

Choir spacing and choral sound: Physical, pedagogical and philosophical dimensions

James F. Daugherty
University of Kansas

Music and music-making are commonly defined in relation to time, as temporal or chronomic activities. Morgan (1980), however, reminds us that "anyone familiar with the philosophical and theoretical literature dealing with music must be struck by the persistence with which spatial terminology and categories appear" (p 259). Similarly, John Dewey (1934) suggests that space is a quality inherent in every art, including music. Just as art intensifies other areas of ordinary experience, says Dewey, so does art express the experience of spatiality more energetically.

The purpose of this paper is to explore the idea of space as it relates to activities associated with choral sound, that is, the complex, composite sound experienced when a number of vocal sound sources sing in ensemble. To that end, this exploration addresses three dimensions or areas of concern: (a) physical, (b) pedagogical, and (c) philosophical. It is offered as a prolegomena, for its intent is not to be exhaustive, but rather to identify broadly some potentially key concepts that merit further consideration.

The idea of space, of course, is a historied concept prominent in both physics and philosophy. As he examines space in the context of the history of physics, for instance, Jammer (1969) finds that philosophy and theology frequently interact with experimental research to define theories of physical space within the natural sciences. By their nature, concepts of space typically carry with them not only physical referents, but larger perspectives of value and meaning as well.¹

Conceptually, therefore, it would seem "space" may be an appropriate hermeneutic, on the whole, for a class of choral sound issues that includes choir formation and choir acoustics, yet also encompasses their pedagogical and philosophical ramifications. In other words, as this paper will argue, matters associated with choir spacing and choral sound have not only physical meanings, but metaphysical dimensions as well.

Physical dimensions

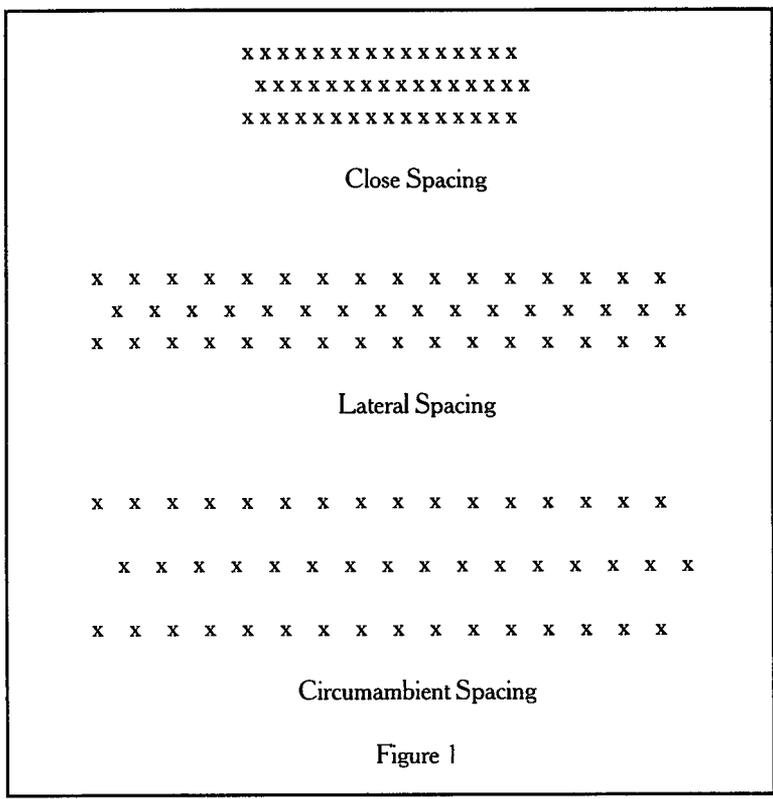
Choral methods materials routinely endorse various choir formations and seating arrangements. Cain (1932) compares them to "the proper disposition of troops on a field to obtain a definite objective" (p. 118). Kohut and Grant (1990) state that "noticeably different" changes in choral sound occur by moving sections of the choir, relocating individual singers, or singing in mixed quartets. While such comments illustrate an abiding

belief among choral music educators, little empirical research is available regarding choir formations. There is still less empirical evidence with respect to spacing of singers and choral sound.

