

Commentary*

Amy Bauer

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1. Introduction

[1.1] Julián Carrillo's microtonal writings have inspired much commentary, alongside the singular legacy of *Sonido 13* and its followers. But few theorists are likely aware of Carrillo's experiments with post-tonal theory, as highlighted by Cannon-Brown's translation and commentary on *Leyes de metamorfosis musicales*. Although Carrillo's theory of musical metamorphosis shared elements with those of early twentieth-century theorists such as Arnold Schoenberg, it embraced far different goals and procedures, all of which make it a fascinating case study in global modernism. As Gavin Lee notes, examples of modernist music from the global margins both deviate from Western models and pursue diverse social and aesthetic goals (Lee 2023, 426). In the case of Carrillo, both his microtonal theory and his ideas on mathematical metamorphosis draw on his extensive training in the European classical tradition, while indulging his tendency towards self-aggrandizement via personal experiment and mythology, and his desire to exalt the present and potential future of Mexican music.

[1.2] As Cannon-Brown notes, the techniques displayed in *Leyes* were prefigured in the earlier *Tratado sintético de armonía* (1915), in the chapter on the whole-tone scale (see as well Madrid 2015, 65). But Carrillo closely followed research on microtonality in Europe, publishing "The Thirteenth Sound" in 1923 to stake his personal claim to this burgeoning area of new music research. My commentary thus begins with a note on commonalities and points of friction between Carrillo's early writing on *Sonido 13* and contemporary theorists of microtonal music. I then speculate on how the legacy of *Sonido 13* relates to the chapter on musical metamorphosis translated by Cannon-Brown, and to Carrillo's sometimes contradictory claims regarding his theoretical techniques, methods and goals.

2. Quarter Tones and Pianos in Early 20th-Century Europe

[2.1] Hans Rudolf Zellner marks 1920—the year Ferruccio Busoni began teaching composition in Berlin—as a moment in which Busoni's interest in the microtonal possibilities expressed in his *Sketch for A New Esthetic of*

Music bore fruit, as the 1920s were a time of microtonal ferment in both Central Europe and Russia (Zellner 2003, 12; Ader 2009). As scholars such as Zellner and Thomas Patteson have noted, the history of microtonal theory is bound up with that of the struggle to create instruments which could realize these sounds. Rudolf Stein was also centered in Berlin at the time; his quarter-tone work for cello and piano in 1906 was preceded by attempts to construct a quarter-tone piano and clarinet (Kallenbach-Greller 1927, 483). Despite these instrument costs and inevitable engineering difficulties, many theorists followed Stein in choosing the obvious pedagogical advantage of keyboards to demonstrate their ideas. Already in 1892 G. A. Behrens-Senegalden had not only written a treatise but also patented a design for a quarter-tone piano, one in which the quarter tones were nestled between the black keys of the piano (Behrens-Senegalden 1982, see the American patent in **Example C1**). Jörg Mager penned *Vierteltonmusik* in 1915, based on earlier experiments with organs (Mager 2015; Patteson 2016, 54). Mager commissioned a harmonium with two manuals tuned a quarter tone apart, adopting a more pragmatic approach to the performance of quarter-tone music similar to the one adopted by Charles Ives in his *Three Quarter-tone Pieces for Two Pianos* (1923–24). Two years later Willi Möllendorff published his *Musik mit Viertel-tönen: Erfahrungen* which—unlike earlier introductory texts—included an aesthetic rationale for his EDO approach to microtonality. The symmetrical division of the octave advanced music in a “natural” way; quarter tones, Möllendorff reasoned, would suffice for many hundreds of years before any need to divide them further (Möllendorff 1917, 12). His bichromatic piano occupied a middle ground between Mager’s (and later Ivan Wyschnegradsky’s) use of two manuals and Carrillo’s metamorphoser pianos by including quarter tones between the white and the black keys of an otherwise conventional manual (Möllendorff 1917, 15). Alois Hába, Wyschnegradsky and Möllendorff became engaged as a group in the problem of how best to approach the construction of a quarter-tone piano, which culminated in a model by Grotrion-Steinweg in 1923, right before Wyschnegradsky was forced to leave Berlin for Paris (Gayden 1973, 14–15).

