malleting suspended handbells requires more careful consideration of how many of the players' hands are needed. Each bell in this excerpt including those of m. 94 must be held up with one hand and struck with a mallet from another. (In this excerpt, a prior **LV** sign is in effect.)

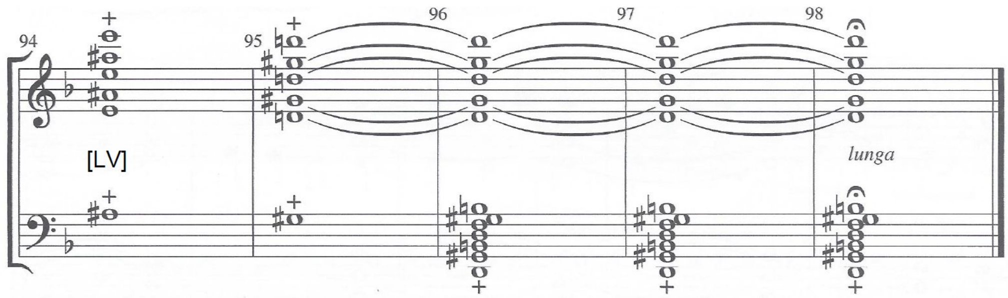


Fig. 22. Cathy Moklebust, *Ah, Holy Jesus* (Fenton: MorningStar Publishers of St. Louis, 2003), mm. 94–98.

<u>Shake</u> (**SK**)

In this excerpt, the Shake technique is shown with the wavy line; the beginning of each handbell's shake is clearly shown within the arpeggiated pattern.

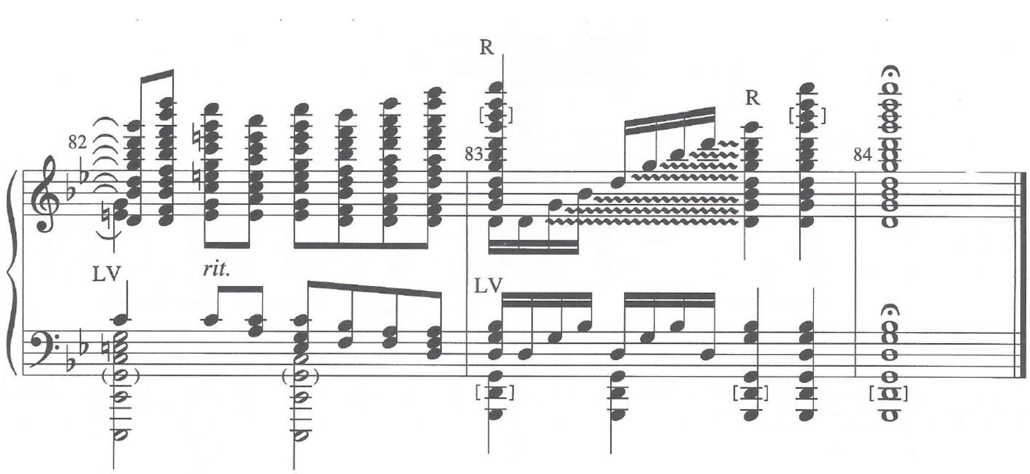


Fig. 23. Fred Gramann, *Prelude on Herzliebster Jesu* (Dayton: The Lorenz Company, 1996), mm. 82–84.

Singing Bell (SB)

The Singing Bell technique is notationally open-ended; the engraver decides if the long note duration should be represented with notes tied over barlines, notes with an **LV** sign before them, or a footnote as in this excerpt. Note also that the engraver should specify not only the duration of applying the dowel to the casting rim (the active part of the Singing Bell technique), but also the duration of the ring allowed once the dowel is removed. This footnote specifies both, and an arrow shows the performers that the technique continues past a system break. A vertical bracket containing all the whole notes in both staves in m. 85 is necessary to clarify that all of the written pitches use SB.

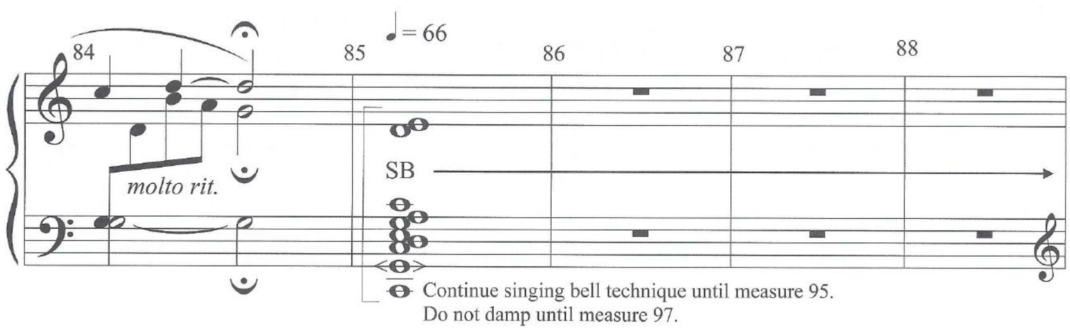


Fig. 24. William A. Payn, *Easter* (Dayton: AGEHR Inc., 2012), mm. 84–88.

Vibrato (handchime)

Note that an ensemble playing multiple handchime vibratos simultaneously will not necessarily align their vibrato patterns. That kind of alignment is usually neither expected nor desired, and if any alignment is called for, the composer must specify its rhythm.

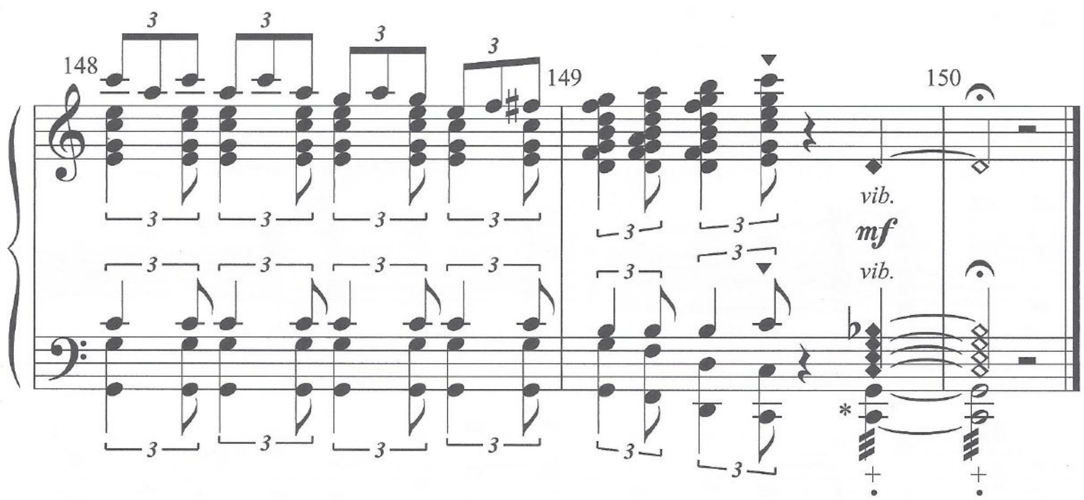


Fig. 25. Margaret R. Tucker, *Bell Hop Boogie and Blues* (Dayton: AGEHR, Inc., 2005), mm. 148–50.

Tower swing (SW, Sw)

This excerpt demonstrates how the tower swing can necessitate some notation clarity. Lines which show the direction and beat of swinging must be labeled and vertically aligned with other objects on their corresponding beats. A footnote applied before the excerpt clarifies that the swings only apply to whole notes, but in context, this is implied and stated as a matter of notational accuracy. The excerpt also demonstrates that most techniques can exist within an **LV** sign with no explanation necessary.

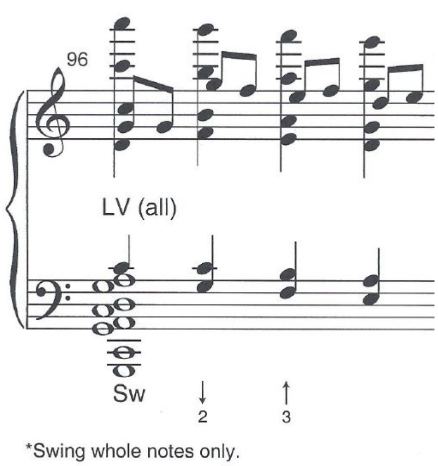


Fig. 26. Cathy Moklebust, *Carillon Festiva* (Dallas: Choristers Guild, 2010), m. 96.

Random Malleting on suspended handbells

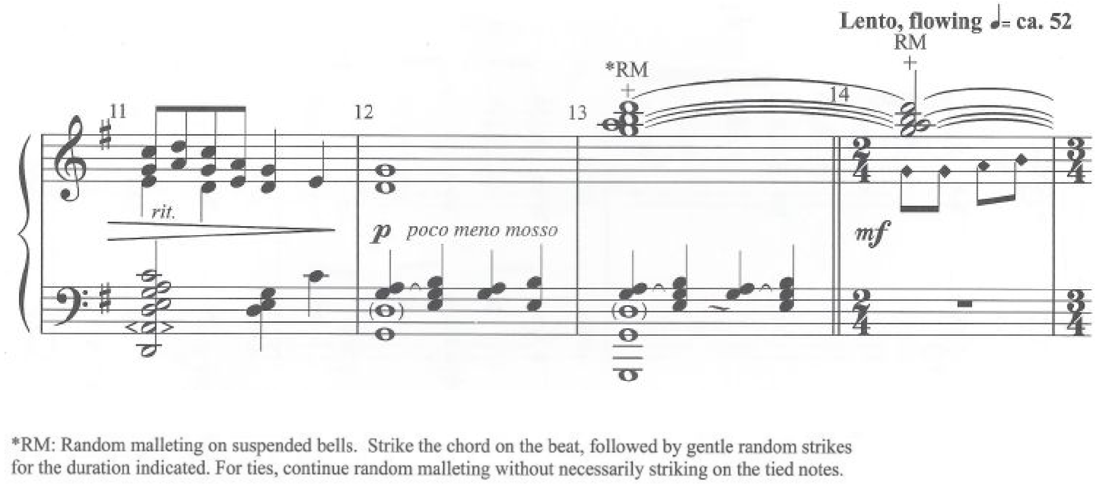


Fig. 27. Catherine McMichael, *Contemplation on Ubi Caritas* (Dayton: The Lorenz Corporation, 2006), mm. 11–14.

Stopped technique with options

A staccato articulation alone is not enough information to convey a stopped handbell technique. When it is used alone, clarification should be added as to which stopped techniques are acceptable to the composer. This excerpt allows for plucking or mallets. The staccato articulation implies that malleting would be done to handbells resting on the padded table.

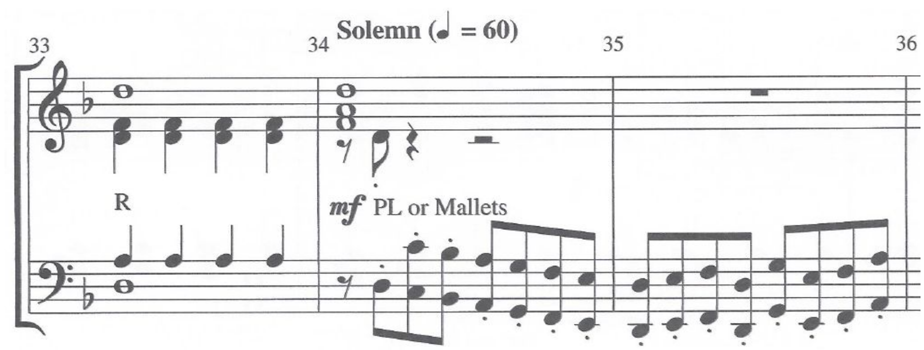


Fig. 28. Cathy Moklebust, *Ah, Holy Jesus* (Fenton: MorningStar Publishers of St. Louis, 2003), mm. 33–36.

Ring Touch (**RT**) with grace note

When performing typical grace notes which connect to a note louder or longer than the grace note, performers or directors may have the grace note and the beat note play together or consecutively. But in this case, as the beat note is short, it is most likely that the performer will in fact *need* to **RT** the grace note also.

Fig. 29. Sandra J. Eithun arr., *Sway (Quien Sera)* (Carol Stream, IL: Hope Publishing Company, 2012), m. 91.

Thumb Damp (**TD**) with grace note

The TD symbol here applies to the note with which it is vertically aligned, but when followed by notes with unlabeled staccato articulation, it can be assumed that it applies to the following notes also. This figuration of a grace note followed by a **TD** grace note is only possible when the preceding grace note is also **TD**; otherwise the sustain of the grace note would overlap with the beat note.

Fig. 30. Margaret R. Tucker, *Bell Hop Boogie and Blues* (Dayton: AGEHR Inc., 2005), m. 1.

<u>Ring then Singing Bell combination</u> (**RSB**)

When instructed to ring and then apply a dowel for the Singing Bell technique, the performer takes care to wait long enough to start with the dowel so as to avoid buzzing.

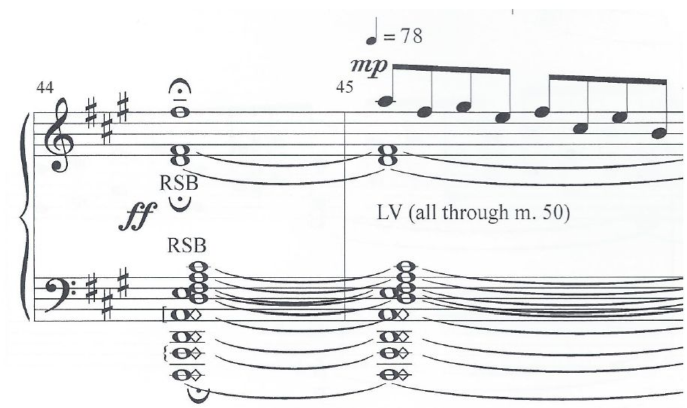


Fig. 31. Matthew Compton, *Impressions on Aberystwyth* (2019), mm. 44–45.

<u>Damp sign for one handbell</u>

During an **LV** section, composers may call for certain notes to be dampened according to their written duration despite the **LV**. In this excerpt, the technique serves to clarify a desired D minor harmony on m. 41. Without the technique applied here, the pitches Bb, C, and E would be heard still ringing at m. 41.

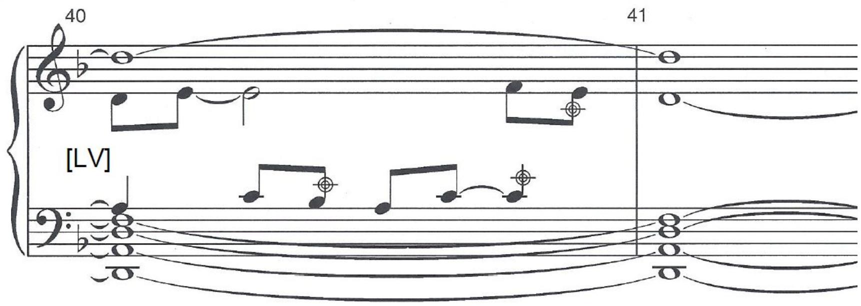


Fig. 32. Cathy Molkebust, *Carillon Festiva* (Dallas: Choristers Guild, 2010), mm. 40–41.

Part 2: Excerpts of Innovative Nonstandard Techniques and Their Notation for Ensemble

Bowed Handchime

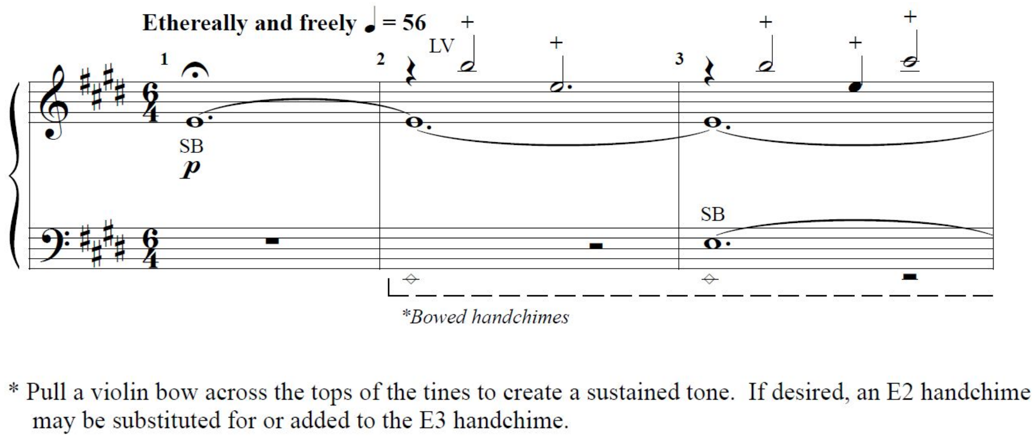
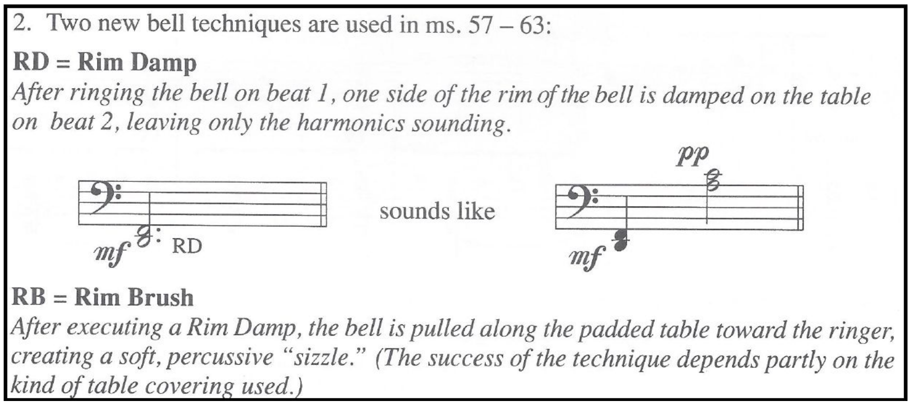


Fig. 33. Jason W. Krug, *Pale Blue Dot* (Irmo: Jeffers Handbell Supply, 2020), mm. 1-3.

Rim Damp and Rim Brush

Fred Gramann's *Come, Thou Almighty King* introduces the following two new techniques which result in two timbres:



2. Two new bell techniques are used in ms. 57 – 63:

RD = Rim Damp

After ringing the bell on beat 1, one side of the rim of the bell is damped on the table on beat 2, leaving only the harmonics sounding.

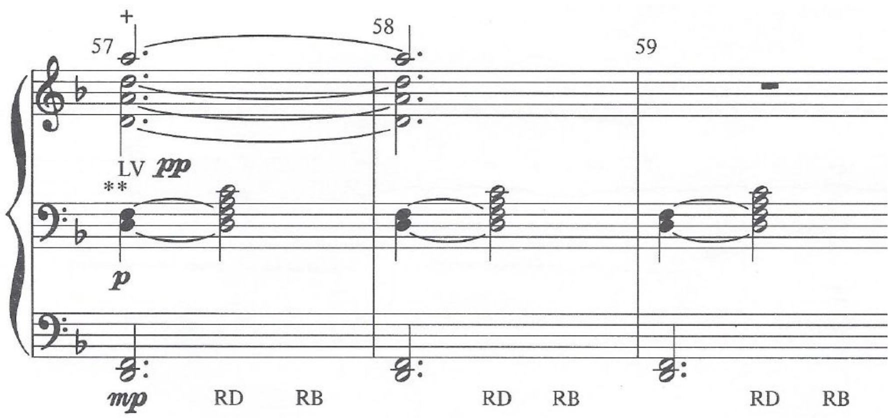
RB = Rim Brush

After executing a Rim Damp, the bell is pulled along the padded table toward the ringer, creating a soft, percussive "sizzle." (The success of the technique depends partly on the kind of table covering used.)

Fig. 34. Fred Gramann, *Come, Thou Almighty King* (St. Louis: Concordia Publishing House, 1995), Front Matter.

The phenomenon of the third partial remnant caused by a Rim Damp is notated in the performance notes above. The D3 and F3 in the excerpt below show how the two techniques are notated. As is the case for some sound modulation techniques, the beat on which the techniques are executed is not notated, but is implied by vertical alignment or typical division of beats in the measure. Note that even when abbreviations (like RD and RB) are created for a new technique and even when performance notes are given before a score, sometimes a footnote is still desired to clarify notation. In this case, as in much published handbell music, a second option must be allowed for ensembles not possessing necessary tools to project the interesting timbres. To use these two timbres convincingly, the ensemble here would need the D3 and F3, an adequate acoustic space, and foam pad coverings which would cause a good buzz for the Rim Brush.[155]

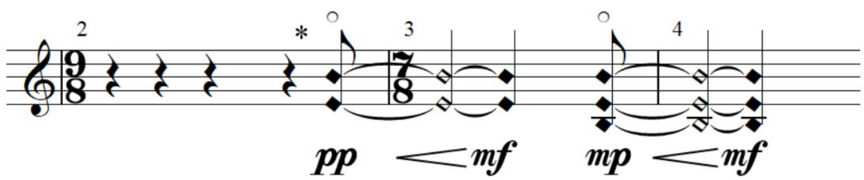
[155] Some handbell ensembles cover their pads with corduroy, which would be excellent in this particular case.



(** The middle staff is an alternate version for 3 & 4 octave choirs. Ideally this will be omitted if using D3 & F3. However, if the harmonics do not carry well in the particular performance space, the middle staff can be added to the 5 octave version.)

Fig. 35. Fred Gramann, *Come, Thou Almighty King* (St. Louis: Concordia Publishing House, 1995), mm. 57–59.

Handchime Crescendo



*stop the chime with the finger (as in handchime *vibrato* technique) during the strike; then *crescendo* by slowly removing the finger

Fig. 36. Christian Guebert, *Four Bagatelles with Curious Titles: II. Cute bug until I* (2016), mm. 2–4.

Clothespins (pegs) affixed to casting

As there is no standard notation for a technique so uncommon, the handbells which get clothespins are listed in the front matter of the score and handbell part. In the score, the notes with clothespins can then appear normally.

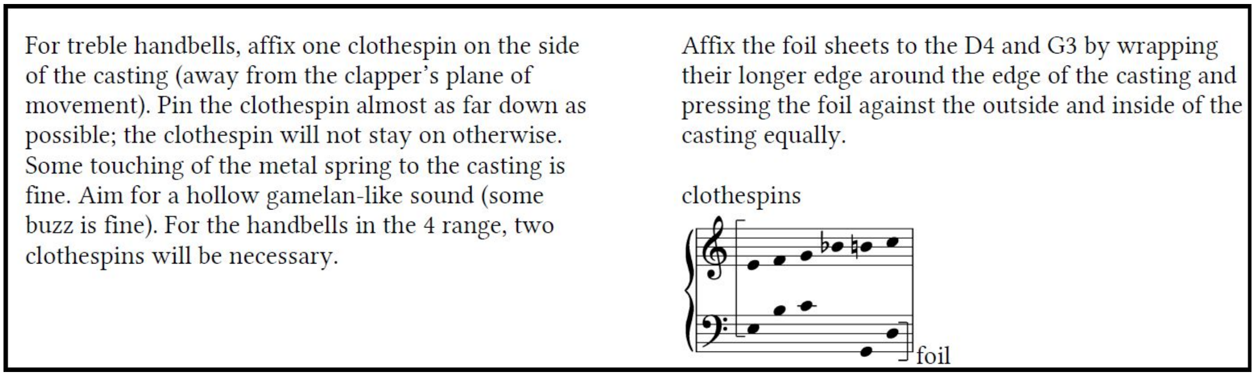


Fig. 37. Christian Guebert, *Voyaging* for choir, harp, and handbell ensemble (2019), Front Matter, iv (full score).

Malleting bell handles and chime handles

Note that two noteheads are needed for the distinct unpitched techniques of striking a handbell handle and striking a handchime handle.

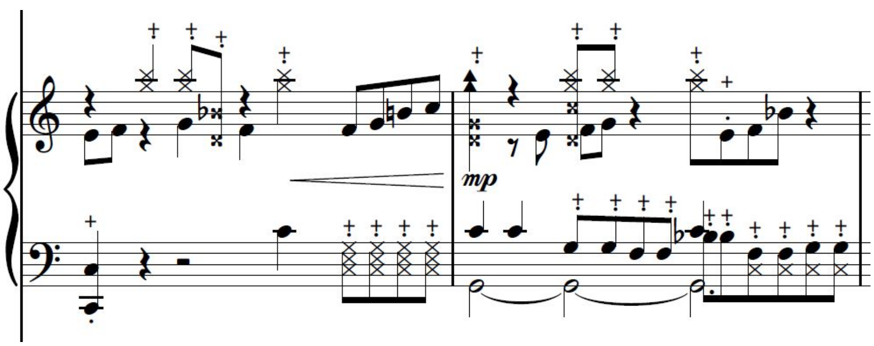


Fig. 38. Christian Guebert, *Voyaging: VIII. Passage to India 2* for choir, harp, and handbell ensemble (2019), mm. 35–36 (excerpted from the full score).

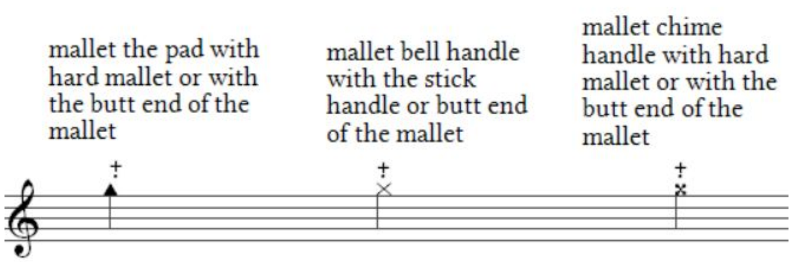
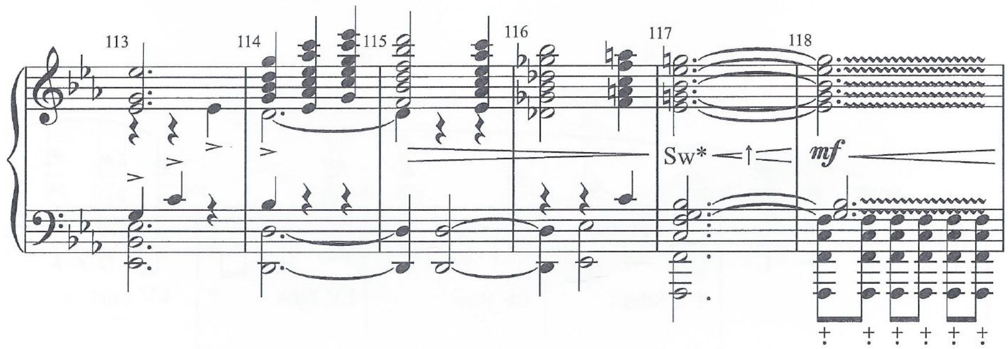


Fig. 39. Christian Guebert, *Voyaging* (2019), Front Matter, iii (full score).

Swing starting from behind table

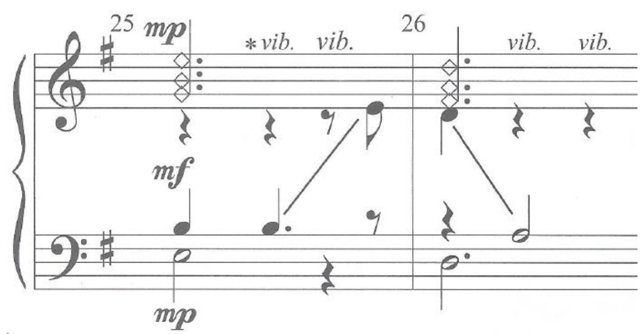


*Treble and stems-up bass: ring below table (with bell near your hip; clapper pointing forward), then swing up. The up-swing should last a full measure. Ring strongly, but the effect should be a soft sound followed by a crescendo.

Fig. 40. Alex Guebert arr., *Built on the Rock* (Irmo: Jeffers Handbell Supply, 2017), mm. 113–18.

Timed vibrato (handchime)

Two excerpts below demonstrate two different approaches to this technique’s notation.



* To achieve the desired vibrato effect in this piece, ring the handchime on beat one and then make one touch on the lowest portion of the handchime tine (or slot) with the index finger on beat 2 and again one touch on beat 3.

Fig. 41. Nancy Hascall, *Waltz Fantasy* (Dayton: AGEHR Inc., 2012), mm. 25–26.

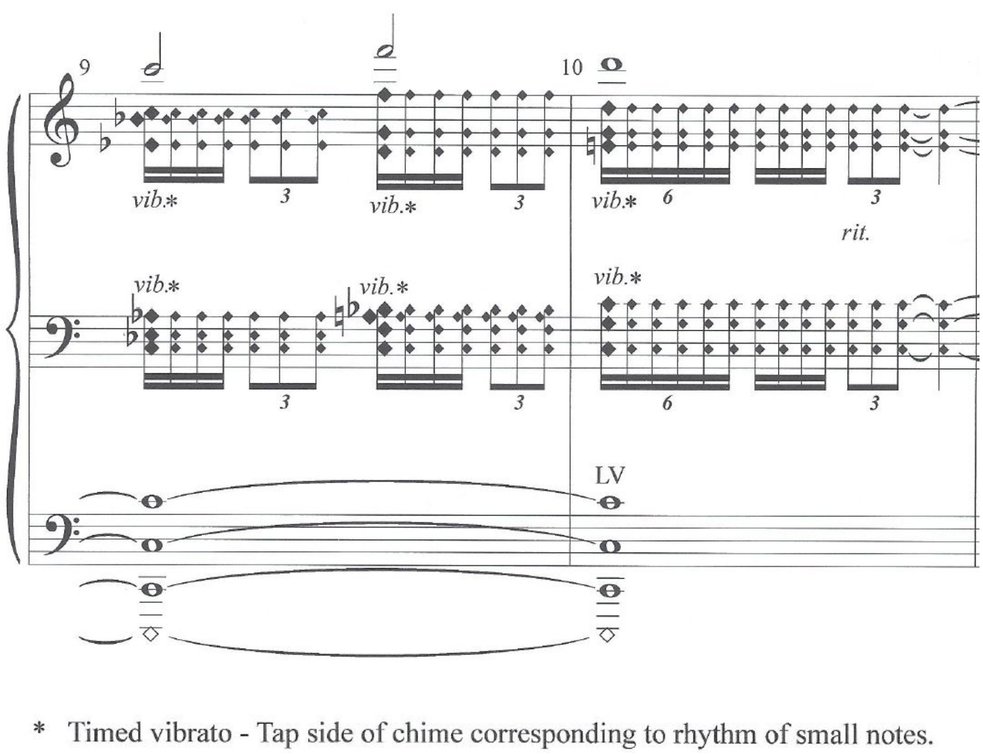


Fig. 42. Alex Guebert, *Out of the Silent Planet* (Dayton: AGEHR Inc., 2016), mm. 9–11.