Spacing for acoustic effect has been studied empirically with respect to frogs, crickets, orangutans, and wolves (e.g. Forrest & Green, 1991; Mitani, 1990; Harrington, 1989; Robertson, 1984). Such studies have indicated purposeful, nonrandom spacing among these species as they interacted with their acoustic environments.

Although aspects of human chorusing have been investigated empirically using individuals and small groups, a comparatively small number of acoustical studies have included a functioning, intact choir in the research design (Killian, 1985; Lambson, 1961; Lottermoser & Meyer, 1960; Lottermoser, 1969; Hunt, 1970; Ternstrom, 1989, 1994, 1995; Tocheff, 1990).

Daugherty (in press) designed a controlled study to assess preferences of auditors ($N = 160$) and choristers ($N = 46$) relative to the choral sound of an SATB high school choir in two choral formations (block sectional and mixed) and three spacings. The spacing used between and among singers was either close, lateral, or circumambient (see Figure 1).



Choristers were randomly assigned positions within each formation, retaining the same row for each trial. Videotaped conducting was employed for consistency of tempo and conductor behavior. Six conditions of a 30-second homophonic excerpt ("Ubi Caritas," Duruflé) were recorded digitally. Excerpts were adjusted manually for peak amplitude consistency during transfer to an auditor DAT.

Auditors listened to ten pairs of randomly ordered excerpts, and responded by: (a) characterizing the degree of any difference heard, and (b) indicating a preference for most pleasing choral sound. Auditor results indicated (1) significant and consistent preference for those excerpts sung with more spread spacing; (2) no consistent preference for formation per se, with preferences apparently related to the spacing dimensions at which performances were compared; and (3) preference for sectional formations with more spread spacing over mixed formations with less spread spacing. Overall, differences heard were characterized as modest, though greater differences were reported with the spacing variable than with the formation variable. For auditors, then, perceived differences associated with spread choir spacing suggests that such spacing lends a nuance to choral sound, yet a desirable and significantly preferred nuance.

Choristers (95.60%) thought that spacing influenced choral sound, with 82.60% characterizing such influence as "much" or "very much." Singers consistently and significantly preferred spread spacing over close spacing and attributed to spread spacing more independent singing, improved vocal production, and ability to hear better both self and ensemble. Results overall clearly suggested that choir spacing made a greater contribution to choral sound preferences of both auditors and choristers than choral formation.

In a series of other studies, Ternström (1989, 1994, 1995, in press) investigates what he terms Self-to-Other Ratio (SOR) in choir singing. This phenomenon may ultimately relate to singer preference for spread spacing and thus contribute to understanding space within the soundscape of the choir itself. According to Ternström's research, choir singers apparently have rather defined preferences for the balance between self-sound and other-sound. When the reference sound of the rest of the choir overpowers the airborne feedback received from one's own voice, as might happen in a choir singing with cramped spacing between and among singers, potentially all manner of chaos may ensue: oversinging, intonation problems, and less than ideal vocal production. Venue acoustics, of course, can exacerbate the problem still further, especially in absorbent and overly reverberant rooms.

Moreover, Ternström's studies find that SOR preferences tend to differ among voice types. Sopranos, for instance, tend to have a higher SOR and basses a lower SOR. Lower SOR's seem to obtain in the center section of a choir and higher SOR's on the ends of a choir.

Pedagogical dimensions

Results of both the Daugherty and Ternström studies suggest that the spacing employed with singers may have very practical pedagogical implications in terms of how

choirs present their best sound in both rehearsal and performance. Shifting singers from a cramped to a more spread spacing may be a desirable strategy that is both non-verbal and vocally non-intrusive. Choristers are not instructed to manipulate the vocal apparatus. They need not change the basic character of their individual voices in order to achieve the nuances in choral blend and intonation that spread spacing may afford. Moreover, spread spacing can be one means toward developing in choristers a sense of more independent singing, better balance between their own voices and the sound of the whole choir, as well as more satisfaction in the choral sound produced.