3. *Beyond the Quarter Tone*

[3.1] As Cannon-Brown notes, Carrillo heaped scorn on Möllendorff’s approach, possibly because the German integrated quarter tones into an essentially tonal framework, using them to substitute a soft and “veiled” transition between triads rather than the coarseness of semitonal modulation (Möllendorff 1917, 25). But Czech composer and theorist Hába—who moved to Berlin with his teacher Franz Schreker in 1920—and the Russian emigre Wyschnegradsky were soon to pioneer microtonal systems independent of tonal models. Hába was writing microtonal music by 1918 at the latest, but set down his thoughts in a systematic way in Czech several years later (Hába 1922), expanding them in the definitive *Neue Harmonielehre des diatonischen, chromatischen, Viertel-, Drittel-, Sechstel- und Zwölftel-Tonsystems* (1927). Wyschnegradsky’s own writings on quarter-tone music and what he called “infra-” and “ultrachromaticism” followed soon afterward. The various theoretical writings of this Berlin-centered group appeared to take a more pragmatic, systematic approach to the topic of microtonality than that offered by Carrillo’s fanciful declaration of “The Thirteenth Sound,” with its focus on microtonal expansion as “transcendental event” (Carrillo 1923, 2), as well as its echoes of Mexican revolutionary discourse in 1920s Mexico (Madrid 2015, 145; Pareyón 2022). Yet their separate research trajectories reveal a common dialectical weave of systematic description combined with progressive, utopian ideals.

[3.2] For Hába, “tonality” was coextensive with diatonicism, and thus contained non-tertian harmonies, if not chromatic notes (Hába 1927, 75). The generation of microtonal divisions followed from the “law of division” found in the sixth octave of the overtone series, but can also be found in much music of the past, as well as in folk repertoires. Beginning with the dyad, Hába painstakingly constructed scales and harmonic units from quarter-, third-, sixth-, and twelfth-tones in a methodical and comprehensive presentation with copious illustrations. But Hába also embraced the spiritual ideas of Rudolf Steiner, for whom music represented a direct connection to a higher plane of being (Steiner 1983). Wyschnegradsky also sought to forge a highly technical system based on loftier, metaphysical ideals. He eventually charted 67 different divisions of the octave (from five to 72), and introduced the notion of a “total sound continuum” composed of “an infinite number of musical tones arranged at infinitely small distances” which underpinned an audible sound continuum composed of 144 sounds per octave up through the limits of human hearing (Wyschnegradsky 1972). This vast system, informed by his study of Eastern religions, gestured towards music becoming a “transformation of human consciousness” (Wyschnegradsky [1954] 1996, 104). Both musicians were devoted to socialist ideals, and saw themselves as revolutionary figures whose individual expansions of musical

language were aligned with their progressive convictions (Wyschnegradsky [1954] 1996, 72; Battan 1980, 99–100).

4. “Is There a Future for Quarter-tone Music?”

[4.1] Much like Hába and Wyschnegradsky, Carrillo’s early publications were followed by serious theoretical treatises infused by his social and metaphysical zeal. Yet the foundational myth of Sonido 13 scarcely explains Carrillo’s all-encompassing drive to found a system, school and instrumental legacy on the youthful discovery of sixth tones on the violin. Alejandro Madrid’s analysis of microtones in Carrillo’s early *Preludio a Colón* (1924) suggests their function as prolongations of structural pitches, in a nod to the German tradition in which Carrillo was trained (Madrid 2015, 124). But it could be argued that these early microtonal works also reflect Carrillo’s interest in training listeners’ ears to hear new sounds, and in the expansion of human hearing as a vehicle of progress. Carrillo’s discussion of “Koenig’s harp”—the organ of hearing—in “The Thirteenth Sound” has puzzled commentators, but may obliquely reference the Prussian instrument-maker and acoustician Rudolf Koenig who had studied the limits of hearing and advocated their expansion (Pantalony 2009).⁽¹⁾ Despite frequent performances of microtonal music in Europe and New York, there remained great resistance to the idea that the musical public was ready for such progress. Although the original edition of Schoenberg’s *Harmonielehre* looked towards a future when the “spirit” would be ready for microtonal music, a postscript added to the second edition in 1920–21 disparaged those who reduce music to a “quarter-tone art” (Schoenberg 1978, 423–25). At the same time Béla Bartók lamented the fact that it may be “decades or centuries” until the semitone system relinquishes its hold on artistic life (Bartók 1920, 459). Writing in 1926 Albert Wellek cited the psychological impossibility of discerning microtones, and states as a given the paradoxical claim that more is less, when it comes to flouting the necessary limitation that is twelve-tone equal temperament (Wellek 1926, 236). A dozen years later Artur Holde could still ask “Is There a Future for Quarter-Tone Music?” (Holde 1938). It is in the context of such diminished expectations, and the resistance Carrillo felt from members of the Mexican musical establishment—most notably Carlos Chávez—that his theory and practice take on a meta-musical justification, one that fuses a mythological sense of Mexican nationalism with indigenous roots to a narrative of linear, technological progress in the arts.⁽²⁾