<u>Mallet roll on the inside of the casting</u>

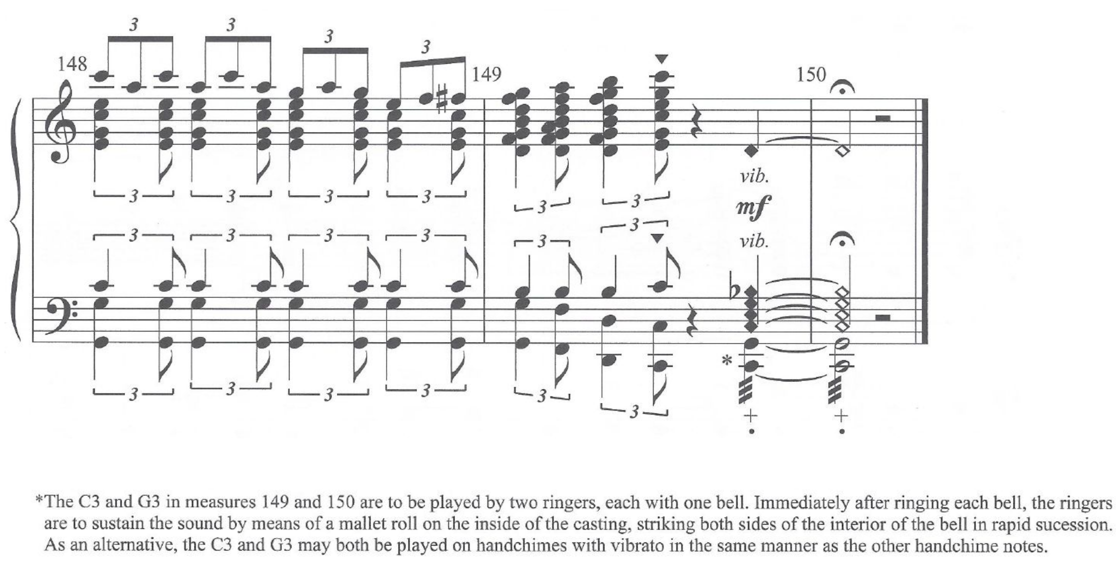
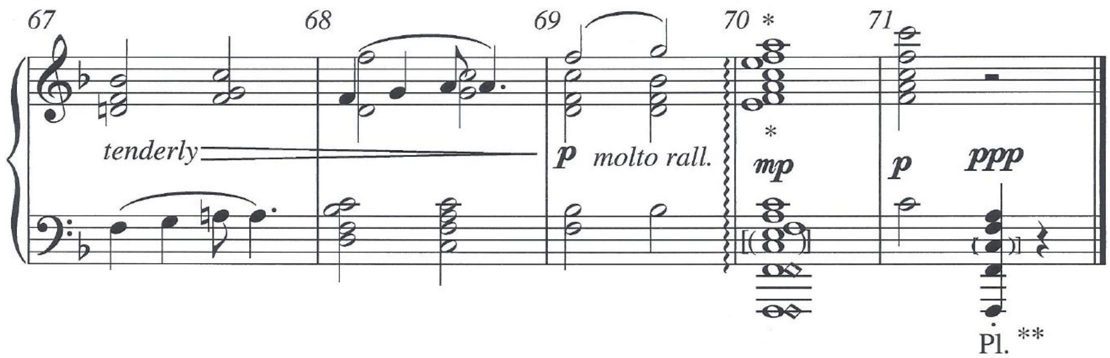


Fig. 43. Margaret R. Tucker, *Bell Hop Boogie and Blues* (Dayton: AGEHR Inc., 2005), mm. 148–50.

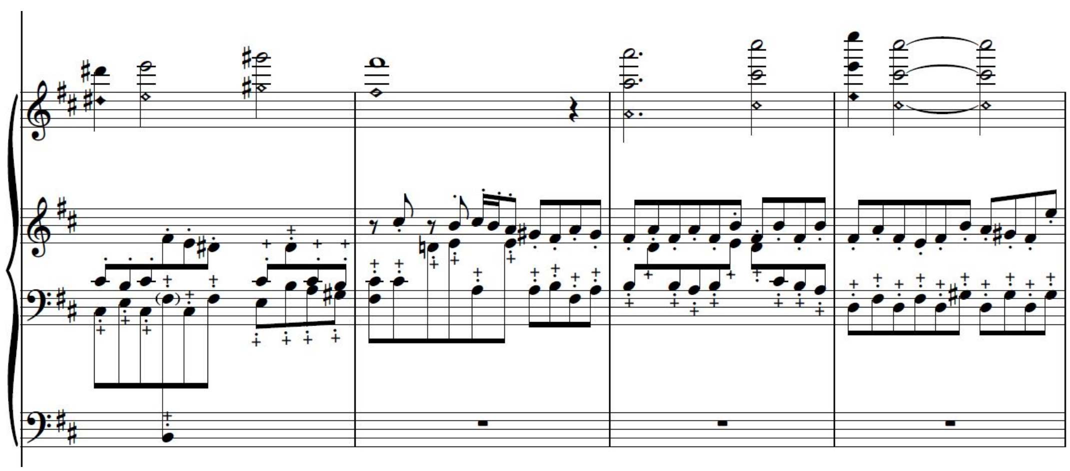
Low-Pressure Pluck



**Hold the bell *slightly* off the table (still somewhat touching the pad) throughout the pluck; hold it there until the sound dies.

Fig. 44. Alex Guebert arr., *Spring Wind* (2010), mm. 67–71.

Low-Pressure Thumb Damp



stopped notes without **+ :**
TD partially with some
ringing, LV as possible

Fig. 45. Christian Guebert, *Voyaging: III. Passage to India 1* for choir, harp, and handbell ensemble (2019), mm. 25–28 (excerpted from the full score).

Thumb Damp (**TD**), modulate pressure

In this excerpt, Thumb Damping is already in effect for all notes, and the score marking indicates a slow transition from the Thumb Damp timbre to a Ring timbre.

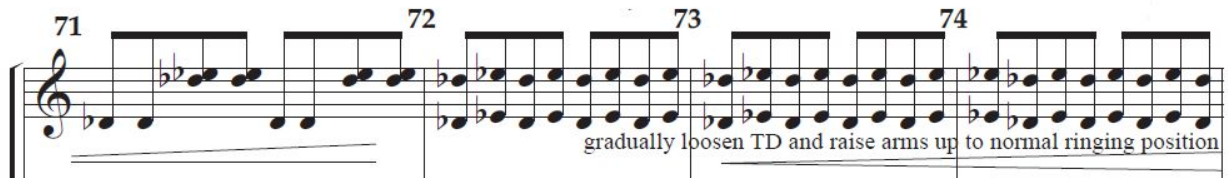


Fig. 46. James Meredith, *Sonics* (Berkeley: Meredith Music Press, 2002), mm. 71–74 (excerpted from the full score).

Mallet casting with handle ends

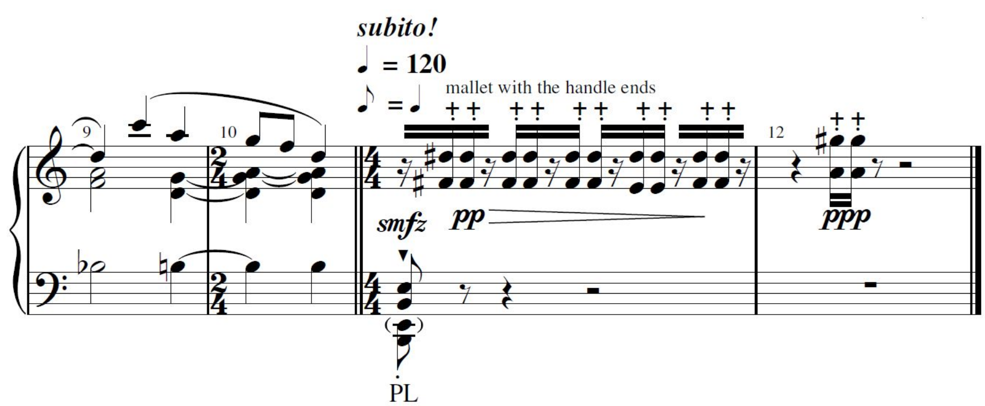


Fig. 47. Christian Guebert, *Four Bagatelles with Curious Titles: II. Cute bug until I* (2016), mm. 11–12.

Mallet handbell on table; modulate pressure

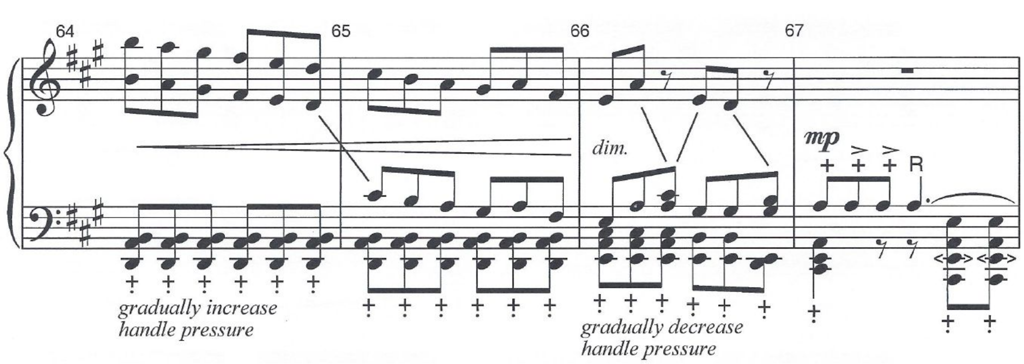


Fig. 48. Michael Glasgow arr., *Allegro (from Songs Without Words)* (Dallas: Choristers Guild, 2010), mm. 64–67.

Random malleting with chopsticks on suspended handbells

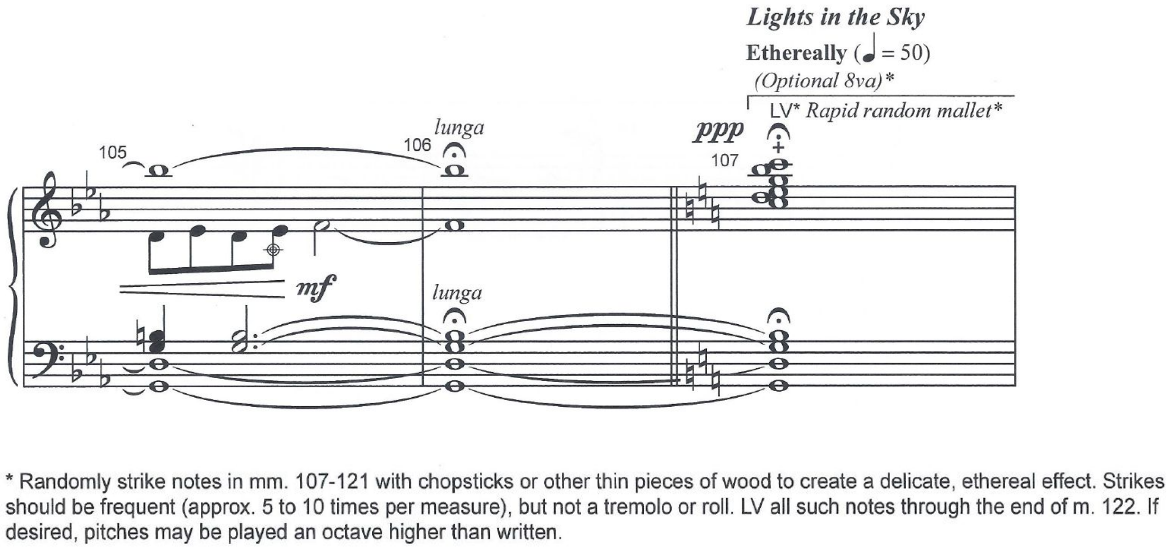


Fig. 49. Jason W. Krug, *Kodiak* (Dallas: Choristers Guild, 2016), mm. 105–107.

Mallet handbell on table; gradual lift off

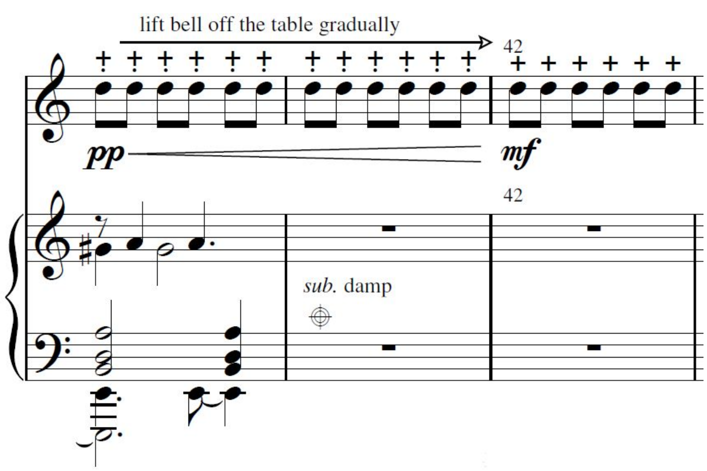


Fig. 50. Christian Guebert, *Four Bagatelles with Curious Titles: IV. CPU usage* (2016), mm. 11–12.

Mallet (Roll) Handbell on Table (using mallet handles)

This technique is the same as a mallet roll upon handbells resting on the table, except using the butt end of the mallets rather than the heads.

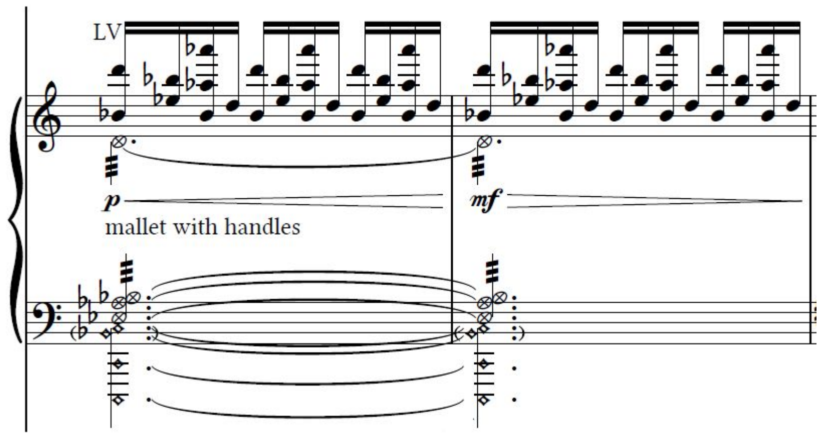


Fig. 51. Christian Guebert, *Voyaging: X. Now Finale to the Shore* for choir, harp, and handbell ensemble (2019), mm. 94–95 (excerpted from the full score).

<u>Mallet Suspended Handbell (harder mallet than standard for handbell size)</u>

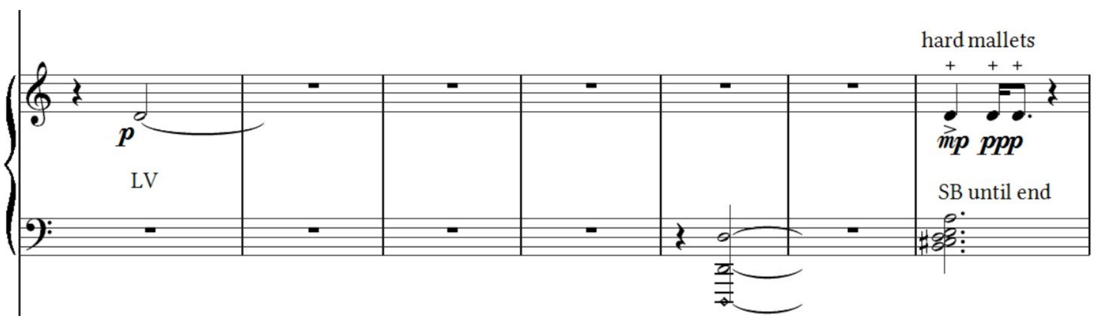


Fig. 52. Christian Guebert, *Voyaging: X. Now Finale to the Shore* for choir, harp, and handbell ensemble (2019), mm. 157–63 (excerpted from the full score).

<u>Mallet (Roll) Handbell on Table (harder mallet than standard for handbell size)</u>

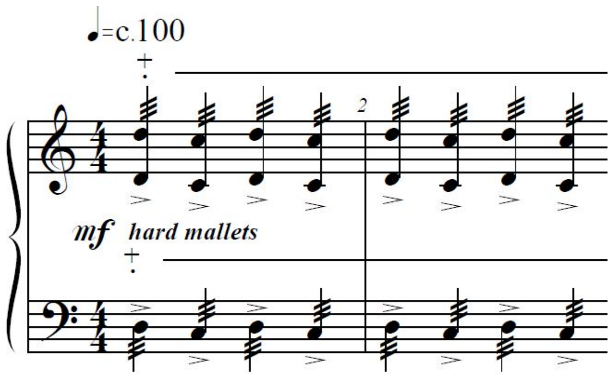
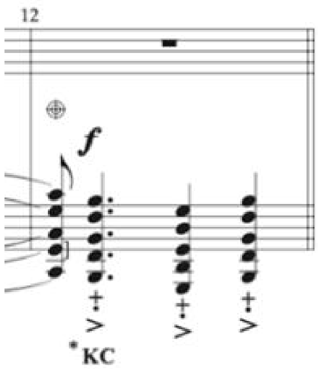


Fig. 53. Libby Larsen, *Hell's Belles: IV. The Magic City Golden Transit* (2001), mm. 1–2.

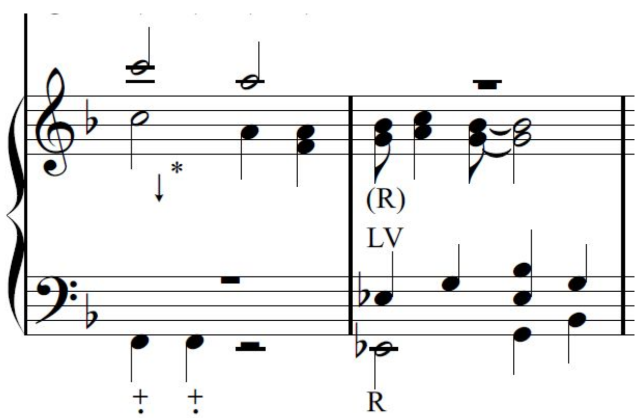
Mallet Handbell on Table; bell rests on paper (“*Klocken Carta*”)



* Klocken Carta technique: malleted notes are performed with a sheet of paper underneath each bell.

Fig. 54. Nicholas A. Hanson, arr., *Radioactive* (Falls Church: 8-Bit Handbell Publications, 2018), m. 12.

Casting dipped in water (after ring)



*F5 and C6: Prepare a small tub filled almost to the top with water, and a hand towel. Ring the bell close to the tub, then dunk the edge of the casting into the water (turn it sideways to avoid getting the clapper mechanism wet). The effect should be a pitch bend about a minor 3rd down. Finger-damp on time, then lift the bell out of the water and quickly dry it on the towel.

Fig. 55. Alex Guebert arr., *Mr. Blue Sky* (2019), mm. 36–37.

Casting dipped in water (before striking with mallet)

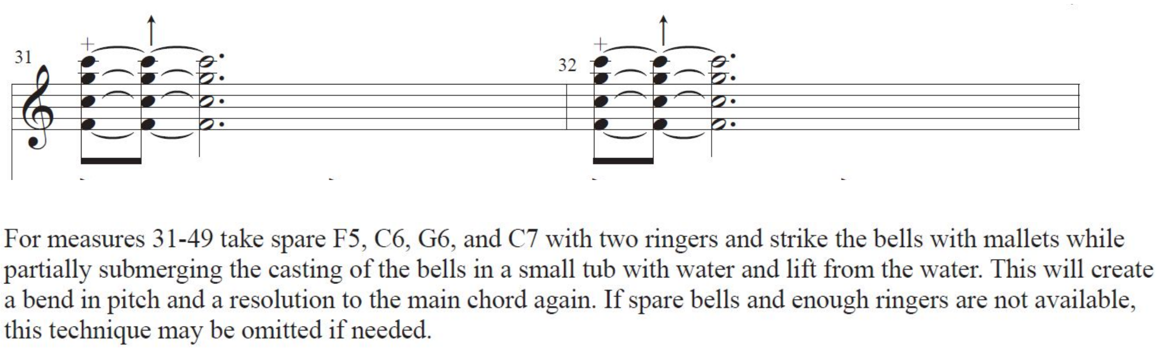


Fig. 56. Matthew Compton, *Soundscapes* (2018), mm. 31–32 (excerpted from the full score).

Casting drags across frame drum [1], casting Brush Damped on frame drum rim [2], Casting taps small drum head [3]

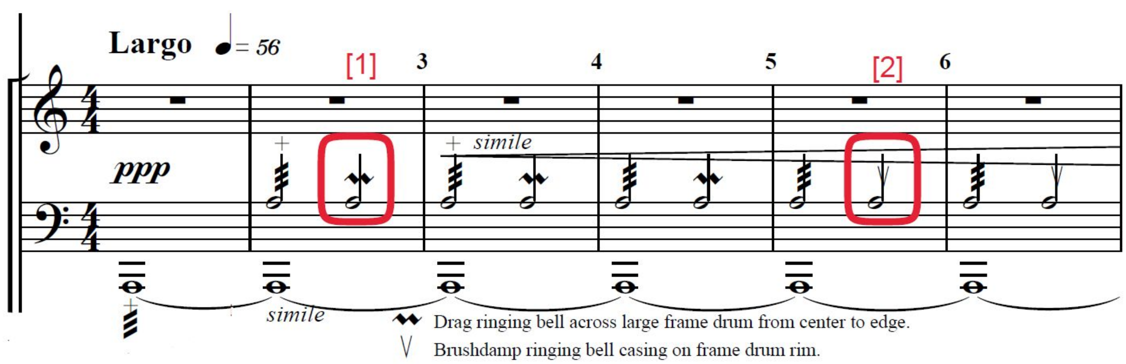


Fig. 57. James Meredith, *Natura* for treble chorus and handbell ensemble (Berkeley: Meredith Music Press, 2002), mm. 1–6 (handbell part).

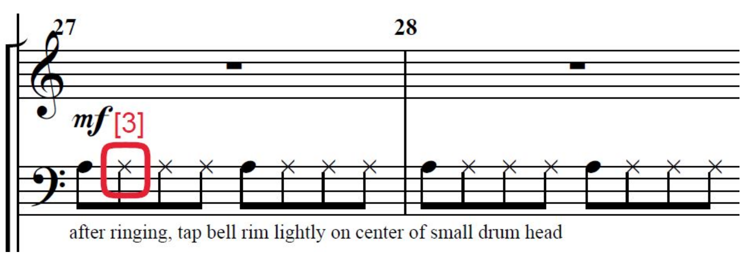


Fig. 58. James Meredith, *Natura* for treble chorus and handbell ensemble (Berkeley: Meredith Music Press, 2002), mm. 27–28 (handbell part).

Gradual damp ("sloppy damp")

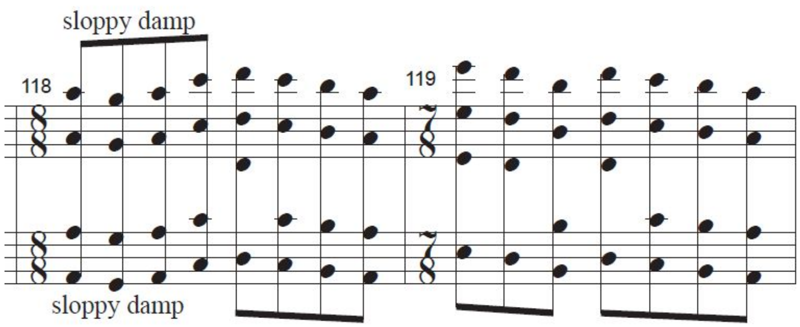


Fig. 59. James Meredith, *Kodo Tryptich: III. Dance* for handbell ensemble and percussion (Oakland: Meredith Music Press, 1997), mm. 118–19 (handbell part).

Strike handchime handle with mallet

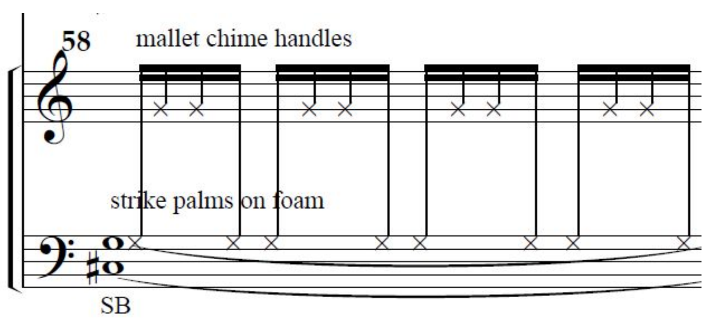


Fig. 60. James Meredith, *Smirti* for cello and handbell ensemble (Berkeley: Meredith Music Press, 2004), m. 58 (handbell and handchime part excerpted from the full score).

Aluminum foil wrapped around casting

In this excerpt, a prior note explains that the five handbells played in the bass clef are wrapped with foil. Duplicate handbells are used for the treble clef part. Composer P.L. Grove describes *Luminance* as an expression of divisions of the sun's progress during the day (such as "Sunrise" and "Sun-dance"), with the sizzling foil effect expressing "sunburn."

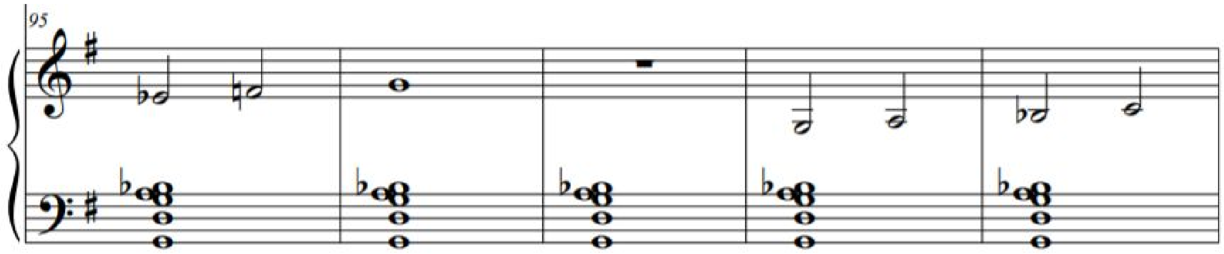


Fig. 61. P.L. Grove, *Luminance* (2016), mm. 95–99 (excerpted from the full score).

Part 3: Excerpts of Innovative Technique Combinations and Their Notation for Ensemble

<u>Two simultaneous, opposing tower swings</u>

Like most standard techniques, the tower swing's effectiveness increases with the number of simultaneous bells performing it. Typically, all players would swing at the same time. But in this instance, Gramann has split the ensemble's swings so that one part's swing is the opposite direction of the other part's swing. The effect on the amplitude over time, when visualized, elegantly matches how the parts sound. Note that the range of the swinging bells necessitated a second bass staff, an uncommon addition in handbell music.

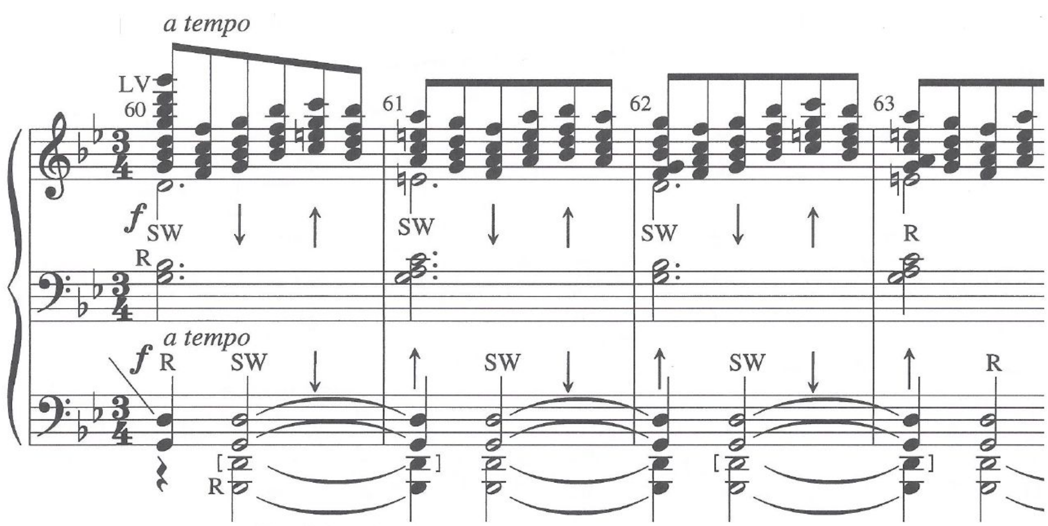


Fig. 62. Fred Gramann, *Prelude on Herzliebster Jesu* (Dayton: The Lorenz Company, 1996), mm. 60–63.

The following chart demonstrates a hypothetical amplitude pattern of two swinging groups of bells much like in the *Prelude on Herzliebster Jesu* excerpt except if allowed to continue for nine beats at moderate tempo.

Fig. 63. Amplitude chart of two groups of handbells performing two tower swings on alternating beats.

The blue part strikes first, and the red part strikes one beat later. Each part swings their bells backward for the beat after the attack, then swings forward after that. The interplay between the two parts produces a sort of "timbral counterpoint" not possible on many instruments besides handbells and handchimes. With this orchestrational technique, an allusion can be made to two tower bells swinging. This allusion is strengthened in the Gramann excerpt by the higher treble bells playing a thickened-out chant tune at **LV**.

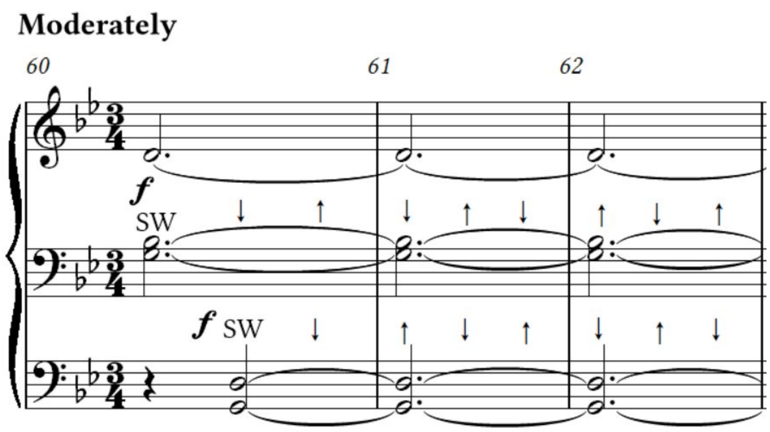


Fig. 64. Version of the above chart in music notation. These two simultaneous, opposing tower swings are like those in the Gramann excerpt, but separated from the rest of the musical texture and elongated.

Multiple unmeasured and uncoordinated tower swings

Yet another approach is for an ensemble to perform tower swings out of ensemble alignment. The timbral effect is more random but still interesting as pitches seem to drop in and out. While the amplitude peaks of the swings in *Prelude on Herzliebster Jesu* are aligned with beats and are isolated, in this excerpt any amplitude peaks would be irregularly timed and constantly overlapping.