Clearly, however, all choirs, all singing venues, and all singers are not alike. As a pedagogical tool, choir spacing is likely not a "one size fits all" proposition. Coleman (1994), for instance, finds that individual singers within the same choir, subject to the same choral training, can vary greatly in their vocal output power. Some experimentation is likely needed to determine optimal spacing conditions for particular choirs and particular singers in particular acoustic venues.

Such experimentation, though, is perhaps in itself of pedagogical value. Allowing singers to assist in the process of experimenting with spacing by soliciting their evaluations and preferences from one spacing formation to another focuses their attention on nuances of choral sound and permits them more ownership in the sound of the choir as a whole.

Research to date (Daugherty, in press) suggests that "weaker" singers may at first resist spread spacing, especially circumambient spacing. For these singers there apparently is a sense of safety in close spacing. "Average" and "strong" singers, however, appear to prefer and enjoy spread spacing. Such data may argue that there are more optimal times than others for choirs of certain abilities to experiment with spacing.

It may not be a good idea, for instance, to initiate circumambient spacing as a fixed protocol with a beginning choir the moment the first rehearsal begins. However, it may be instructive with such an ensemble to sing from memory a simple round or folk song, one that students already know and enjoy, in various spacings. One might begin with close spacing, then move to lateral spacing and, finally, circumambient spacing. As singers are asked what they notice about their own voices and the sound of the choir as a whole after each condition, students begin to be sensitized to the relationship between their own voices and desired choral sound. Moreover, the teacher/conductor gathers both sonic and interpersonal data, and the way is prepared to shift to various spacings as desired in subsequent rehearsals.

Just as experimentation with spacing may be helpful in determining optimal conditions for particular choirs and particular acoustic venues, so may choir spacing lend itself to achieving different nuances in choral sound with different choral literature. Wilhelm Ehmann (1968), among others, has suggested that choral concerts should employ a variety of choir formations sensitive to the musical structures of the compositions being sung. A similar principle may apply to choir spacing and particular compositions. Robinson and Winhold (1976), for example, describe the "multidimensional" spacing often employed by the Gregg Smith Singers:

For example, *Nymphes de bois*, a five-part funeral madrigal with the Latin *cantus firmus* in the tenor, can be performed with

the tenors spread throughout the hall while the other parts sing their lines on stage in French. The effect is stunning! (p. 186).

Choir spacing may likewise assist amateur school choirs to perform successfully literature that might otherwise elude them due to the numbers and skills of singers in the various choir voice sections. This writer recalls, for instance, programming for a festival choir the James Erb eight-part divisi arrangement of "Shenandoah," only to arrive at the event to discover that while there were indeed an equal number of singers in each divisi section as promised, the male voices were far weaker than the female voices. Rather than abandon the piece, the tenors and basses were placed in lateral spacing on the stage risers while the sopranos and altos were spread throughout the back of the hall. In this fashion the audience heard a balanced choir and the ensemble enjoyed the particular sounds they were able to create with this piece.

The concept of choir spacing in its physical, acoustical dimensions merits further controlled investigation, particularly with respect to ensembles of varying ages, abilities, and voicings in various venues. Research to date, however, suggests that informal experimentation with choir spacing may have valuable pedagogical results as a means to (a) introduce and sensitize choristers to fundamental choral sound issues, (b) grant singers more ownership in their own choral sound, (c) discourage oversinging and misuse of the vocal apparatus since singers are enabled to find a comfortable, natural balance between the feedback sound of their own voices and the reference sound of the choir as a whole, and (d) perhaps sing with balance and blend some choral literature that would otherwise be ignored. Such pedagogical implications by no means suggest that choir spacing is a magic technique to solve all choral sound problems. They do suggest, however, that choir spacing may add desirable nuances to the choral sound of particular ensembles and that such nuances may contribute to the difference between pleasing and non-pleasing presentation of choral sound.

