A/Symmetrical Reading of *Inversion* in Fin-de-Siècle Music, Musicology, and Sexology

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Give me where to stand: And I will turn your system of persecution upside down.
—Numa Numantius[1]

Introduction

TOWARDS THE END OF THE NINETEENTH century, *inversion* and *inversional symmetry* evolved into fundamental concept-metaphors in various scientific disciplines, such as biology, physics, crystallography, music theory, sexology, and group theory. In mathematics, for example, the general idea of *symmetry* had evolved into perhaps one of the most significant contributions to the discipline at that time.[2] Although the very idea of mathematics is predicated on notions of symmetry, I. M. Yaglom argues, the post-Aristotelian period, under the influence of Euclid, witnessed an indifference and skepticism toward the concept. A lengthy hiatus in the use of symmetry in the mathematical sciences ensued. It was not until the new European mathematics of the late nineteenth century, particularly in the work of Felix Klein and Sophus Lie, that the mathematical apparatus began again to reflect symmetrical relationships.[3] At the same time, this era witnessed the emergence of new disciplines, such as scientific crystallography, that were deeply beholden to the idea of symmetrical inversions. Again, while the use of symmetric properties to classify crystals dated back to ancient times, Yaglom argues, "the mathematical theory of crystals ... was entirely a product of the 19th century" (206). An exhaustive list of crystallographic groups, two hundred and thirty in all, was achieved by the combined efforts of Efgraf Stepanovich Fedorov (1853–1919), Arthur Moritz Schönflies (1853–1928), and William Barlow (1845–1934) in 1894. Around this time, the literature on geometric symmetries, as they appeared in both science and art, abounded ranging from L. Sohncke's

Entwicklung einer Theorie der Kristallstruktur (1879) and G. V. Vulf's *Symmetry and Its Manifestation in Nature* (1908) to A. V. Shubnikov's *Symmetry: The Laws of Symmetry and Their Application in Science, Technology and Applied Art* (1939).[4] In fact, despite the divergent ways in which they were put to use, there was hardly a discipline that remained wholly untouched by the idea of *symmetry* and *inversion*.

This paper concerns itself with the deployment of these concepts in two of these disciplinary contexts in Europe between 1860 and 1910. Despite many affinities, *inversion* in musical discourse – both theoretical and compositional – was crucially involved in a significant stylistic shift, while in sexology, the *invert*, although a transitional term, inaugurates less a shift than a consolidation of the modern *homosexual*. What follows are speculations on both the convergence and the divergence of this concept in these fields and the implications this has for queer theory and musicology today. This will involve the telling of a less known history of the transition from chromaticism to atonality, on the one hand, and revisiting the transition from the *sodomite* to the *homosexual*, on the other.

Hence the paper narrates music's turn-of-the-century transition into modernism in terms of underlying generative modalities – inversional operations amongst them – instead of adopting the more widely-held view that this transition involved a saturation of chromaticism or an imperative to avoid the tonic. This it does by marking certain formal affinities between tonal syntax, as it came to be understood in the late nineteenth century, and early serial procedures. In an article entitled "Inversional Balance as an Organizing Force in Schönberg's Music and Thought," David Lewin also attempts to correlate notions of inversional balance with aspects of tonality. He shows, for example, how Schönberg employs inversionally balanced 'areas' in ways that relate to *key* areas in tonal music. Lewin also points out that, in important ways, the tonal system is based on inversional relations. Since the constituents of the *subdominant* cannot be generated by the overtones of a tonic note, it is posited by inversion: "Tonic-to-subdominant *inverts* the relation of tonic-to-dominant, and the force of the tonic involves its central character, as mediating between upper and lower dominants" (1968, 2-3). Although we identify a different trajectory from tonality to atonality via the work on inversional symmetries by nineteenth-century music theorists, Lewin's observations contribute to a similarly focused history of relations between these aesthetic periods.

Analogously, the paper narrates the shift in sexology, from the *sodomite* via the *invert* to the *homosexual* in less familiar terms, suggesting that more than taxonomy is at stake. That is, in this reading, the transition from *invert* to *homosexual* involves *more* of a transformation than the, now widespread, Foucauldian genealogy would have it. *Inversion*, as the conceptual tool used to understand the experience of same-sex sexual desire occupied a key moment in a European history of sexuality. Easily dismissed in current theory as biologically essentialist and empirically unprovable, this term is mostly understood as the simple forerunner of the *homosexual*. Rendered marginal in one domain, central in another, *inversion* has many confusing meanings and applications, which we will attempt to explore through a close reading of selected theoretical and compositional works.

A word on our historical method: we advance the notion at various points in our examination that the explanatory force of *inversion* and *inversional symmetry* – their ability to account for and generate new phenomena – was granted to such an extent that, even in situations in which the phenomena did not line up with the empirical situation, the empirical findings were nonetheless assumed to fit the pattern. On such occasions, it was felt that the data were merely still to be collected. The point to be observed about these moments of faith is that in an era of rampant positivism, some truth claims were as deeply implicated in the symmetrical identity as they were wholly empirical. In other words, the scientific discourse was thus charged with the energy of an aesthetic structure; its empirical content patterned by a form. We thus take Hayden White's configuration of "form-as-message" (204) as axiomatic in our account.

Our methodology also takes for granted the challenge to disembodied objectivity in the writing of history made by White, Stephen Greenblatt, H. Arom Veeser, and many others in recent years. We share with these writers an interest in exposing the manifold ways in which different aspects of social, scientific, and cultural life affect each other, and particularly in revealing the unsuspected regularities and borrowings that obtain in ostensibly distinct and unrelated activities, disciplines and institutions. However, unlike the New Historicists, we are not as much concerned with a differential analysis of local discourse, or of local conflicts in a specific setting, as might be expected. The concept-metaphors under investigation were, in fact, quite widespread and, in many cases, institutionally central. Thus, we have kept this general view in mind throughout our analysis, and paradoxi-

cally also strategically suspended an examination of the extent to which the form of the above scientific discourse, as well as our historical discourse, is the site of ideologically significant work. This is because not all manifestations of these forms, and thus their concomitant messages, yielded equivalent ideological meanings. While it is true that *inversion* in both sexology and musicology could be linked to certain modalities for the production of social norms and musical works respectively, we offer the idea that the concept also had a radical potential to undo gendered binaries that, in sexology, could not be managed in the end.

I.

By the late nineteenth century, leading German music theorists, such as Moritz Hauptmann (1792–1868), Oskar Fleischer (1856–1933), Arthur Joachim von Öttingen (1836–1920), Hugo Riemann (1849–1919), Bernhard Ziehn, and Hermann Schröder (1843–1909), sought to explain the duality of major and minor less in terms of the traditional masculine and feminine bifurcation and more in terms of a symmetrically inversional relation (*die symmetrische Umkehrung*). In Schröder's view, the major triad consisted of a perfect fifth and a major third above the fundamental, while the minor triad consisted of the same intervals below the fundamental (fig. 1). Minor was thus regarded as a mirror image of major and vice versa. While the empirical buttress for the major triad rested on the overtone series, scientific explanations of the minor were notoriously a good deal trickier. That is, the major triad was formed by the overtones closest to the fundamental, while the overtone series could not be relied upon to explain the minor triad, for the overtone yielding the characteristic minor third was not nearly among the first partials. Figure 2 reproduces Hermann von Helmholtz's representation of the overtone series in *On the Sensations of Tone* (1875). To complicate matters, partials occurring earlier in the series, than the lowest that could approximate a minor third, were already excluded from the (chromatic) system, presumably as too remote from the fundamental to be sensible.

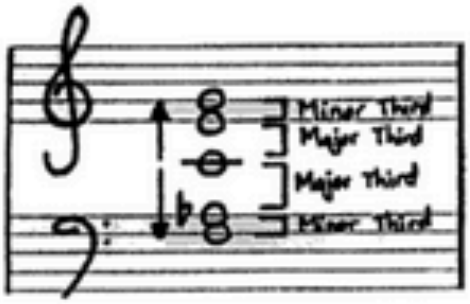

Figure 1. The Minor Triad as a Mirror Image of the Major Triad

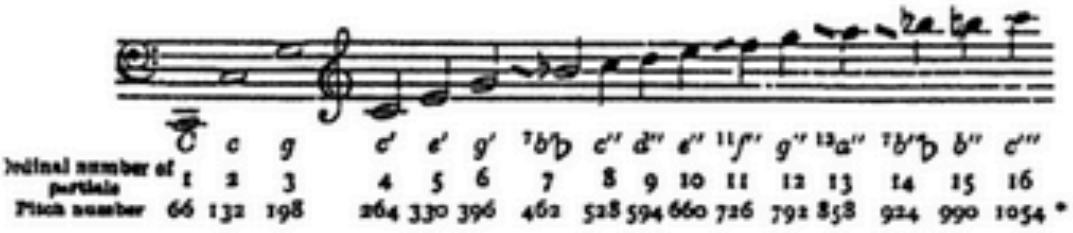

Figure 2. The Overtone Series as Explicated by Hermann von Helmholtz (1877)

This lack of empirical support for the minor triad led the more traditionally-minded theorist Ernst Mach (1839–1916) to posit a single chord of nature *(Naturklang)*, namely the major triad, in relation to which the minor triad was explained as a modification or as an embellishment, weak and unstable in itself. This *harmonic monism* had a well-established eighteenth-century precedent. For Jean-Jacques Rousseau, the minor triad lacked the necessary resonance of Rameau's chord of nature *(corps sonore)*. It could be "discovered only by analogy and inversion" (in Wheelock 202) and thus, in the words of Johan Kirnberger, was suitable for the expression of "sad, doubtful sentiments, for hesitation and indecision" (in Wheelock 202). The minor was thus judged either in the terms of a lack – Knecht's C minor was "lamenting and longing," while his C major was "cheerful and pure" – or the minor was judged in the terms of an excess; Galeazzi's G minor was "frenzied," while his G major was "innocent and simple" (in Wheelock 208). For the later nineteenth-century harmonic monists the subordinate place of the minor triad was maintained. Its failure to align neatly with the overtone series rendered the minor triad a derivative of the harmonic monists' *Naturklang* and lacking in an empirical grounding in nature.