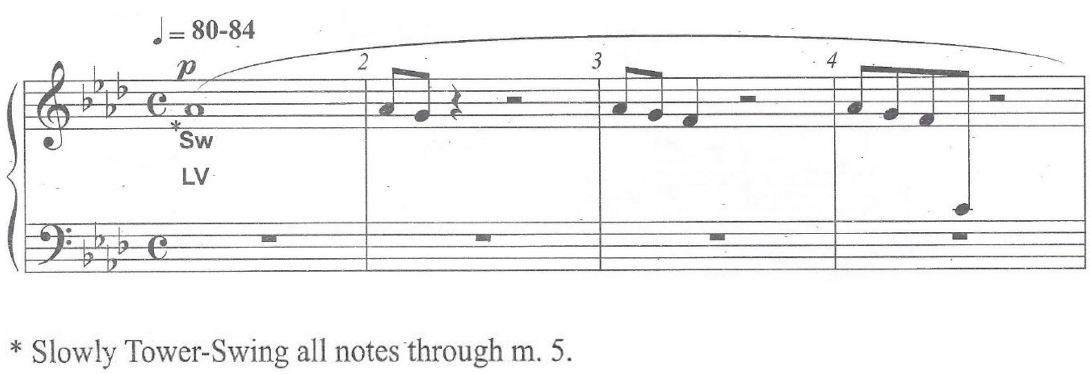


Fig. 65. William A. Payn, *Horizons* (Montclair, CA: National Music Publishers, 2006), mm. 1–4.

Random ringing: various approaches

1. Random handbell ringing morphing into random handchime ringing

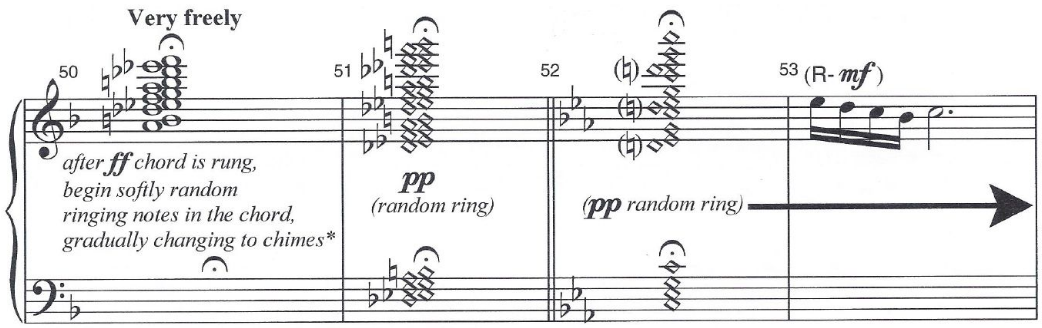


Fig. 66. Cynthia Dobrinski, *The Passion Prophecy* (Dallas: Choristers Guild, 2009), mm. 50–53.

2. Random ringing notation with alternate notehead

A footnote clarifies that the random ringing occurs only during the “x” noteheads. This helps clarify the duration of the end of the random ringing section when players let bells vibrate. The footnote asks performers to play sparsely during the random section.

Fig. 67. Christian Guebert, *Voyaging: VI. O Captain! My Captain!* for choir and handbell ensemble (2019), mm. 109–13 (excerpted from the full score).

3. Random ringing starting gradually

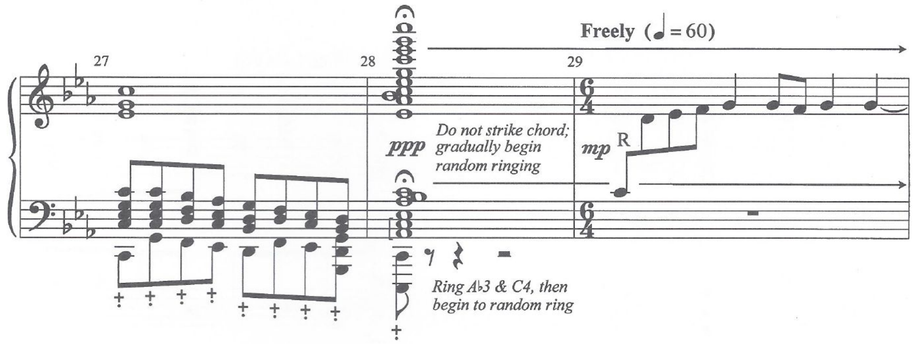


Fig. 68. Cathy Moklebust, *Let All Mortal Flesh Keep Silence* (Irmo: Jeffers Handbell Supply, 2004), mm. 27–29.

4. Notated rhythms morphing into random ringing

Fig. 69. Alex Guebert, *Ransom: II. Oyarsa* for large chamber ensemble (2013), m. 13 (treble clef).

5. Loosely notated music morphing into random ringing

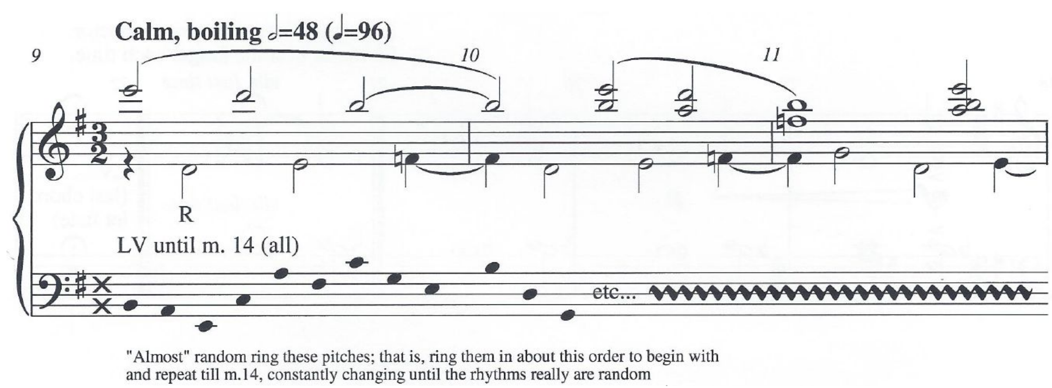


Fig. 70. Alex Guebert, *Ransom: II. Oyarsa* for large chamber ensemble (2013), mm. 9–11.

Multiple unmeasured and uncoordinated gyros

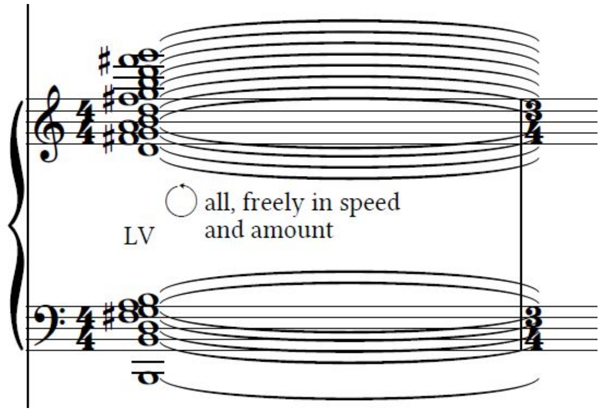


Fig. 71. Christian Guebert, *Voyaging: X. Now Finale to the Shore* for choir, harp, and handbell ensemble (2019), m. 79 (excerpted from the full score).

Improvised rhythms and techniques for specific pitches

The composer explains that in this measure, handbell improvisation using any techniques is allowable. Players might use rhythms that complement the previous groove.

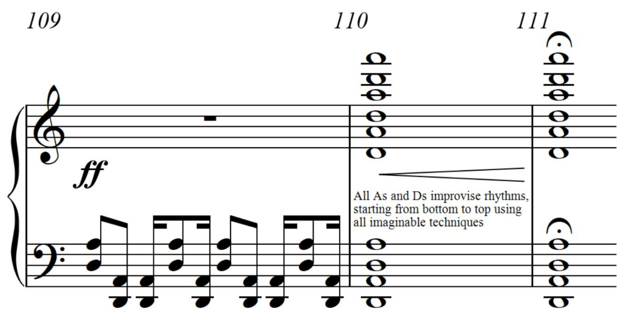


Fig. 72. Herbert Geisler, *Drummers to the Manger* (1999), mm. 109–11.

Echo effect for specific pitches and rhythms

A traditional echo technique would be notated with its arrow symbol; the symbol applies to all handbells which are ringing on its beat. This passage offers an alternative and more detailed echo technique in which the rhythm and pitch of echoed handbells are notated with small noteheads and beams. Note that this is only timbrally effective when the preceding ring(s) are done loudly, since echoes (and especially multiple echoes) diminish the amplitude quickly. The nearby footnote adds that the echoed bells must be touched "lightly but precisely" to the padded table.

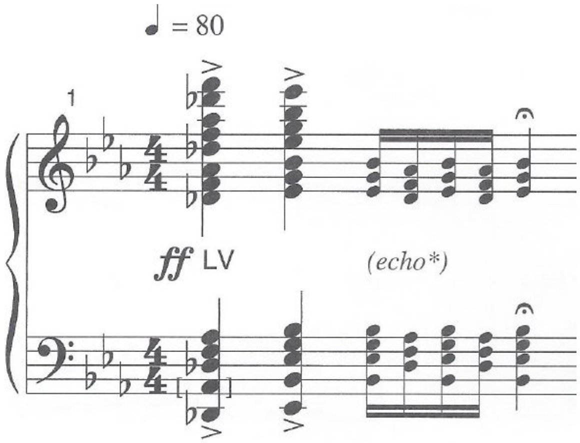


Fig. 73. Fred Gramann, *Everlasting Light* (Dallas: Choristers Guild, 2003), m. 1.

Damping of some, not all handbells

This technique is simply the damping of some notes and not others, and can be rendered in musical notation by simple note values in a **R** (not **LV**) section of handbell music. However, to avoid mistakes, a footnote is often added to clarify, as it is in the two examples of notation below. It is up to a director how dramatic or seamless to make the first damp. A diatonic tone cluster like this one can serve to allude to a tower carillon's sound after chiming a change-ring or something scalar or fast.

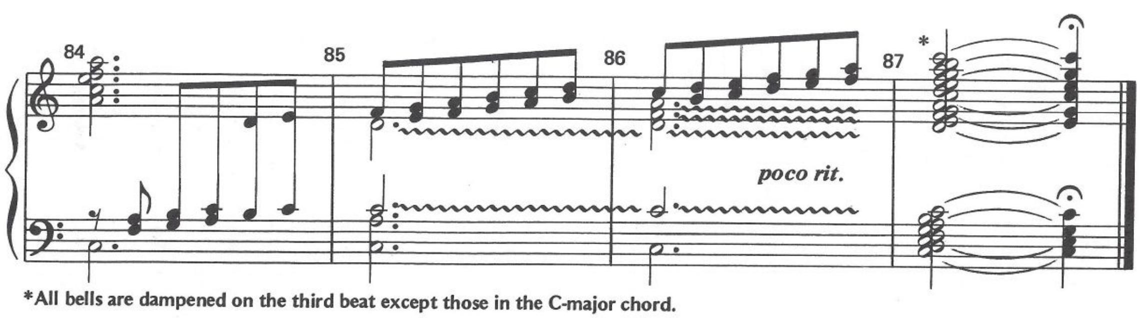
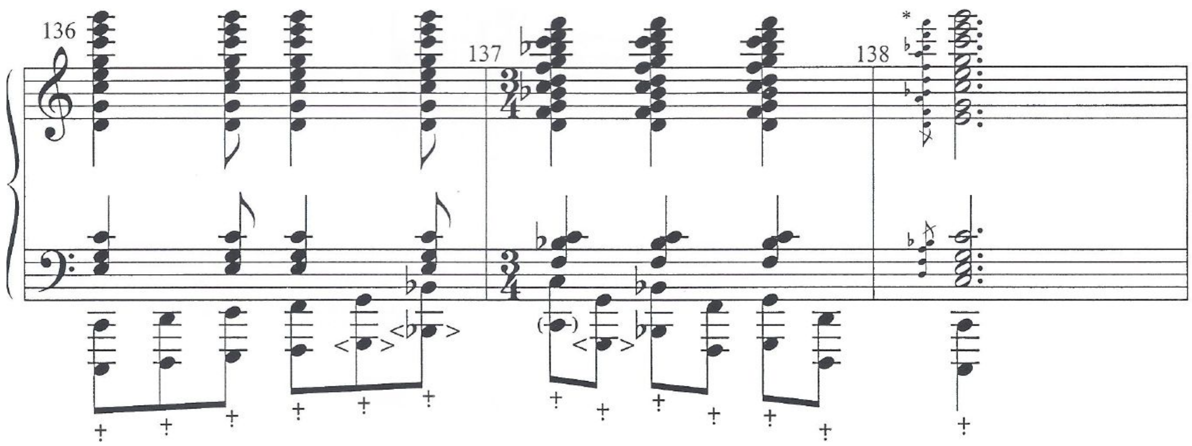


Fig. 74. Hal Hopson, *Pedalpoint and Passacaglia* (Carol Stream: Hope Publishing Company, 1980), mm. 84–87.

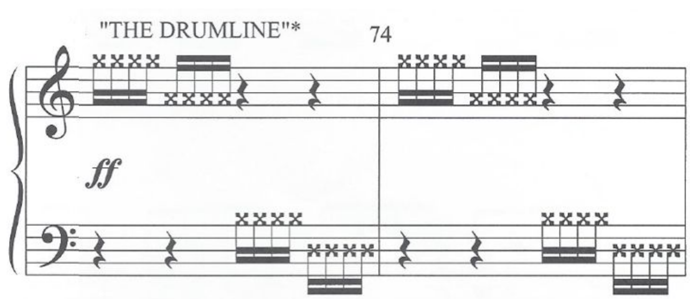
In this second excerpt, the first damping notes are so short in duration as to sound like the attack of the longer notes; the notation strategy here is to use grace notes with a footnote. Composer Michael Joy describes this vertical moment as a tone cluster which “resolves” into a C major triad. He also notes how most performances tend to ignore the footnote and perform the grace notes as traditional grace notes, thus producing an entirely different result.



* Grace notes should be played on the beat with the principal note and damped quickly.

Fig. 75. Michael Joy, *Toccata Ritmica* (Tyler, TX: Red River Music Inc., 2002), mm. 136–38.

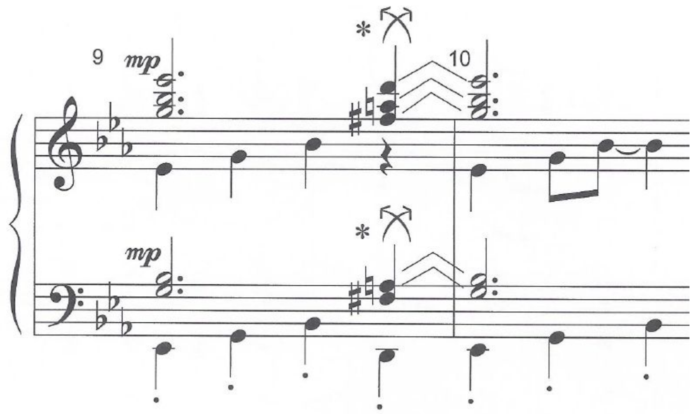
<u>Unspecified ensemble unpitched percussion</u>



*Divide the choir into four groups: high bells, middle treble bells, middle bass bells, low bass; or if done in festival, divide the choirs into four groups, which will correspond with the graphic notation on the score. If you like you can choose four different percussion timbres by having group 1 hit their mallets on their bell handles, group 2 hit their folders, group 3 hit the foam, and group 4 hit bell cases.

Fig. 76. John Behnke, *Rhythmic Rip!* (Dayton: AGEHR Inc., 2005), mm. 73–74.

Trombone smear effect



* A "trombone smear effect" is accomplished by striking BOTH the 1st and 2nd bells of each glissando once SIMULTANEOUSLY: -- The 1st pitch is rung upright.
-- The 2nd pitch is rung with the bell casting pointed toward the shoulder.
Then slowly tilt the 1st pitch toward the shoulder as the 2nd pitch is tilted to an upright position.
Damp the 1st pitch when the 2nd pitch is damped.

Fig. 77. Carol Lynn Mizell, arr., *Rock Around the Clock* (Dallas: Choristers Guild, 2006), mm. 9–10.

Shake (**SK**) as trill (and with preceding ornamentation)

Unmeasured grace notes are difficult to perform across multiple players. Yet, this ensemble technique is an effective rendering of such a Baroque-like ornamentation. A trill for handbell ensemble is often constructed out of two handbells shaking, as is seen in the example (with octaves).

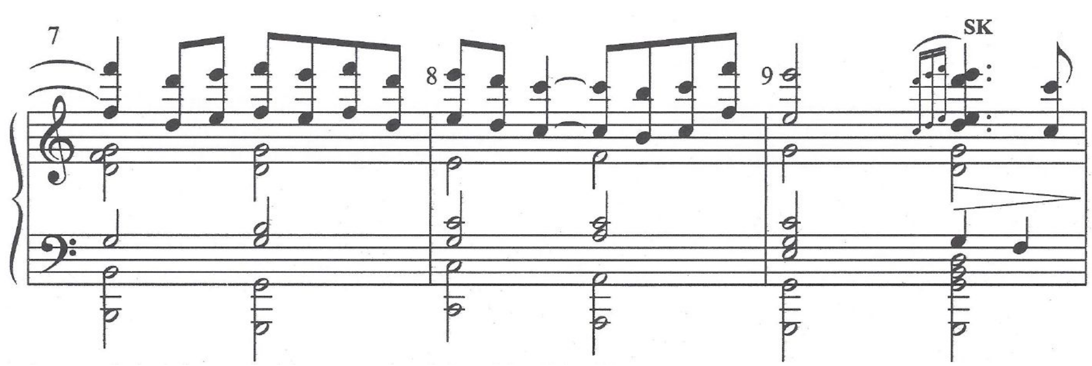


Fig. 78. Blanche Kangas arr., *Adagio and Toccata* (Spokane: Bell Canto Press, 1996), mm. 7–9.

Chapter 6. Timbre Measurements of Handbell Techniques

The sounds measured below are selected from the list in Chapter 4a for their contrast from the baseline “Ring” and from each other. The sounds are listed in their order in from that list, with the exception of sounds that serve as an appendix of other sounds (Brush Damp as an appendix of Damp, for example). Refer to the beginning of Chapter 4 for the disclaimer on the safety of handbell techniques which is relevant again here.

The number of possible timbres on a handbell using just one technique, if given a variety of sizes and dynamics, is often vast. The total number of sounds possible on a single handbell at the end of Chapter 4 does not take into account this multiplicative effect. To see the details of a sound with this variety, one technique can be measured in at least six sound parameters, and at three levels of dynamic force, and on five widely different sizes of handbell.

For each sound, the six parameters below are measured on five sizes of handbell and three dynamics. In rare cases, a seventh parameter is relevant. A movement profile is also measured, showing speed and time during the sound. For each technique the measurements of each parameter are valued from 1–9, 1 meaning insignificant effect of the technique or unsaturated content of that parameter, and 9 meaning most significant or most saturated. The scale of 1–9 is used so that measurements can be imagined in three sets (1–3 being low, 4–6 medium, 7–9 high) and so that 5 is a measurement of the very middle. Since these sounds were listed and categorized by their discreteness and distinctiveness to the human ear and to consider their musical potential, the measurements are not mathematically generated, but are the results of careful listening by the author. The model of a sound amplitude envelope and its parts is referenced for Parameters A–D (Attack, Sustain, Release). Parameters E–F address qualities of the frequency.

Parameters Used

A. *Attack Amplitude*: effect of the technique on the attack loudness.

VALUE	EXAMPLE OF TECH.
1: Attack is insignificant; not audible whatsoever.	Singing Bell, no preliminary strike
2: Attack is slightly audible, only to the performer.	Singing Bell, preliminary tap
5: Attack is medial and musically typical.	Ring (default)
9: Attack is significant; the loudest possible.	Mallet Suspended Handbell (casting, hard mallet)

B. *Attack Noise:* effect of the technique on the non-pitched percussive sound during the attack.

VALUE	EXAMPLE OF TECH.
1: Attack noise is insignificant; not audible whatsoever.	Singing Bell (no preliminary strike)
2: Attack noise is slightly audible, only to the performer.	Mallet Suspended Handbell (casting, soft mallet)
5: Attack noise is medial and musically typical.	Ring (default)
9: Attack noise is significant; the loudest possible.	Martellato

C. *Sustain Reduction:* effect of the technique on the shortening of the natural fade present in a handbell or handchime sound after a typical attack. This parameter is particularly suited to a measurement which is more exponential than linear.

VALUE	EXAMPLE OF TECH.
1: Duration is unchanged from the natural fade.	Ring (default)
2: Duration is shortened by about half.	Aluminum foil on casting
3: Duration is shortened by a bit more than half.	Low-Pressure Thumb Damp
5: Duration is reduced to ⅛.	Brush Damp
9: Duration is reduced to smallest possible (instant).	Hand Damp (full hand), strike handle with mallet

The following sample chart demonstrates the *Sustain Reduction* measuring scheme where a naturally fading handbell or handchime sound is represented by a measurement value of 1 and lasts 20 seconds. Techniques applied to this handbell or handchime which shorten the duration will fall into the measurements 2–9. A sufficient variety of techniques shorten the duration to the range of 0–3 seconds to require that the measurements are made to distinguish between these. A technique resulting in a sustain of one second, for instance, would be measured at 7. This chart shows all nine durations starting from a typical attack amplitude.[156]

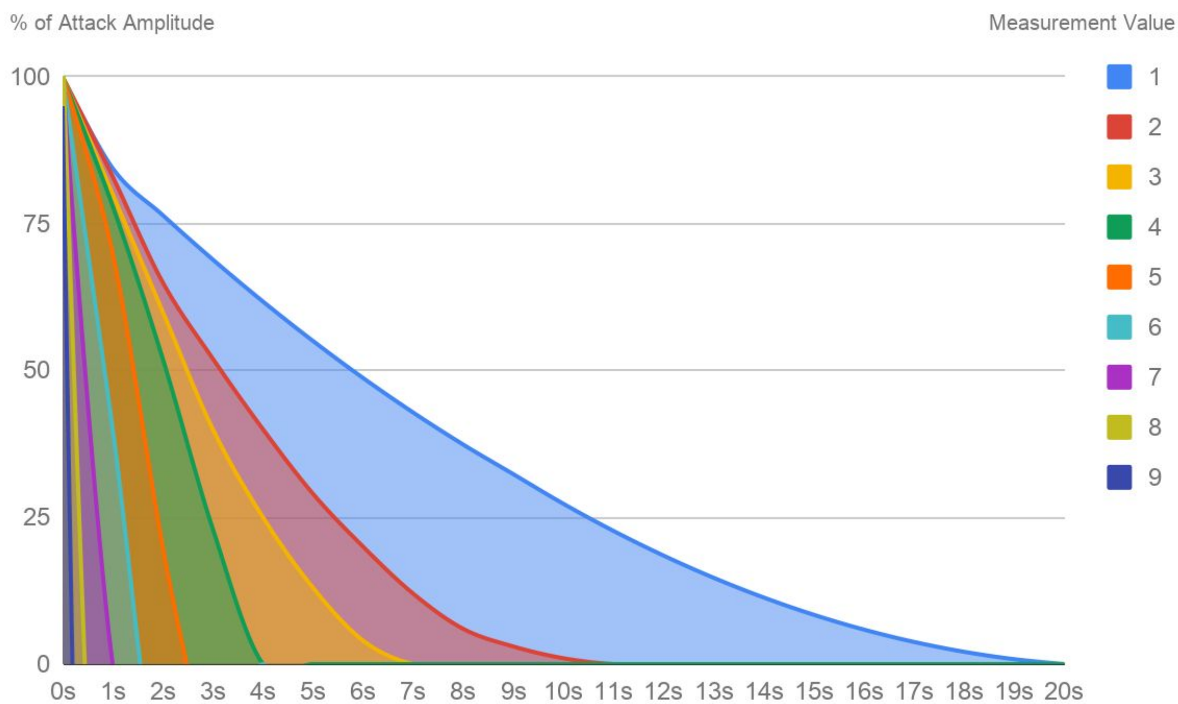


Fig. 79. Sustain Reduction measuring chart.

D. *Release Audibility:* effect of the technique on the audibility of the release.

VALUE	EXAMPLE OF TECH.
1: Release is not audible whatsoever.	**LV**
2: Release is slightly audible, only to the performer.	Damp
5: Release is somewhat audible.	Slow Table Damp

[156] The measurements are roughly the value of $1/(2^{(n-1)})$; the values shown in the chart were arrived at through observation and subjective categorization of release patterns.

9: Release is the loudest possible.	Fast Table Damp

E. *Darkness—Brightness:*[157] effect of the technique on the perceived brightness of the sound, using a scale measuring "darkness" to "brightness," where darkness describes a timbre in which the amplitude is greatest in the lower harmonics, and brightness describes a timbre in which the amplitude is greatest in the higher harmonics.

VALUE	EXAMPLE OF TECH.
1: Timbre is as dark/warm as possible.	Singing Bell
2: Timbre is that of a typical handbell sound.	Ring
5: Timbre is between extremes for the instrument.	Strike with medium mallet
9: Timbre is as bright as possible.	Strike two castings together

F. *Pitch Interference*: effect of the technique on frequencies outside of the expected harmonic series. Note that the default measurement (1) has a small amount of interference. This can be expected of any bell, but the American handbell has very little.

VALUE	EXAMPLE OF TECH.
1: Timbre is made up of only the expected harmonic series.	Ring
2: The expected harmonic series has some faint interference.	Mallet on casting by handguard
5: A pitch is clearly heard which is not in the expected series.	Strike two castings together
9: Multiple series and/or rogue pitches appear in the most complex way.	Bowed Handbell

G. [Other, when applicable]: Some individual timbres will suggest a seventh measurement which can be applied evenly to all dynamics and bell sizes:

a. *Perceived Amplitude Modulation After Attack/Decay*: effect of the technique on perceived loudness change occuring at the beginning of the proper sustain, measured in units of small amplitude change and tracked in temporal order. Units

[157] Some musicians use an alternate pair of terms: warmth (analogous to darkness) and coldness (analogous to brightness).

represent an amount of change smaller than the units of the above six parameter measurements. +1, for example, denotes the slightest increase of perceptible sound. A Gyro, for instance, is [-3 +3] as the bell points away and back, while a Pluck Lift is [+1] as the casting resonance moves from the table to become parallel with the listener.

b. *Frequency Change from Fundamental*: effect of the technique on the frequency, measured in cents[158] and tracked in temporal order. For example, dipping the handbell in water creates various opportunities for frequency modulation, like submerging the casting and then taking it out [-100 +100].

The five sizes of handbells measured are C3, C4, C5, C6, and C7, pictured below. This range effectively demonstrates a wide variety of effects of techniques. As handbells are sold in octave sets from the middle outward, not every ensemble will possess the lowest and highest range; some will not possess the C7 or C3.[159] An image shows a comparison of sizes and each bell size's corresponding standard mallet size.

DIAMETER MEASUREMENTS (of casting rim)

C7:	2.5 in	6.3 cm
C6:	3.4 in	8.8 cm
C5:	4.6 in	11.8 cm
C4:	6.9 in	17.5 cm
C3:	10.2 in	25.8 cm

[158] 100 cents = one semitone.

[159] Ensembles which possess a greater range may be the very ensembles willing to experiment with new timbres.

Fig. 80. C7, C6, C5, C4, and C3 handbells with a ruler.

Fig. 81. All five tested handbells in a row next to a ruler.

Fig. 82. All five tested handbells and their corresponding default mallets, with a ruler.

Measurements

Ring (no motion afterward) [BASELINE TIMBRE]																																					
I.A.1.a.1 (**R**)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1
	m	5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1
	f	5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1
Averages:	avg	5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1

Perceived Amplitude Modulation After Attack: 0. Frequency Change from Fundamental: 0.

Notes: All six parameters are measured here as the baseline timbre.

Typical Ringing Style (typical ringing shape)		
IV.A.1.a	As **Ring**, with:	Perceived Amplitude Modulation After Attack: +1 -1

Swing		
IV.A.2.a (↓↑)	As **Ring**, with:	Perceived Amplitude Modulation After Attack: -5 +5 on first swing, -4 +4 on second, etc.
		Darkness-Brightness reduction when bell swings back: -1 to all

Gyro		
IV.A.3.a (↻)	As **Ring**, with:	Perceived Amplitude Modulation After Attack: -3 +3 (per rotation)

Controlled Diminuendo		
IV.B.3 **(CD)**	As **Ring**, with:	Sustain Reduction changeable by the performer: 2-7 (C3-C6)

Notes: The C7 is too small for the performer to effectively control the Sustain Reduction.

Martellato Lift																																					
I.A.1.b.1 (▼↑)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	7	7	7	7	6	6.8	7	7	7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	5	4	4	2	2	3.4	1	1	1	1	1	1
	m	8	8	8	8	7	7.8	7	7	7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	5	5	4	2	2	3.6	1	1	1	1	1	1
	f	-	9	9	9	8	8.8	-	7	7	7	7	7	-	1	1	1	1	1	-	1	1	1	1	1	-	5	5	2	2	3.5	-	1	1	1	1	1
Averages:	avg	7.5	8	8	8	7	7.7	7	7	7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	5	4.7	4.3	2	2	3.6	1	1	1	1	1	1

Perceived Amplitude Modulation After Attack: +2

Notes: Not safely done loudly on C3.

Slow Martellato Lift																																					
I.A.1.b.2		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	7	7	7	7	6	6.8	7	7	7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	1	1	1.8	1	1	1	1	1	1
	m	8	8	8	8	7	7.8	7	7	7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	2	3	6	1	1	2.6	1	1	1	1	1	1
	f	-	9	9	9	8	8.8	-	7	7	7	7	7	-	1	1	1	1	1	-	1	1	1	1	1	-	4	8	1	1	3.5	-	1	1	1	1	1
Averages:	avg	7.5	8	8	8	7	7.7	7	7	7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	2	3	5.7	1	1	2.5	1	1	1	1	1	1

Perceived Amplitude Modulation After Attack: +1

Notes: With smaller handbells, this effect is less colorful, as the small wavelengths are absorbed too quickly by the pad. Not safely done loudly on C3.

Pluck Lift																																					
I.A.1.c.2.a (**Pl** ·↑)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	7	6	5	6	6	6	7	6	5	7	7	6.4	2	2	2	2	2	2	1	1	1	1	1	1	5	4	4	2	2	3.4	1	1	1	1	1	1
	m	7	6	5	6	6	6	8	7	6	8	8	7.4	2	2	2	2	2	2	1	1	1	1	1	1	5	5	4	2	2	3.6	1	1	1	1	1	1
	f	7	6	5	6	6	6	9	8	7	9	9	8.4	2	2	2	2	2	2	1	1	1	1	1	1	6	5	5	2	2	4	1	1	1	1	1	1
Averages:	avg	7	6	5	6	6	6	8	7	6	8	8	7.4	2	2	2	2	2	2	1	1	1	1	1	1	5.3	4.7	4.3	2	2	3.7	1	1	1	1	1	1

Perceived Amplitude Modulation After Attack: +2

Notes: Only the mid-range size, C5, has a Pluck Lift which matches the timbre of Ring. With smaller handbells, this effect is less colorful, as the small wavelengths are absorbed too quickly by the pad.

Fig. 83. Measurements, first page.

Mallet suspended handbell on casting with appropriate mallet size/composition (*ord.*)																																					
I.B.1 (*ord.*) (+)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7*	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	2	2	3	3	3	2.6	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	2	2.2	1	1	1	1	1	1
	m	3	3	4	4	4	3.6	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	2	2.2	1	1	1	1	1	1
	f	3	4	4	4	4	3.8	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	2	2.2	1	1	1	1	1	1
Averages:	avg	2.7	3	3.7	3.7	3.7	3.3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	2	2.2	1	1	1	1	1	1

Notes: The *de facto* baseline for all mallet technique timbres. *In very small bells like C7, the tightness of the hand affects the perceived attack noise; a loose hand can make the mallet resonate.