Philosophical dimensions

To speak of the concept of space as it relates to choral singing in its physical and pedagogical dimensions, however, is also to speak of a schema—a framework that may entail a way of conceiving and appreciating the art of choral singing itself. Just as the historic idea of space in general has by its nature both physical and metaphysical dimensions, so does the idea of choir spacing in particular suggest an interplay between practical and conceptual issues.

In this regard, it is interesting to note that the director of the choir employed in Daugherty (in press) lamented that her school stage had insufficient room to practice lateral and circumambient spacing among her choristers in performance. In a similar vein, Weston Noble (in Tocheff, 1990) has commented that when his choir of 75 choristers stood on risers, he did not have the option of employing spacing between singers.

Such observations of physical limitations are understandable. At the same time, however, it is interesting to contemplate to what extent the choral sound of contemporary

ensembles may be restricted by such concerns, and why this is so. Why, for instance, are choirs so often confined to a stage? Why do choirs typically sing on risers with eight inch elevations and individual rows 12 - 18 inches in depth?

Once such questions are raised, other value issues quickly follow. Who or what, for instance, truly decides where choirs sing? What governs expected or accepted canons for the physical presentation of choral sound? Why?

Historically, of course, choral music has deep functional associations with social, religious, and dramatic space. The ancient Greek chorus, for instance, typically sang in large circles, processed, and otherwise moved from place to place. Kleinig (1993) finds that choristers in ancient Israel played an important role in the definition of sacred space, and that their positioning varied between sitting and standing, elevated and not elevated. Helmrich (1966) observes that Medieval Christian choristers frequently moved about the space in which they sang, repositioned themselves in smaller ensembles, and were also prone to make visually as well as aurally appealing the texts that motivated their singing. The *cori spezzati* ("spaced out choirs") often associated with the Venetian Renaissance harken back to certain elements present in Hebrew antiphonal singing and forward to such twentieth century innovations as composer Alvin Curran's "The Lake" (from "Maritime Rites," 1978). This composition is scored for a 50 voice mixed choir singing in boats while rowing aimlessly on a small lake, five or six voices per boat (DiLio and Smith, 1989). While this is not the place to offer a full history of how choirs have positioned themselves for singing, such examples are sufficient for present purposes to indicate considerable variety in choir spacing. It suggests as well that the contemporary custom of packing choristers closely together on standing risers does not necessarily enjoy normative status historically. Indeed, available documentation such as treatises, paintings, and woodcarvings indicates that choirs have sung in circles, semi-circles, and an astounding variety of more or less informal, and sometimes dynamic, geometric designs, in addition to lines.

Ehmann (1968) suggests that the staged "choral line" arose with eighteenth century opera productions and continued into the concert halls of the nineteenth century. Allen (1937) and Helmrich (1996) describe an earlier precedent. In later Roman theatre room for choristers to perform in their accustomed orchestra semi-circle or circle was increasingly commandeered by various important personages wishing better seating. The chorus was thus forced onto the stage and into more or less straight lines.

The size of choirs may also contribute to the development of more tightly spaced and generally straight-line choral singing. Ancient Greek dramatic choruses, for instance, appear to consist for the most part of 12 - 15 persons who danced and spoke as well as sang (Smith & Young, 1980). In the western tradition, earlier polyphony (1100-1300) appears to be sung by one singer per voice part. Yet even by the fifteenth century, with two or more voices per part and a transition from small to larger choirbooks that could be seen by more singers, choir size seems typically to average 9 - 15 singers (Bukofzer, 1950; Fallows, 1983). By the sixteenth and into the seventeenth centuries, there is evidence of some choirs consisting of as many as 25 - 40 singers, though it is not documented that every chorister sang in every performance (D'Accone, 1997).