For the *harmonic dualists*, on the other hand, the minor triad was equally as axiomatic, or fundamental, in their harmonic schemes as the major was. The minor, they claimed, was also based in nature. To impart an acoustical foundation for the minor, Riemann invoked the *undertone* series. As David Bernstein tells us: "A given complex musical tone, for Riemann, engendered both an overtone and a symmetrically related undertone series" (380): the major sonority *(Klang)* was a mirror image of the minor and vice versa. Thus we witness a moment in Riemann's empirical scheme where the symmetry carries the bulk of the explanatory force and the acoustics, not yet fully proven, were assumed.

Configuring the minor triad in terms of an inverted major has an extensive genealogy, beginning, perhaps, with Gioseffo Zarlino (1517–1590). For Zarlino, a fundamental C could, through the principle of *covibration*, generate the tones f, a-flat and c. While Zarlino's views preceded the common practice period and contributed to the then emergent principles of tonality, the work of Schröder, Riemann, and others marked the end of this period and contributed, in unforeseen ways, to the decline of these principles. Not surprisingly Riemann identified Zarlino's idea as the starting point of his own history of harmonic theory, praising him for "discovering" *harmonic dualism*, the "two possible forms of harmony" (506). Scott Burnham argues that Zarlino's understanding of major and minor had little to do with the nineteenth-century concept of dualism; that Riemann selectively reads dualism into Zarlino's work in order to justify the dualism which is the foundation of his own theory (8). In any event, Riemann chose to emphasize Zarlino's identification of major and minor as inversionally related and, in contrast, criticized Zarlino's adherence to the figured-bass school, claiming that the development of dualistic harmonic theory was thus hampered (425). According to Riemann, it was not until the late nineteenth century that dualism was rediscovered as axiomatic to harmonic theory. Thus, he maps a history of harmony that parallels that of mathematics and crystallography in terms of an early appearance, followed by the disappearance, and finally the reemergence of symmetrical inversions in the late nineteenth century.

Much of Riemann's dualistic theory seems to have been derived from a treatise written by Arthur von Öttingen in 1866 called *Dual Development of Harmony (Harmoniesystem in dualer Entwickelung)*. Öttingen's theory of harmony rested on the idea that elements of a *Klang* either have a common fundamental or a common overtone. The major triad represented *tonicity* because its constituents had a common fundamental, while the minor triad represented *phonicity* because its representatives all possessed a common overtone. For instance, in the phonic G chord (better known to us as the C-minor triad), c, e-flat, and g had a common overtone of which they were fundamentals, while the constituents c, e, and g of tonic C (known as the C major triad) were overtones of a common fundamental. These relations are depicted in figure 3. Öttingen's wording is interesting: "The tones of the major triad are common components of the tonic fundamental, those of the minor triad have a common phonic overtone" (39). In the spirit of the dialectician Moritz Hauptmann, Öttingen posited

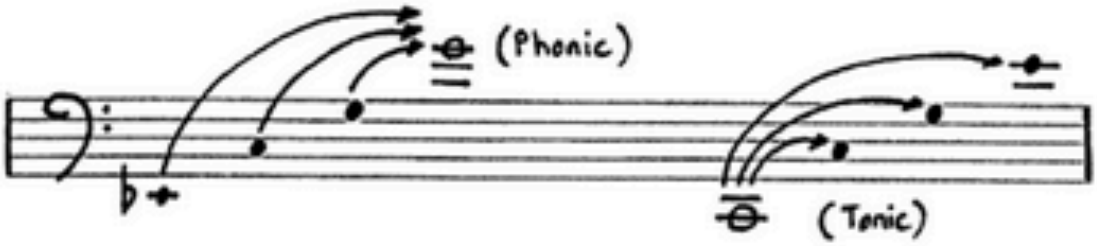

Figure 3. Arthur von Öttingen's Theory of Harmonic Dualism: Tonicity and Phonicity (1866)

an opposition between *Haben* and *Sein*. The phonic constituents *have* a common overtone, and the tonic constituents *are* overtones of a fundamental. On the one hand, Öttingen thus posited major and minor as inversionally symmetrical, and, on the other, he asserted ontological priority for the former. In other words, the phonic acted as a kind of back formation, or an opposite projection, of the tonic.

II.

In the contemporaneous realm of sexology, *inversion* enjoyed popular and scientific currency from the mid-nineteenth century to the early twentieth century. The origin of the term is unclear. Havelock Ellis and John Addington Symonds stated in 1898 that, a few years before, sexual inversion had not yet been named (35). They claimed that the term first appeared in the work of several Italian writers and then passed into general European currency in the last half of the nineteenth century. Karl Heinrich Ulrichs used the term *conträre Sexualempfindung* (contrary sexuality) in *Memnon: Die Geschlechtsnatur des mannliebenden Urnings. Eine naturwissenschaftliche Darstellung* (1868). Jean Charcot and Valentin Magnan introduced the term *inversion* in an 1882 article in the *Archives de Neurologie*. The term was also used by Karl Friedrich Otto Westphahl in his article "Die Sexualempfindung" (cf. Katz 55; and Chauncey 114–46), as well as by J. Chevalier in his 1893 study entitled *L'inversion sexuelle*. The meaning of the term broadly involved a description of a sexual desire that was projected in a direction opposite to the norm and additionally identified such a desire as a medical disposition. In its fully developed form, sexual *inversion* was a condition whereby sexual desire thus found expression toward not the opposite but the same sex, and suggested that a desire whose orientation had been inverted could be an essential component of a person's biological and social identity. This understanding of same-sex desire as innate and

essential marked a radical break with earlier understandings of a related phenomenon, *sodomy*, which was understood as contingent, circumstantial aberrant behavior.

To rehearse Michel Foucault's almost axiomatic genealogy: the *sodomite*, an occasional sinner, became the *homosexual*, a species, through the medicalization of discourses around sexuality (43). Discourses regulating sexual behavior were increasingly no longer the exclusive concern of priests but came under the purview of doctors and lawyers. Participants in same-sex sexual acts were to be pathologized instead of being condemned as sinners. Yet the term *inversion*, as a liminal concept between *sodomy* and *homosexuality*, is not entirely interchangeable with *homosexuality*. Without contesting Foucault's genealogy in its broad outlines, one question nevertheless arises: is the *invert* simply the forerunner of the *homosexual*, the *homosexuel avant la lettre*, or does the term imply a different configuration, however slight, of same-sex sexual desire?

In *Sexual Inversion*, Havelock Ellis and John Addington Symonds reveal the social terrain in which the meaning of the term is contested. Ellis, claiming the mantle of science asked in 1898: "What is Sexual Inversion: Is it an abominable acquired vice, to be stamped out by the prison, a beneficial variety of human emotion, which should be tolerated or even fostered? Is it a diseased condition that qualifies its subject for the lunatic asylum or is it a natural monstrosity, a human 'sport', the manifestations of which must be regulated when they become anti-social?" (128). There was not just one kind of *invert* nor one kind of *inversion*. For Ellis and Symonds, while not all *inversion* was congenital, all *inverts* were born with a congenital disposition toward *inversion*. Although the term was disputed on legal, humanitarian, psychological, and evolutionary-scientific grounds, Ellis identified *inversion* as congenital at bottom. In his summary "Theory of Sexual Inversion," he concluded that "we must regard sexual inversion as largely a congenital phenomenon, or, to speak more accurately, as a phenomenon which is based on congenital conditions. This ... lies at the root of the right comprehension of the matter" (129). Keeping this empirical fact in mind, Ellis continued the chapter with an argument against regarding *inversion* as a disease.

What was new and significant was the claim for a natural basis for same-sex sexual desire. Like the minor triad for the harmonic dualists, the late nineteenth-century *invert* was also based in nature. Inversion was a congenital "anomaly" or "abnormality" given by "a peculiarity in the sperm or

oval elements or in their mingling" that could be likened to the "dissimilarities [such as] between brothers and sisters"(135). *Inversion*, in this scheme, was thus grounded, even born, in a natural site. Addressing the desire itself, Karl Heinrich Ulrichs explained that the *Urnings* and *Urningens* – Ulrichs's versions of the *invert* – were "naturally attracted" to men and women respectively and were not "acting contrary to nature" (36). Resisting the view that *inversion* was "eccentric," "melancholic," or "perverse," Ulrichs argued that *inversion* "is deeply rooted in human nature" (77-78). The *Urning*, he claimed "act[s] according to his own nature ... following not only his nature but the nature of his own kind" (37).

Recalling the work of the harmonic dualists, *inversion* thus functions as the concept-metaphor that challenged the unnatural basis of both the minor harmony and scale, and same-sex sexual desire. In effect, minor shifted from derivative, lamenting or frenzied to a phenomenon grounded in the natural undertone series, while same-sex sexual desire shifted from perverse, melancholic or eccentric to a natural inheritance – at least fleetingly – in these accounts. Arguably, this congruence extends further than the mere attempt to ground both phenomena in nature, and hence to grant both equal status in compositional and social law respectively. But before elaborating this deeper affinity, we must distinguish this project from, or finesse its relation to, Foucault's broad genealogy, whose lineaments have become widespread in the literature.

For example, Wayne Koestenbaum claims that the concept of inversion poses "homosexuality [as] the inferior and derivative mirror image of a sound and uninverted normality" (1989, 43). One could possibly substitute *homosexuality* for sexual *inversion* in the quote from Ellis without radically transforming its sense, in a way that would not be possible with *sodomy*. However, the specificity of the meanings of *inversion* would be lost in this substitution. Koestenbaum uses the term *homosexual* to explain *inversion*, and so anachronistically subsumes the one in the other. In other words, by antedating *homosexuality* and, by implication, *heterosexuality*, he names the as yet unnamed.

In Jeffrey Weeks's *Sexuality and Its Discontents*, *inversion* appears in its own right, but is identified principally with "sexological definitions, embodied in medical interventions, 'creat[ing]' the homosexual," a "label," or a "social categor[y] whose fundamental aim and effect was regulation and control" (93). Weeks is suspicious of the effort to account for abnormal sexual behavior in positivist terms because "the call upon science ...

becomes little more than a gesture to legitimise interventions governed largely by specific relations of power. The production in sexological discourse of a body of knowledge that is apparently scientifically neutral (about women, about sexual delinquents or offenders) can become a resource for utilisation in the production of normative definitions that limit and demarcate erotic behaviour" (79). Weeks argues that the scientific endeavor is thus dubious in itself, particularly when it is applied to the "imprecise domain of sex" (72). Sexuality, he argues, is social through and through and the scientific claims to facticity should be regarded as uniquely repressive and implicated in dogmatic social control. It is the scientific "seeking for truth" itself, Weeks suggests, "that is the problem" (62).