Mallet suspended handbell on casting with one size harder in mallet																																					
I.B.1 (hard)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	3	3	4	4	-	3.5	4	4	5	6	-	4.8	2	2	2	2	-	2	1	1	1	1	-	1	2	3	4	5	-	3.5	3	2	2	1	-	2
	m	4	4	5	5	-	4.5	4	4	5	6	-	4.8	2	2	2	2	-	2	1	1	1	1	-	1	3	4	5	5	-	4.3	3	2	2	1	-	2
	f	4	5	5	5	-	4.8	4	4	5	6	-	4.8	2	2	2	2	-	2	1	1	1	1	-	1	4	5	5	5	-	4.8	3	2	2	1	-	2
Averages:	avg	3.7	4	4.7	4.7	-	4.3	4	4	5	6	-	4.8	2	2	2	2	-	2	1	1	1	1	-	1	3	4	4.7	5	-	4.2	3	2	2	1	-	2

Notes: The C7 is not tested. Some pitch conflict is present especially for low bells.

Mallet suspended handbell on casting <u>rim</u> with appropriate mallet size/composition																																					
I.B.2		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	1	1	2	2	2	1.6	3	4	4	4	4	3.8	3	3	3	3	3	3	1	1	1	1	1	1	1	1	2	2	1	1.4	1	1	1	1	1	1
	m	1	2	3	3	3	2.4	3	4	4	4	4	3.8	3	3	3	3	3	3	1	1	1	1	1	1	1	1	2	2	1	1.4	1	1	1	1	1	1
	f	2	2	3	3	3	2.6	3	4	4	4	4	3.8	3	3	3	3	3	3	1	1	1	1	1	1	1	1	2	2	1	1.4	1	1	1	1	1	1
Averages:	avg	1.3	1.7	2.7	2.7	2.7	2.2	3	4	4	4	4	3.8	3	3	3	3	3	3	1	1	1	1	1	1	1	1	2	2	1	1.4	1	1	1	1	1	1

Notes: Attack amplitude to noise ratio is skewed opposite of most others. Noisier and darker than *ord.* malleting, but less dark in midrange.

Mallet lift																																					
I.C (+)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7*	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	2	2	3	3	3	2.6	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	2	2.2	1	1	1	1	1	1
	m	3	3	4	4	4	3.6	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	2	2.2	1	1	1	1	1	1
	f	3	4	4	4	4	3.8	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	2	2.2	1	1	1	1	1	1
Averages:	avg	2.7	3	3.7	3.7	3.7	3.3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	2	2.2	1	1	1	1	1	1
Perceived Amplitude Modulation After Attack: +2																																					

Strike casting with hard thin wood (chopstick)																																					
I.D.1		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	1	1	1	1	1	1	6	6	6	6	6	6	4	4	4	4	4	4	1	1	1	1	1	1	5	5	5	6	6	5.4	3	2	2	1	1	1.8
	m	2	2	2	2	2	2	7	7	7	6	7	6.8	4	4	4	4	4	4	1	1	1	1	1	1	6	6	6	6	6	6	3	2	2	1	1	1.8
	f	3	2	2	2	2	2.2	8	7	7	6	8	7.2	4	4	4	4	4	4	1	1	1	1	1	1	7	6	6	6	6	6.2	3	2	2	1	1	1.8
Averages:	avg	2	1.7	1.7	1.7	1.7	1.7	7	6.7	6.7	6	7	6.7	4	4	4	4	4	4	1	1	1	1	1	1	6	5.7	5.7	6	6	5.9	3	2	2	1	1	1.8

Notes: The loudest and brightest sound is in the C3 when struck hard.

Fig. 84. Measurements, second page.

Singing Bell

III.D.1 (**SB**)		Attack Amplitude*						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	1	1	1	1	-	1	1	1	1	1	-	1	1	1	1	3	-	1.5	1	1	1	1	-	1	1	1	1	1	-	1	1	1	1	1	-	1
	m	1	1	1	-	-	1	1	1	1	-	-	1	1	1	1	-	-	1	1	1	1	1	-	1	1	1	1	-	-	1	1	1	1	-	-	1
	f	1	1	1	-	-	1	1	1	1	-	-	1	1	1	1	-	-	1	1	1	1	1	-	1	1	1	1	-	-	1	1	1	1	-	-	1
Averages:	avg	1	1	1	1	-	1	1	1	1	1	-	1	1	1	1	3	-	1.5	1	1	1	1	-	1	1	1	1	1	-	1	1	1	1	1	-	1

Notes: The C7 does not produce sound. The C6 does not effectively achieve the relative amplitude of the lower bells. *Forte* is difficult to achieve on the lower bells. *A start from truly nothing is possible but only easy on C4 and C5. A slight knock to get the vibration started would still be a negligible [1].

Singing Bell with buzzing*

III.D.2		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	1	1	1	-	-	1	3	3	2	-	-	2.7	2	2	2	-	-	2	1	1	1	-	-	1	7	7	7	-	-	7	1	1	1	-	-	1
	m	1	1	1	-	-	1	3	3	2	-	-	2.7	2	2	2	-	-	2	1	1	1	-	-	1	8	7	7	-	-	7.3	1	1	1	-	-	1
	f	1	1	1	-	-	1	3	3	2	-	-	2.7	2	2	2	-	-	2	1	1	1	-	-	1	8	8	7	-	-	7.7	1	1	1	-	-	1
Averages:	avg	1	1	1	-	-	1	3	3	2	-	-	2.7	2	2	2	-	-	2	1	1	1	-	-	1	7.7	7.3	7	-	-	7.3	1	1	1	-	-	1

Notes:*The timbre measured here is the buzzing, not the beginning of the Singing Bell. The C7 does not produce sound, and the C6 does not produce this technique effectively.

Low-Pressure Thumb Damp

IV.B.2		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	6	6	5	5	5	5.4	3	3	4	5	4	3.8	6	6	6	6	6	6	6	5	5	3	5	4.8	3	3	3	3	3	3
	m	5	5	5	5	5	5	7	6	5	6	6	6	2	3	3	5	4	3.4	6	6	6	6	6	6	6	6	5	3	5	5	3	3	3	3	3	3
	f	5	5	5	5	5	5	8	7	6	7	7	7	2	3	3	4	4	3.2	6	6	6	6	6	6	7	6	6	3	5	5.4	3	3	3	3	3	3
Averages:	avg	5	5	5	5	5	5	7	6.3	5.3	6	6	6.1	2.3	3	3.3	4.7	4	3.5	6	6	6	6	6	6	6.3	5.7	5.3	3	5	5.1	3	3	3	3	3	3

Notes: All bells gain a very high cluster of tones which could be inharmonicity, but may be overtones. *Sustain Reduction can be increased by using more fingers or pressure.

Dip casting in water

IV.D.1.c.1-2		Attack Amplitude						Attack Noise						Sustain Reduction*						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	7	7	6.4	1	1	1	1	1	1	2	2	2	1	1	1.6	1	1	1	1	1	1
	m	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	7	5.6	2	1	1	1	1	1.2	3	2	2	1	1	1.8	1	1	1	1	1	1
	f	5	5	5	5	5	5	5	5	5	5	5	5	2	3	5	6	7	4.6	3	2	1	1	1	1.6	4	3	2	2	1	2.4	1	1	1	1	1	1
Averages:	avg	5	5	5	5	5	5	5	5	5	5	5	5	4.3	4.7	5.3	6.3	7	5.5	2	1.3	1	1	1	1.3	3	2.3	2	1.3	1	1.9	1	1	1	1	1	1
Frequency Change from Fundamental:								C3	C4	C5	C6	C7	avg	These values are the maximum change. Performers can achieve less change by dipping less of the cast																							
								33	100	166	166	133	119.																								

Notes: C3 is large enough that the water affects mostly its rim, causing brightness. The other bells are more fully submerged, causing darkness and more extreme pitch change. Spashing causes audibility in large castings.

* if left in. If taken out immediately, a sustain sound remnant is heard; divide this value by 3.

Elastic cloth or gauze around casting rim

IV.D.2.b.1		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility*						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	6	6	5	5	5	5.4	5	5	6	7	7	6	3	2	1	1	1	1.6	7	4	3	3	3	4	1	1	1	1	1	1
	m	5	5	5	5	5	5	7	6	5	6	6	6	4	5	5	7	7	5.6	3	2	1	1	1	1.6	7	5	3	3	3	4.2	1	1	1	1	1	1
	f	5	5	5	5	5	5	8	7	5	7	7	6.8	3	5	5	6	7	5.2	3	2	1	1	1	1.6	8	5	3	3	3	4.4	1	1	1	1	1	1
Averages:	avg	5	5	5	5	5	5	7	6.3	5	6	6	6.1	4	5	5.3	6.7	7	5.6	3	2	1	1	1	1.6	7.3	4.7	3	3	3	4.2	1	1	1	1	1	1

Notes: *In the midrange and high bells, the attack is indistiguishable from the release in time. In the lower bells, only some release is heard.

Fig. 85. Measurements, third page.

Elastic cloth or gauze around casting close to the rim

IV.D.2.b.2		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	5	5	5	5	5	5	4	4	5	6	6	5	5	5	5	5	5	5	6	5	5	3	5	4.8	1	1	1	1	1	1
	m	5	5	5	5	5	5	6	5	5	5	5	5.2	3	4	4	6	6	4.6	5	5	5	5	5	5	6	6	5	3	5	5	1	1	1	1	1	1
	f	5	5	5	5	5	5	7	6	5	6	6	6	3	4	4	5	6	4.4	5	5	5	5	5	5	7	6	6	3	5	5.4	1	1	1	1	1	1
Averages:	avg	5	5	5	5	5	5	6	5.3	5	5.3	5.3	5.4	3.3	4	4.3	5.7	6	4.7	5	5	5	5	5	5	6.3	5.7	5.3	3	5	5.1	1	1	1	1	1	1

Elastic cloth or gauze around casting shoulder

IV.D.2.b.3		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	4	4	4	4	4	4	5	5	5	5	5	5	3	3	4	5	4	3.8	6	6	6	6	6	6	5	4	4	2	4	3.8	1	1	1	1	1	1
	m	4	4	4	4	4	4	5	5	5	5	5	5	2	3	3	5	4	3.4	6	6	6	6	6	6	5	5	4	2	4	4	1	1	1	1	1	1
	f	4	4	4	4	4	4	5	5	5	5	5	5	2	3	3	4	4	3.2	6	6	6	6	6	6	6	5	5	2	4	4.4	1	1	1	1	1	1
Averages:	avg	4	4	4	4	4	4	5	5	5	5	5	5	2.3	3	3.3	4.7	4	3.5	6	6	6	6	6	6	5.3	4.7	4.3	2	4	4.1	1	1	1	1	1	1

Apply foil around casting

IV.D.2.f		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	4	4	4	4	4	4	5	5	5	5	5	5	2	2	2	3	3	2.4	1	1	1	1	1	1	7	7	6	6	7	6.6	3	3	3	3	3	3
	m	4	4	4	4	4	4	5	5	5	5	5	5	2	2	2	3	3	2.4	1	1	1	1	1	1	7	7	6	6	7	6.6	3	3	3	3	3	3
	f	4	4	4	4	4	4	5	5	5	5	5	5	2	2	2	3	3	2.4	1	1	1	1	1	1	7	7	6	6	7	6.6	3	3	3	3	3	3
Averages:	avg	4	4	4	4	4	4	5	5	5	5	5	5	2	2	2	3	3	2.4	1	1	1	1	1	1	7	7	6	6	7	6.6	3	3	3	3	3	3

Perceived Amplitude Modulation After Attack: 0. Frequency Change from Fundamental: 0.

Notes: Percieved interference is from the foil. Mostly the aluminum vibrates sympathetically with the fundamental and second partial.

Damp

V.B.1		Attack Amplitude						Attack Noise						Sustain Reduction*						Release Audibility						Darkness-Brightness*						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	5	5	5	5	5	5	7	7	7	8	8	7.4	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1
	m	5	5	5	5	5	5	5	5	5	5	5	5	6	7	7	7	8	7	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1
	f	5	5	5	5	5	5	5	5	5	5	5	5	5	7	7	7	8	6.8	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1
Averages:	avg	5	5	5	5	5	5	5	5	5	5	5	5	6	7	7	7.3	8	7.1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1

Notes: Attack Amplitude and Attack Noise are that of **Ring.** Since this technique is almost entirely silent, the brigtness and inerference remain that of the preceding sound.
*Sustain Reduction can be changed by the performer to be about 1 less if damping slowly.

Brush Damp

V.D.1.b.2	As **Damp**, with:	A sustain sound remnant afterward with value of n/2 where n is that of the Sustain Reduction value for **Ring.**

Notes: C7 cannot effectively Brush Damp.

Thumb Damp

V.C.1.b (**TD**)		Attack Amplitude						Attack Noise						Sustain Reduction*						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	6	5	4	6	6	5.4	5	5	6	7	7	6	6	6	6	6	6	6	6	5	5	3	5	4.8	5	5	5	5	5	5
	m	5	5	5	5	5	5	7	6	5	7	7	6.4	4	5	5	7	7	5.6	6	6	6	6	6	6	6	6	5	3	5	5	5	5	5	5	5	5
	f	5	5	5	5	5	5	8	7	6	8	8	7.4	3	5	5	6	7	5.2	6	6	6	6	6	6	7	6	6	3	5	5.4	5	5	5	5	5	5
Averages:	avg	5	5	5	5	5	5	7	6	5	7	7	6.4	4	5	5.3	6.7	7	5.6	6	6	6	6	6	6	6.3	5.7	5.3	3	5	5.1	5	5	5	5	5	5

Notes: All bells gain a very high cluster of tones which could be inharmonicity, but may be overtones. *Sustain Reduction can be increased by using more fingers or pressure.

Fig. 86. Measurements, fourth page.

Hand Damp																																					
V.C.2.b (**HD**)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility*						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	6	5	4	6	6	5.4	5	5	6	7	7	6	3	2	1	1	1	1.6	7	6	6	4	6	5.8	4	4	4	4	4	4
	m	5	5	5	5	5	5	7	6	5	7	7	6.4	4	5	5	7	7	5.6	3	2	1	1	1	1.6	7	7	6	4	6	6	4	4	4	4	4	4
	f	5	5	5	5	5	5	8	7	6	8	8	7.4	3	5	5	6	7	5.2	3	2	1	1	1	1.6	8	7	7	4	6	6.4	4	4	4	4	4	4
Averages:	avg	5	5	5	5	5	5	7	6	5	7	7	6.4	4	5	5.3	6.7	7	5.6	3	2	1	1	1	1.6	7.3	6.7	6.3	4	6	6.1	4	4	4	4	4	4

Notes: All bells gain a very high cluster of tones which could be inharmonicity, but may be overtones. *In the midrange and high bells, the attack is indistiguishable from the release in time. In the lower bells, only some release is heard.

Table Damp																																					
V.D.1.a.1		Attack Amplitude						Attack Noise						Sustain Reduction*						Release Audibility*						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	5	5	5	5	5	5	5	5	5	5	5	5	6	7	7	8	6.6	3	3	3	3	3	3	5	4	4	2	2	3.4	1	1	1	1	1	1
	m	5	5	5	5	5	5	5	5	5	5	5	5	4	6	6	7	8	6.2	3	3	3	3	3	3	5	4	4	2	2	3.4	1	1	1	1	1	1
	f	5	5	5	5	5	5	5	5	5	5	5	5	3	5	6	7	7	5.6	3	3	3	3	3	3	5	4	4	2	2	3.4	1	1	1	1	1	1
Averages:	avg	5	5	5	5	5	5	5	5	5	5	5	5	4	5.7	6.3	7	7	6	3	3	3	3	3	3	5	4	4	2	2	3.4	1	1	1	1	1	1
Perceived Amplitude Modulation After Attack: -2 if Table Damped shortly after attack, -1 if Table Damped later in the sustain																																					

Notes: Attack Amplitude and Attack Noise are that of **Ring.** *If performer presses casting firmly into the pad, Sustain Reduction and Release Audibility [+1].

Martellato																																					
V.F.1.a.1.a (▼)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	7	7	6	6	5	6.2	7	7	7	7	7	7	7	8	8	9	9	8.2	7	7	7	7	7	7	4	3	3	3	3	3.2	1	1	1	1	1	1
	m	8	8	7	7	6	7.2	7	7	7	7	7	7	6	6	8	8	9	7.4	7	7	7	7	7	7	4	4	3	3	3	3.4	1	1	1	1	1	1
	f	-	9	8	8	7	8	-	7	7	7	7	7	-	6	7	8	8	7.3	-	7	7	7	7	7	-	4	4	3	3	3.5	-	1	1	1	1	1
Averages:	avg	7.5	8	7	7	6	7.1	7	7	7	7	7	7	6.5	6.7	7.7	8.3	8.7	7.6	7	7	7	7	7	7	4	3.7	3.3	3	3	3.4	1	1	1	1	1	1

Notes: Not safely done loudly on C3.

Pluck																																					
V.F.2.1.a (**PL**)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	7	6	5	6	6	6	7	6	5	7	7	6.4	6	6	7	8	8	7	6	6	6	6	6	6	5	4	4	2	2	3.4	1	1	1	1	1	1
	m	7	6	5	6	6	6	8	7	6	8	8	7.4	6	6	6	8	8	6.8	6	6	6	6	6	6	5	5	4	2	2	3.6	1	1	1	1	1	1
	f	7	6	5	6	6	6	9	8	7	9	9	8.4	5	6	6	7	8	6.4	6	6	6	6	6	6	6	5	5	2	2	4	1	1	1	1	1	1
Averages:	avg	7	6	5	6	6	6	8	7	6	8	8	7.4	5.7	6	6.3	7.7	8	6.7	6	6	6	6	6	6	5.3	4.7	4.3	2	2	3.7	1	1	1	1	1	1

Tap Pluck																																					
V.F.2.1.b (**TPl**)		Attack Amplitude						Attack Noise						Sustain Reduction						Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	5	4	5	6	6	5.2	7	6	5	7	7	6.4	6	6	7	8	8	7	3	4	4	4	4	3.8	5	4	4	2	2	3.4	1	1	1	1	1	1
	m	6	4	5	6	6	5.4	8	7	6	8	8	7.4	6	6	6	8	8	6.8	3	4	4	4	4	3.8	5	5	4	2	2	3.6	1	1	1	1	1	1
	f	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Averages:	avg	5.5	4	5	6	6	5.3	7.5	6.5	5.5	7.5	7.5	6.9	6	6	6.5	8	8	6.9	3	4	4	4	4	3.8	5	4.5	4	2	2	3.5	1	1	1	1	1	1

Notes: *Forte* not measured; the technique is not feasible at this dynamic.

Fig. 87. Measurements, fifth page.

Mallet Handbell on Table

V.G		Attack Amplitude						Attack Noise						Sustain Reduction					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7*	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	2	2	3	3	3	2.6	2	2	2	2	2	2	6	6	7	8	8	7
	m	3	3	4	4	4	3.6	2	2	2	2	2	2	6	6	6	8	8	6.8
	f	3	4	4	4	4	3.8	2	2	2	2	2	2	5	6	6	7	8	6.4
Averages:	avg	2.7	3	3.7	3.7	3.7	3.3	2	2	2	2	2	2	5.7	6	6.3	7.7	8	6.7

V.G		Release Audibility						Darkness-Brightness						Pitch Interference					
Bell Size:		C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg	C3	C4	C5	C6	C7	avg
At Dynamic:	*p*	6	6	6	6	6	6	1	2	3	3	2	2.2	1	1	1	1	1	1
	m	6	6	6	6	6	6	1	2	3	3	2	2.2	1	1	1	1	1	1
	f	6	6	6	6	6	6	1	2	3	3	2	2.2	1	1	1	1	1	1
Averages:	avg	6	6	6	6	6	6	1	2	3	3	2	2.2	1	1	1	1	1	1

Fig. 88. Measurements, sixth page.

Chapter 7. Proposals for the Handbell Ensemble

The handbell ensemble has immensely diverse potential. This potential, with the help of the research above, can be distilled into eight proposals for the handbell ensemble. These proposals demonstrate how the reader and any musicians might use the ensemble. They are built from the study above, and they encourage a broader and more creative approach to the ensemble and its genre. They are for composers and performers, but also for conductors, listeners, benefactors, collaborators, enthusiasts, writers, aspiring percussionists, children, designers and manufacturers, and publishing organizations. They are for all, to be freely considered.

1. The handbell ensemble is not handbells. A handbell is a nice-sounding bit of percussion, and handbells will make a fine background aura in any composition. But handbells are a decoration; the handbell ensemble is a musical instrument. The ensemble is greater than its parts, and is capable of expressing more than a single bell. The handbell or handchime alone is capable of many sounds, but it is the ensemble—with padded tables, mallets, and all other means of sound production—which is needed for full timbral expression, and thus, advancement of the art form. If a handbell is a piano key, an ensemble is a piano; no-one thinks of a piano as a loose assortment of strings. *Proposal*: *The handbell ensemble is not handbells and therefore should be treated less like a symbol and more like an instrument.*

2. The handbell and the handbell ensemble are free from the boundaries of their historical roots. The survey of history shows that the bell, that cast metal tonemaker so highly prized across continents, occupies a place of honored, sometimes zealous, prestige. But now, when not used for a deliberately spiritual ritual, the bell is often reduced to a symbol of itself. What is the meaning of bells? In the present day, they can mean more—or less—than their historic functions.

Handbells are suitable and flexible for music-making, and so they do not need to merely evoke history or decorate music. Music which is evocative of historical bell sounds is not necessarily a crutch for the handbell, but the handbell should be recognized for more than decoration and symbolism. Modern casting technology allows for a clarity such that handbell sounds need not automatically remind the listener of the old, bright "bell" timbre. Yet, part of the strength of the handbell is that its sounds can also evoke abstract bells while being timbrally cleaner and more flexible than its ancestors. The handbell ensemble should be free to evoke abstract bells, but it should not be obligated to do so. The meaning of bells is transcended through this modern instrument. *Proposal: The handbell and the handbell ensemble are free from the boundaries of their historical roots and are capable of evoking them or not evoking them.*

3. The handbell ensemble qualifies as an expressive instrument. The bell's acoustic potential has expanded in the 20th century to be clearer and more capable of complex pitch arrangements. The result has been an overabundance of basic arrangements with few timbres. The ancient bell and early bell towers were revered for their glorious tones but were mostly unsuitable for harmony or melody; now that the modern ensemble is suited for these elements, it has become known only by the simplest form of them. In a sense, the handbell can *reunite* with its timbral roots. It can do this without being reduced to a decoration because composers since the 20th century have demonstrated that timbre is a useful compositional space in which music can be expressed and organized. The handbell (even without a full ensemble) now contains a tremendous timbral variability that rivals or surpasses many standard orchestral instruments, as demonstrated in Chapter 4. Instruments like the violin have clearly had a head start among other advantages, while the handbell ensemble is relatively young. Some might accuse the handbell

ensemble of being incapable of as much timbral sensitivity as more professionalized instruments; Chapter 4 shows how this accusation is indefensible. If some accuse the ensemble of being incapable of dynamic sensitivity or pitch variety, Chapter 6 shows how this accusation is also indefensible. *Proposal: The handbell ensemble qualifies as an expressive instrument and should be considered just as musically capable of expression as other instruments.*

4. The handbell ensemble genre qualifies as a serious genre. Many publications in this genre are educational or for the lower amateur level. This can be good for a genre up until the point the genre develops the reputation of supporting virtually no contemporary music at a high-performance level. This negative reputation can be reversible when a genre builds a serious and high-level repertoire of original compositions, with associated performances and recordings. The potential for the handbell ensemble genre to improve its reputation is within its grasp. A larger and older genre like the symphony orchestra has a thriving professional world but also a well-rounded amateur and educational system. A smaller and newer genre like the handbell ensemble could enjoy the same levels of depth. A second problem is also addressed in this proposal: the reputation of the ensemble as a theatrical instrument. The ensemble is often characterized by its emphasis on movement during performance; this choreography opportunity should be an asset, but directors can easily let it turn banal, resulting in a stereotype that dismisses handbells as an amateur and comic expression. The handbell is often reduced to sonic decoration; the handbell ensemble should not be reduced to visual decoration. The solution is in a discussion of movement-based techniques and timbres like those found in Chapter 4. The ensemble is capable of vast sonic variety by movement alone. This creates performance possibilities which embrace the visual potential and intertwine it with the aural. The ensemble

uses this potential for good instead of banality when it focuses on the timbral variety of movement-based techniques, not the showiness of them. *Proposal: The handbell ensemble genre qualifies as a serious genre and should therefore be considered to perform at levels comparable to canonically popular genres.*

5. Handbell ensemble performers must professionalize and incorporate more trained percussionists. Classically trained percussionists would make the ideal handbell ensemble performers, but crossover between the two worlds is not common. While classical percussionists must have training on orchestral chimes, crotales, and malleted percussion instruments, they are rarely trained on handbells. Though all handbell ensemble performers are percussionists by definition, even high-level amateurs and specialized professional handbell musicians tend to lack classical percussion training. A simple idea is for trained percussionists to learn to participate in handbell ensembles; a second and more compelling idea is to train all handbell musicians in basic marching, orchestral, and drum set percussion technique. This way, both the general world and handbell musicians are better able to meet each other in the middle. This meeting would, over time, cause the handbell ensemble to more successfully professionalize. *Proposal: Handbell ensemble performers must professionalize and incorporate more trained percussionists, so that the cross-pollination will strengthen the professionalism of the handbell ensemble.*

6. Non-"handbell" composers should be exposed to the handbell ensemble. The handbell ensemble's current reputation manifests itself into three constrained public images: the Christmas music instrument, the instrument which plays arrangements, and the theatrical instrument (a problem addressed in Proposal 4). All three images can be counteracted by composers, who could do so by writing more original music for the genre. But who are the

composers of the handbell ensemble? Prolific handbell composers are a small set. Writing effectively for the handbell ensemble takes a special compositional skill set analogous to writing for the harp, classical guitar, or marimba. Those instruments require such a specialty that composers must understand their unique limitations before unearthing their vast hidden possibilities. So, the majority of trained composers *do not know* how to write for handbells. This is not an indictment of composers; most composers do not need to specialize in every way. But if more composers were exposed to handbell writing during their training to write for orchestral and band percussion or as part of separate training, then more original works would exist. This would counteract the present problem of handbell ensemble repertoire being mostly arrangements or educational music. It would also help inherently to dispel public images of the "Christmas music instrument" and the "instrument for arrangements." Yet, a source such as Gould's *Behind Bars*, respected and used by professionals for engraving rules, does not even mention the handbell, its ensemble, or its notation, despite having sections for harp, classical guitar, and marimba.[160] This is the opposite side of the coin from Proposal 5; if handbells were considered by composers, performers, and authors as a percussion option, the ensemble could be considered and written for more often. *Proposal: Non-"handbell" composers should learn to write for the handbell ensemble so that more wholly original works can be added to the repertoire to balance the preponderance of arrangements and educational music and to counteract the reputation of Christmas music and other arrangements.*

7. The handbell is a timbral instrument; therefore, composers should learn to use the handbell ensemble timbrally. This proposal addresses the underuse of the timbral variety of

[160] In an interview conducted by the author, James Meredith likened the specialty of the handbell ensemble to that of the classical guitar. The guitar genre contains Rodrigo's *Concierto de Aranjuez*, a masterwork with innovative instrumentation; handbell composers could aspire to this standard.

handbells and handchimes. Clarity in handbell timbre has only been available to composers for a matter of decades, not centuries or millennia. The newer clarity means that handbells can sound “good” enough to play anything, including recognizable arrangements of popular music, without loss of sound quality via complication of bright, high overtones. Most pieces for the handbell ensemble are such arrangements, and they tend to use only a small set of contrasting techniques aside from the default “ring.” Chapter 4 demonstrates that there should be no reason to ignore timbral variety in a handbell or handchime composition, and Chapter 6 suggests that some available timbres are sufficiently interesting individually when they are applied to instruments of different sizes and at different dynamic forces. When considering the different parameters of timbres and their suitability to each other, a composer could imagine countless ways to use such timbres. Even without an exploration like this study, composers could try new ways to organize handbell sounds; that field is ripe, especially when considering unstandardized techniques. Yet most ensemble compositions and arrangements do not do this. *Proposal: The handbell is a timbral instrument; therefore, composers should learn to use the handbell ensemble timbrally by taking advantage of its vast sound variety.*

8. Finally, musicians should make boundary-crossing creations with the handbell ensemble. Several times in this study, the handbell world and the larger world of classically trained and other musicians have been described as occupying two “worlds.” The handbell ensemble “world” is internally active, containing organizations like HMA which help broaden its scope. But overall, this “world” is not as connected to the greater world of music as it could be. I believe this is not due to its small size, but its reputation as mentioned in Proposals 4 and 7. Proposals 1–7, and all of the prior chapters, have shown that the handbell ensemble has rich

history, good modern acoustic and mechanical technology, a particular strength in ensemble musicianship, a relatively new and open genre, and an abundance of timbres (many unused or unexplored by composers). Proposals 1–7 offer solutions mostly for the use of the handbell ensemble alone. Indeed, more original music should be written for the ensemble alone, but this proposal goes further to what I believe is the next necessary step. I believe that the handbell ensemble must be combined with other instrumentations. To be clear, this combination is different from that of handbells with other instruments; this is the handbell *ensemble* with other instruments. Only by using the ensemble do composers have access to its attributes: a group trained to work together, with tables and mallets and all else imaginable to produce a broad spectrum of timbres. When the handbell ensemble is used by composers as a composite percussion group to be mixed with other instrumentations, these composers can work with sound combinations that are mostly unexplored. But most critically, when this occurs, it promotes collaboration with handbell ensembles and it connects the "two worlds." Many provocative works have yet to be written for the handbell ensemble with voice, small vocal ensemble, large choir, solo instrument, chamber instruments, large instrumental ensembles, non-Western instrumentations, amplified instruments, electronic media, multimedia components, or combinations of these. Both the set of composers who consider themselves "handbell composers" *and* the set of all other composers should endeavor to write these works. It is critical that these works be written so that the handbell ensemble can move forward with growing into its potential. *Proposal: Musicians should make boundary-crossing creations with the handbell ensemble by writing and performing music for the handbell ensemble combined with other instrumentations.*

The Eight Proposals in List Form

1. *The handbell ensemble is not handbells and therefore should be treated less like a symbol and more like an instrument.*

2. *The handbell and the handbell ensemble are free from the boundaries of their historical roots and are capable of evoking them or not evoking them.*

3. *The handbell ensemble qualifies as an expressive instrument and should be considered just as musically capable of expression as other instruments.*

4. *The handbell ensemble genre qualifies as a serious genre and should therefore be considered to perform at levels comparable to canonically popular genres.*

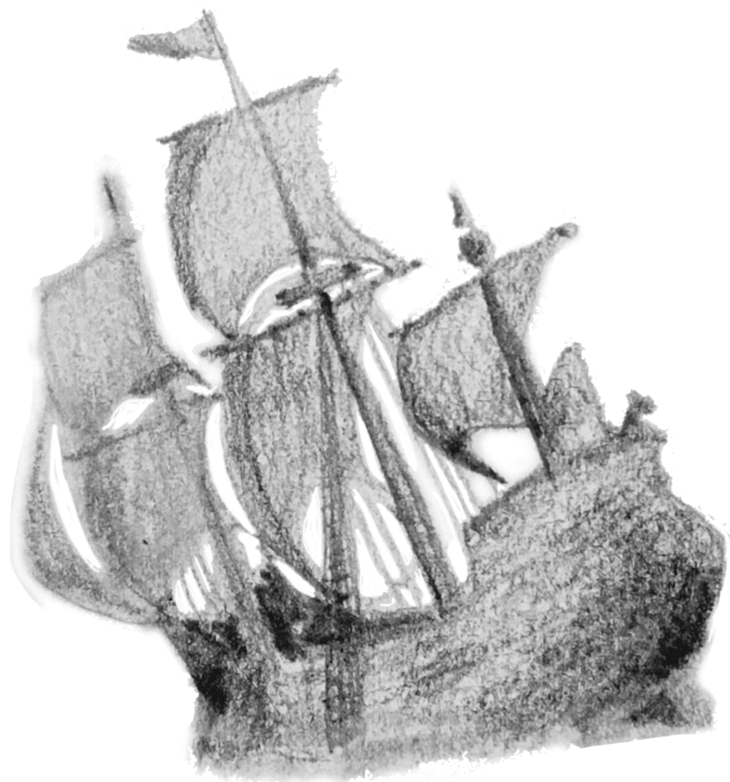
5. *Handbell ensemble performers must professionalize and incorporate more trained percussionists, so that the cross-pollination will strengthen the professionalism of the handbell ensemble.*

6. *Non-"handbell" composers should be exposed to the handbell ensemble so that more wholly original works can be added to the repertoire to balance the preponderance of arrangements and educational music and to counteract the reputation of Christmas music and other arrangements.*

7. *The handbell is a timbral instrument; therefore, composers should learn to use the handbell ensemble timbrally by taking advantage of its vast sound variety.*

8. *Musicians should make boundary-crossing creations with the handbell ensemble by writing and performing music for the handbell ensemble combined with other instrumentations.*

VOYAGING



CHRISTIAN GUEBERT

on poems of the seafaring soul from Walt Whitman's Leaves of Grass

for mixed chorus, handbell ensemble (3-7 octaves), and harp

COMPLETE FULL SCORE: FIRST EDITION

Please notify the composer of any performance plans and to procure the score's foreword, "Seafaring and the World of Walt Whitman," by Daniel Clausen.

cnguebert@gmail.com

With ever-flowing gratitude

to the following instrumentalists, composer-mentors, singers, and conductors who offered guidance and enthusiasm (or full movement performances or workshopping) during my several years of work: John Alexander, Rob Istad, The John Alexander Singers and Pacific Chorale, Jackson Thomas, KC VITAs, David S. Lefkowitz, Richard Danielpour, Peter Golub, Ian Krouse, A. J. Racy, Movses Pogossian, Ken Walicki, Pamela Madsen, Kimo Furumoto, John Prothero, Christina Perez, Hanna Deloe, Justin Solis, Megan Guebert, and premiere performance harpist Gretchen Sheetz,

and to P. L. Grove, Nancy Jessup, Herbert Geisler, Alex Guebert, the local Area 12 and Southern California handbell communities and ensembles, the members of the premiere 6+ octave handbell ensemble of Voyaging, and so many other supportive and friendly members of Handbell Musicians of America,

and to Daniel Clausen for personalized and much-needed Whitman scholarly research, discussion, and the written introduction to the musical score,

and to Sydney Hsueh for the specialized cover artwork for the full song cycle and movements,

and to Brandon Elliott and the dedicated musicians of the Choral Arts Initiative for putting the ultimate faith in this music by spearheading the world premiere of the entire finished work.