While the scoring and some treatises suggest occasional larger choirs in the seventeenth century, especially in compositions for multiple choruses, it is not until the mid to latter eighteenth century in the western tradition that choir size sometimes increases dramatically. The London Handel Commemoration of 1784, for instance, featured a choir of 275 voices and an orchestra of 250 players, while a festival performance of Berlioz' Requiem indicated a choir of 210 singers (Koury, 1981). Thus, while the evidence is somewhat limited and it can be assumed that likely there were exceptions, especially for special occasions, the size of choirs in the western tradition appears conducive to a variety of spacings and positionings, both on and off a "stage," until approximately the mid-eighteenth century.

Interestingly, it is also around the middle part of the eighteenth century that choral music, as music in general, begins to be categorized in some quarters as a "fine art" and grouped with painting, poetry, architecture, and sculpture (Kristeller, 1980). It is in this time frame as well that A.G. Baumgarten (1714-1762) coins the term "aesthetics." As Elliott (1995) and others point out with respect to the emergence of music as one of the fine arts, "prior to the founding of aesthetics in the eighteenth century there was no theoretical basis for uniting these otherwise distinct pursuits" (p. 22). With this conceptual framework as subsequently developed and applied, choral music in the western tradition outside of the church gradually begins to lose many of its historically functional associations with dramatic, religious, and social occasions—in short, to shed its grounding in common, everyday experience.

Choral music, of course, experiences perhaps more difficulty than instrumental music ("music alone") in finding a home in the autonomy of an aesthetic framework, because choir music is most commonly a hybrid of music and text. Philosophers of an aesthetic bent, such as Langer (1953) and Reimer (1989), may suggest that ultimately music subsumes text and is the more important partner, but, as at least one empirical research study indicates, words with their referential associations and meanings still remain in the attention of many choral musicians and their listeners as words (Daugherty, 1996).

What historical contribution, if any, the aesthetic approach to choral music has made with respect to the way contemporary choirs are typically spaced is a question worthy of further exploration. Certainly in western choral art music as practiced today some compatibility with aesthetic philosophy, whether coincidental or otherwise, is evident in the way choirs are placed.

In an "art for art's sake" schema, for example, choral music is conceived primarily as an aural art object. Much as museums tend to display sculptures and paintings framed with conventional sameness of presentation and spacing, so is choral sound often presented. A museum spectator commonly stands outside a painting, looking into it. Indeed, the notions of "disinterested perception" or "psychical distance" are seminal to many aesthetic approaches to art and the aesthetic experience thought to be derived from contemplation of art objects. Likewise, an audience at a choral concert is typically positioned so that its only permissible function can be to listen to a musical "work," emanating from a largely static sonic object, from outside a framework, both visual and aural, typically supplied by both a stage proscenium and stationary risers (almost a frame

within a frame). Sense of choral space then becomes stagnant, fragmented, and economized. Paradoxically, moreover, the musical work, the appreciation of which is ostensibly a primary focus of this configuration of choir and audience, may not be as richly nuanced in its choral sound as it might be with more spatial freedom.

As Sennet (1994) observes, "The spatial relations of human bodies obviously make a great deal of distance in how people react to each other, how they see and hear one another..." (p 17). The semi-circular amphitheatre design of the ancient Greeks, for instance, provided for raked, terraced audience seating. Such arrangement made it possible for audience members to be aware of one another and to see and gauge the reactions of others. In many auditoria today people may experience trouble seeing and interacting with more than a few neighbors seated close by. This emphasis upon individuality rather than community is exacerbated when the choral ensemble, now placed above instead of below the audience, remains stationary in its framed place.