But the more seriously we take Weeks's claim that this form of scientific power was "spreading its tentacles of regulation and control ever-more thoroughly to the nooks and crannies of social life" (74), the more exactly are we presented with the terms of power with which any resistance at the time was forced to negotiate. Instead of ruling out positivism *tout court* as reactionary, an investigation into resistance requires a serious look at positivist modes of thought; in this case a rethinking of the common scientific impulse grounding both sexual *inversion* and the inversionally related minor triad. Given the predominance of positivist thinking and its attendant claims to authority in the late nineteenth century, we feel a danger in anachronistically projecting onto the period late twentieth-century terms of the debate – "sexuality is a social construction" as a phrase would have it – and thus overlooking the authoritative terms in which nineteenth-century theorists were then debating. Problematic as it was, the positivist ethos surrounded these writers. In other words, if there was resistance at the time, then it would have been specific and contingent upon the cultural field upon which it operated. And, in this case, if the resistance was to carry any persuasive power, the terms were set by positivism. To dismiss such science as necessarily in service of coercive control would be to overlook such a possibility. The point is not to regard scientific findings as fact – or to grant a dichotomy between positivism and politics – but to examine the conceptual forms that guided scientific narration, to heighten the tension between these forms and facts, and finally to gauge, even rediscover, their positive explanatory power and significance by comparing the uses of the same metaphor in diverse contexts.

What then was different about the narration of same-sex sexual desire and gender identity under the rubric of *inversion*? How did sexual *inver-*

sion work as an explanatory model, what were its internal arrangements and what, exactly, got inverted? One type of *inversion* theory depended on the idea of a biologically grounded sexual instinct, whose direction got inverted. In other theories gender identity was inverted. Ellis's *Sexual Inversion* embodied the oppositely-projected instinct while Ulrichs's *Urnings*, whereby a woman's soul coexisted in a man's body, inverted gender, resulting in a *third sex*. Similarly, Edward Carpenter explained *inversion* in terms of an *intermediate type* between opposite genders. For all the variations in these conceptions, the *inversion* theorists shared a resistance to the binary structuring of gender, Carpenter and Ulrichs using the poles of masculine and feminine identity and desire to call for a third category.

Arguably, there is something in the internal arrangements of the term that contributes to this undoing in ways that are closed down in the consolidation of the term *homosexuality*. The term brings the entire sex/gender system explicitly into play. As much as it may reify gender by insisting on masculine and feminine poles of identification and desire, *inversion* 'de-essentializes' gender by infusing one with the other. Ulrichs explains that the inverted Urning "is not a man, but rather a kind of feminine being when it concerns not only his entire organism, but also his sexual feelings of love, his entire natural temperaments and his talents" (36), and simultaneously that Urnings "are not fully ... women [and] that [they] are similar to men because [they] assume the masculine role in society and because [their] capacity for work is the same" (36). The *invert* emerges as either both woman and man or as neither woman nor man. Instead, the male body coexists with the female soul and vice versa.

Ellis echoes this kind of gender reversal, claiming, on the one hand, that in behavior "the male invert frequently resembles the normal woman" (108) and, on the other, that "the chief characteristic of the inverted woman is a certain degree of masculinity" (94). Furthermore, the question of gender origins is posed in explosive ways when Ellis disputes Ulrichs's claims. He says "to assert dogmatically that a female soul, or even a female brain, is expressing itself through a male body ... is simply unintelligible. I say nothing of the fact that in male inverts the feminine psychic tendencies may be little if at all marked" (132). The invert both does and does not resemble the opposite sex at different times in Ellis's text, while s/he emerges finally as the person who was incapable of "killing out those [germs] of the other sex" (132–33) as they appear at conception in all organisms. Ellis's organism at conception contained for all human beings "about 50 per cent of

male germs and about 50 per cent of female germs" (132). The invert's germs, whose male or female components failed to "assume the upper hand" (133), remained, by implication, divided in later life. Empirically speaking, then, the point of origin, or conception, is paradoxically split in equal halves and the conceptual *inversion* relation was channeled into a symmetry that cut across the gender binary.

Many commentators have remarked on the constitutive force that the terms *homosexuality* and *heterosexuality* have for one another. For example, in *Between Men: English Literature and Male Homosocial Desire*, Eve Kosofsky Sedgwick writes: "The importance – an importance – of the category 'homosexual' comes not necessarily from its regulatory relation to a nascent or already constituted minority of homosexual people or desires, but from its potential for giving whoever wields it a structuring definitional leverage over the whole range of male bonds that shape the social constitution" (86). Judith Butler, in "Imitation and Gender Insubordination," argues for an understanding of gender and heterosexuality as imitations which lack originals: "The origin requires its derivations in order to affirm itself as an origin, for origins only make sense to the extent that they are differentiated from that which they produce as derivatives. Hence, if it were not for the notion of the homosexual as copy, there would be no construct of heterosexuality as origin" (313).

Without denying the potential for this kind of deconstructive movement, it is significant that, in Ellis's understanding of the organism's structure at conception, a symmetrical relation lay not only conceptually, but also empirically, at the origin. Thus the question of deconstructively marking the constituent derivative term in the opposition may not even arise: a gender symmetry is posited at the core. Also, in its as yet unformed state, Ellis did not specify which of the organism's gendered germs killed the other. To be normal required only that either were so killed. In effect, the female body in this empirical scheme was thus figured less in terms of the male person than in terms of a process of self-emergence. The same applied to the development of the male person. Neither gender necessarily assumed precedence.

We end this section with two speculations. First, perhaps this empirically given mirror relation was more readily accommodated in the theories of *inversion* and its promise of symmetry than in the later theories of *homosexuality*. Second, perhaps the shortness of the life span of *inversion* as the concept configuring same-sex sexual desire had something to do

with this potential. Not surprisingly, later sexological and psychoanalytic theorizing discredited theories of *inversion* on putatively scientific grounds, claiming that *inverts* lacked empirical proof for their assertions which were made more in their political interests than in the service of science.[5] The emergence of the *homosexual* in this later body of theory should be considered against this background.

In this regard it should be noted that, at its inception, sexual *inversion* was concerned with giving public voice to increasingly pathologized and criminalized groups of people. Ulrichs and Carpenter's writings were as much manifestoes as theory. Ulrichs, for example, proclaimed in "The Rod of Freedom": "I am an insurgent. I decline to accept what exists if I believe it is unjust. I am fighting for a life free from persecution and scorn. I urge the general public and the state to recognize Uranian love as equal to congenital Dionian love" (109). The discourse of sexual *inversion* gave an insistent voice to the "love that dare not speak its name" decades before Lord Alfred Douglas coined the phrase. As a discourse of self-naming, *inversion* theory actively engaged a debate during a period in which sexuality was not publicly discussed as such. Weeks, for example, argues how the question of lesbianism remained "silent because unthinkable" (1989, 93) during the Victorian era. In England in 1889, the Director of Public Prosecutions expressed a concern for just such a public voice, noting "the expediency of not giving unnecessary publicity" to cases of sexual indecency. Paradoxically, the Director's concern for public silence on such matters extended to the point of advocating permitting "private persons – being full grown men – to indulge their unnatural tastes in private" (in Duberman et al. 201). Arguably, *inversion* theory partly broke such a public silence.[6]

III.

In subsequent music theory, a resistance to *harmonic dualism*, whereby minor was conceived as the symmetrical inversion of major, was raised in consonant ways. Öttingen's ideas were criticized for privileging what could not be heard in musical practice, for their lack of empirical grounding, and for their lack of applicability to specific musical examples and to actual compositions. Ernst Mach maintained that the ear did not perceive the inversional relationships expounded by Öttingen: "A reversal of musical sounds conditions no repetition of sensations. If we had an ear for height

and an ear for depth, just as we have an eye for right and an eye for left, we should also find that symmetrical sound structures existed for our auditory organs" (in Bernstein 388). Some years later, Georg Capellen criticized Riemann in strikingly similar terms: "[The ear] rejects the inversion that is noticeable to the eye, since it hears all the tones in a simultaneity from the bottom up (in terms of a fundamental) according to a law of gravity which is also valid in music. *The external difference in direction entails a more profound difference in type*" (in Bernstein 388). According to Capellen, any chord's constituent tones were necessarily determined from the bottom up, in accordance with the natural model presented by the overtone series. Inversional equivalence between major – historically gendered as masculine – and minor was an impossibility, defying the 'musical law of gravity' upon which all tonal music was premised. Paradoxically, Capellen's observation that a musical structure that gave prominence to symmetrically inversional relations could lead to the demise of the tonal system, precisely culminated in the atonal musical language of Arnold Schönberg (1874–1951), Alban Berg (1885–1935), and Anton von Webern (1883–1945) a few years later. Hermann Schröder, albeit a harmonic dualist, also expressed an anxiety about the demise of diatonic music, but in an almost opposite way. Here inversion seemed to be a given, and other forces were leading to chromaticism even though chromaticism tended to wipe out the effect of inversion:

> An inverted painting of a battle results in a chaos of color blotches, it would not be much different for the inversion of wildly moving music, particularly with some of the new [compositional] directions, in which the clear, identifiable diatonic is crowded out by the, now fashionable, chromatic. The inversion of diatonic tone-rows yields an absolutely effective contrast in identity and character; major becomes minor and vice versa. On the other hand, with the inversion of a chromatic scale, little of the contrast in identity and character, that is, of major and minor, is recognizable – a proof that symmetrical inversion is notably more effective in the diatonic than it is in the chromatic. (6)

For Schröder, the new chromaticism disconcerted the opposition between major and minor because inverted chromatic lines could not be told apart in the same way that major and minor could. As a result, he claimed that

inversions should be restricted to diatonic lines. Unlike Capellen, who recognized that symmetrical inversions potentially undid the opposition between major and minor, Schröder, paradoxically, used the logic of inversion in an attempt to safeguard this distinction.