Orange, California
03/23/19

VOYAGING

on poems of the seafaring soul from Walt Whitman's Leaves of Grass
for mixed chorus, 3-7 octaves handbells, harp

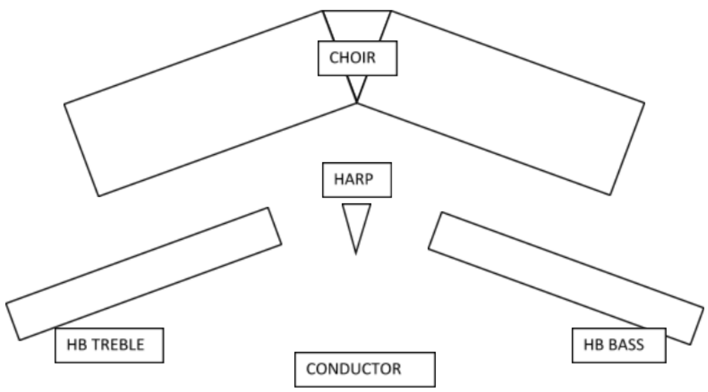
With this conductor's score, parts needed for performance are: choral score with instrumental reduction, harp part, 3-7 octave handbell score, and a reduction of the choral parts for rehearsal accompanist. Reductions are available for piano with chorus and harp with chorus.

Requirements for full ensemble version: minimum 24 vocalists (SATB, *divisi* style varies, S+A and T+B positioned by each other), 3-octaves minimum handbells (11-15 players, 32-40 ft of table length), harp. (See pg. ii for list of soloists drawn from the chorus.)

S and A sections stand so all female voices can be divided *a3* equally. T and B sections stand so all male voices can be divided *a3* equally. Chorus will also divide SSAATTBB.

If flat space, risers recommended for seeing and projecting over handbell tables. Conductor recommended. Split of handbell ensemble recommended between E5 and F5.

A suggested setup:



Front matter and score contents:

LIST OF MOVEMENTS

		INSTRUMENTATION	CHORUS DIVISION/SOLOS	Approx. duration
I.	*The Ship Starting*	full ensemble	S, M-S, A, T, Bar, B Solo S, T	4’
II.	*Aboard at a Ship’s Helm*	unaccompanied chorus	SATB with *divisi*	4’
III.	*Passage 1: Passage to India* (7b)	full ensemble	SATB with Solos: 2 S (1 light, *coloratura*) 3 A, 2 T, 1 Bar, 1 *Basso profundo*	4’
IV.	*The Untold Want*	unaccompanied chorus	SATB with *divisi* 2 solo S (high, full)	6’
V.	*Interlude 1: Out of the Rolling Ocean the Crowd*	harp and soloist (wordless music based on the poem)	Solo contralto/ countertenor	3’30’’
VI.	*O Captain! My Captain!*	handbells and chorus	SATB with *divisi* Solo S, A, T, B	6’30’’
VII.	*Interlude 2: The Sobbing of the Bells*	handbells, harp, and three soloists (wordless music based on the poem) (optional antiphonal soloists)	Solo S (high), S (second), A	2’
VIII.	*Passage 2: Passage to India* (8d)	full ensemble (optional antiphonal soloists)	S, M-S, A, T, Bar, B Solos: S (high), M-S, A, T, Bar, B	4’30”
IX.	*Joy, Shipmate, Joy!*	unaccompanied chorus	SATB (minimal S *divisi*)	2’
X.	*Now Finale to the Shore*	full ensemble	SATB with *divisi* SOLO S, A, T, B	6’30’’

Total duration ≈ 43’. Individual movements can be performed separately.

OPTIONAL PERFORMANCE DIRECTIONS

Antiphonal voices and bells: near the end of mvt. VI beginning at m. 119, the six soloists for mvt. VIII (which should include the three soloists for mvt. VII) begin walking silently to an antiphonal position (side or rear but not too far away, soloists singing as they walk or not at the discretion of the director). The positions of the three female voices should be as far from each other as comfortable. The six soloists remain in antiphonal position through mvt. VII and until mvt. VIII m. 26, when they walk back. These notes are marked as options in the scores of mvts. VI, VII, and VIII. The two handbell players (recommend the two players in positions C4 D4 and G6 A6) may also begin walking silently and subtly to an antiphonal position near the end of mvt. VI beginning at m. 108 (earlier than the singers) taking the handbells C4 and D4 (taken by the C4 D4 player), and A6, B♭6, C7, and F7 (taken by the G6 A6 player). The echo effect for the C4 and D4 can be achieved by the player using their thighs. In mvt. VI mm. 111-113, the G♭6 bell is covered by another player, and throughout mvt. VII, the C4 chime and G6 bell are covered by other players still at the tables. The antiphonal handbell players return during the first half of mvt. VIII (before the singers return).

Textural shaping of "O Captain! My Captain!": On mvt. VI, the choir may decide to orchestrate the choral texture of rehearsal marks A-C in this way or something similar: solos at A, some additional voices at B ("The port…"), tutti sections entering before C on "But O…" (S section at m. 23 beat 1, ATB sections at m. 23 beat 3), S solo at m. 29, B section becomes solo at m. 31 ("Where on…"), then the solo quartet again at "Fallen cold and dead."

Voyaging is performable without amplification of the handbell ensemble or harp, but any experimenting in amplification is welcome.

All other performance notes are listed directly in each movement.

HANDBELLS AND HANDCHIMES USED CHART

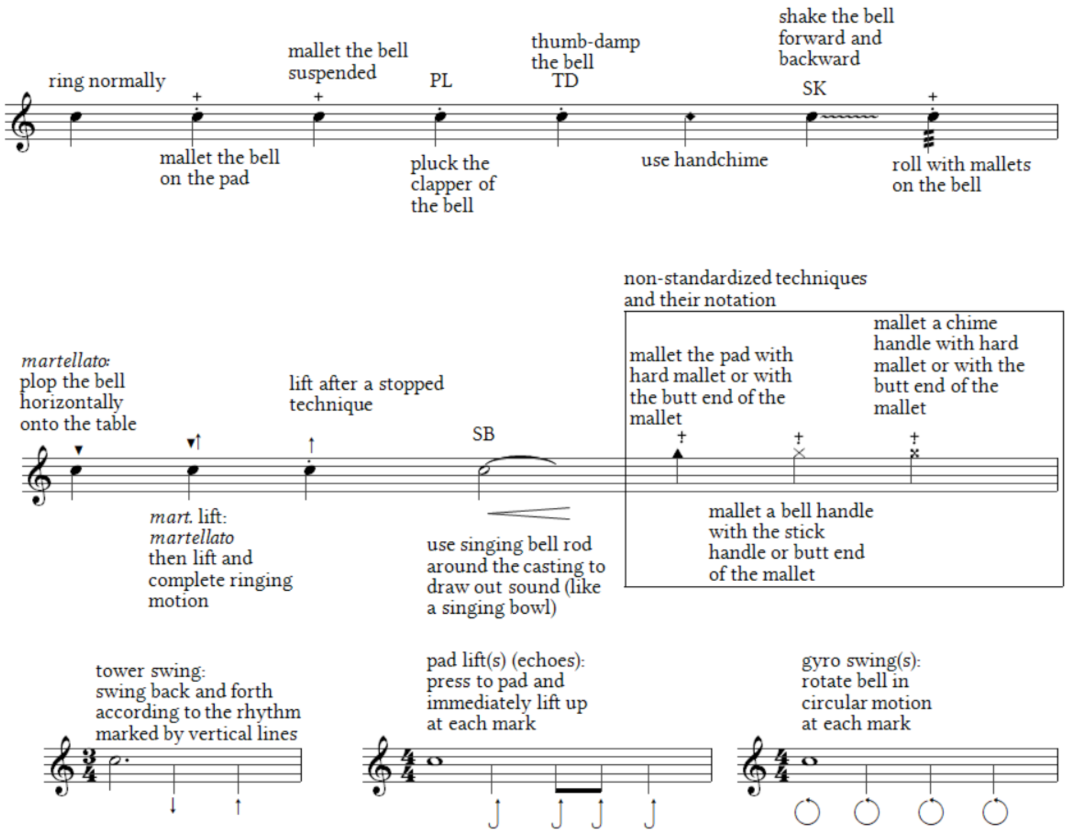
Handbells used (entire choral song cycle, 7 oct): 110

Handchimes used (entire choral song cycle, 7 oct): 30

- 4-7 octave ensembles omit notes in ( ) throughout the score.
- Additional handbell requirements: mallets, singing bell rods, clothespins, aluminum foil.
- Handbells-used charts for individual movements are printed in the handbell part.
- Standard AGEHR assignments recommended through C4-C8 for handbell ensemble player assignments. 11 players recommended for 3 octave version. 13-15 players recommended for 5-7 octave version.

HANDBELL AND HANDCHIME NOTATION LEGEND

LV: let vibrate (do not damp after note duration); canceled by R or next LV.
R: ring the note's written duration, damping after; cancels previous LV.
Staccato marks indicate a stopped technique; another marking will specify which.



HANDBELL ENSEMBLE TECHNIQUE EXAMPLES, PREPARATIONS FOR MVT. VIII

See the link for visual representations and examples of the handbell techniques used in *Voyaging.*

Mvt. VIII requires about 12 standard wooden clothespins (pegs) for 9 midrange handbells and two rectangular strips of aluminum foil (~8’’x12’’ for G3 and ~4’’-6’’ for D4) for two lower handbells.

For treble handbells, affix one clothespin on the side of the casting (away from the clapper’s plane of movement). Pin the clothespin almost as far down as possible; the clothespin will not stay on otherwise. Some touching of the metal spring to the casting is fine. Aim for a hollow gamelan-like sound (some buzz is fine). For the handbells in the 4 range, two clothespins will be necessary.

Affix the foil sheets to the D4 and G3 by wrapping their longer edge around the edge of the casting and pressing the foil against the outside and inside of the casting equally.

clothespins

foil

In the context of a complete performance, the handbell players with clothespin-muted bells and the player(s) using foil prepare these during the first half of mvt. VIII and silently remove them during mvt. IX. It is strongly recommended that the D4 and G3 player(s) mold the foil onto the bell before the performance and leave the prepared shape aside so that they can then slide the foil into place silently.

HARP TUNING, PREPARATIONS FOR MVT. VIII

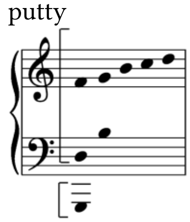
The lowest C is tuned to C♭ for the complete performance of *Voyaging*. This tuning is required for mvts. III, V, and X. Harp harmonics sound an octave higher than written, throughout.

Mvt. VIII requires one short length of picture hanging wire (~3 inches) (an unwound paper clip may work), several strips of adhesive putty (Bostik Blu-Tack® or similar material).

Affix metallic wire around the bass string where it meets the soundboard. Aim for a continuous buzz sound.

Mute the midrange strings with putty by forming little balls (no bigger than marbles) and wrapping them around the strings near the soundboard. Aim for a hollow gamelan-like sound.

putty



wire

In the context of a complete performance, the harpist silently makes these preparations during the first half of mvt. VIII and silently removes them during mvt. IX.

USING THE TEXT

A program note and the full Whitman text appear beginning on the next page, suitable to copy for printing. Permission is granted to freely reproduce the title and list of movements with texts (public domain poetry) and brief version of program notes.
Year of composition of the poetry is listed in the scores of each movement. However, texts from movements II-X are the versions Whitman edited and as they appear in the 1881 “Deathbed” Edition of Leaves of Grass as presented in the Norton Critical Edition (ed. Michael Moon). Digital copy-ready *Voyaging* text and notes housed at the link.

PROGRAM NOTE FROM THE COMPOSER

Voyaging delves into Whitman's poetry of the sea, and the American author's fascination of its existential and spiritual metaphors. I am drawn to the seafaring poems in the author's work which led me to select this vivid poetry. Before we notice the depth of Whitman's text, we are brought by the bells and harp and chorus into the fluid and tumultuous space of *Voyaging* with the overture of "The Ship Starting," where we first suspect that the "Ship" is something more to Whitman than a wooden vessel. A cyclical pattern of harmony underpins this metaphor throughout the songs. Warning alarm bells signal the unaccompanied poem "Aboard at a Ship's Helm," the text selected first when the project began. Here the text drives the music to illustrate a Voyager, a young sailor, dutifully minding warnings. But the crux of all ten poems rests in the last lines, where we learn the real voyage is of the transcendent soul, aboard the ship of the physical body.

The journey continues with an ever-widening passage; the speaker convinces his soul to explore the world and defy time, returning back to experience all creation in the verse from "Passage to India." The music reverses and winds the passage back down. Once back to the beginning, the chorus is immediately propelled in "The Untold Want" by the vibrant exhortation "now…" addressing the Voyager with vigor and intrepid energy. A second poem is set, beginning "Gliding o'er all…" and spanning all the wide dimension it describes. A 4-note motif at the word "Gliding" is one of the primary musical motifs of the song cycle and is woven into other movements. This second poem encourages the singing of both life and death, and the choir will merge it with the energy of the former poem, appealing all the more "now" to set sail on the soul's voyage.

"Out of the Rolling Ocean the Crowd" shows how Whitman sees that all things and fragile bodies are tenderly interconnected as undying self-aware souls across the vast and unpredictable ocean; his poetry is represented here without words. Then the most famous of the Whitman poetry selected, "O Captain! My Captain!" follows, serving as the center of the larger work. Bell tones on the shoreline heralding the return of the victorious ship are set against impassioned phrases of shock on the deck that the leader has perished. While the other poems depict the voyage of the soul aboard the body and the eagerness to sail forth, this poem (itself metaphorical for the Civil War and the fallen Lincoln) depicts the starkness of returning to a fresh tragedy. It describes the death of the "body" of a people; for Whitman, this leader/Voyager represents the whole, and in the poet's optimistic vision of democracy, the extension of the self through others means that though a body has perished, the "soul" of the people is not lost.

The news reaches land and the messengers and bell towers of the people, and "The Sobbing of the Bells" ties the souls of the people together. The voyage continues through grief into an awareness of the nature and continuity of death and life both. The Voyager is borne into limitless realms in the second "Passage," as two choirs join back as one and the exotic tones of strange lands sound from strange instruments. The once-young Voyager is joyful in death also, even along with a shipmate appreciating everyone's place in all things; in "Joy, Shipmate, Joy!" fellow Voyagers are freely untethering, one-by-one, from the shore. The bodily death sees the soul of the now-old sailor leaving the adventures of earth's oceans in "Now Finale to the Shore." The exhortation to "depart" is now given one last meaning. The ocean, the poet's most complete expression of endless nature, is now for the sailor a continuous and infinite voyage.

THE TITLES AND THE TEXT

I. The Ship Starting
II. Aboard at a Ship's Helm
III. Passage 1: Passage to India (*from part 7b*)
IV. The Untold Want (*with* Gliding O'er All)
V. Interlude 1: Out of the Rolling Ocean the Crowd (*music based on the poem*)
VI. O Captain! My Captain!
VII. Interlude 2: The Sobbing of the Bells (*music based on the poem*)
VIII. Passage 2: Passage to India (*from part 8d*)
IX. Joy, Shipmate, Joy!
X. Now Finale to the Shore

I. The Ship Starting

Lo! the unbounded sea!
On its breast a Ship starting, spreading all her sails—an ample Ship, carrying even her moonsails;
The pennant is flying aloft, as she speeds, she speeds so stately—below, emulous waves press forward,
They surround the Ship, with shining curving motions, and foam.

II. Aboard at a Ship's Helm

Aboard at a ship's helm,
A young steersman steering with care.

Through fog on a sea-coast dolefully ringing,
An ocean bell—O a warning bell, rock'd by the waves.

O you give good notice indeed, you bell by the sea-reefs ringing,
Ringing, ringing, to warn the ship from its wreck-place.

For as on the alert O steersman, you mind the loud admonition,
The bows turn, the freighted ship tacking speeds away under her gray sails,
The beautiful and noble ship with all her precious wealth speeds away gayly and safe.

But O the ship, the immortal ship! O ship aboard the ship!
Ship of the body, ship of the soul, voyaging, voyaging, voyaging.

III. Passage 1: Passage to India (*part 7b*)

O soul, repressless, I with thee and thou with me,
Thy circumnavigation of the world begin,
Of man, the voyage of his mind's return,
To reason's early paradise,
Back, back to wisdom's birth, to innocent intuitions,
Again with fair creation.

IV. The Untold Want
(*with* Gliding O'er All)

The untold want by life and land ne'er granted,
Now voyager sail thou forth to seek and find.

Gliding o'er all, through all,
Through Nature, Time, and Space,
As a ship on the waters advancing,
The voyage of the soul—not life alone,
Death, many deaths I'll sing.

V. Interlude 1: Out of the Rolling Ocean the Crowd (*music based on these words*)

Out of the rolling ocean the crowd came a drop gently to me,
Whispering [I love you, before long I die,
I have travel'd a long way merely to look on you to touch you,
For I could not die till I once look'd on you,
For I fear'd I might afterward lose you.]

Now we have met, we have look'd, we are safe,
Return in peace to the ocean my love,
I too am part of that ocean my love, we are not so much separated,
Behold the great rondure, the cohesion of all, how perfect!
But as for me, for you, the irresistible sea is to separate us,
As for an hour carrying us diverse, yet cannot carry us diverse forever;
Be not impatient—a little space—know you I salute the air, the ocean and the land,
Every day at sundown for your dear sake my love.

VI. O Captain! My Captain!

O Captain! my Captain! our fearful trip is done,
The ship has weather'd every rack, the prize we sought is won,
The port is near, the bells I hear, the people all exulting,
While follow eyes the steady keel, the vessel grim and daring;
        But O heart! heart! heart!
            O the bleeding drops of red,
                Where on the deck my Captain lies,
                    Fallen cold and dead.

O Captain! my Captain! rise up and hear the bells;
Rise up—for you the flag is flung—for you the bugle trills,
For you bouquets and ribbon'd wreaths—for you the shores a-crowding,
For you they call, the swaying mass, their eager faces turning;
        Here Captain! dear father!
            This arm beneath your head!
                It is some dream that on the deck,
                    You've fallen cold and dead.

My Captain does not answer, his lips are pale and still,
My father does not feel my arm, he has no pulse nor will,
The ship is anchor'd safe and sound, its voyage closed and done,
From fearful trip the victor ship comes in with object won;
        Exult O shores, and ring O bells!
            But I with mournful tread,
                Walk the deck my Captain lies,
                    Fallen cold and dead.

VII. Interlude 2: The Sobbing of the Bells (*music based on these words*)

The sobbing of the bells, the sudden death-news everywhere,
The slumberers rouse, the rapport of the People,
(Full well they know that message in the darkness,
Full well return, respond within their breasts, their brains, the sad reverberations,)
The passionate toll and clang—city to city, joining, sounding, passing,
Those heart-beats of a Nation in the night.

VIII. Passage 2: Passage to India (*part 8d*)

O soul thou pleasest me, I thee,
Sailing these seas or on the hills, or waking in the night,
Thoughts, silent thoughts, of Time and Space and Death, like waters flowing,
Bear me indeed as through the regions infinite,
Whose air I breathe, whose ripples hear, lave me all over,
Bathe me O God in thee, mounting to thee,
I and my soul to range in range of thee.

IX. Joy, Shipmate, Joy!

Joy, shipmate, joy!
(Pleas'd to my soul at death I cry,)
Our life is closed, our life begins,
The long, long anchorage we leave,
The ship is clear at last, she leaps!
She swiftly courses from the shore,
Joy, shipmate, joy.

X. Now Finale to the Shore

Now finale to the shore,
Now, land and life finale and farewell,
Now Voyager depart, (much, much for thee is yet in store,)
Often enough hast thou adventur'd o'er the seas,
Cautiously cruising, studying the charts,
Duly again to port and hawser's tie returning;
But now obey thy cherish'd secret wish,
Embrace thy friends, leave all in order,
To port and hawser's tie no more returning,
Depart upon thy endless cruise old Sailor.

WALT WHITMAN

FULL SCORE

VOYAGING

I. The Ship Starting

Christian Guebert

Walt Whitman
1865

* All harp harmonics sound an octave higher than written.


A
moving, slowly
rocking ♩=63
SOPRANO SOLO
emerging from the background slowly, lilting
4
S solo
pp
p
oh,
oh,
oh,
oh,
S
ppp
m,
M-S
ppp
m,
A
ppp
m,
TENOR SOLO
emerging from the background slowly, lilting
T solo
pp
p
oh,
oh,
oh,
oh,
T
ppp
m,
Bar
B
ppp
m,
Hb.
p with stick of mallet
mp
(+ ord.)
Hp.
mp
pp
mp


13
mp
p
pp
S solo
ah, ah, ah, oh, oh,
S
M-S
A
T solo
ah, ah, ah, oh, oh,
T
Bar
B
Hb.
mf
Hp.
mf


B
with excitement ♩ = ♩.
(♩. = 60-63)
20
S solo
S
M-S
A
T solo
T
Bar
B
(♪=♪)
Lo!
lo,
lo!
the un-bound-ed
the un-bound-ed,
A5-A7
LV
R
Pl.↑
Hb.
Hp.


25
C
p
S
sea, the un-bound - ed sea! Lo!
M-S
sea, the un-bound - ed sea! Lo,
A
sea, un-bound - ed sea! Lo,
T
the un-bound - ed sea, the un-bound - ed sea! Lo,
Bar
sea, un-bound - ed the un-bound - ed sea! Lo,
B
the un-bound - ed sea, the un - bound - ed sea!
Hb.
R
ff
Pl.
table damp
PL
Hp.
ff
sim.


with motion ♩. = ♩
(♩ = 60-63)
D
30
S
M-S
A
T
Bar
B
Hb.
Hp.
m, m, changing to ah ah,
lo, lo! m, m, changing to ah On
lo, lo! m, m, changing to ah ah,
lo, lo! m, m, changing to ah ah,
lo, lo! m, m, changing to ah On
lo, lo! m, m, changing to ah ah,
R
not rolled
not rolled


pressing further ♩=80
41
S
start - ing, spread-ing all her sails— ah,
M-S
its breast a Ship an ...am - ple Ship,
A
start - ing, spread-ing all her sails— an am - ple Ship,
T
start - ing, spread-ing all her sails— ah,
Bar
its breast a Ship start - ing, ah, an am - ple Ship,
B
an am - ple Ship,
Hb.
Hp.
F♮
B♮
G♭


46
S
carry-ing even her moon - sails;
M-S
ah,
oh,
A
car-ry-ing e-ven her moon - sails;
oh,
T
oh,
Bar
ah,
oh,
B
car-ry-ing e-ven her moon - sails;
oh,
Hb.
pass
LV
R
Hp.
D♭
A♯
B♭
D♮
A♮
D♭
A♯
B♮
G♭


E
51
S
ah, as she speeds, she speeds so
M-S
ah, The pen-nant is fly-ing a-loft, ah,
A
ah, fly-ing a-loft, ah,
T
ah, The pen-nant is fly - - - ing, speeds, she speeds so
Bar
ah, pen-nant is fly-ing a-loft, as she speeds, she speeds so
B
ah, fly - - - ing, ah,
Hb.
LV
R
*R down and under the edge of the table
Hp.
LV
D♯


54
S
state - ly— be - low,
M-S
lo, em-u-lous waves press
A
lo, em-u-lous waves press
T
state - ly— be - low, em-u-lous waves press
Bar
state - ly— lo, press
B
lo,
Hb.
LV
LV until plucked
PL
R
Hp.
B♮ on the beat
A♯
B♭


56
S
They sur - round
M-S
for - ward, They sur - round
A
for - ward, They sur - round
T
for - ward, They sur - round
Bar
for - ward, They sur - round
B
They sur - round
Hb.
LV
Hp.
LV


tempo I ♩=50
S solo
59
F
S
the Ship,
oh,
M-S
A
T solo
T
Bar
B
Hb.
LV
R
Hp.
F♮ B♭
C♮
D♭
G♭
LV


SOLO
65
S solo
ah,
ah,
S
oh,
m,
M-S
with shin - ing
curv - ing mo - tions
and foam.
m,
A
with shin - ing
curv - ing mo - tions
and foam.
T solo
ah,
ah,
T
with shin - ing
curv - ing mo - tions
and foam.
Bar
with shin - ing
curv - ing mo - tions
and foam.
B
oh,
m,
Hb.
Hp.