In the great European cathedrals of the medieval and Renaissance periods, it was participation in the "communion of saints" that was furthered by lofty, vaulted areas designed to portray, visually and sonically, space as the divine ubiquity of God's presence. Although common worshippers were not typically direct participants in the liturgy, the architectural space served to envelope them in proceedings and further a feeling of corporateness as the people of God. Here choral music was functional, an aid to auditors whose primary purpose was not to attend to the singing alone. A similar context obtained with the sociability surrounding secular choral music of the period as people often dined, drank, and conversed in connection with it. In other words, most of the Renaissance and early Baroque choral repertoire sung in today's concert auditoria was initially performed for and heard by people who were present for reasons other than, or in addition to, attending exclusively to music. In this vein, Small (1998) points out that:

If the idea of an event that consists entirely of a musical performance, with no other social function..., is a modern one, so is the building that is built expressly to house such an event (p. 21).

Modern school auditoria merit mention here because they are often multi-purpose facilities. Events other than musical performances occur in them. Moreover, they sometimes function primarily as gymnasiums or cafeterias into which a small stage is incorporated or where choral risers and audience chairs are arranged in carefully demarcated areas on the facility floor. Regardless of particular physical arrangements made in such venues when school choirs sing, the effect is often an attempt to emulate as closely as possible the setting of a concert hall.

Another interesting question, of course, is posed by the advent of the modern, portable choral standing riser. Though that history remains to be chronicled in detail, the first advertisements for them appear in music educators' journals after World War Two in the late 1940's. Prior to that, many of the leading a cappella college and professional touring choirs in the United States made use of individual chorister boxes of different heights that could be placed in various configurations in the performance venue. The

portable choral riser is certainly convenient in the sense of affording contemporary choirs ease of transportation and assembly. It serves the obvious function of allowing all members the chorus to be seen and, in turn, for them to see the conductor in almost any venue.

Yet the portable riser may also contribute to the compact ways choirs tend to perform today. Depending on the size of the ensemble and the number of riser units, choral risers may tend to diminish the heritage of space and spatial presence that has marked the long history of the chorus by compressing and confining the choir. Their portability, moreover, abets a concert hall framework in almost any room. Exclusive use of choral standing risers, therefore, may willy-nilly reinforce the idea of the choir's sound as an autonomous, aesthetic object and the choir's audience as simply an aggregate of individuals whose purpose is to attend privately and aesthetically to the form of the musical works presented.²

It may be that the choral experience for listener and singer alike is not always best revealed or appreciated by these physical arrangements. Such circumstances may prevent the choir from making its best sound and the audience from feeling a part of, or even participating in, a musical process rather than being dominated by a musical product. Indeed, in many venues where choirs sing today, choral sound may be captive to either an architecture or mindset bent on reifying rather than magnifying the choir.

The concept of choral space, on the other hand, potentially embodies meanings that make alternatives intelligible. Everyday words commonly associated with spatial description include: up/down, between/among, high/low, close/distant, inner/outer, center/end, front/back, near/far, right/left, linear/circular, etc. Other familiar terms such as "distance," "area," and "place" typically depend upon a prior spatial concept. To say something occupies or has a "place," for instance, suggests that it exists in some sort of spatial framework. Similarly, the word "placement," along with cognate terms such as "position," "arrangement," and "formation" are customarily defined in relation to space.

One of the functions of a concept of space, it would seem, is to describe relationships. These relationships exist not so much in chronological order as they do simultaneously. At heart, the issues — physical, pedagogical, and philosophical — associated with choir spacing are concerned with the way in which things relate. Indeed, choral singing, at its best, is about celebrating relationships, relationships between the singer and the rest of the choir, relationships between choir and its singing venue, the choir and its audience, relationships among complex, beautiful sounds, relationships among audience members. Such relationships inevitably create meanings and patterns. Indeed, as Small (1998) has observed, perhaps choral music-making "is an activity by means of which we bring into existence a set of relationships that model the relationships of our world, not as they are but as we would wish them to be" (p. 50). If this be so, then the idea of space as it relates to choral singing is at heart a way of exploring, understanding, and celebrating those patterns of relationships that we idealize or desire to cherish. Gadamer (1986) refers to this quality as the festive or festival-like character of art. A festival, he says, is "an experience of community". If there is one thing that pertains to all festive experiences, then it is surely the fact that they allow no separation between one person and another (p 39).