Current theory takes little from Öttingen's inversional relations. Not only are his speculations scientifically unsound – the undertone series has never been proven definitively – but his symmetries, engendered by harmonic dualism, give rise to differences that are incommensurate with the tonal syntax of actual musical practice. In short, phonicity does not apply to any music of the time.[7] Kevin Mooney, in a recent presentation at Columbia University, claimed that Öttingen's project amounted to a rationalization of minor harmony that essentially fails to provide insight into music – where musical examples exist at all in Öttingen's writings, the doublings are strange and the progressions are unusual. Figure 4 is one such example.

a.

Figure 4. Öttingen's Characteristic Cadential Figure in (a) Tonicity and (b) Phonicity

b.

What follows are partial analyses of two musical works precisely in Öttingen's terms. The analyses are mainly an attempt to challenge the view that Öttingen's inversional symmetries do not apply to actual musical examples, but also to question the idea that some things cannot be *heard* because their theoretical formulations lack empirical proof. Before doing so, however, and in light of certain recent developments in musicology, the use of formal analysis in a project concerned with hierarchies of gender and sexuality calls for a methodological comment. In a recent collection of essays entitled *Queering the Pitch*, edited by Philip Brett et al., theories and methods attuned to questions of gender and sexuality are proposed for the study of music. Although it is a new methodological awareness that is principally emphasized throughout, the book's explorations cohere, perhaps unwittingly, around various 'gay' musical figures and composers. The approaches advanced in this book are set apart from the older, ostensibly narrower, formalist category of musical research. Jennifer Rycenga, for instance writes: "The first [methodology in present-day academia] is the time-honored analysis that is taught under the titles of musicology and music theory, in which music is considered ex-

clusively in its own terms, but in such a way that it is reduced to meaninglessness – its connectivity with social/historical, erotic, and personal dimensions is scorned and virtually ignored" (279).

This call for a musicology that casts a wider net – a call for the inclusion of what is traditionally regarded as extramusical data into the field of music scholarship – is part of a broader critical impulse in the discipline, commonly identified as the *new musicology*. We cannot take up this debate here, except to note that, in many cases, this new approach is predicated on an opposition between the work of music analysis – hermetically sealed from society – and that of a broader, culturally-situated study, and hence often does less to undo than to inaugurate this opposition. Such a gesture essentially accepts formalism's hermetic claims, instead of identifying the business of analysis as irreducibly social. Our project suggests a supplementary approach, by interrogating the, often unconscious, sex and gender determinants of the very language of music, analysis, and theory. Firstly, we are reluctant to consider only the work of (presumably) gay composers. Secondly, we are reluctant to cede the traditional territory of analysis, claiming instead that a strategically focused music analysis can also raise a host of questions relevant to queer theory.

The works selected are the first movement of Johannes Brahms's String Quintet in G, op. 111 (1890) and the last of Webern's Five Pieces for Piano and Violin, op. 7 (1907–1910). Both Brahms and Webern must have been familiar with the work of Öttingen.[8] These compositions, separated by less than two decades, are often held to be situated in sharply diverging aesthetic camps and periods. However, an application of Öttingen's notions of symmetrical inversion also reveals a generative affinity between them. This calls into question a *modernism* figured exclusively in the terms of a rupture with the past.

IV.

Brahms's Quintet begins a little like a cadential ending. The 'stable' root position tonic harmony in measure 1 is sounded on the weak last beat of the measure and moves, by a kind of inverted root movement – the leap of a fourth – to the dominant note D1. The stability of this harmony is thus at odds with its rhetorical function as an anacrusis. The first articulated downbeat of the piece (m. 2) is thus a six-four tonic harmony. The use of the 'unstable' six-four chord as a structural pillar is suggested by the place-

ment of the repeat and can be traced throughout the movement. For example, the stability of the second subject (from m. 26), appearing characteristically in the traditional key of the dominant (D major), is offset in exactly the same way. D major is announced with a pizzicato A1. Again, the unstable six-four marks a structural point in the music. To further weaken its structural weight, it is not preceded by a definite dominant, but by a half-diminished seventh on ii, followed by a diminished seventh on vii. This seems to function, albeit not without ambiguity, as a predominant instead of as a dominant. A1 in the bass (m. 26) – the sound, perhaps, signaling the dominant function least ambiguously at this point – fails to move to its tonic root in measure 26. Instead, it is held as a pedal point for two measures. In effect, we get a cadential formula that cuts across the structural boundary ushering in the second subject group. By the time the not-quite cadence reaches closure (on the second beat of m. 27), the three-note viola motive is already implicated in a kind of descending line that propels the music forward, rather than bringing it to a close. Thus the voice-leading is 'out-of-phase' with the tonally normative cadential figure – an ending embedded in a beginning. While such overlapping effectively sutures the formal division at this point, how can the structural six-four chord be explained?

Let us have a look at Öttingen's representation of cadential formulae as demonstrated in figure 4. Despite his occasional efforts to allay its sounding incomplete, Öttingen's phonic cadence (fig. 4.b) ends with a six-four chord. This, if anything, is its point of repose. The chord is also preceded by what is called in traditional functional terms a *half-diminished* seventh chord on ii, only here it functions as a 'dominant' to the 'phonic'. In short, the progression from measures 24 to 26 is more closely aligned to the structural divisions of this sonata form if it is read upside-down or phonically. The prevalence of the half-diminished chord (a chord whose very name becomes ambiguous now) throughout the movement, and particularly in those positions where a dominant is called for in terms of tonal syntax, becomes differently coherent when read this way.

This casts a light on other passages in the movement, such as the strikingly colorful progression in measures 8 to 9 and 10 to 11. The sudden modulation to B major is effected on the third beat of measure 7 by a half-diminished seventh on C-sharp. This does not function as a dominant in tonicity but rather in phonicity. Even the characteristic leap of a fourth in the bass (sounded here by the second viola) from C-sharp to F-sharp in-

vokes the cadential V to I, but articulates instead a half-diminished seventh on ii, followed by a six-four on I. As a rhetorical gesture, root movement is still given, but by different harmonic means. There are many ways of interpreting the progression that follows. For one, it could be conceded that tonal norms are momentarily disrupted here, and that it is the descending chromatic line in the second violin, beginning on a-sharp 1 in measure 8 that ultimately drives the passage. This line is continued after passing through an octave coupling in measure 9 and ends on e-flat 2 three measures later. The local contrapuntal scoring suggests such a linear projection in which the fleeting vertical harmonic formations are yielded secondarily. Alternatively, in traditional functional terms, the passage can be taken to pass in B major (V of vi) from I (six-four) to V to ii to iv (flat-3) to I. Perhaps the iv (flat-3) chord suggests a concealed invocation of B minor as the chromatic descent intermittently sounds the flattened seventh and sixth degrees of the descending melodic minor scale. The parallel progression in measures 10 to 11 casts an alternative reading: take the passage as a series of tonic/dominant relations in descending whole tones. The parallel progression beginning in measure 10 would thus read I to V in the keys G, F, and E-flat respectively: a consistent pattern, but a highly unstable sense of tonic.

What if this passage were understood as phonically in F-sharp instead of as tonically in B? The progression would now read: upside-down 'i', 'iv', 'VII', 'V', 'i'. The phonic F-sharp is strikingly unambiguous. In fact, the anomalous iv (flat 3) in tonicity becomes precisely the dominant function with a lowered leading note g-natural 1, or, more correctly, a leading note g-natural 1 raised in inverse pointing toward the root-tone f-sharp 1. Reading upside down thus results in the more economical account of the passage: phonically there are no anomalies. In other words, the passage, for all its non*diatonic* chords is arguably not non*diaphonic*. Also, the phonic progression is a stock i, iv, V, i (albeit chromatically inflected) while the tonic progression is more complicated, leaping back to I from iv with a lowered third. It is as if the inverted progression in F-sharp can make sense of the right-side-up progression in B.

Paradoxically, this phonic F-sharp is a minor triad *in* phonicity (or a major triad in tonicity). Such an interpretative gesture extends Öttingen's model beyond the purview of theorizing minor-as-phonic (or major-as-tonic). Instead, it recognizes that both modalities can be articulated as either minor or major. But even if we remain strictly within the terms set by Öttingen, the progression is more readily understood in his basic rules for chord transformations than in terms of traditional tonal syntax. In his theory of chord connections, Öttingen described a progression between two chords that were oppositely derived – that is, a move from phonic to tonic or vice versa – as *antinomic*. A special case of antinomy involved tonic and phonic chords that were built on the same pitch, such as the upwardly projected C major triad along with the downwardly projected F minor. Such a chord relation was termed "reciprocal" and amounts to what Riemann called a *Seitenwechsel* (changeover). Now, the progression under discussion precisely elaborates this special case of antinomy (fig. 5).

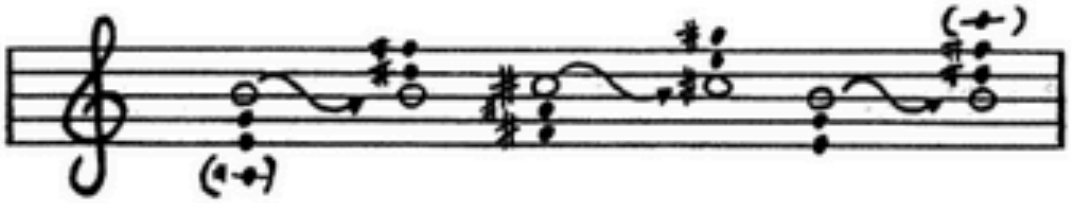

Figure 5. Mm. 8-9 of Brahms's Quintet as a Chain of *Seitenwechsel* steps

Ignoring for the moment the bracketed notes in the diagram, the progression – beginning now on the last beat of measure 7 – is a chain of *Seitenwechsel* relations. Such a pairing brings to the ear the implied 6/8 meter here. In the context of the progression as a whole, the bracketed notes, representing sevenths in their respective formations, can be read as a further symmetrical articulation marking the enclosure of the progression.

There are other places in the movement that can be read productively in a phonic terrain, as, for example, the uniquely quiet passage in measures 89 to 94 – the heart of the development – which can be construed as an extended cadence in phonic G. Phonality is suggested on the surface of the music as well. Firstly, Brahms generates motives through inversion. Instances include the start of the recapitulation in measure 106, where the opening ascending motive in the cello is presented in its descending form in the violins and the hypermetrically displaced descent on the second and third beats of measures 9 and 11, which ascends in measure 113. Second, Brahms frequently builds triads from the top down which sug-

gests a phonic construction of the chord. In measure 79, for example, the cadence in G (the final tonic stated as an open octave) is immediately re-interpreted as the third of an E-flat major triad by means of a downwardly projected addition of chord tones.