G
Tempo II ♩=63
68
S solo
S
M-S
A
T solo
T
Bar
B
Hb.
Hp.
ppp
m,
m,
m,
m,
m,
m,
f
mf
all
1
2
6
6


72
S solo
T solo
ah,
ah,
LV (through end)
76
♩=92
attacca
in time
Hb.
Hp.
C D G
3-8
E♭F A B♭
3-7
continue LV through
start of mvt. II;
handbells to table
after complete decay

FULL SCORE

II. Aboard at a Ship's Helm

Walt Whitman
1867

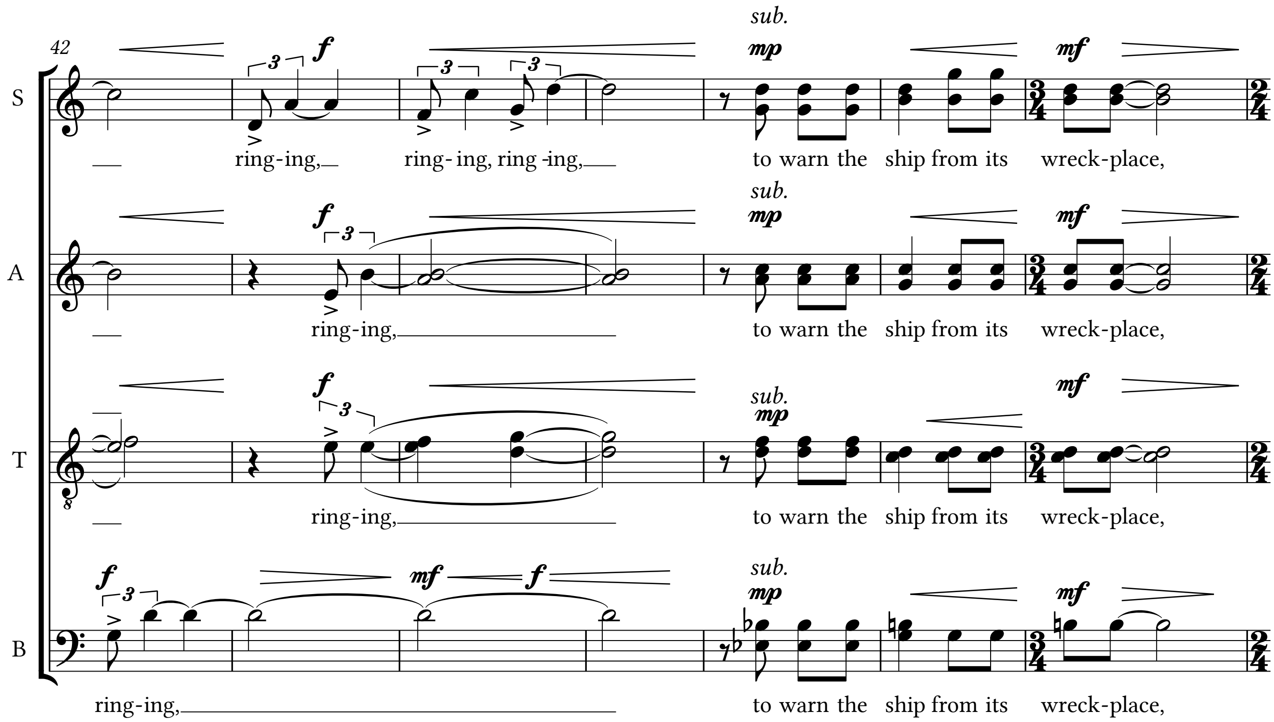
Christian Guebert

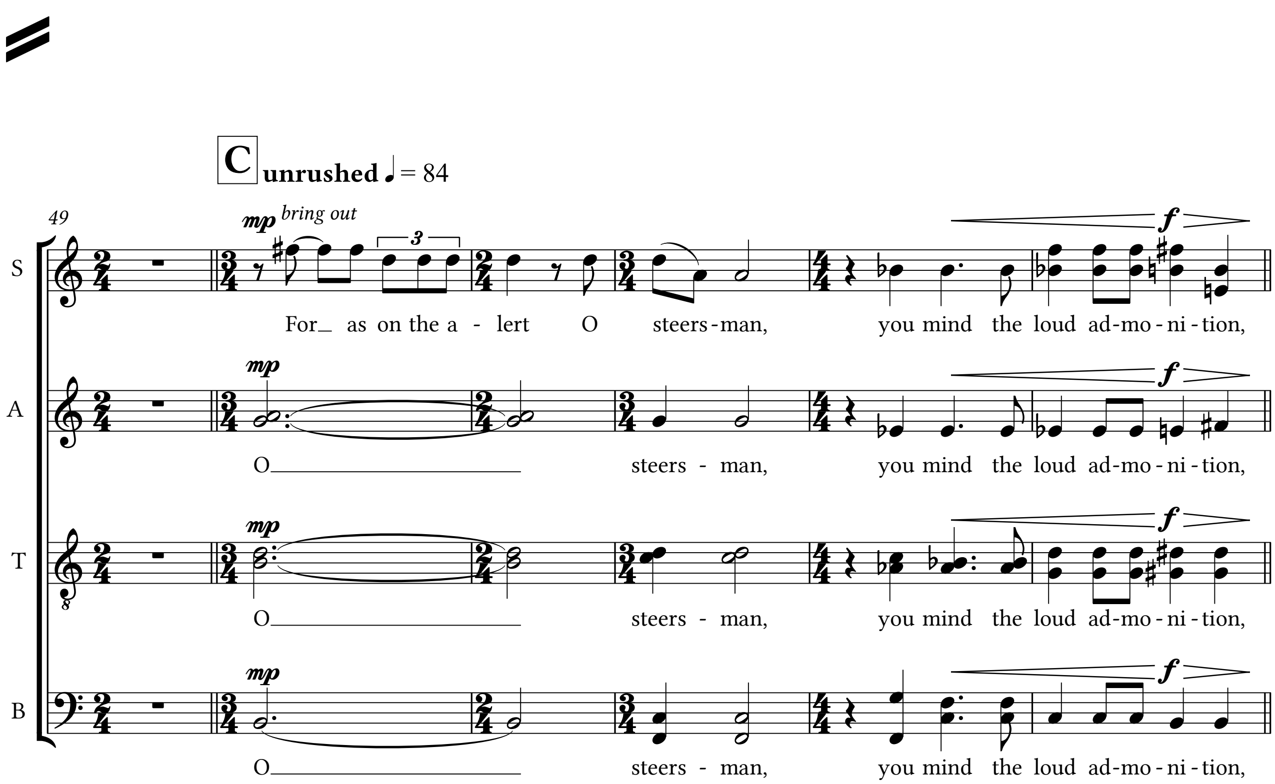
*between /ə/ and /ɑ/; roughly /ɜ/
† match the vowel of A,T,B "ah"


A
pp
16
S
ah,
ah,
ah,
ah,
ah,
ah,
ah,
ah,
I
A
II
pp
pp
ah,
ah,
ah,
ah,
ah,
ah,
ah,
ah,
T
pp
ah,
ah,
ah,
ah,
ah,
ah,
B
ah,
p lightly
Through fog on a sea - coast
23
ah,
ah,
mf
3
An o-cean bell, O a warn-ing
ah,
An
mf
3
ah,
An o-cean bell, O a warn-ing
ah,
mf
ah,
O a warn-ing
mf
dole - ful - ly ring - ing,
O a warn-ing

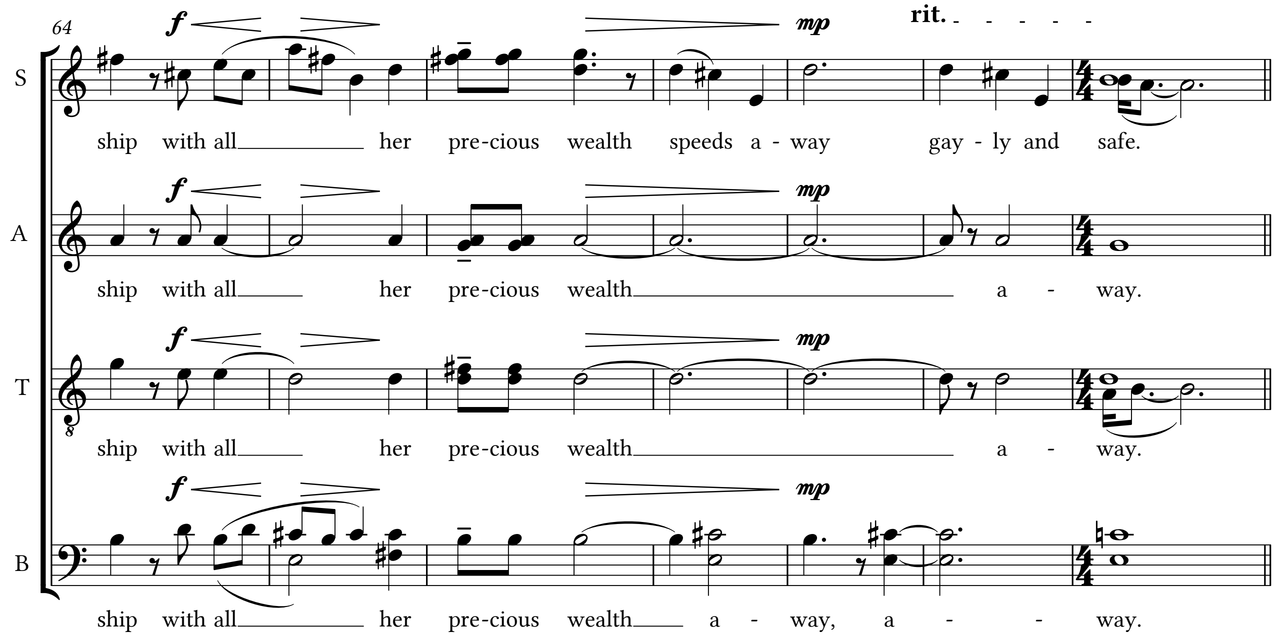

29
B
S
fp p mp p mp
bell, O O
A
fp p mp mp p
bell, O O you give good
T
fp mp p mp p
bell, rock'd by the waves. You give good
B
fp p mp mp p
bell, O O you give good


36
S
mp f mf
you bell by the sea - reefs ring - ing, ring-ing,
A
mp f mf
no - tice in - deed, by the sea - reefs ring-ing, ring-ing,
T
mp f mf
ring-ing,
no - tice in - deed, you bell ring - ing,
B
mp f
no - tice in - deed, you bell

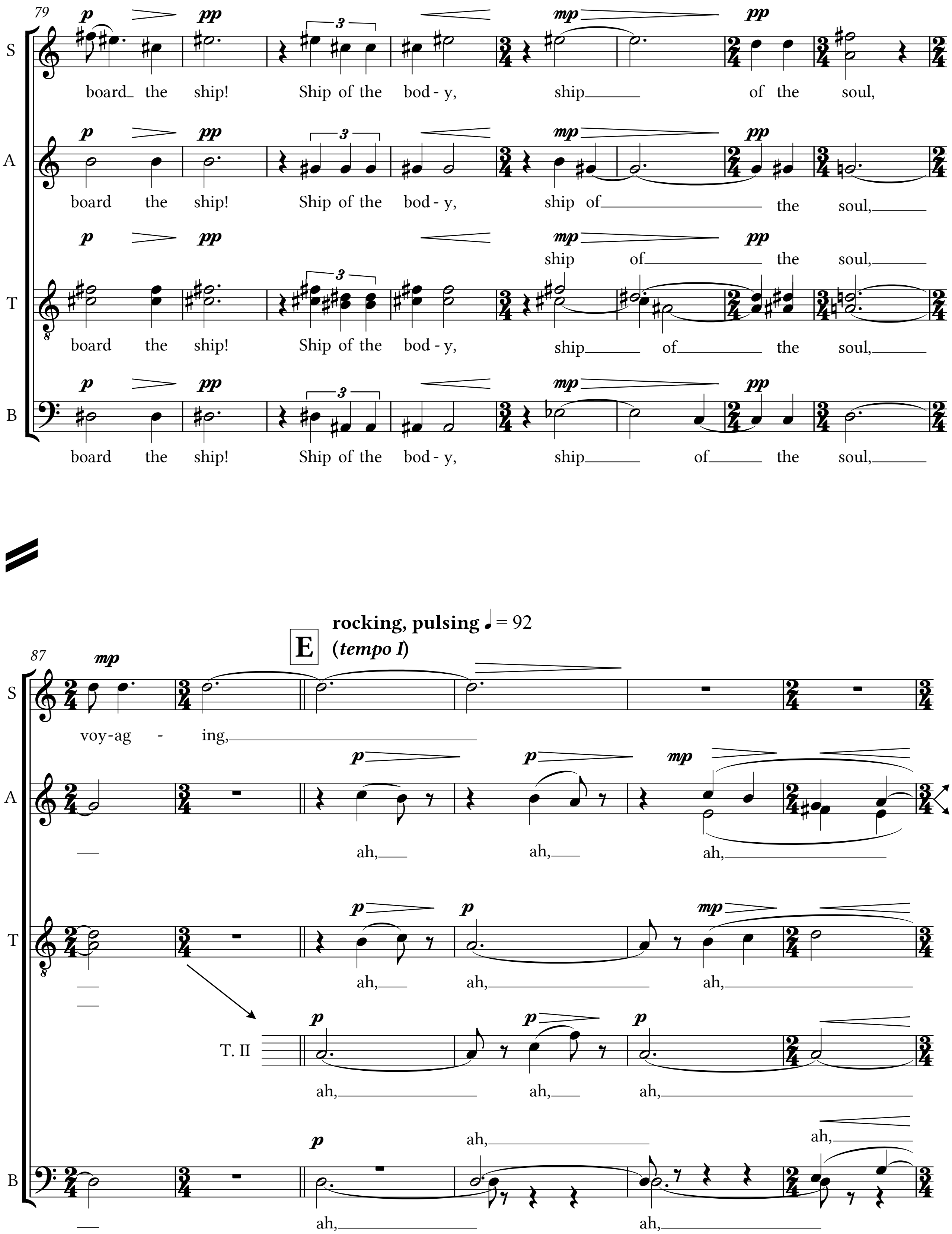

42
S
ring-ing, ring-ing, ring-ing, to warn the ship from its wreck-place,
A
ring-ing, to warn the ship from its wreck-place,
T
ring-ing, to warn the ship from its wreck-place,
B
ring-ing, to warn the ship from its wreck-place,
sub.


C unrushed ♩ = 84
49
S
bring out
For as on the a-lert O steers-man, you mind the loud ad-mo-ni-tion,
A
O steers-man, you mind the loud ad-mo-ni-tion,
T
O steers-man, you mind the loud ad-mo-ni-tion,
B
O steers-man, you mind the loud ad-mo-ni-tion,


markedly slower ♩ = 60
55
accel.
mp bring out
p
S
the freight-ed ship tack-ing speeds a-way
A
the bows turn, the bows turn,
T
The bows turn, the bows turn,
B
The bows turn, the bows turn,
mp
pp
more motion ♩ = 84
59
mp poco
mp molto f
un-der her gray sails, The beau-ti-ful and no-ble


64
f
mp
rit.
S
ship with all her pre-cious wealth speeds a-way gay-ly and safe.
A
ship with all her pre-cious wealth a-way.
T
ship with all her pre-cious wealth a-way.
B
ship with all her pre-cious wealth a-way, a-way.


D
suddenly static, serene ♩ = 80
71
pp
S
But O the ship, the im-mor-tal ship! O ship a-
A
But O the ship, the im-mor-tal ship! O ship a-
T
But O the ship, the im-mor-tal ship! O ship a-
B
But O the ship, the im-mor-tal ship! O ship a-


79
S
board the ship! Ship of the bod - y, ship of the soul,
A
board the ship! Ship of the bod - y, ship of the soul,
T
ship of the soul,
board the ship! Ship of the bod - y, ship of the soul,
B
board the ship! Ship of the bod - y, ship of the soul,
E
rocking, pulsing ♩ = 92
(tempo I)
87
voy-ag - ing,
ah, ah, ah,
T. II
ah,


93
S
voy - ag - ing, voy - ag - ing, ah,
I
A
II
T
B
ah,
poco rit.
to mvt. III; handbell
singing rods begin
99

FULL SCORE

III. Passage 1

Walt Whitman
PASSAGE TO INDIA, part 7b
1871

Christian Guebert


C
13
SOPRANO SOLO 1
p
S solo 1
O
soul,
Hb.
p LV
Hp.
17
S solo 1
O
soul,
ah,
Hb.
Hp.


21
D
S solo 1
I with thee and thou with me,
O
soul,
S solo 2
A solo 1
SOPRANO SOLO 2
ALTO SOLO 1
O
soul,
F6 and above
+ chimes: A5, C♯6, D6, D♯6, E6
p
LV
stopped notes without + :
TD partially with some
ringing, LV as possible
Hb.
B3 and below
Hp.
mp


25
S solo 1
O
soul,
ah,
S solo 2
A solo 1
oh,
oh,
oh,
oh,
oh,
Hb.
Hp.


29
E
S solo 1
I with thee and thou with me,
O
soul,
S solo 2
A solo 1
oh,
oh,
O
soul,
A solo 2
ALTO SOLO 2
O
soul,
A solo 3
ALTO SOLO 3
oh,
oh,
T solo 1
TENOR SOLO 1
O
T solo 2
TENOR SOLO 2
O
soul,
Hb.
LV
Hp.


33
S solo 1
O
soul,
ah,
S solo 2
A solo 1
oh,
oh,
oh,
oh,
oh,
A solo 2
soul,
oh,
A solo 3
oh,
oh,
T solo 1
soul,
oh,
T solo 2
oh,
oh,
LV
LV
(LV B3)
LV
LV
LV
Hb.
Hp.


37
F
S solo 1
I with thee and thou with me,
O
S solo 2
A solo 1
oh, oh,
O
A solo 2
oh, oh,
O
A solo 3
oh, oh,
oh,
T solo 1
oh, oh, oh,
T solo 2
oh,
O
oh, oh, oh,
BARITONE SOLO
Bar solo
B solo
BASS SOLO
oh, oh, oh, oh, oh, oh,
LV
Hb.
PL
Hp.


40
S solo 1
soul, O soul, ah,
S solo 2
A solo 1
soul, oh, oh, oh,
soul, oh, oh,
A solo 2
soul, soul, oh,
A solo 3
soul, oh, oh,
T solo 1
soul, oh,
T solo 2
soul, oh,
oh, oh, oh, oh, oh,
Bar solo
B solo
oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh,
Soprano section
Alto section
Tenor section
Bass section
f
mp
O soul, re - press - less, Thy cir - cum - nav - i - ga - tion of the world
6-7 oct. ensembles
coll. 8va
LV
(LV B3)
Hb.
Hp.


45
G
I with thee and thou with me,
O soul, O
O soul, oh,
oh, oh, O soul,
oh, oh, O soul,
oh, oh, O soul,
oh, oh,
oh, O soul,
oh, oh, oh, oh,
oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh,
begin, Thy cir-cum-na-vi-ga-tion be-gin, O soul, re-press-less,
be-gin, Thy cir-cum-na-vi-ga-tion be-gin, O soul, re-press-less,
be-gin, Thy cir-cum-na-vi-ga-tion be-gin, O soul, re-press-less,
be-gin, Thy cir-cum-na-vi-ga-tion be-gin, O soul, re-press-less,
LV
LV (chimes)
R
gliss.

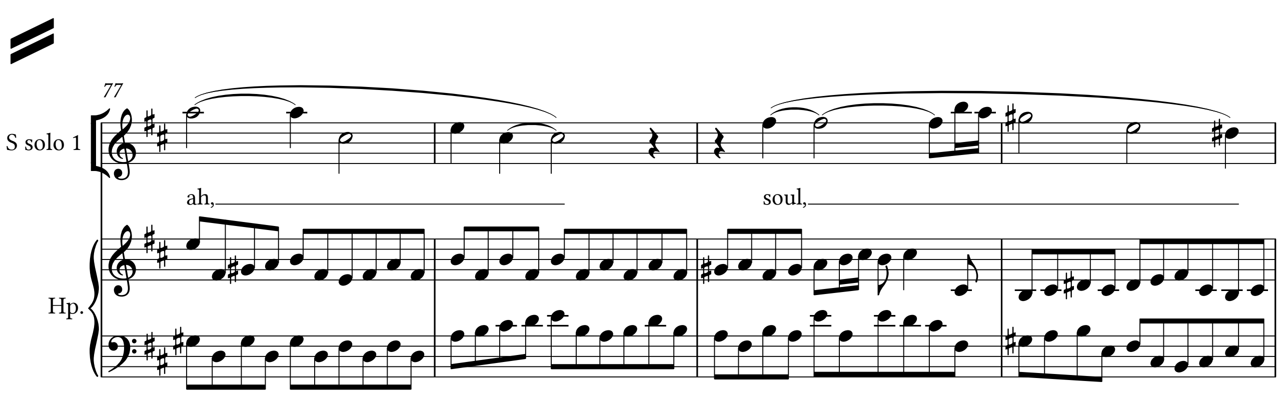

50
soul, ah, I with thee and thou with me,
oh, oh,
oh, oh, oh, oh,
soul, oh, oh, oh,
oh, oh, oh, oh, oh,
soul, oh, oh,
oh, oh,
oh, oh, oh, oh,
oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh, oh,
ff mf ff mf f
Thy cir - cum-nav - i - ga - tion of the world begin, Thy cir - cum-na-vi-ga-tion,
Thy cir - cum-nav - i - ga - tion of the world be-gin, Thy cir - cum-na-vi-ga-tion,
Thy cir - cum-nav - i - ga - tion of the world be-gin, Thy cir - cum-na-vi-ga-tion,
Thy cir - cum-nav - i - ga - tion of the world be-gin, Thy cir - cum-na-vi-ga-tion,
LV
gliss.
ff


H
55
tutti
ff
S
Of man, of the voy - age, voy - age of his mind's re -
A
Of man, of the voy - age, voy - age of his mind's re -
T
Of man, of the voy - age, voy - age of his mind's re -
B
Of man, of the voy - age, voy - age of his mind's re -
RT
PL
Hb.
Hp.


I
Soprano solo 1
ah,
63
S
turn, re - turn,
To rea - son's ear - ly par - a - dise, Back, back
A
turn, ...turn,
To rea - son's ear - ly par - a - dise, Back, back
T
turn, ...turn,
To rea - son's ear - ly par - a - dise, Back, back
B
turn, ...turn,
To rea - son's ear - ly par - a - dise, Back, back
stopped notes:
TD partially with some
ringing, LV as possible
LV
PL
Hb.
LV
Hp.


69
S solo 1
ah,
mf
ah,
S
mp
f
mp
f
to wis-dom's birth, to in - no - cent in - tu - i - tions, A - gain with fair cre-a -
A
to wis-dom's birth, to in - no - cent in - tu - i - tions, A - gain with fair cre-a -
T
to wis-dom's birth, to in - no - cent in - tu - i - tions, A - gain with fair cre-a -
B
to wis-dom's birth, to in - no - cent in - tu - i - tions, A - gain with fair cre-a -
LV
mp
LV
mf
LV
Hb.
Hp.


73
J
S solo 1
mp
ah,
I with thee and thou with me,
S
mp
- tion.
A
mp
- tion.
T
mp
- tion.
B
mp
LV
- tion.
gradually unmute (LV)
(LV...)
Hb.
A4-C♯4 gradually unmute (LV)
Hp.
mp


77
S solo 1
ah,
soul,
Hp.


81
K
S solo 1
oh,
Hp.
p
85
L
malleted (all)
Hb.
mp
90
mf
achieve mf for 5'', continue LV through start of mvt. IV; handbells to table after complete decay
93
rit.
attacca
SB
LV...

FULL SCORE

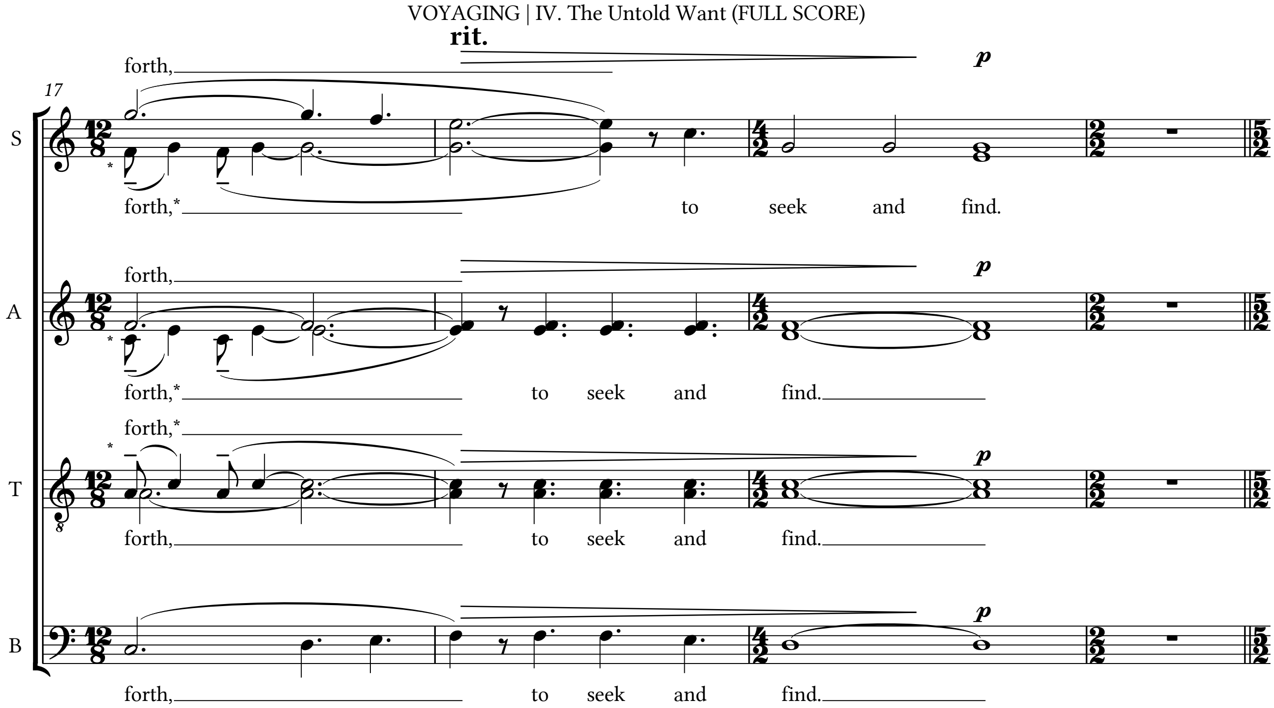
IV. The Untold Want

Walt Whitman

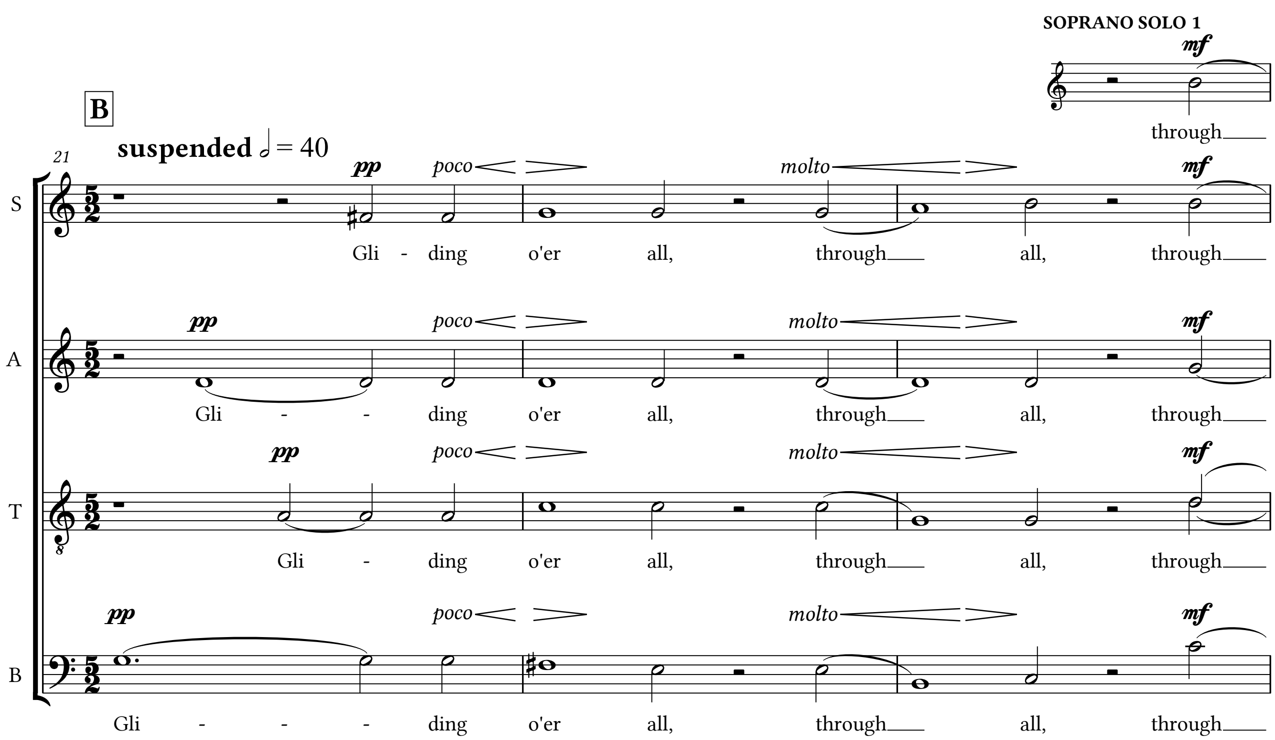
THE UNTOLD WANT
1871
GLIDING O'ER ALL
1871

Christian Guebert


9
A
S
A
T
B
mp
The un - told want, by life and land ne'er
p
nah, ah, ah, ah, nah, ah, ah, nah, ah, ah, ah, nah, ah, ah,
nah, ah, ah, ah, nah, ah, ah,
now, now,
now, now,
nah, ah, ah, ah, nah, ah, ah,
sail thou forth, sail thou forth,
13
mf
f
grant - ed,
Voy-ag - er,
sail thou
nah, ah, ah, ah, now, nah, ah, ah, ah, nah, ah, sail thou
nah, ah, ah, ah, now, nah, ah, ah, ah,
now, now, now, nah, ah, sail thou
mp
sail thou forth, Voy -ag - er, sail thou

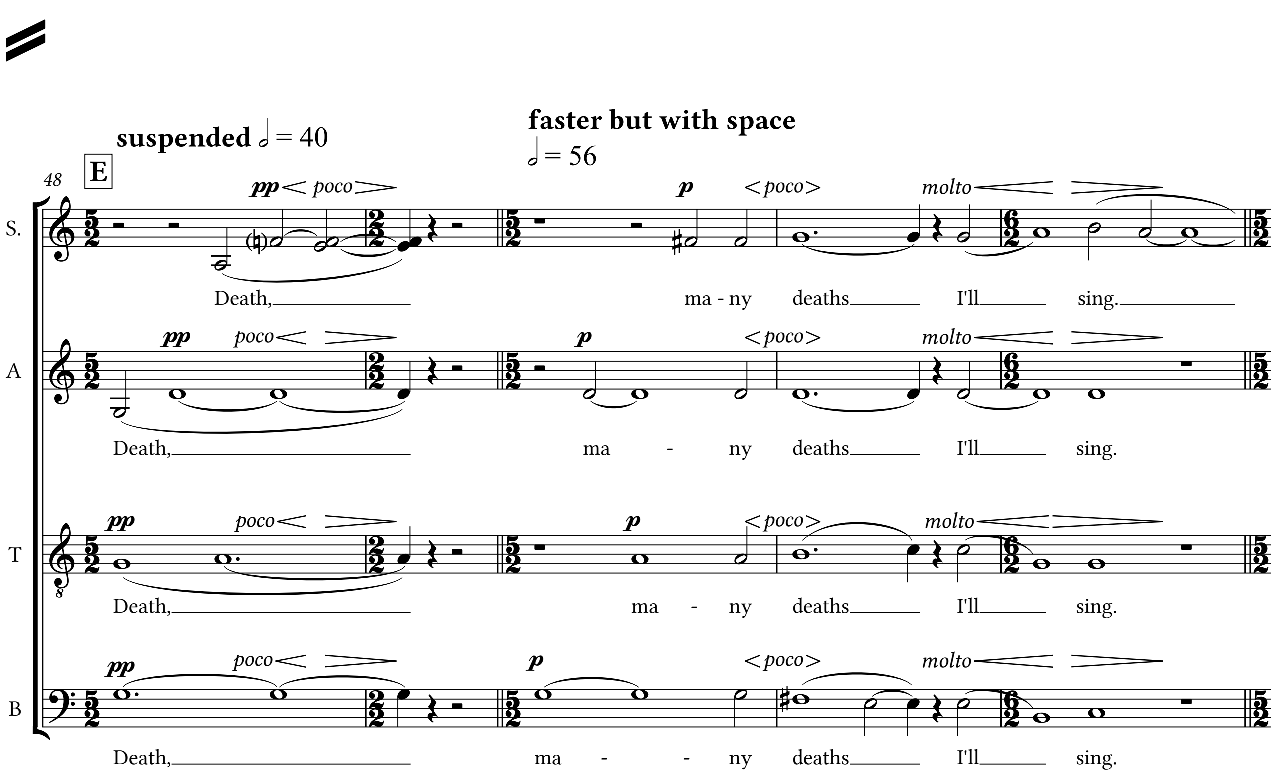


*S2, A2, T1: *"foh - orth"*




cresc.
♩ = ♩ (♩ = 80)
time
SOPRANO SOLO 2
through time
S.
na - ture, through time and space,
As a ship,
sub.
A
na - ture, through time and space,
T
through time
na - ture, through time and space,
B
na - ture, through time and space,
SOPRANO SOLO 1
ad - van -
C
as a ship on the wa - ters ad van - cing, ad - van - cing, ad - -
As a ship on the wa - ters ad - van - cing, ad - -
As a ship on the wa - ters ad - van - cing, ad - -
cresc. poco a poco
Ad - - - - - - - - - van - cing, ad - -
Ah, Ad - - - - - - - van - cing, ad - van -


40
D
SOPRANO SOLO 1 and 2
rit.
S.
A
T
B
cing, ad - van-cing, ad-van-cing,
van - cing, The voy-age of the soul, not life a - lone,
van - cing, ad - van-cing, ad-van-cing,
van - cing, ad - van-cing, ad-van-cing,
van-cing,
A - lone,
cing, ad - van-cing, ad-van-cing,


suspended 𝅗𝅥 = 40
faster but with space
𝅗𝅥 = 56
48
E
S.
A
T
B
poco
molto
Death, ma - ny deaths I'll sing.
Death, ma - ny deaths I'll sing.
Death, ma - ny deaths I'll sing.
Death, ma - ny deaths I'll sing.