[4.2] Yet Carrillo’s personal mythology served a larger purpose. As Gabriel Pareyón (2022) notes, Carrillo’s appeal to Mexican myths of harmonic space and aesthetic infinity offered one solution to the problem of injustice, and the “phenomenology of colonialization” [*fenomenología de la colonización*] as a spiritual succor to Europe’s dwindling supply of the sacred. In this sense Carrillo’s introduction of not one, not two, but fifteen unique microtonal pianos to Europe function as a Trojan horse: their advanced tonal systems unleash a musical development necessary for the human soul to progress (Carrillo 1938, 101). And if his pianos did not launch a new movement in Europe, they did inspire Wyschnegradsky’s further research into third-, sixth- and twelfth-tone music (Brotbeck 2014). In *Rectificación básica al sistema musical clásico*, Carrillo railed at the falsity of equal temperament—“How horrendous! To deliberately stain the purity of natural sounds!” (Carrillo 1930, 13)—much like György Eszter’s music teacher in Lázló Kraznahorkai’s *The Melancholy of Resistance*, who—upon discovering the historical lie that constituted well-temperament—suffers an existential crisis of faith from which he never recovers (Kraznahorkai 1998, 63ff.)

5. *Laws of Music Theoretical Metamorphosis*

[5.1] Carrillo of course soldiered on, but with what appears to be a strategic retreat. The utopian promises of Sonido 13 seem at odds with the rigid, strangely cramped transformations found in Chapter 1 of *Leyes de metamorfosis musical*. Carrillo’s earlier explorations in pitch and tonal multiplicity here default to mapping chromatic scales and melodies onto whole tones in several octaves. *Leyes* does reflect two ongoing concerns: a focus on hearing and a technical, rule-based approach to the expansion of compositional technique. But here we begin with a given composition, metamorphosed to undergo a fundamental ontological change. Although generated from a prior tonal work, it is very important to Carrillo that the original composer be unable to recognize their old work. The renewed piece enters a post-tonal universe, one greatly expanded in registral scope, even as “not a single note is added or removed from those originally written, in terms of melody, or in terms of harmony and rhythm.” On one hand, Carrillo acknowledged the long history of rhythmic and melodic transformation via augmentation, diminution and embellishment, and carved out space for himself in this

venerable tradition. On the other, the choice to warp and defamiliarize a beloved classic beyond recognition seems a profound act of hubris. Or was Carrillo simply pointing towards a new musical universe, one reachable by those who have not yet joined the microtonal revolution (but who have acquired instruments of extraordinary range)?

[5.2] We might reference Rudolph Koenig again as a spiritual ally, given that he built tuning forks at minute gradations of pitch that went beyond the range of human hearing, and was the first person to measure and record sound in the ultrasonic range (Pantalony 2009, 139, 159). Pareyón cites fascinating sketches by Carrillo, in which microtonal relations in a grid of tessellated hexagons correspond to a projected piano keyboard in the proportion 88/8. Carrillo's sketch suggests an expansion of the neo-Riemannian *Tonnetz* to encompass a form of microtonality that retains the focus on self-similar structures exemplified by the metamorphoses in *Leyes*. Pareyón suggests that had he lived longer, Carrillo may have merged his microtonal and contrapuntal theory, and expanded on his remark that the singular intervals composing the harmonic series do not reflect the actual intervals used in musical practice (Carrillo 1967, 316–17, cited in Pareyón 2022).

[5.3] Carrillo later shifted away from an interest in harmony to the world of infinite scalar permutations that recalls Wyschnegradky's later focus on non-octaviant scales and their use. These explorations would come to fruition in *El infinito en las escalas y los acordes* (1957), which—as Madrid notes—prefigures pitch-class set theory as we know it (Madrid 2015, 154). *El infinito* represents a fully-atonal theory propounded as a permutation of all scale and harmonic possibilities, using familiar numbers from 0 to 11. Carrillo used the chromatic scale as a model to present his formulas, leaving future microtonal expansions to the reader. But his exhaustive presentation recalls not so much the more traditional presentations of Hába and Wyschnegradsky, as those of Olivier Messiaen, especially his vast charts of *permutations symétriques* in the third book of the *Traité de rythme, de couleur et d'ornithologie* (Messiaen 1996). In this sense Carrillo's theoretical works from “The Thirteenth Sound” onward take part in a larger meta-theoretical cycle that joins the symbolic register of formalist theory with the allegorical one of spiritual and social renewal. The revival of interest in Carrillo's ideas suggests a certain confluence of historical moments: as Carrillo unearthed the sounds between the semitonal cracks on the piano, so music theory recovers treatises wedged between the canonic models of musical practice. The thirteenth sound is coming!

Amy Bauer
University of California, Irvine
Department of Music
Claire Trevor School of the Arts
University of California, Irvine
abauer@uci.edu

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Footnotes

* I would like to thank Isaac Otto Hayes and Stephan Hammel for their comments and suggestions on this commentary.

[Return to text](#)

1. Madrid (2015, 147, 155) refers to it as "Koenig's harp."

[Return to text](#)

2. Leon Botstein (2015, 328–30) explores the ironies in the Chávez-Carrillo conflict.

[Return to text](#)

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Prepared by Andrew Blake, Editorial Assistant