As can be seen, a phonically conceived harmonic terrain, far from lacking applicability, can be mapped in various respects in this movement, alongside a tonic conception. In fact, in some places this inverted reading produces the simpler interpretation, and, in this way, could even substitute for tonicity. What would happen if two inversionally related strands coexisted with, instead of substituted for, one another, throughout a musical span? The last of Webern's Pieces for Piano and Violin, op. 7, offers one answer.

Here, the tonal system almost falls away completely and the unfolding of symmetrical inversions in themselves becomes the sole generating principle. The opening consists of two interwoven chromatic lines, one ascending, the other descending, that are sounded 'across-the-octave' (fig. 6). While d1 leads to d-sharp 2, which in turn leads to e3, g2 leads to f-sharp 1. If the logic of the process implied here were to be continued, we would arrive at F, a pitch that cannot be played on the violin. The addition of this F would yield the symmetrically inversional hexachord 012345 around axis E/F and/or A-sharp/B. In the terms of David Lewin's notion of a 'generative lust', we can say that there is an urge to complete the inversional symmetry in this way.[9] But, instead of sounding F, the piano enters with a new sonority. In fact, the first F in the piece is in the middle of measure 3, in the middle of a piano chord. It is thus buried in another sonority and seemingly far removed from the opening violin figure.

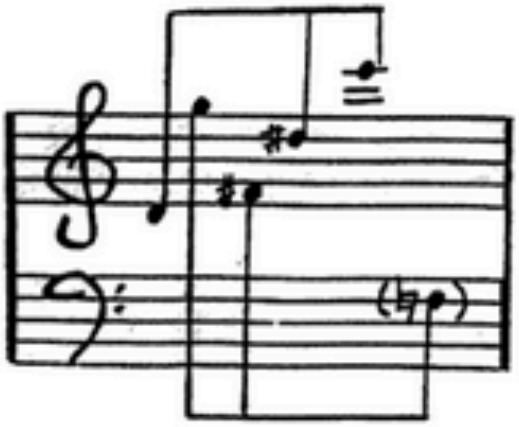

Figure 6. (012345), m. 1
Figures 6–14. Symmetrical Inversions in Webern's op. 7, no. 4

There is one other way that the opening 01245 could become inversionally symmetrical with the addition of just one pitch class, namely G-sharp. When added to this sonority, G-sharp yields the symmetrically inversional 012456. The axis of inversion for this hexachord would be F and/or B (fig. 7).

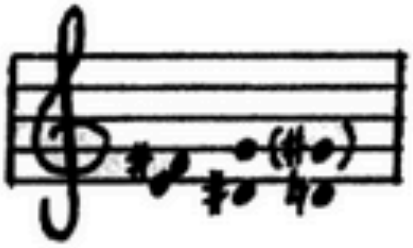

Figure 7 (012456)

Now, if we take the violin line alone, we hear just these tones, first g-sharp 3 in measure 3 which completes the 012456, and then the axis tones f3 and b2. Not surprisingly, the registral distribution, the chromatic line across octaves, remains consistent. Figure 8 depicts the completed 012456 in its actual register. Clearly, as axis tones, f3 and b2 cannot undo the inversion, but simply extend – and, in so doing, confirm – an inversional sonority. The f-sharp 2 in measure 4 also does not undo the inversion of the hexachord as it simply repeats a pitch class.

Figure 8. Mm. 1–4, violin

In this way, all the tones of the violin part in measures 1 to 4 are an unfolding of this inversional symmetry. Near-symmetry 01245 is completed in measure 3. Now, the g-sharp 3, f3, and b2 in measure 3 are duplicated in the second right-hand chord in the piano with a change in spelling. Instead of functioning as a continuation of a chromatic line, the a-flat of this chord functions as an axis note around which b1 and f1 form an inversional symmetry. The surrounding voice-leading clarifies this symmetrical relation: c-sharp 2 and e-flat 1, also symmetrical around a-flat 1, move by interval class 2 to b1 and f1, and then back again. The axis tone a-flat 1 is sounded throughout (fig. 9). The relation between the violin G-sharp 3, f2, and b2 in measure 3 and the enharmonically equivalent f1, a-flat 1, and b1 in the piano becomes this: where g-sharp 3 is the result of a chromatic line over the octaves of the inversionally symmetrical hexachord 012456, and b2 and f2 are the axis tones of the same hexachord in the

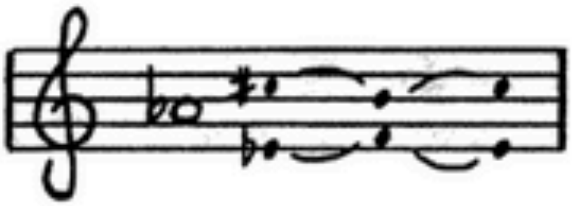

Figure 9. M. 3, piano

violin, a-flat 1 is the axis tone of the local voice-leading stated by the b1 and f1 of the piano chord. Their roles have been interchanged. In the upper line G-sharp/A-flat confirms B and F as axis tones, while in the lower chord the G-sharp/A-flat is the axis tone of B and F. The senses attributed to the three pitch classes has been inverted precisely.

This interplay between axis tones and the inversionally symmetrical collections surrounding them, between near-symmetries and their completion, between local voice-leading and voice-leading that spans more time, can be tracked throughout the piece. It would not be inaccurate to say that the unfolding of inversional symmetries spanning various durations *generates* the piece, at least until the final section marked *ruhig*, "still" or "calm" Here, closure is achieved in the final measures with sonorities that are already inversions of themselves. The first four pitch classes in the piano in measure 11 recall the opening 0145 tetrachord. An analogous 01245 is formed with the addition of a1, which, together with c-sharp 3 in the violin, yields the inversionally symmetrical 012456. The two chromatic lines (broadly, still articulated across-the-octave) now interlock with one another (fig. 10). The piano pitch classes in measures 13 to 14 comprise the symmetrical 0167 collection, while the ponticello figure in the violin is comprised of two inversionally symmetrical tetrachords: 0145 and 0156 (figs. 11 and 12). There are no longer any "generative urges." The combination of all the pitch classes sounded in measure 13 in the piano and the ponticello figure results in the inversionally symmetrical 01234589 (fig. 13), while the collection on the last beat of the penultimate measure is a symmetrical 0158 (fig. 14). Finally, the piano is cut off in the last measure leaving a fragment of the ponticello figure to complete the piece. Even this fragment is an inversionally symmetrical 0156. Webern states that the

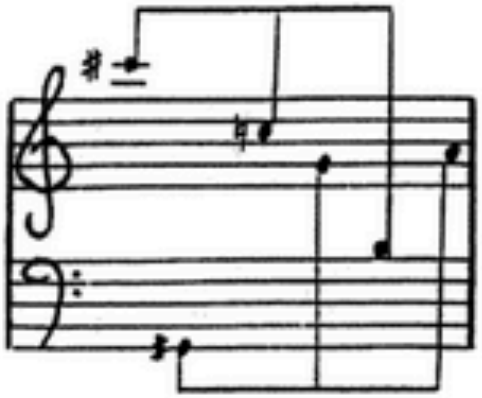

Figure 10. (012456), mm. 10–12

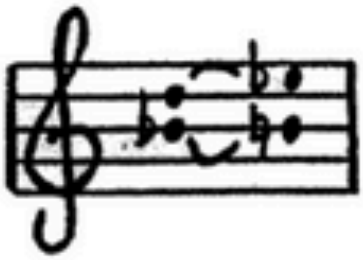

Figure 11. (0145), m. 13

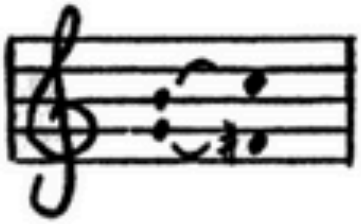

Figure 12. (0156), m. 13

ponticello figure is to be played *wie ein Hauch*, "like a breath," and, finally, he places rests on the last two beats of the measure, as if to envelop this breath in silence; or is it as if to posit an index of inversion that remains unheard?

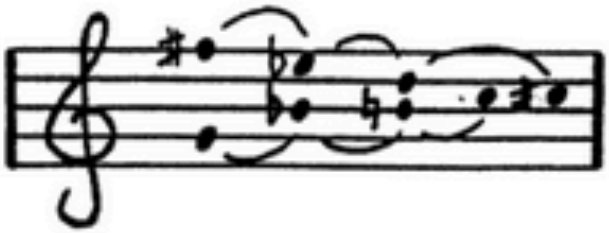

Figure 13. (01234589), m. 13

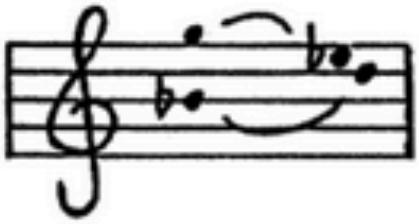

Figure 14. (0158), m. 14

What does the stylistic break between Brahms and Webern signify, particularly in the light of their historical proximity? As shown, both of the works analyzed embody substantial aspects of the theoretical conceptions of symmetrical inversions prevalent at the time, albeit in different ways. In Brahms's Quintet phonality operates alongside tonality, and occasionally substitutes for it, while in the last of Webern's Five Pieces for Piano and Violin, the temporal unfolding of inversional strands coexist. These works are not isolated examples of such procedures in the respective output of these composers. For example, downwardly projected harmonic formations can be usefully mapped in Brahms's Clarinet (or Viola) Trio in A Major, op. 114 (1891), or in his Intermezzo in B Minor. Webern's Symphony, op. 21 (1928), on the other hand, can be analogously analyzed as a symmetrical unfolding around shifting inversional centers. Webern's fascination with symmetrical inversions is persistently thematized in his *The Path to the New Music*. His very description of the Symphony, op. 21, centers around the question of unity made possible by "constant mirrorings" (56) in the form of inversion, retrograde, and retrograde inversion.