SOPRANO SOLO 1
cresc.
sing, I'll sing, I'll
faster still 𝅗𝅥 = 69
accel.
53
F
S.
mp cresc. poco a poco
Ma - ny, ma - ny deaths I'll sing, ma - ny deaths, ma - ny deaths,
A
Ma - ny deaths, ma - ny deaths, ma - ny deaths, ma - ny deaths,
T
Ma - ny deaths I'll sing, I'll sing, I'll sing, I'll
B
Ma - ny deaths I'll sing, ma - ny deaths I'll sing,
𝅗𝅥 = 92
57
SOPRANO SOLO 1 and 2
più f
sing, I'll sing, I'll, I'll sing.
deaths I'll sing,
ma - ny deaths, ma - ny deaths, ma - ny deaths, I'll sing.
ma - ny deaths, ma - ny deaths, ma - ny deaths I'll sing.
sing, I'll sing.
sing, I'll sing, I'll sing. I'll sing.
I'll sing, I'll sing. I'll sing.


(tempo 1: ♩. = 92)
61
G
S.
A
T
B
nah, ah, ah, ah,
nah, ah, nah, ah,
Now,
ah...
sim.
65
H
Gli - ding
poco
now,


I
69
molto
mf
all,
through
all,
S.
nah, ah, ah, ah, nah, through all,
p
molto
mp
through
A
o'er all,
nah, ah, ah, ah,
nah, ah, ah, ah,
nah, ah, ah,
T
through,
nah, ah, ah, ah,
nah, ah, ah,
o'er all,
through
all,
now,
B
o'er all,
through
all,
73
Now, Voy-ag - er,
nah, ah, ah, ah, now, nah, ah, ah, ah, nah, ah,
now,
now,
Voy -ag - er,
nah, ah, Voy -ag - er,
nah, ah, ah, ah, nah, ah,
through all, The


SOPRANO SOLO 1 and 2
forth,
forth,
J
77
mp
f
ff
S.
nah, ah, ah, ah, now, sail, sail thou forth, now,
A
nah, ah, ah, ah, nah, ah, sail thou forth, sail thou forth, nah, ah, ah, ah,
T
now,
nah, ah, ah, ah, nah, ah, sail thou forth, sail thou forth, now,
B
voy - age of the soul, sail thou forth, sail thou forth,
82
poco rit.
K a tempo
poco
now, now,
now, sail thou
ah, ah, nah, ah, now, nah, ah, ah, ah, sail thou,
sail thou
nah, ah, ah, ah, nah, ah, ah, ah, nah, ah, ah, ah, sail thou,
now, sail, sail thou forth, now,
now, now, sail, sail thou forth, now,


poco
86
now,
S.
poco
molto
forth, sail thou forth, Voy - a - ger,
nah, ah, ah, ah, sail thou, nah, ah, ah, ah,
A
poco
molto
forth, sail thou forth, Voy - a - ger,
nah, ah, ah, ah, sail thou, nah, ah, ah, ah,
T
poco
molto
sail, to
sail, sail thou forth, now, sail, Voy - a - ger,
B
poco
molto
sail, sail thou forth, now, sail, sail, to
89
now, now...
S.
seek and find, now, now, Voy-a-ger, now...
now,
A
seek and find, now, now, Voy-a-ger, now...
seek and find,
T
now, now, Voy-a-ger, now...
B
seek and find, now, now, Voy-a-ger, now...

V. Interlude 1: Out of the Rolling Ocean the Crowd

Out of the rolling ocean the crowd came a drop gently to me,
Whispering *I love you, before long I die,*
I have travel'd a long way merely to look on you to touch you,
For I could not die till I once look'd on you,
For I fear'd I might afterward lose you.

Now we have met, we have look'd, we are safe,
Return in peace to the ocean my love,
I too am part of that ocean my love, we are not so much separated,
Behold the great rondure, the cohesion of all, how perfect!
But as for me, for you, the irresistible sea is to separate us,
As for an hour carrying us diverse, yet cannot carry us diverse forever;
Be not impatient—a little space—know you I salute the air, the ocean and the land,
Every day at sundown for your dear sake my love.

Walt Whitman
1865

Christian Guebert

truly slow ♩ = 96 (throughout!)
vast and distant, retaining sweetness


20
27
enter just as the
voice fully fades
34
42


50
57
(slight roll)
(slight roll)
63

VI. O Captain! My Captain!

Walt Whitman

Christian Guebert
2018


più mosso
a tempo
B
C
14
20
S
A
T
B
Hb.
won, The port is near, the bells I hear, the peo-ple all ex - ult - ing, While fol - low eyes the
won, The port is near, the bells I hear, the peo-ple all ex - ult - ing, fol - low the
won, The port is near, the bells I hear, the peo-ple all ex - ult - ing, fol - low the
won, The port is near, the bells I hear, the peo-ple all ex - ult - ing, fol - low the
stead-y keel, the ves-sel grim and dar - ing; But O heart!
stead-y keel, and dar - ing, dar - ing; But O heart!
stead-y keel, the ves-sel grim and dar - ing; But O heart!
stead-y keel, the ves-sel grim and dar - ing; But O heart!


26
meno mosso
S
heart! heart! O the bleed-ing drops of red,
A
heart! heart! O, red,
T
heart! heart! O, red,
B
heart! heart! O, Where on the deck my Cap-tain
Hb.
33
a tempo
all
D
S
Fal-len cold and dead. O Cap-tain! my
A
Fal-len cold and dead. O Cap-tain! my
T
Fal-len cold and dead. O Cap-tain! my
B
lies, Fal-len cold and dead. O Cap-tain! my
sim. downbeat accent
(throughout)
Hb.


40
S
Cap tain! rise up and hear the bells; Rise up— for you the flag is flung— for
A
Cap tain! rise up and hear the bells; Rise up— for you the flag is flung— for
T
Cap tain! rise up and hear the bells; Rise up— for you the flag is flung— for
B
Cap tain! rise up and hear the bells; Rise up— for you the flag is flung— for
Hb.
LV
R
SK
più mosso
E
45
mp
mf
you the bu - gle trills, For you bou-quets and rib-bon'd wreaths— for you the shores a -
you the bu - gle trills, For you bou-quets and rib-bon'd wreaths— for you the shores a -
you the bu - gle trills, For you, for you, for you, for
you the bu - gle trills, For you, for you, for
SK


a tempo
50
S
A
T
B
turn - ing;
crowd - ing, For you they call, the sway - ing mass, their ea - ger fac - es turn - ing; Here,
crowd - ing, For you they call, the sway - ing mass, their ea - ger fac - es turn - ing; Here,
you they call, the sway - ing mass, their ea - ger fac - es turn - ing, turn - ing;
you they call, the sway - ing mass, their ea - ger fac - es turn - ing; Here,
F
56
Here Cap - tain! This arm be - neath your head!
opt. solo
here Cap - tain! dear fa - ther! This arm be-
Here Cap - tain! dear fa - ther! This arm be - neath
here Cap - tain! dear fa - ther! This arm, this arm be-
RANDOM RING (x noteheads)
Hb.


65
dream,
pp
S
It is some dream that on the deck, You've fal - len cold and dead.
A
neath your head! It is some dream that on the deck, You've fal - len cold and dead.
T
your head! It is some dream that on the deck, You've fal - len cold and dead.
B
neath your head! It is some dream that on the deck, You've fal - len cold and dead.
Hb.
p
(R)
mf
LV
74
G
My Cap - tain does not an - swer, his
Cap - tain, an - swer,
Cap - tain, an - swer,
His
mp
mf
p
pp


81
S
lips are pale and still, still, Fa-ther, feel my arm, feel,
A
Cap - tain, Cap-tain, an-swer, Fa-ther, feel my arm, no pulse, no pulse nor
T
Cap - tain, Cap-tain, an-swer, Fa-ther, feel my arm, no pulse, no pulse nor
B
lips are pale and still, My Fa-ther does not feel my arm, he has no pulse nor will,
Hb.
più mosso
H
88
S
feel, its voy-age closed and done, From fear-ful trip the
A
will, The ship is an-chor'd safe and sound, voy-age closed and done, From fear-ful trip the
T
will, The ship is an-chor'd safe and sound, voy-age closed and done, From fear-ful trip the
B
The ship is an-chor'd safe and sound, voy-age closed and done, From fear-ful trip the
Hb.


94
rit.
I
tempo I ♩ = 60
mp
S
A
T
B
Hb.
vic-tor ship comes in with ob-ject won; Ex - ult O shores, and
Ex - ult,
vic-tor ship comes in with ob-ject won, won; Ex - ult O shores, and
vic-tor ship comes in with ob-ject won, won; Ex - ult O shores,
vic-tor ship comes in with ob-ject won; Ex - ult, ex - ult, ex - ult O shores,
ff
f
mf
101
ring, ring O bells!
meno mosso
pp
O,
(non dim.)
ring O bells, ring O bells!
and ring O bells!
But I with
p
ring O bells, O bells!
O,
and ring, ring O bells!
and ring O bells!
But I with
O,
and ring O bells!
LV
R
mp
p
opt. antiphonal handbell players begin slowly walking


109
S
A
T
B
Hb.
O,
dead,
Walk the deck my Cap-tain lies,
Fal-len
mourn - ful tread,
O,
dead,
Fal-len
dead,
mourn - ful tread,
dead,
Fal-len
Walk the deck my Cap-tain lies,
Fal-len
RANDOM RING
116
attacca without damping
cold and dead.
opt. antiphonal singers begin slowly walking
cold and dead.
cold and dead.
cold and dead.
LV

FULL SCORE

VII. Interlude 2: The Sobbing of the Bells

The sobbing of the bells, the sudden death-news everywhere,
The slumberers rouse, the rapport of the People,
(Full well they know that message in the darkness,
Full well return, respond within their breasts, their brains, the sad reverberations,)
The passionate toll and clang—city to city, joining, sounding, passing,
Those heart-beats of a Nation in the night.

Walt Whitman
1881

Christian Guebert

15
(as an echo)
B
(as an echo)
espr.
S1
S2
A
Hb.
Hp.
4
1
2
LV
G3 bell and chime
rubato as necessary
22
C
(as an echo)
espr.
5

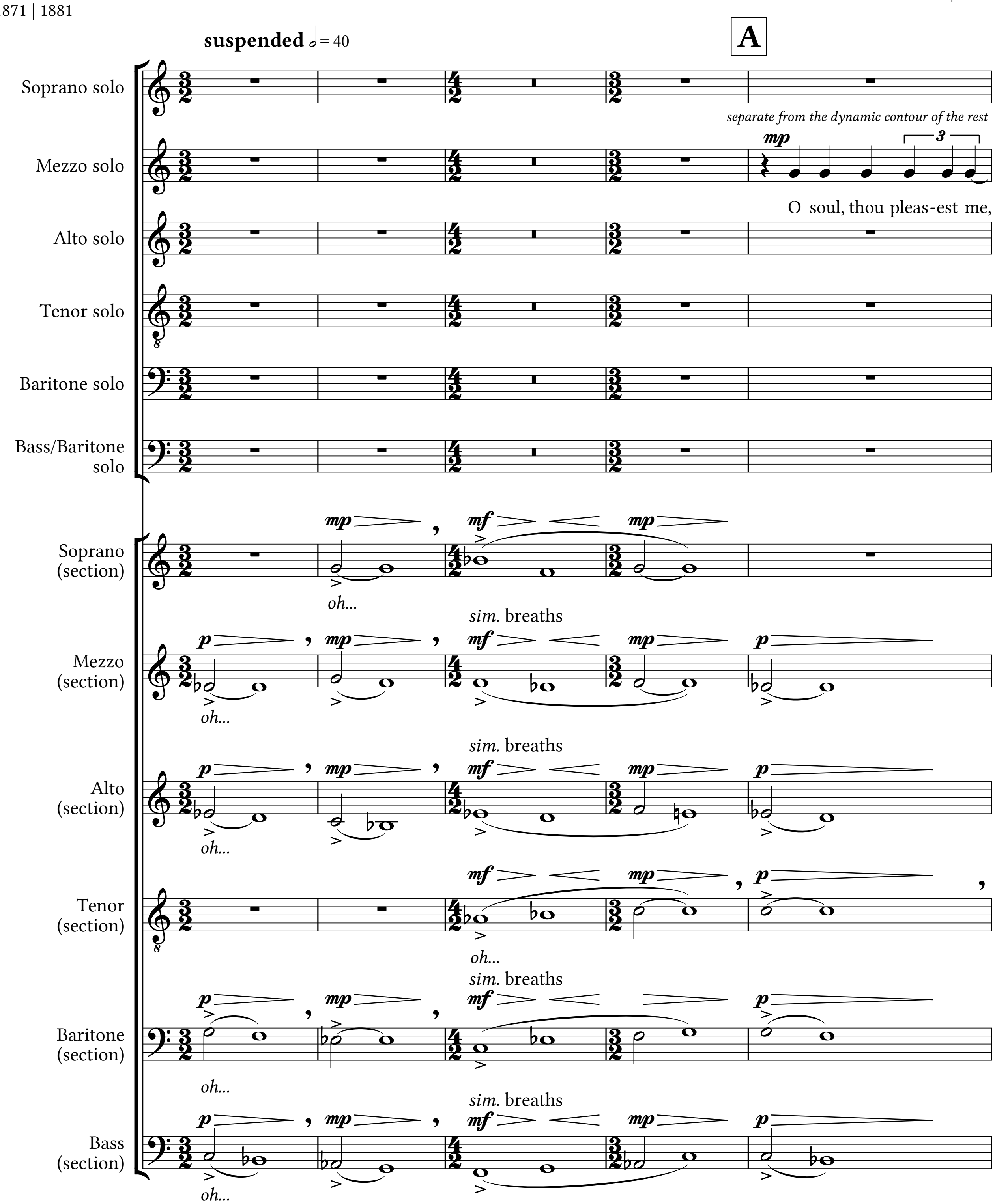

attacca; let vibrate; mvt. VIII begins when only the bass notes are audible
27
molto rit.
S1
(as an echo)
S2
(as an echo)
(as an echo)
A
molto rit.
damp all
E♭, F, B♭
LV
1 2
E♭6 and below
4
1 2
Hb.
damp all vibrating
F, B♭ strings
Hp.

FULL SCORE

VIII. Passage 2

Walt Whitman
PASSAGE TO INDIA, part 8d
1871 | 1881

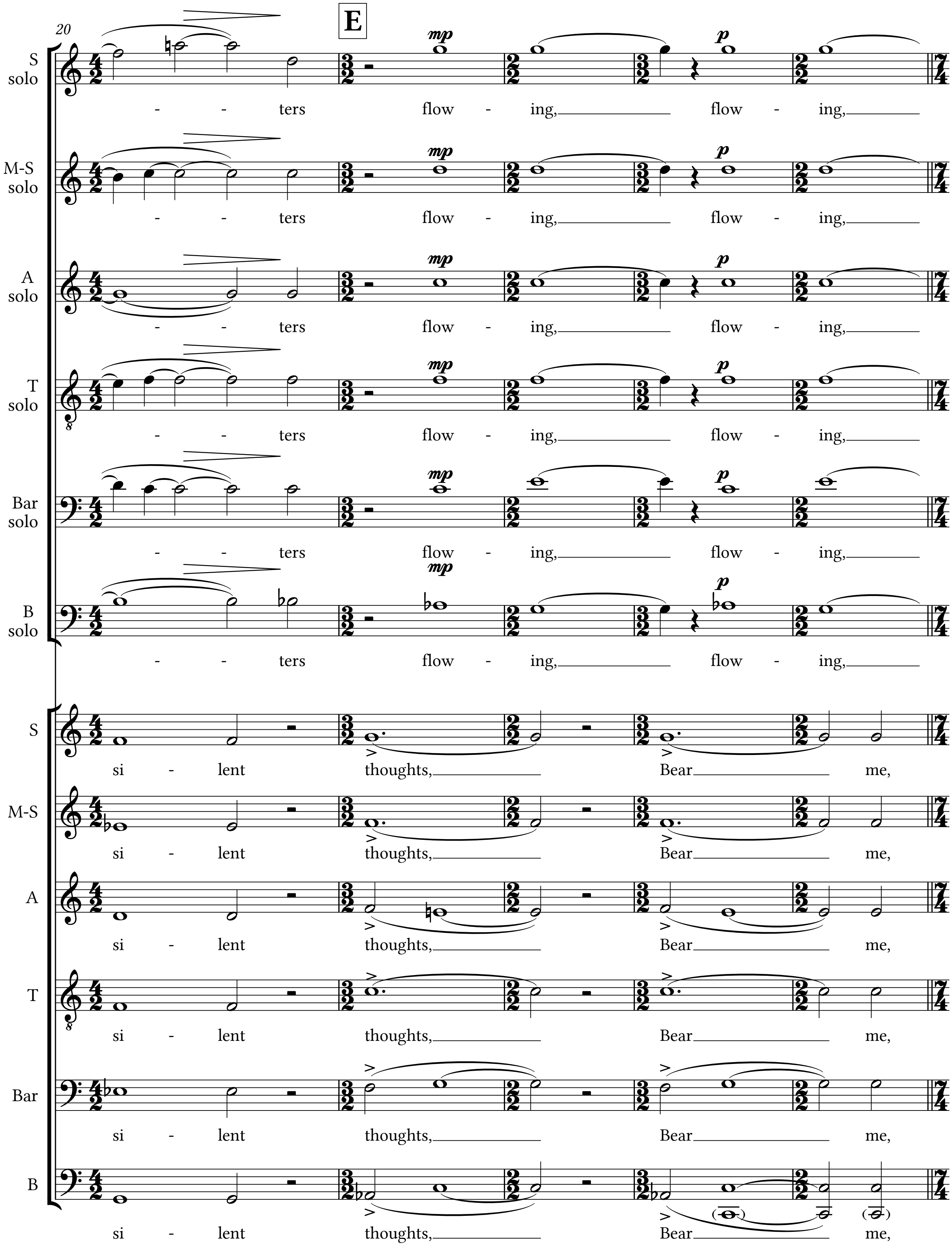
Christian Guebert
2016 | 2018




B
6
S solo
M-S solo
I thee, sail - ing, Sail - ing these seas or on the hills, or wak -
A solo
T solo
Bar solo
B solo
sim. breaths
S
M-S
A
sim. breaths
T
Bar
B

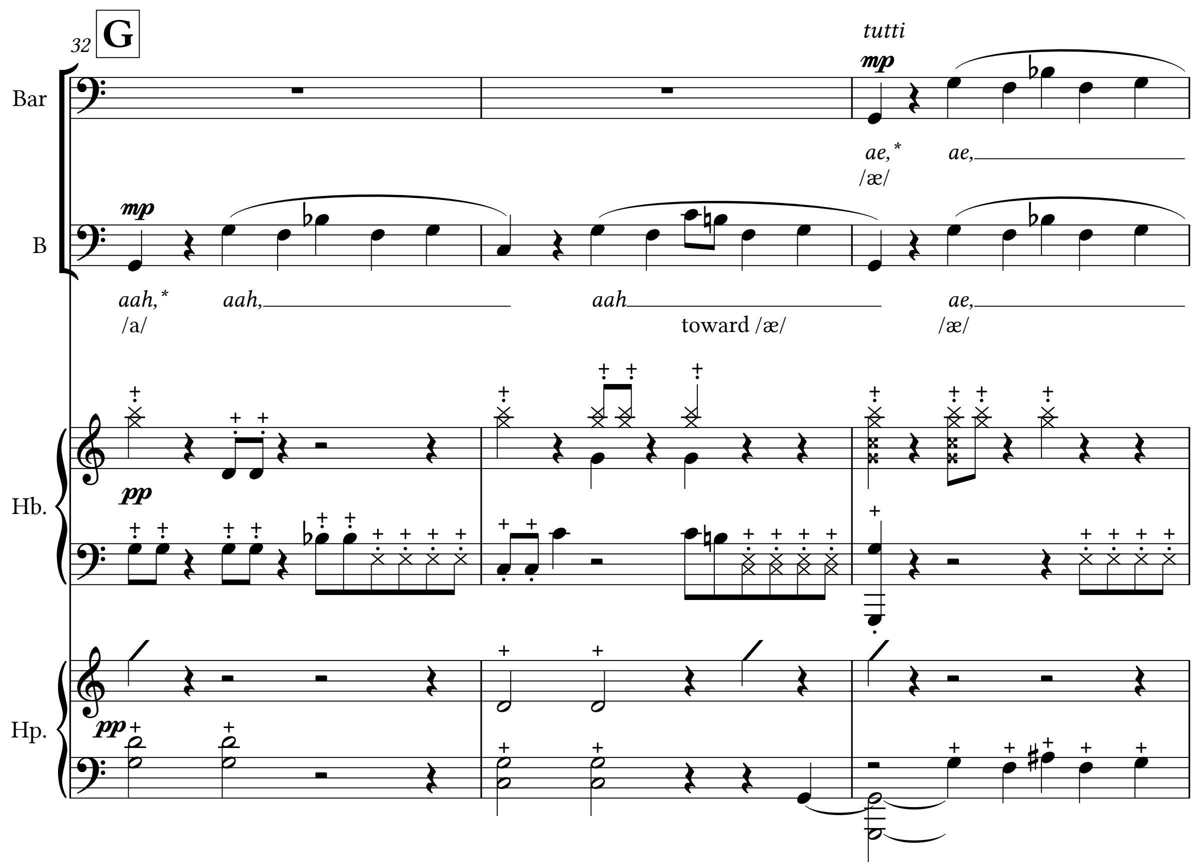

C
11
S solo
Thoughts, si-lent thoughts, of Time
M-S solo
- ing in the night, si - lent thoughts, of Time
A solo
Thoughts, si-lent thoughts, of Time
T solo
Thoughts, si-lent thoughts, of Time
Bar solo
Thoughts, si-lent thoughts, of Time
B solo
Thoughts, si-lent thoughts, of Time
S
M-S
A
T
Bar
B


15
D
S solo
M-S solo
A solo
T solo
Bar solo
B solo
mf
and Space and Death, like wa - -
S
M-S
A
T
Bar
B
mf mp p mp
O soul, Thoughts,


20
E
S solo
M-S solo
A solo
T solo
Bar solo
B solo
mp
p
- - ters flow - ing, flow - ing,
S
M-S
A
T
Bar
B
si - lent thoughts, Bear me,

F
swarthy, rugged ♩≈ 132
25
return to section
S solo
M-S solo
A solo
T solo
Bar solo
B solo
S
M-S
A
T
Bar
B
All castings malleted with very hard mallets
LV all muted handbells (muted pitches are never malleted)
Refer to pg. iv for non-standard notation legend
pp
mp
Hb.
Hp.
tap the soundboard where there isn't much resonance
LV all but staccato
(+) = p.d.l.t.

*The textless vowels found in the lower three parts beginning at rehearsal mark G correspond to a linear range of vowels (from open to closed): /ɑ/, /a/, /æ/, /ɛ/, e, and /i/. Musical lines will either dwell on one vowel or slide gradually to a neigboring one. The vowel /i/ may be rounded to come closer to the choral vowel. (/ɑ/ as in fall, /a/ as in aisle, /æ/ as in bat, /ɛ/ as in deck, e as in they, and /i/ as in eager.




35
S
tutti
mp
Bear me,
mf
bear me,
M-S
tutti
mp
Bear me,
mf
bear me,
A
tutti
mp
Bear me,
mf
bear me,
T
tutti
mp
ae,* eh, ...(ey)
/æ/ toward /ɛ/ /ɛ/ toward /e/ /e/
mf
Bear me,
Bar
ae, ...(eh)... ...(ey)
toward /ɛ/ /ɛ/ toward /e/ /e/
mf
Bear me,
B
ae, ...(eh)
toward /ɛ/ /ɛ/
mf
ey, ey,
/e/
Hb.
mp
Hp.


H
38
S
bear me, bear me, bear me,
M-S
bear me, bear me, bear me,
A
bear me, bear me, bear me,
T
ey, toward /i/ ee, /i/ ee, toward /e/
Bar
bear me, bear me,
B
ee, /i/ ee,
Hb.
(R unmuted handbells, LV muted handbells)
Hp.
muffle all unmuted strings


41
S
bear
me,
bear
me,
M-S
bear
me,
bear
me
in-deed
as
A
bear
me,
bear
me
in-deed
as
T
ey,
/e/
me,
Bear
me
in-deed
as
Bar
bear
me,
bear
me,
B
ey,
/e/
ey,
ey,
toward /ɛ/
eh,
/ɛ/
toward /æ/
Hb.
p
Hp.


I
44
S
bear me,
M-S
mp
through the re - gions in - fi nite, Whose air I breathe,
A
mp
through the re - gions in - fi nite, Whose air I breathe,
T
mp
through the re - gions in - fi nite, aah, aah,
/a/ toward /æ/
Bar
mp
bear me, ae, aah, aah,
/æ/ toward /a/ /a/ toward /æ/
B
mp
ae, ae, ...(aah) Whose air I breathe,
/æ/ toward /a/ /a/
Hb.
Hp.


48
mp
S
whose rip-ples hear, lave me all
M-S
whose rip-ples hear, lave me all
A
whose rip- ples, rip-ples hear, lave me all
T
...(ae) /æ/ whose rip-ples hear, lave me all
Bar
ae, /æ/ toward /ɛ/ eh, /ɛ/ eh, eh,
B
whose rip-ples hear, lave me, all
Hb.
mf
Hp.


J
52
S
mf
o - ver,
Bathe me
M-S
mf
o - ver,
Bathe me
A
mf
o - ver,
Bathe me
T
mf
o - ver,
eh,
ey,
/ɛ/ toward /e/ /e/
Bar
mf
eh,
eh,
Bathe me
B
mf
o - ver, eh,
eh,
ey,
/ɛ/ toward /e/ /e/
Hb.
Hp.


55
S
O
God
in thee,
M-S
O
God
in thee,
A
O
God
in thee,
T
O
God
in thee,
Bar
O
God
in thee,
B
ey,
toward /i/
ee,
/i/
ee,
toward /e/
lift D6
f
mp
Hb.
Hp.


58
S
mount - - - - - - - - - - - - ing to
M-S
mount - - - - - - - - ing to
A
mount - - - - - - - - ing to
T
mount - - - - ing to
Bar
ey, toward /ε/
/e/
eh, toward /æ/
/ε/
ae, toward /a/
/æ/
B
...(ey)
/e/
ae,
/æ/
ae, toward /a/
mf
Hb.
Hp.


61
K
S
M-S
A
T
Bar
B
Hb.
Hp.
f
thee,
I
ah,
/ɑ/
aah,
/a/
toward /ɑ/


63
S
and
my
M-S
and
my
A
and
my
T
my
Bar
and
my
B
ah,
toward /a/
Hb.
Hp.


64
S
soul to range in range of
M-S
soul to range in range of
A
soul to range in range of
T
soul to range eh, in
/ɛ/ toward /e/
Bar
soul to range in
B
aah, ae, eh,
/a/ toward /æ/ /æ/ toward /ɛ/ /ɛ/ toward /e/
Hb.
Hp.
mf
C♮ *pedal slightly toward ♭
* for a buzz near ♮
C♮


67
attacca
in time
S
thee.
M-S
thee,
of
thee.
A
thee.
T
range
of
thee.
Bar
range
of
thee.
B
...(ey)
/e/
Range
of
thee.
ff
LV
LV
R
Hb.
fast table damp*
*Muffle low notes quickly. D4 may match the table damp motion but damp with the hand to avoid touching any foil against the table.
ff
Hp.
C
G

FULL SCORE

IX. Joy, Shipmate, Joy!

Walt Whitman
1871

Christian Guebert

(𝅗𝅥 of previous ≈ ♩.)

energetic ♩. = 66

dancing, downbeat-bouncing, but distinctly articulate
marcato, except *legato* for "Our life is closed, our life begins,"


D
35
S
A
T
B
Joy, ship-mate, joy! (Pleas'd to my soul at death I cry,) Joy, joy,
is closed, our life be- gins, Ship-mate,
Our life is closed, our life be- gins, Ship-mate,
Our life is closed, Joy, ship-mate, joy, ship-mate, joy,
47
joy, ship-mate, joy, joy!
ship-mate, joy, ship-mate, joy, ship-mate, ship-mate, ship-mate, joy, joy, The
joy, joy, ship-mate, joy, ship-mate, ship-mate, joy, ship-mate, joy, The
ship-mate, joy, ship-mate, joy, ship-mate, ship-mate, joy!
E
58
F
Joy, ship-mate, joy! Clear, The ship is clear at
long, long an-chor-age we leave, The ship is
long, long an-chor-age we leave, The ship is
The long, long an-chor-age we leave, The ship is


G
68
S
last, she leaps! She leaps!
A
clear, she leaps! At last, at last, she leaps!
T
clear, she leaps! At last, she leaps! Joy, ship-mate, joy! (Pleas'd to my soul at
B
clear, she leaps! At last, she leaps! Joy, ship-mate, joy! (Pleas'd to my soul at death I
H
79
Joy, ship-mate, joy! (Pleas'd to my soul at death I cry,)
Joy, ship-mate, joy! (Pleas'd to my soul at death I cry,) Joy,
legato
death I cry,) Joy! The ship is clear at last,
cry,) Joy! The ship is
I
J
90
Clear at last, she leaps! She swift-ly cour-ses, Joy, ship mate, joy!
Clear, clear at last, ship mate, Joy, ship mate, joy! She swift - ly cours - es from the
marcato
Joy, ship-mate, joy! She swift - ly cours - es from the shore, Cours es from the
clear, clear at last, she leaps! She swift - ly cours - es from the


101
mp
cresc. poco a poco
S
She swift - ly cours - es from the shore, cours - es from the
A
shore, Ship-mate, joy! She swift - ly cours - es from the shore, the
T
shore, Joy, ship-mate, joy! She swift - ly cours - es from the
B
shore, Ship-mate, joy! She swift - ly cours - es from the shore,
K
109
molto
ff
f
shore, Joy, joy, joy, joy,
shore, Joy, joy, joy, joy, joy, joy,
shore, Joy, joy, joy, joy, joy, joy,
from the shore, Joy, joy, joy, joy,
L
114
p
pp
joy, ship-mate, joy.
joy, ship-mate, joy.
joy, ship-mate, joy.
joy, ship-mate, joy.

FULL SCORE

X. Now Finale to the Shore

Walt Whitman
1871

Christian Guebert


9
Hb.
LV
A3
Hp.
12
A
R
Hb.
R
Hp.


16
S
mp
Now fi - na - le to the shore,
A
mp
Now to the shore,
T
mp
Now fi - na - le to the shore,
B
mp
Now fi - na - le to the shore,
Hb.
Hp.


20
S
Land and life fi - na - le and fare - well,
A
Now life fi - na - le and fare - well,
T
Now land, life fi - na - le and fare - well,
B
Now life fi - na - le and fare - well,
Hb.
Hp.
mp
mf


B
24
S
Now Voy-a - ger,
A
Now Voy-a - ger de -
T
Now Voy-a - ger de -
B
Now Voy-a - ger de -
Hb.
Hp.