What might we experience in a choir performance that takes seriously and celebrates

the heritage of space inherent in the choral tradition, especially in its physical, pedagogical, and philosophical dimensions? Perhaps the choir would not necessarily sing in a "concert hall" setting, be it real or makeshift. If it did, the ensemble might well begin by surrounding the audience in song, enveloping auditors in its sound while acknowledging the acoustical attributes of the room as a full partner in its music-making. Thereafter, the choir might process, singing, to gather in a specific area of the hall. If risers were then utilized, choristers would be spaced laterally and/or circumambiently. The choir, moreover, would not necessarily be limited to one area or to a set of risers. It would be free to move from place to place, divide as desired into smaller ensembles spaced in various areas of the room, sit on the edge of the stage, stand on stairways, arrange itself into circles or semi-circles—in short, to utilize space and spacing to maximize its best sound on particular compositions. Though he is not addressing directly spatial placement of choristers in ensemble, Dewey's (1934) observation is apt as he notes that there is a "feeling of energy...closely connected with rightness in placing. For there is an energy of position as well as of motion" (pp 210-211).

In addition, the choir might well invite its audience to sing, too, at appropriate junctures, or perhaps provide appropriate percussive accompaniment as desired. Such spatial freedom does not exclude times where the choir might indeed find itself situated on a stage on risers, with auditors listening intently in what Gadamer terms "festive quiet." The point is that spatial freedom does not require that the choir be limited exclusively to that placement.

In such context, the placement and spacing of choirs, the placement of the audience, the acoustics of a particular venue—all might be better approached in terms of what sort of dynamic relationships, personal as well as sonic, are to be furthered, and not simply in terms of reifying an objective art form. Leibnitz's definition of space as "an order of coexistent data" (quoted in Jammer, 1969, p 4) is perhaps instructive here. For, ultimately, the issues of choir spacing and choral sound are concerns that refer to simultaneous, multiple strata of data in complex relationships. An exclusively aesthetic approach to choral singing, manifested in a simple "listen to the choir stand on the risers and sing" orientation, purposely ignores the truthful complexity of the process of choral music-making, especially its contextual realities. On the other hand, to begin to explore the experience of space more energetically may allow the choral art perhaps to celebrate, if not regain, more of its inherently relational qualities. "Lack of room," asserts John Dewey, "is denial of life..(but) openness of space is affirmation of its potentiality" (p 209). A sense of space can be sought not only in the physical dimension of the choir's sound, but in its pedagogical and metaphysical dimensions as well.

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Endnotes

1 Descartes (trans. 1965), for example, held that the primary attribute of a thing was its extension in space. This worldview attributed causality to the external world and buttressed a mechanistic concept of science primarily focused upon empirical objects and their spatial dimensions. Kant (trans. 1965), on the other hand, embraced the notion of space as an *a priori* way of intuiting the external world that was a universal and necessary kind of knowledge for consciousness, and, along with time, constituted his transcendental aesthetic. Einstein, of course, defined space anew in a way that significantly impacted the way we think and live. And contemporary physicists, such as Hawking (1989), think in terms of "a four-dimensional space called space-time" (p 25). Such examples illustrate that how one approaches and thinks about space may occasion differing perspectives on a plethora of enduring issues. Norberg-Schultz (1971) alludes to several ways that the concept of space functions in our worldviews when he speaks of "the pragmatic space of physical action, the perceptual space of immediate orientation, the existential space which forms man's stable image of his environment, the cognitive space of the physical world," and "the abstract space of pure logical relations" (p 6).

2 Let me emphasize that I am not disparaging use of portable choral standing-risers per se. The argument here centers upon their exclusive use, and their use in such a way as to allow insufficient room for lateral and/or circumambient spacing of singers. Moreover, the height and width at which such risers are currently manufactured may need to be reconsidered.