However, the crucial point is that major and minor seem to have collapsed in the music that mapped inversional trajectories in themselves. Ironically, this emphasis on inversional symmetries was the result of the very scientific imperative that was driving the new theorizing about the minor sonority. That is, *the desire by Öttingen, Ziehn and Schröder to ground the minor in empirical fact, to ground it in the immutable undertone series – the mirror inversion of the major – led precisely to the undoing of both major and minor.* Schröder, in fact, was resistant to the 'new

chromatic' music, and harnessed acoustical claims about the scientific truth of inversional symmetries to safeguard *diatonic* music, unaware that inversional symmetries had the potential to undo the very system he aimed to protect – a danger that Capellen had recognized in his critique of harmonic dualism.[10] Brahms's harmonic language, where phonicity still operates as a crosscurrent in tonicity, gives way to atonality in Webern's more precisely symmetrically inversional syntax. In this respect, then, Webern is working with the same conceptual forms that are paradoxically stripped of the scientific content that was their raison d'être.[11]

Even Öttingen's attempt to grant privilege of presence to the major triad, is rendered nonpertinent by its own reflection. Just as, in Öttingen's terms, the constituents of the major triad *are* the overtones of a common fundamental, while the constituents of the minor triad *have* a common overtone, so too, when the model is that of inversion, does the fundamental of the major *have* the constituent overtones of its triad, while the constituents of the minor triad *are* fundamentals of a common overtone. As such, the major triad is rendered originally and essentially a symmetrical reflection, it is always already the inversion of its inversion. In this play of representation the point of origin is lost. As Jacques Derrida might say, "There are things like reflecting pools, and images, an infinite reference from one to the other, but no longer a source, a spring. There is no longer a simple origin. For what is reflected is split *in itself* and not *only* as an addition to itself of its image" (1976, 37). Which is prior? Overtone or fundamental? Which *is*?

V.

An analogous attempt to ground sexuality in physiology did not produce the same undoing of opposites, though it arguably had the theoretical investment in positivism to do so. To recapitulate, like Schröder insisting on grounding major, and its inversion minor, in nature, Ulrichs proclaimed in 1864: "The fundamental proposition upon which I base my entire system is the following: it is Nature which gives the feminine sexual love drive and a body built as a male to a large class of people" (51). Magnus Hirschfeld founded the Scientific-Humanitarian Committee in Berlin in 1898 to agitate against social and legal prejudices against same-sex sexual desire. He too believed that natural science rather than history or psychology was best equipped to address the injustices against sexual

inversion: "I believe in Science and I am convinced that Science, and above all the natural Sciences, must bring to mankind not only truth, but with truth, Justice, Liberty and Peace" (in Weeks 1989, 71).

However, these ethical-scientific approaches to same-sex sexual desire never completely succeeded in grounding *inversion* in nature. They gave way to theories where questions of nature were mediated through evolutionary concepts; for the movement from vice to scientific discourse mobilized many evolutionary tropes, such as degeneration, arrested development and 'survival of the fittest'.[12] The insertion of evolutionary tropes was significant for it evacuated the implicit symmetry of poles in the *inversion* model of same-sex sexual desire. Poles of identification within evolutionary narratives in general were effectively hierarchized. The child and the adult, the savage and the civilized, while constitutively dependent on each other as categories, could not be symmetrical inversions of each other as they occupied different temporalities within a single telos: the adult subsumed the child; the civilized transcended the savage.[13]

For example, Max Dessoir, implying an evolutionist temporality, claimed that an "undifferentiated sexual feeling is normal, on the average during the first years of puberty – that is, from 13–15 in boys and 12–14 in girls – while in later years it must be regarded as pathological" (37). Consequently, Ellis, prefiguring Freud, asserted that "if the sexual instinct is comparatively undifferentiated in early life, then we must regard the inversion of later life, if it persists, as largely due to arrested development" (39). Similarly, he later defined morbid inversion as when "old men with failing sexual powers, or younger men exhausted by heterosexual debauchery are attracted to boys" (41). Within this evolutionist-inflected strand of *inversion* theory, the *invert* thus paradoxically occupied the position of both the underdeveloped and the overdeveloped, of both lack and excess. The evolutionary paradigm placed *inversion* in any position except that of the normative subject. Unlike its counterpart in musical practice, the inversion-relation in sexology was fractured by these displacements and never achieved an analogous symmetry. It resembled instead the earlier minor triad, unevenly figuring *inversion* as either too much or too little.

These asymmetries in theories of *inversion* were maintained in later theories of *homosexuality*. These theories maintained the general idea of directional drives in *inversion* but lost one significant figuration. They kept the understanding of same-sex sexual desire as a turning inwards (*narcissism*), a turning backwards (*degeneration*), a holding still (a *fixation* or

arrest), but abandoned it as a gendered turning upside down (*inversion*). Psychoanalysis would treat homosexuality as *arrested development* and connect it to *narcissism*. The idea of the *homosexual* as a *degenerate* would have a long life in a wide range of scientific and popular discourses.[14]

We suggest that the political implications of radical gender disturbance in *inversion* theories may have encouraged their revision into *homosexuality*. For Freud, the aspects of *inversion* theory "which were formulated without regard for the psychogenesis of homosexuality" were precisely the "intermediate stage of sex or ... 'third sex'" (*Three Essays* 60), imagined as the man's soul in the woman's body or vice versa. Still today, even though *homosexuality* has been officially depathologized by its removal from the *American Psychiatric Association's Diagnostic and Statistical Manual (DSM III)*, *gender* nonconformity is still considered an illness and is a designated pathology – *Gender Identity Disorder*. Thus, *homosexuality* has been more easily 'normalized' than a proliferation of gender identities in a broader patriarchal gendered hierarchy. Seeing *inversion* theory only as the forerunner to *homosexuality*, as a medical discourse of control, as biologically essentialist or empirically untrue, loses sight of the utopian political horizon of embodied gender symmetry. This is where atonal music, considered also as imaginative thought, may point to such a horizon.

VI.

Like the theories of sexual *inversion*, the music and thought of Webern, Berg and Schönberg were, and still are, frequently regarded as inverting the natural order of things. This can be gauged in the surprising congruencies of the language of their respective detractors in the popular and professional domains. We cannot undertake a thorough examination of the proximity of these cultures of reproach except to note that, broadly speaking, like their contemporaneous *inverts*, the atonal composers were frequently charged with violations against nature. Schönberg was presenting "the constant succession of unnatural sounds from the extreme notes of every instrument" (*Manchester Guardian*, 1912) or Berg's music had "nothing to do with the natural enfoldment of melody" (*New York Times*, 1935). Additionally, the work of these composers was considered abnormal and perverse. In Berg's music "all is calculated ... to insult the esthetic sense of any normal and healthy human being" (V. Gorodinsky, *Music of Spiritual*

Poverty, Moscow, 1950) or "everything must be harmonically queer and perverse" (*Neue Freie Presse*, Vienna, 1925), while Schönberg offered a "most unaccountable jumbling together of abnormalities" (*Musical Courier*, New York, 1913). Webern is similarly characterized: "One is reluctant to utter the word 'abnormal', but on the other hand, one cannot assert that there is any connection [in Webern's music] with our accustomed ideas about music" (*Deutsche Allgemeine Zeitung*, Berlin, 1928).[15]

It was not uncommon for the abnormality of these works to be articulated in terms of a psychological disorder of an often explicitly sexual nature. Berg's work had "a prevailing flavor of a highly diseased eroticism" (*New York Times*, 1935), and Schönberg's was expressing "disordered fancies of delirium" (*London Globe*, 1912). While "it might deal successfully with neuroses of various kinds ... I cannot imagine it associated with any healthy and happy concept such as young love or the coming of Spring" (*Music and Letters*, London, 1951). As opposed to the happy coupling of the young heterosexual couple in the spring of their lives, Schönberg could offer only "quasi masochistic pleasure" (*Musical Opinion*, London, 1952). Relatedly, like same-sex sexual acts, these composers' abnormalities were figured as nonreproductive. Schönberg's theories were held to be "stillborn" (G. Schneerson, *Music in the Service of Reaction*, Moscow, 1950), Berg's music said to be "unfertile" (*New York Times*, 1935).

The emergent Darwinian evolutionary tropes, adapted to discussions of same-sex sexual desire in figures such as Max Nordau, Richard von Krafft-Ebing and Freud, were also applied to dismissals of this body of music in almost identical terms. It too was "childish," "infantile," "barbaric," "primitive," or "a bestial racket" (*Inter Ocean*, Chicago, 1913). In Schönberg, "the statue of Venus, The Goddess of Beauty, is knocked from its pedestal and replaced by the stone image of the Goddess of Ugliness, with the hideous features of a Hottentot hag" (*Musical Progress*, New York, 1923), while his theories were "calculated to destroy melody and harmony ... lead[ing] to retrogression ... in art" (Schneerson). Like the *invert*, this music was imbued with degeneracy and arrested development.

Occasionally, the invective invoked the trope of criminality: "I regard Alban Berg as a musical swindler and a musician dangerous to the musical community. We must seriously pose the question as to what extent the musical profession can be criminal. We deal here, in the realm of music, with a capital offense" (*Deutsche Zeitung*, Berlin, 1925). Recalling the criminalization of all same-sex sexual activity in 1886 by the Labouchere

Amendment in Britain, and the prohibitions of the same by the Prussian Civil Code over all of Germany in 1870, the body of the *invert* was already affixed with criminality. Posing a threat to the community on the grounds of practices that were unnatural, abnormal, perverse, degenerate, infantile, and unfertile, these musicians and *inverts* were faced with an alarmingly commensurate criminal oratory.

This is not to claim that hostility per se to both is sufficient to establish a substantive link between them, but rather to register the shared tropes of disapproval in the language of their respective detractors and thus to mark the nearly analogous awkward place these sub-cultures held in relation to the perceived musical/sexual norms. The founding of the Society for Private Musical Performances by Schönberg in 1918 cannot be understood apart from this public response. The secrecy surrounding the society's activities was linked to their wish to exclude any public reporting. In its statutes, Schönberg located "normal present-day concert life" as the practice which "the society intends to keep definitely at a distance" (in Reich 120). Thus Schönberg identified the norm as suspicious, and publicity, even the spoken word in general, as a "corrupting influence" (in Reich 120). Like that love, this music risked corruption by being spoken about; like that practice, this one thus sought a private performance space.