29
S
mp
p
(much,
much
for
A
part,
(much
for
T
part,
(much,
much
for
B
part,
(much,
much
for
Hb.
Hp.


33
S
thee is yet in store,)
A
thee is yet in store,)
T
thee is yet in store,)
B
thee is yet in store,)
Hb.
Hp.


38
C
S
E - nough hast thou ad - ven - tured o'er the seas,
A
Of - ten hast thou ad - ven - tured o'er the seas,
T
Of - ten e - nough hast thou ad - ven - tured o'er the seas,
B
Ad - - - ven - tured o'er the seas,
LV
LV
LV
Hb.
Hp.


41
S
A
T
B
Hb.
Hp.
mp
p
f
mf
LV
Cau - - tious-ly cruis - - ing,
Cau - - tious-ly cruis - - ing,
Cau - - tious-ly cruis - - ing,
Cau - - tious-ly cruis - - ing,

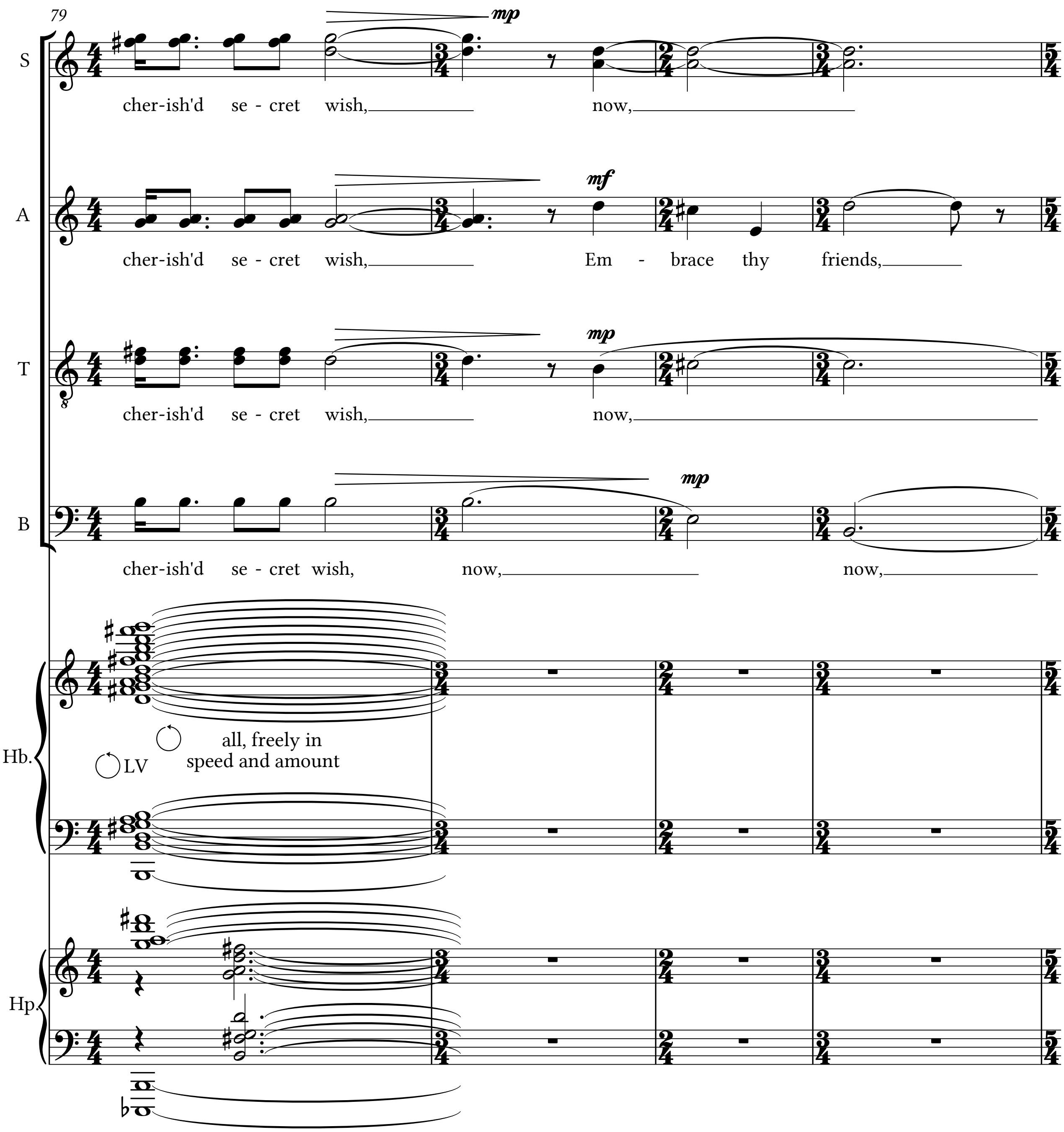

D
opening,
broadening ♩ = 112
S
stud-y-ing the charts,
Du - ly
A
stud-y-ing the charts,
Du - ly
T
stud-y-ing the charts,
Du - ly
B
stud-y-ing the charts,
Du - ly
LV
(in one beat)
R
Hb.
Hp.


48
S
a - gain to port__ and haw-ser's tie__ re-turn-ing, ...turn - ing,
A
a - gain to port and haw-ser's tie__ re-turn-ing, re - turn-ing,
T
a - gain to port__ and haw-ser's tie__ re-turn-ing, re - turn-ing,
B
a - gain to port__ and haw-ser's tie__ re-turn-ing, re - turn-ing,
sim.
Hb.
Hp.


E
much slower ♩ = 88
56
S
...turn - ing,
ah,
ah,
A
re - turn-ing,
ah,
ah,
T
re - turn-ing,
B
re - turn-ing,
RANDOM MALLET
SUSPENDED BELL (x noteheads)
(in one beat)
SB B5
(B5)
LV
gyros
(in one beat)
SB B4
(B4)
Hb.
random and continuous
note entries
Hp.


F
66
S
ah, ah, ah, But now o- bey thy se - cret
A
ah, ah, ah, But now,
T
now,
ah, ah, ah, But now,
B
now,
ah, ah, ah, But now,
(SB +E5)
(E5)
Hb.
LV
(B3, E4)
(SB +B3, E4)
Hp.

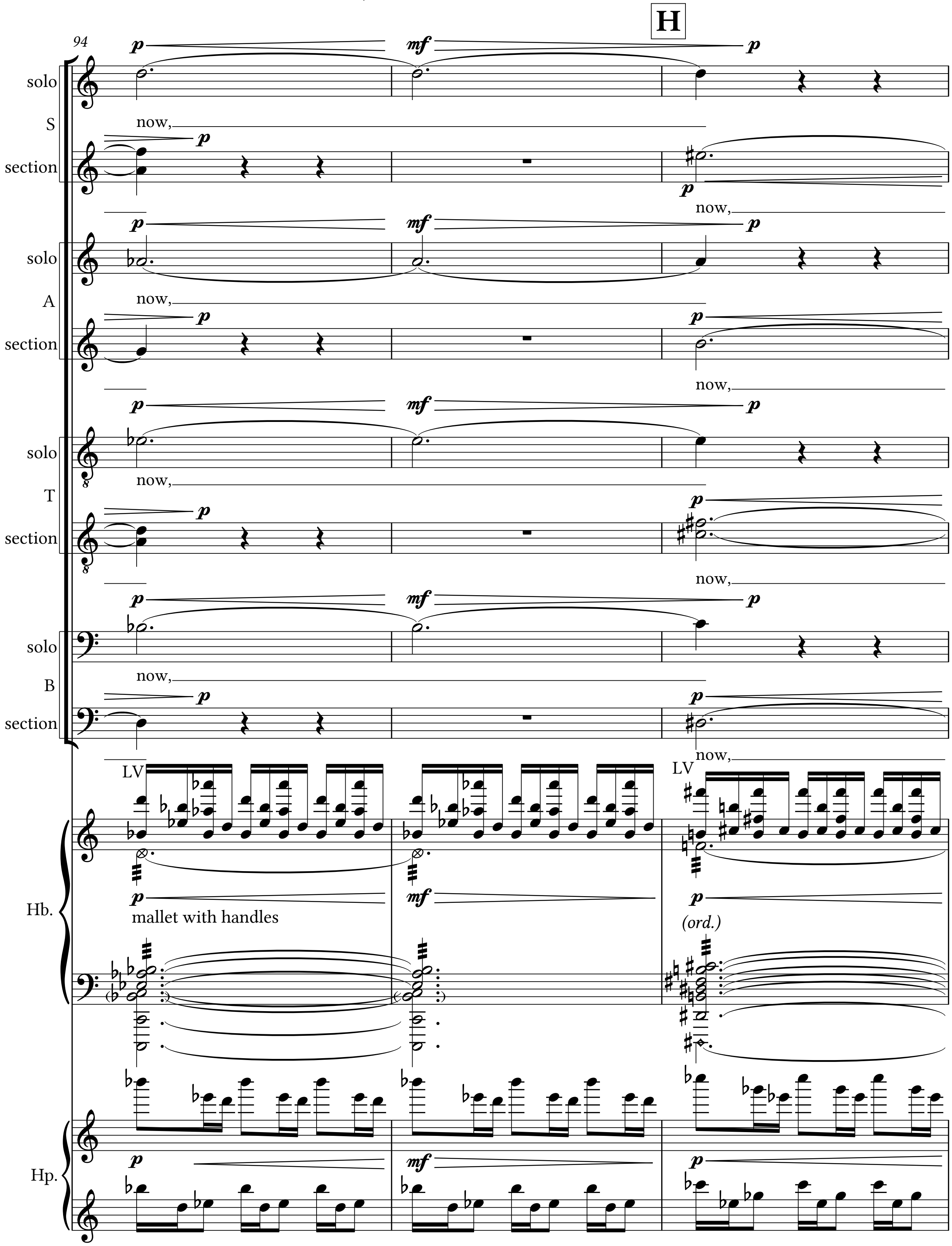

broader ♩ = 76
74
S
A
T
B
Hb.
Hp.
mf
f
mp
LV
R
wish, but now, But now o-bey thy
now, but now, But now o-bey thy
now, now, But now o-bey-thy
now,
now, now, But now o-bey-thy


79
S
cher-ish'd se - cret wish,
now,
A
cher-ish'd se - cret wish,
Em - brace thy friends,
T
cher-ish'd se - cret wish,
now,
B
cher-ish'd se - cret wish,
now,
now,
Hb.
LV
all, freely in speed and amount
Hp.


suddenly with energy ♩ = 84
G
SOPRANO SOLO
pp
now,
broader still ♩ = 69
82
S
leave all in or - der,
now,
ALTO SOLO
[...now,] now,
A
mp p
now,
TENOR SOLO
-turn - ing, now,
T
To port and haw-ser's tie no more re - turn - ing,
BASS SOLO
[...now,] now,
B
now,
LV + only
Hb.
R
B2-B4
table-damp
loudly
Hp.


88
solo
S
section
solo
A
section
solo
T
section
solo
B
section
LV
SB
mp
R
mp
Hb.
mp
Hp.


91
solo
S
section
now,
solo
A
section
now,
solo
T
section
now,
solo
B
section
now,
Hb.
Hp.


H
94
solo
S
section
now,
now,
solo
A
section
now,
now,
solo
T
section
now,
now,
solo
B
section
now,
now,
LV
LV
mallet with handles
(ord.)
Hb.
Hp.
p
mf
p


97
mp
solo
S
section
mf
now,
solo
A
section
now,
solo
T
section
now,
solo
B
section
now,
R
Hb.
Hp.
Db


100
solo
S
section
now,
solo
A
section
now,
solo
T
section
now,
solo
B
section
now,
LV
Hb.
PL
Hp.
C♮


rit.
I
accel.
105
ff
S
Now
Now
Voy - a - ger de - part,
A
Now
Voy - a - ger de - part,
T
now,
Now
now,
Now
Voy - a - ger de - part,
B
Now
Now
Voy - a - ger de - part,
Hb.
LV
PL
LV
PL
Hp.
sffz
ff
sffz
sffz


SOPRANO SOLO
mp
ah,
a tempo
109
f
p
S
ALTO SOLO
mp
ah,
A
solo
[..part,]
T
section
solo
B
section
Hb.
mp
Hp.
mp


113
rit.
solo
S
section
ah,
ah,
ah,
solo
A
section
ah,
ah,
ah,
solo
T
section
ah,
ah,
ah,
solo
B
section
ah,
ah,
ah,
Hb.
LV
R
LV
SB
SB
R
Hp.


119
J a tempo
solo
S
section
A
T
B
Hb.
Hp.
De- part
up - on thy end -
oh,
oh,


127
S
- less cruise old Sail - or.
oh, oh,
A
oh,
T
- less cruise old Sail - or.
oh, oh,
B
ah,
ah,
Hb.
Hp.


134
K
S
A
T
B
Hb.
Hp.
ah, voy-a - ger,
voy - a - ger, voy - a - ger,
ah, ah, ah,
mf
mp


140
pp p
S
ah, ah, ah, ah, ah, ah,
A
ah, ah, ah, ah, ah, ah,
T
ah, ah, ah, ah, ah,
B
ah, ah, ah, ah, ah,
Hb.
Hp.
5
mf
p

slower, lulling ♩=76
L
146
S
A
T
B
Hb.
Hp.
ah,
ah,
ah,
ah,
ah,
ah,
ah,
ah,
ah,
ah,
pp
pp
p
LV through end
6
mf
pp
mp


150
solo
S
section
A
solo
T
section
B
Hb.
Hp.
oh,
m,
mp
mf
p
pp


157
pp
mf
p
solo
S
section
ah,
ah,
ppp
mf
ppp
m,
m,
A
m,
m,
pp
mf
p
solo
T
section
ah,
ppp
mf
ppp
m,
m,
B
m,
m,
hard mallets
p
mp
ppp
Hb.
SB until end
Hp.
mf
p
mf
pp


M
164
p
mp
pp
solo S
ah,
oh,
oh,
solo T
ah,
oh,
oh,
RANDOM MALLET
SUSPENDED BELL*
SB until end
soft mallets
Hb.
*very sporadic (one strike every 3-4")
mf
Hp.
169
fade when out of air
SB dim. until as soft as possible
pp
ppp

Annotated Bibliography

Adler, Samuel. *The Study of Orchestration, Fourth Edition.* New York: W. W. Norton & Company, 2016.

The comprehensive textbook for composers and arrangers has nothing to say about handbells or handchimes. This omission suggests that the instruments are not commonly used in an orchestration setting. It has a useful description of orchestral chimes.

Allured, Donald E. *Handbell Composing and Arranging.* Tustin: National Music Publishers, 1985.

The guide from a known figure in recent handbell history is tiny and overly simple regarding techniques, timbres, and compositional advice, but it contains a quote about footnoting special techniques which is quoted in Chapter 3.

Becker, Judith. "Earth, Fire, Śakti, and the Javanese Gamelan." *Ethnomusicology* Vol. 32, No. 3, 1988.

The article provides a counterpoint to the idea of casting bronze musical instruments for tonal clarity; gamelan ensembles are often composed of gongs which are deliberately made with pitch interference (what might be called "out-of-tune" in Western thought).

Behnke, John. *Handbell and Handchime Notation, Difficulty Level System, and Solo and Ensemble Notation.* Sue Garton, Martha Lynn Thompson, David Weck, William H. Griffin, David Ruder, Susan Ullom-Hungerford, Sueda Luttrell, and Arnold

Sherman, eds. Cincinnati: The American Guild of English Handbell Ringers, Inc., 2017.

This small guide is the standard in American handbell and handchime notation. It is revised every few years at a notation conference run by the organization Handbell Musicians of America. Handbell notation is relatively young, so the results of the notation conferences are critical for publishers, composers, and performers. Part A of the guide contains the bulk of the notation. For this study, Part A is the source of most of the notation and symbology for the standard handbell and handchime techniques. Any technique not in this guide can be assumed not to be standardized. Part B is the difficulty level system referred to in Chapter 3. Part C on solo and ensemble notation is less applicable to the present study because most of its guidelines are for proper and clear engraving and physical handbell and handchime layout. I also have the 2006, 1997, 1996, and 1995 Editions, but they contain fewer techniques.

Berry, Susan, et al. *Healthy Ringing: for Handbells and Handchimes*. Detroit: Handbell Services, 2012.

The book is a guide on the fundamentals of warming up and playing handbells and handchimes without injury. Healthy methods of performing "special" techniques are discussed; they are mostly those handbell techniques which have standardized notation.

Black, James and Tom Gerou. *Essential Dictionary of Orchestration.* Los Angeles: Alfred Publishing Co., 1998.

The pocket-sized reference includes a useful page on handbells which gives composers an adequate sense of the default timbre. However, the page is tiny and does not hint at the vast sound possibilities or even the standard techniques of the ensemble.

Brandt, Henry. *Textures and Timbres: An Orchestrator's Handbook.* New York: Carl Fischer, 2009.

Brandt's guide is informative, artful, and not pedantic. It offers an alternative organization of the percussion instruments from older conceptualizations. It organizes an entire section of percussion instruments into "bell-like" timbres which are metal and have "carryover" in their sound. Handbells do not need the simile to fit in that category, and even though they are literally bells, Brandt includes them. One score example does show a handbell part which looks to be intended for a small ensemble of players, but this book does not address ensemble writing or timbre. It also does not discuss any handbell timbre except the default ring.

Camp, John. *In Praise of Bells: The Folklore and Traditions of British Bells.* London: Robert Hale, 1988.

This volume's strength is its descriptive sections not only about church bells but all other types (lighthouse, ship, schoolyard, dinner, etc.). The book devotes a great deal of its historically informative chapters to the description of tower bell ringing technique. The book often comes across as florid and verbose, but with enthusiasm for the material. It also includes various collections of tales and poetry surrounding the bells. Most importantly for this study, there is a significant chapter on English handbell ringing.

Carrillo, Abelardo, and Gariel Carrillo. *Campanas de México.* Mexico City: Universidad Nacional Autónoma de México, 1989.

This is a brief Spanish-language catalog of historical Mexican bells.

Faulkenhausen, Lothar von. *Suspended Music: Chime-Bells in the Culture of Bronze-Age China.* Berkeley, Los Angeles, Oxford: University of California Press, 1993.

Faulkenhausen's comprehensive tome is a centerpiece of ancient Far-East scholarly research on archaeological bells, about which he is recognized as a foremost authority by ethnomusicologists. His work centers on Bronze-Age China and the crucial societal functions of bells. His work assiduously covers the two-tone bell phenomenon, which can produce two distinct tones depending on the area struck. It also describes an extensive and meticulously crafted suspended bronze bell set which archaeologists uncovered. The main body of the book deals with *Zhou* dynasty bells and the culture surrounding them. A brief analysis of tones follows, but it is slight in comparison to a true acoustic analysis. However, it does catalogue and translate various ancient and Eastern concepts that would be hard for the Western reader to grasp. Faulkenhausen explains the pitches in *solfege*, graphically represents acoustic data, and concludes with a comprehensive typologically arranged list of all known Chinese musical bells. The book is replete with well-presented data figures and images, and well as thoroughly described and detailed graphic breakdowns of intricate mechanical parts.

Gall, Griff. “Sharing Our Art: Collaborating with Other Musical Artists.” *Overtones: the Official Journal of the Handbell Musicians of America*, Jan/Feb 2015.

The article describes its author’s diverse collaborations between his handbell ensemble and other musical groups, and advises on working with non-handbell composers and performers.

Guebert, Alexander M. *The Modern Handbell Ensemble as an Asset to New Music: Expanding Opportunities in Extended Technique*. Masters Thesis, California State University Long Beach, 2014.

The Masters thesis is a rare academic exploration of the handbell ensemble. There are sections on the makeup of the ensemble, notation of some techniques, and examples from the handbell ensemble’s part from the author’s composition. The conclusion argues that composers have underestimated the potential of the handbell ensemble; this conclusion serves as a starting point for the present study.

Hornbostel, Erich M. von and Curt Sachs. *Revision of the Hornbostel-Sachs Classification of Musical Instruments by the Musical Instrument Museums Online (MIMO) Consortium.* Jeremy Montagu and Margaret Birley, eds. Paris, Île-de-France. The MIMO Project, 2011.

Hornbostel and Sachs’ seminal *Classification of Musical Instruments* was published in 1914, and was the organology standard for classifying all instruments including non-Western ones. The Mimo Project published an updated version 97 years later to incorporate new instruments.

Ivey, Robert. *Handbell Ringing.* Carol Stream: Hope Publishing Company, 1995.

The longtime handbell director and educator's reference guide contains chapters on handbell history, directing an ensemble, standard techniques, and maintenance of handbells.

Jedamzik, Michael. *Handbell Compendium: A Summary (Draft of the Third Edition, May 9, 2020)*. Wiedensahl: Michael Jedamzik, 2020.

The ambitious project has chapters on techniques, physics, notation, and ensemble playing, along with charming imagery and collected material. Mr. Jedamzik has graciously collaborated with this study and facilitated the use of his work.

Jessup, Nancy and James Walters. *Building a Successful Handbell or Handchime Program.* Dallas: Choristers Guild, 2019.

The guide includes proper instructions on how to play standard techniques. Walters' foreword on handbell history features some new research.

Johnston, Ron. *Bell-Ringing: The English Art of Change-Ringing.* Hammondsworth, Middlesex: Penguin Books Ltd., 1986.

This book, after a lengthy and flowery introductory section on the importance of change-ringing in England, provides charts of changes (that is, numbered sequences and patterns used by change-ringers to achieve a mathematically permuted order, so all possible note orderings are heard before repeating). The book includes an appendix on using handbells for change-ringing, though using handbells to play melodies and tunes with accompaniment is not discussed. This appendix is still useful as it offers a detailed explanation on how

English handbells are used primarily as an activity related to tower bell ringing. The book catalogues these "peals," treating them as compositions with almost the same artistic merit and craft as pieces of written music. The book lays out a set of rules for a convincing peal, and devotes an entire section to instructions for how to manage the ropes and mechanisms for proper technique. The book closes with information on ringing associations and organizations in England.

Landers, Jackson. *A Rare Collection of Bronze Age Chinese Bells Tells a Story of Ancient Innovation.* Washington, D.C.: Smithsonian Institute, 2017.

The article describes the Zeng bell set's construction and historical setting, and speculates on its acoustics.

Larsen, Libby. *Interview with David Harris about Hell's Belles, commissioned by Sonos Handbell Ensemble*. Sonos, 2001. Permission granted.

The interview about Larsen's *Hell's Belles* commissioned by Sonos has some salient points on the handbell ensemble's sonic possibilities.

Lefkowitz, David S. *Analysis of Post-Tonal Music: A Parametric Approach.* Los Angeles, 2019.

The in-progress textbook from committee co-chair Dr. David Lefkowitz contains a chapter on analyzing timbre which, with his guidance, helped provide tools to analyze handbell and handchime sounds.

Maunsell, W. T. *Church Bells and Ringing.* London: Joseph Masters, Aldersgate Street, and New Bond Street, 1861.

This dated artifact, a small article on church bell ringing from the mid-19th century, is itself a historical piece. From a June 1861 magazine *The Ecclesiologist*, the article seeks to provide local London bell towers with simple peals for their ringers, and charmingly describes the history and practice of the instrument.

Meredith, James. *Ringing Up: Music of Three Worlds* (Recording). Berkeley: Sonos Handbell Ensemble, 2009.

The video recording of this Sonos concert includes two musical sources included in this study: *Kodo Tryptich* and *Smirti*.

Meredith, James. *Space Between the Notes* (Recording). Berkeley: Sonos Handbell Ensemble, 2003.

The video recording of this Sonos concert includes the musical source *Sonics*.

Montagu, Jeremy. *Timpani and Percussion.* New Haven: Yale University Press, 2002.

The book contains a "Bells and their Substitutes" section which lists early compositions and 20th century compositions that call for bells.

Morris, Ernest. *Legends O' the Bells.* London: Sampson Low, Marston & Co., Ltd., 1920.

This compilation of legends and folklore surrounding or involving bells makes for a charming and antiquated list of trivia. Its archaic tone and overly wide scope make searching it for valuable historical data difficult. However, it contains in its collection such a variety of stories that one finds connections between it and other objective studies on bell and tower chime history. The folklore serves as a vivid portrait into how these historical peoples heard and experienced various historic (or fictitious) bells. The veracity of the folklore is suspect and somewhat haphazard in organization. Some stories, such as "A Tale of Old Japan," are vaguely cited and their sources are not trackable. Despite these limitations, the work contains excellent pictures added by an editor, which make the collection visually diverse, and replicate the experience of stepping into a museum or listening to a verbose tour guide. Traditions from around the world are treated with the most respect that can be expected of a hundred-year-old source.

Nannestad, Joshua Hawkins. *Benjamin Britten's* Noye's Fludde: *An Analysis and Repositioning for Contemporary Use*. DMA Thesis, Boston University, 2014.

The research project on Britten's one-act opera including handbells is sourced for the section on 20th century uses of the handbell ensemble. While much of the contemporary published repertoire for handbell ensemble is for educational and amateur use, Britten's work is notably written for a mixture of professionals and children. The handbell ensemble part is meant to be played by children, and it is not printed in music notation but as a type of chart, which must have been the notation to which the children were accustomed.

Price, Percival. *Bells and Man*. Oxford, New York, Toronto, Melbourne: Oxford University Press, 1983.

This book, while respectable in its data of how various world cultures' bells are made and used, is particularly valuable for its organology; it does an excellent job of categorizing the musical instruments. Various examples in music notation appear throughout the book; a reading and simple audiating knowledge of sheet music is needed to interpret it. Most importantly for this project, there is a section on old handbells as they appeared as practice aids for English tower carillon change-ringers, and a following section (with some pictures) on the showy 19th-century handbell performance touring ensembles. The book is large and well-cited with an impressive notes section.

Racy, Ali Jihad. "A Dialectical Perspective on Musical Instruments: The East-Mediterranean *Mijwiz*." *Ethnomusicology* Vol. 38, No. 1, 1994.

The article by a member of the dissertation committee offers an alternative viewpoint on the relationship between musical instruments and the culture in which they are used.

Read, Gardner. *Source Book of Proposed Music Notation Reforms*. New York: Greenwood Press, 1987.

The encyclopedic book of experimental notation reforms was mainly used in this study for its section on notehead shape meanings. Curiously, not as much information from Read's work was relevant to the present study as expected; his large section on noteheads was mostly about their use for rhythm and pitch, not articulation, technique, or timbre.

Reed, Philip and Mervyn Cooke, eds., *Letters from a Life: The Selected Letters of Benjamin Britten, vol. 5.* Woodbridge, Suffolk: Boydell Press, 2010.

This collection contains a quotation by Britten about the handbell ensemble in his *Noye's Fludde*, which sheds light on how unusual even this prolific composer considered the ensemble.

Rossing, Thomas D., ed. *Acoustics of Bells.* New York: Van Nostrand Reinhold Company Inc., 1984.

The series editor of these collected articles on bell acoustics explains to the reader that this is the first collection of its kind, and that most of the research on this precise topic is in other languages. But the collected articles are so detailed, data-heavy, and redundant that they are almost too thick to sort through. However, no other such complete source in English likely exists. The articles include amplitude and frequency spectra charts of various tower carillons, as well as a whole section on tubular-shaped bells, and another on how to produce bell-tones on non-bell instruments. An appendix houses images of bells from around the world and the various contexts in which they are photographed, including paintings, sculpture, and drawings depicting bells with information about how such bells would sound and function.

Sharik, Michèle. *Handbell Techniques with Michèle Sharik* (Recording). Beverly Hills: Above the Line Publishing, 2011.

The instructional DVD teaches healthy execution of handbell techniques.

Shen, Sin-Yan. *Chinese Music and Orchestration: A Primer on Principles and Practice*. Chicago: Chinese Music Society of North America, 1991.

This book is printed as part of a monograph printing series and seems closer to a dissertation than a large book. Its topic is so wide, however, that it maintains a broad approach. It contains informative, if general, words on Chinese metallic percussion. It defines the Chinese orchestra, a complex concept that is not consistent across the wide country and whose definition encompasses authentic Chinese ensembles through orchestras with Western imports and Chinese sections. After a section on Chinese wind instrument acoustics, a useful section on percussion orchestration instruments follows. While not explicitly about bells, this section is helpful to generalize and categorize Chinese percussion.

Spear, Nathaniel Jr. *A Treasury of Archaeological Bells.* New York: Hastings House Publishers, 1978.

Of all the large book sources on bell history, this one has the widest scope, and covers the most time and space across human history. Compiling data from every populated continent, it often reads like a textbook. Pages have wide margins for convenient section dividers and notes, and there are continually interspersed high-quality images; the book is very expensive and polished. It is replete with small historical maps every few pages and tracks migratory patterns of how such musical instruments and the surrounding ideas and traditions were spread. Sections on Central and South America are particularly impressive, with large glossy pages of color images.

Strepka, Kimberlee. *Handbell Artistry from the Inside Out: Laban Movement Theory for the Handbell Musician.* Chicago: GIA Publications, Inc., 2012.

The work of Rudolf Laban, Hungarian dance and movement theorist, is applied to handbell performers and the ensemble in Strepka's study. The book offers a movement-based approach to many standard handbell techniques.

Definitions of movement directions and planes also prove adaptable for Chapter 4 of this study.

Thiermann, Eric and Aleksandra Wolska. *The Heart of a Bell* (Film). Santa Cruz: The Impact Media Group, 2011.

The film is a collection of bell imagery and stories from fifteen countries, narrated and set to music recorded by Sonos Handbell Ensemble.

Walters, H. B. *Church Bells in England.* London. New York, Toronto, and Melbourne: Henry Frowde, 1912.

This book is itself a piece of history, the first of its kind published as a self-described "adequate manual" on all things English church bells. Over a century later, though newer sources supersede its thoroughness, the work remains useful. One of the book's primary sources is the Whitechapel Bell Foundry and its director. A direct line can be traced to the current Whitechapel company still casting bells and handbells in England (although the longstanding factory closed in 2017). A book mainly focused on large tower bells, it delves deep into the founding and construction and design of these giant instruments. It contains endless trivia on old medieval and early modern-era tower bell inscriptions, dedications, scaffolding, towers, ringing instruction, etc.

Walters, James. *Historic Handbell Techniques.* 2020.

The essay stitches together source material from newspaper articles and old books on handbell ringing in the late 19th century and early 20th century, long before standardization. The sources are focused on performance techniques. This paper was graciously prepared by Mr. Walters for use in this study.

Whitman, Walt. *Leaves of Grass and Other Writings: Norton Critical Edition*. Michael Moon, ed. New York: W. W. Norton & Company, 2001.

The composition component (Volume 2) of the present dissertation is an original work, *Voyaging* for handbell ensemble, harp, and chorus, which uses text from Whitman's *Leaves of Grass*. In it I explore handbell and handchime timbres.

Williams, Edward V. *The Bells of Russia.* Princeton: Princeton University Press, 1985.

This book takes advantage of the thorough record-keeping of various distant and obscure townships across Russia to compile an impressive bell history collection. It begins with an obligatory explanation of ancient historical bells before presenting fortified research on Early Modern-era Russian bells (mainly large tower bells). There is a lengthy medieval section, but the most detailed chapter explores Imperial Russia. The second half of the book consists of short chapters covering one bell apiece; various large town bells across the country are cited and detailed thoroughly. There is a staggering appendix and notes section, a testament to the thoroughness of the book.

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