Most importantly, the conceptual form underlying both abnormalities was significantly enmeshed in the, then prevalent, idea of *symmetrical inversion*. It is just this concept that critics today identify as having led Schönberg and company astray. For example, echoing both turn-of-the-century newspaper reviews and the old arguments of the harmonic monists, William Thomson, in his aptly titled book *Schönberg's Error*, argues that the idea of *symmetrical inversion* contributed significantly to the mistakes Schönberg made. Imagining various triads, keys, and functions in tonal music to be in a relation of symmetry, Schönberg "yield[ed] to the temptation of the fictional *über-unter* mirror symmetry that became the nemesis of late nineteenth-century German music theory" (45). According to Thomson, Schönberg thus understood the tonal system within a specious *Überklang-Unterklang* structure which he took on faith from his predecessors, and then erroneously applied to his own theories. Thomson writes:

> The roots of [his] concept-percept tension are manifestly traceable to Schönberg's controlling assumptions ... For instance, the insecure perceptual basis of his 'solution' can be detected in the way

> he perpetuates the mythic symmetry of tonality by exploitation of inversional sets. In this he derives abstraction from pure myth: the very idea of dominant and subdominant as 'upper' and 'lower' balances for tonic was itself a hapless fiction motivated by conceptual ambition rather than perception. (193)

Once again, *inversions* can be seen but not heard as such. Ironically, it is not only Schönberg who perpetuates past beliefs in his theory but also Thomson. Like Mach a century before Thomson and decades before Schönberg, Thomson also believes that *symmetries* are perceptually suspect.[16] And, like Capellen, he also believes in a gravitational force given in the harmonic series which plays a "primal role in the conversion of auditory signal into musical meaning" (122).

Thomson concludes his argument for "the harmonic series as cognitive archetype" (122) with historically well expended imagery: "The series ... is decidedly bottom-heavy ... and constitutes a perceptual vector, a 'pointing force' ... The experience from birth of the tonal shape – *the hierarchical shape* – projected in the harmonic series leads to a powerful part of the structural inferences of harmonic roots, the tonic pitches of audition" (124; Thomson's emphasis). Thomson's suspicions about the perception of *symmetries* then echo disconcertingly familiar charges of abnormality about those who think they do hear them: "like the balancing power claimed for the subdominant degree of the major-minor tonal systems, these instances of 'what is there in the notes' lead dubious lives" (190). Resonantly, Thomson adds, "as evolution," the resulting music without pitch hierarchy "was an ill-conceived, though passionately propagandized, mutation" (176). Once more, we encounter the evolutionary anomaly in Schönberg, who, in his quest to "reject ... only the major-minor conventions of his immediate past," erroneously renounced "the primal tonal archetypes bequeathed him ..." (176).[17]

This figuration of atonal and serial music as working against "human nature" has not subsided in the current media either. In an article entitled "Does Nature Call the Tune?" Richard Taruskin writes: "bolstered by solid empirical work in cognitive psychology ... [Leonard] Meyer's counterparts today, increasingly aware and respectful of the mind's hard-wiring, are less circumspect in their critiques of those who ignore rather than explore human nature." Failing to "conform to the physics of sound," Taruskin concludes that the serialist position exhibits "the same optimism that drives

all utopian thinking. It underlies the trendy academic claim that those things between our legs are not biological organs but social constructions." Biologically and cognitively hardwired, the normal subject's hearing and sex are irreducibly fixed by nature.[18]

Conclusion

When, how, and why is it that utopian thought is wished away; or music is charged with empirical error; or *symmetrical inversions* are figured as either not applicable to tonal music or not hearable in atonal music?[19] We have argued that these moments tended to be enmeshed in the question of gender hierarchy in various ways. Unlike the *symmetrical inversions* employed in late nineteenth-century crystallography and mathematics, gender was explicitly situated at the respective poles of the symmetry in contemporaneous music theory and sexology. Ulrichs's inverted Urningens and Urnings were constituted by the coexistence of both female and male components in a single individual. This resulted in his, equally natural, "sexual species ... a *third sex*" (36). Concurrently, major and minor, analogously gendered in traditional music theory, were increasingly regarded as nature-given *symmetrical inversions* of one another.

In fact, the two poles were consciously marked for dissolution into a third gender category by Webern himself. In plotting a history of scales in the *The Path to New Music*, Webern argued, first, that "accidentals spelt the end for the world of church modes, and the world of our major and minor genders (*Geschlechte*) emerged," and second, that the "new music ... has given up this 'double gender' in its progress toward a single scale – the chromatic scale" (28). Like Ulrichs, Webern thought the dissolution of gender produced a third category: "Double gender," he claimed "has given rise to a higher race" (37),[20] and elsewhere, "These two [keys, like genders] have produced something that's above gender, our new system of twelve notes" (43).

Embedded in the compositional method that would bring about the "dissolution of major and minor" (37) was the notion of *inversion*, a technique that permitted the equal status of basic sets, the "constant mirrorings" (56) that ultimately attributed apparent differences to "variations of the same idea" (53). "Considerations of symmetry," stated Webern, "are now to the fore" (54). Like his late nineteenth-century counterparts in music theory, Webern thus grounded this idea in natural law and regarded

the new music, paradoxically, as born out of a deep theorizing of tonality: "Precisely because we took steps to preserve tonality – we broke its neck!" (48). Hence, tonality – or, more generally, "notes [as] natural law ... related to hearing" (15) – was/were transformed from hierarchy to symmetry. Webern ended his essay with a quotation of the Latin saying:

S A T O R
A R E P O
T E N E T
O P E R A
R O T A S

which can be translated as "Arepo the sower keeps the work circling" (in Reich 136).

Such music, in which the dynamics of creation became necessarily internal, was clearly beholden to German Idealist romanticism. Throughout *The Path to the New Music,* Webern referred to the idea behind the surface chaos. Ironically, it is this kind of abstraction that is regarded by so many commentators today as reductively constraining social thought, as denying interpretative plurality, or as uncritically subscribing to the myth of ahistorical autonomy and high seriousness that was supposed to uphold a criterion of truth. Without abandoning this perspective altogether, we hope to have shown that such abstraction was less abstraction per se than it was a very peculiar engagement with social thought.[21] In fact, Webern encouraged us to engage such thought, calling for a listener "capable of imagining that music can have an idea, a thought, hidden in it" (14). Perhaps a close engagement with the embedded thought of the new symmetrical music, particularly in the context of the current figurations of modernism as abnormal, should give us pause.

Even though Webern, like many proponents of *inversion* theory in sexology, grounded his ideas in nature, we may not want to lose sight of the cultural context in which such thinking took place and the historical terms available for resistance. In other words, it may be worthwhile to listen closely to the view of reality that their 'laws of nature' purported to uphold. After all, could this not have been an affirmative form of resistance? Finally, the proximity of discursive cultures of musical and sexological thought – cultures in which participants and detractors had much in common – reveals some of the stakes involved in such resistance. What

was lost in the transition from the *invert* to the *homosexual* in sexology was the idea of *upside-downness* and the promise of a certain reversibility. This is where a contemporaneous musical imagination usefully provided strategies for the undoing of oppositions.

Late nineteenth-century musicology and attendant musical composition was able to utilize the concept of *inversion* to undo the gendered hierarchy of major and minor and instantiate more symmetrical relations in a new musical language. *Inversion* in sexology was less successful, soon giving way to the lopsided homosexual/heterosexual binary in the figuring of sexuality, revealing a shift, rather than a displacement, of the masculine/feminine polarity, and unevenly doubling the telos of sexual subjectivity rather than interrogating teleological theories of sexuality. The use of *inversions*, one of the constituting trajectories of modern music, had no sexuality in terms of earlier gendered configurations. If it had one at all, it was probably a third category, musicologists and composers having achieved, knowingly and unknowingly, the task of turning conceptual categories and structuring principles upside down and back-to-front. For here, there is no longer any 'law of gravity' to keep things right-side-up. As Schönberg wrote in *Style and Idea*: "In [musical] space ... there is no absolute down, no right or left, forward or backward" (113).[22]

Notes

[1]This was the nom de guerre of Karl Heinrich Ulrichs. All translations are our own unless otherwise stated.

[2]I. M. Yaglom maintains that the history of mathematical symmetry does not extend further back than the late nineteenth century.

[3]For example, the new non-Euclidean *elliptic plane* attempted to eliminate the hitherto sharp distinction between spherical and plane geometry, by introducing two symmetrically inversional pairs of points to configure the sphere. By conjoining opposite points of these pairs (or hemispheres) the sphere is given in a symmetrical space known as *Riemann's elliptical space*.

[4]For a fuller bibliographic account of the literature, see Shubnikov, Belov et al. 249ff.

[5]In 1910, Sigmund Freud rebutted the claims of *inversion* and *third sex* theorists: "Homosexual men who have started in our times an energetic action against the legal restrictions of their sexual activity are fond of representing themselves through theoretical spokesmen as evincing a sexual variation, which may be distinguished from the very beginning, as an intermediate stage of sex or as a 'third sex'. In other words, they

maintain that they are men who are forced by organic determinants originating in the germ to find that pleasure in the man which they cannot feel in the woman. As much as one would wish to subscribe to their demands out of humane considerations, one must nevertheless exercise reserve regarding their theories which were formulated without regard for the psychogenesis of homosexuality. Psychoanalysis offers the means to fill this gap and to put to test the assertions of the homosexuals" (*Three Essays* 60). *Inversion* could be characterized as a discourse of self-naming – the *invert* declared himself as such – while psychoanalysis was the discourse of the expert. One effect of this was that the subject *invert* (in the manifestly political writings of Ulrichs and Carpenter) was rendered the object *homosexual* (in the scientific, and frequently pathologizing, writings of Freud, and also, more virulently, in later psychoanalysis). Even Ellis's objectifying stance in *Sexual Inversion* was mediated by the authorial presence of the *invert* Symonds. It should be noted that Ellis worked hard to erase Symonds as coauthor in subsequent editions of the work (Koestenbaum 1989, 43–67). This began to approach the subsuming of the experience of the analysand in the production of psychoanalytic knowledge.

[6]The informing context of these remarks is the Labouchere Amendment of 1886, which criminalized acts of gross indecency committed by men irrespective of whether they took place in public or in private. Not surprisingly, Ellis's *Sexual Inversion* was initially banned in Britain.

[7]The idea that inversions can be seen, but not heard, is also thematized in more recent theory. Modern pitch-class set theory, for example, offers a formal ground for viewing inversion as the nonhearable. When comparing, for instance, the representation of the formal operation of *inversion* with that of *transposition*, this difference is revealed. For transposition, the mathematical operation of subtraction represents, in musical terms, the difference between two pitches. The difference equals the interval of transposition. If c1 = 0, say, then 5 minus 2 is equal to the interval from d1 to f1, that is 3 (or a minor third). Inversion, on the other hand, involves an opposite intervalic relation between two pitches. That is, a pitch M is as far below a pitch N as another pitch X is above Y. The addition of M to X and of N to Y yields the same (numerical) answer. In this way, the sum becomes a constant, and thus also a convenient determinant for inversion. Hence, the mathematical operation employed to formally represent inversion is addition. But what does the addition of two pitches signify in musical terms? Can it be heard? This sum, known as the *index number of inversion* in set theory parlance, is a theoretical construct which, useful as it may be, does not correspond to anything we hear. Visible to the eye, then, the index of inversion remains silent. We thank Joseph Dubiel for drawing our attention to this aspect of Milton Babbitt's set theoretical work.

[8]The relationship between artist and theorist can also be understood in terms of original and copy. Following Oscar Wilde, we posit here the *critic* (in some ways prior to the composer) as artist, suggesting an inversion of the traditional relationship between the two.

[9]Joseph Dubiel has pointed out to us that Lewin's concept need not be read in the sense of an *anticipation* for completion (in this case of an inversional operation), but rather in the (weaker) sense that, once completed, this operation defines the 'meaning', or the 'effect', of the sound *as* inversionally related. Instead of orienting the claim in the future, this articulation of the concept involves the future-perfect.

[10]Schröder wrote in 1902: "Every true art creates out of nature, she is and remains her best teacher. Unfortunately, the musicians are too little concerned with acoustics, with the nature of sound, as the original source of our art ... In sound we find the sonority with its aliquot parts, which served our tonal system as a basis, and in the symmetrical inversion of the the sonic pillar [we find] its perfect opposite: There sounding together, here silent and concealed (latent), there major, here minor, there shadow, here light, there life, here death, etc." (4-6). In this schema, the difference between major, and its inversional symmetry minor, followed naturally from a proper sensitivity to the role of acoustics in music.

[11]This is not to say that Webern was hostile to science or that he considered his work to be unscientific. On the contrary, he felt that his works were beholden to the "unifying laws" (56) of nature, and that "when th[e] true conception of art is achieved, then there will no longer be any possible distinction between science and inspired creation. The further one presses forward, the greater becomes the identity of everything, and finally we have the impression of being faced by a work not of man but of Nature" (56). But Webern's appeal to scientific progress was concerned with nature's laws understood not as providing a scientific distinction between perceptions of oppositely projected constellations, but precisely as unifying these perceptions, recognizing them in terms of variations of the same idea. A musical idea and its inversion, say, may have appeared distinct on the surface but were, in fact, presentations of the same "primeval form," which, as given by natural law, "applies to every living thing [and] is at the bottom of everything" (53). Science, in Webern's world thus unifies both living things and musical ideas — whether retrogrades or inversions — even if they are different in outer appearance. Here it is also worth noting that Johann Wolfgang von Goethe, to whom Webern's views of science were significantly indebted in this regard, understood the physics of the relationship between major and minor keys as a "polarity in the theory of tone. The basic principle of both: the major key created by climbing, by an acceleration upward, by an upward extension of all intervals; the minor key by falling, by an acceleration downward. (The minor scale extended upwards would have to become a major scale)" (302).

[12]Evolutionary theorists of *homosexuality* usually subscribed to some form of Ernst Haeckel's biogenetic law that ontogenesis (the evolution of the individual) recapitulated phylogenesis (the evolution of the species).

[13]Very occasionally, evolutionary ideas were used to support the claims that same-sex sexual desire was normal. In *Intermediate Types Among Primitive Folks*, for instance, Carpenter claimed: "I think we may say that among primitive folk variations of sex-temperament from the normal have not been negligible freaks, but have played an

important part in the evolution and expansion of human society" (170). Interestingly, this claim relies on the hierarchy of races.

[14]Max Nordau's *Degeneration* (1893) was the classic late nineteenth-century example. More generally, the decadence of fin-de-siècle poetry (Mallarmé, Wilde, Verlaine) and music (Schreker, Pfitzner, Strauss) was often attributed to its invocation of a sexually degenerate milieu.

[15]For complete bibliographical information of these reproaches, consult Nicolas Slonimsky's *Lexicon of Musical Invective*. Listings are in alphabetical order by composers. The translations are his.

[16]Perhaps it should be noted here that Mach's empiricism also led him to believe that, because they could not be seen, atoms did not exist.

[17]For differently articulated theories advancing the same conclusions, see Helen Brown, Leonard Meyer, and Mary-Louise Serafine. Brown empirically 'verifies' the origin of the dominant/subdominant *symmetry* in myth.

[18]In his provocative article "Beyond Analysis," Edward T. Cone examines some of the limits of twelve-tone analysis by inverting three existing pieces – Schönberg's *Klavierstück*, op. 33a, and the first and last movements of Webern's *Variationen für Klavier*, op. 27 – thereby generating, in effect, new pieces that are the mirror of the originals. Because of the new "ambiguity between up and down" (42), Cone argues that structural values alone are not able to capture the "concrete musical values" (45) of the (right-side-up) pieces. These values can only be captured with reference to expressive, associative and representational elements that, strictly speaking, are beyond analysis. Cone's article is one of the early challenges to the discipline insofar as it opens a space for expressive and associative values in music research. This is a challenge that later culminated in the more sustained critical stance of the new musicology. But Cone is also doing something other than challenging the limits of the discipline here. For Cone, turning these pieces upside down, did not "improve on, or even ... equal, the original[s]" (39). To show this, he feels compelled to draw on "concrete values" that are beyond analysis. What are these values? He "call[s] upon implicit tonal functions to clarify [the] concrete values [of the original]" (47) in demonstrating its superiority, and shows how, for example, "in Op. 33a, the V-I effect created by the bass connection B-flat – E-flat from the development into the recapitulation [is] an effect signally, and perhaps disastrously lacking in [the upside-down] version" (47–48). Besides effecting a host of unstable binaries (absolute vs. analytic, etc.), here Cone reinstates, via his absolute values, a bottom-up auditory perception, in the very musical space that, for Schönberg, involved an "absolute perception" that knows "no absolute [up or] down" (113). The point here is neither to assert authorial support to challenge Cone's contention, nor to insist that tonal criteria are inapplicable in op. 33a – although it is far from self-evident what counts *as* a tonal criterion – but to draw attention to the possibility of a mirror to the original that is not automatically inferior to it. This possibility, implicitly held out by Schönberg, is paradoxically lost by Cone in the name of a project that aims to move *be-*

yond the purview of structural analysis. For Cone, it goes without saying that the original is superior to his inversions. Ultimately, this theoretical move clarifies the "ambiguity between up and down" (45) that he mentions at the outset of his article. There is, in the final analysis, a right-side-up, a correct "orientation" (47). Ironically, this, in many ways, recapitulates, in a later theoretical setting, the very debate surrounding Schönberg decades before, and, to our way of thinking, offers a vision that is not likely to give rise to a theoretical approach as imaginative as the music that it is analyzing. Perhaps this cluster of analytic concepts – mirror, inversion, right-side-up – was and is embedded in a discourse of sexuality, and perhaps we should consider that it is just such 'analysis' (whose limits Cone carefully exposes) that is provisionally, but more provocatively, queer, an analysis that is somewhere unable to tell apart an original from its inversion.

[19]Relating the commonly held notion that *inversions* do 'not apply' to tonal music back to sexology, it should be pointed out, that one of Ulrichs's motivations for writing his theory was to challenge the then current hypothesis that "in our species no class of born Urnings exists nor could exist ... no class of individuals exists nor could exist that is born with the sexual drive of women and has the body of a male, ie., whose sexual drive is toward men" (35). Perhaps the nonexistence of *inversion* was/is also a matter of not wanting to know. Thus Ulrichs felt compelled to let the public know.

[20]This comment, written in 1933, also has disturbing resonances with the, then emergent, nationalist socialist notion of an Aryan race. Against this, in the next section Webern identified an opposite attitude within the new political thinking to the dissolution of "double gender": "I don't want a polemic, but just now there's a lot of talk about this, in connection with political developments of course, and things are made to look as if it were all something foreign and repellent to the German soul" (37). In the end, the music of Schönberg, Berg, and Webern was rooted out under Nazism. There is not enough room to take up these important, and often paradoxical, questions here.

[21]For example, we do not want to overlook the fact that the protagonists we discuss were all male, nor the fact that the project of obliterating gender can be recuperated in a patriarchal project, since the universal, or the failure to distinguish between male and female, historically may have served the interests of men. Luce Irigaray's call for "sexuate culture" in *sexual difference* feminism is an example of a very different kind of utopic project in relation to gender. Our position tries to imagine a world without gender, or with radical gender parity, and thus takes a different route to reach the same place. Also, instead of underscoring the scope and authority of the patriarchal order, we have tried to read gender reversal as negatively constituent of, or a deconstructive *supplement* to, this order.

[22]Again, it should be stressed that this thinking preceded Schönberg in a paradoxical way. Schröder, the commited defender of diatonic music, wrote: "An inverted arabesque remains an arabesque ... An inverted painted flower-piece remains a flower-

piece and every single flower 'works' with equal charm. – The same applies to the inversion of simple melodies in music" (6). Schönberg, defending "*the emancipation of the dissonance*" (105) in "Composition with Twelve Tones" produced an uncannily similar figuration: "Just as our mind always recognizes, for instance, a knife, a bottle or a watch, regardless of its position, and can reproduce it in the imagination in every possible position, even so a musical creator's mind can operate subconsciously with a row of tones, regardless of their direction, regardless of the way in which a mirror might show the mutual relations, which remain a given quantity" (113). Webern similarly imagined the relation between tones: "An ash-tray, seen from all sides, is always the same, and yet different" (53). These similarities have impelled us to consider that Schönberg and Webern may have read Schröder, whose project was avidly in defense of diatonicism.