The Hidden Poetics of Messiaen's "Serialism"

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Interpretation of Olivier Messiaen's *Mode de valeurs et d'intensités* as an exercise in the application of post-Viennese dodecaphonism to parameters other than pitch—notably rhythm, dynamics, and articulation—was propagated most loudly by Messiaen's acolytes and retroactively embraced by the composer himself.[1] The second of his four *études de rythme* (1949–50),[2] *Mode de valeurs* has since been enshrined as a modernist milestone, credited with instigating "total" or "integral serialism." As the story goes, a recording of the étude was played in the summer of 1951 by Antoine Goléa to the young Karlheinz Stockhausen and Karel Goeyvaerts at Darmstadt—where Stockhausen described the

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1. As early as 1953—shortly after the work's significance for "serialism" emerged—Messiaen described composing *Mode de valeurs* "naively, with no foresight of the possible consequences" of a "super-series" ("naïvement et sans aucune prévoyance des conséquences possibles"). Quoted in Christopher Brent Murray, "Le développement du langage musical d'Olivier Messiaen: Traditions, emprunts, expériences" (PhD diss., Université Lumière-Lyon 2, 2010), 438. Unless otherwise indicated, translations are mine. Writing in 1958, Messiaen more confidently affirmed his role as the first composer to devise a "super-series applied to all the elements of music." Quoted in Christopher Dingle, *The Life of Messiaen* (Cambridge: Cambridge University Press, 2007), 125.

2. The collective title *Quatre études de rythme* was only gradually authorized. Each étude was first published individually; it is unclear when Messiaen decided to unify them as a cycle. For the Parisian premiere in 1954, he still insisted, "you absolutely should not write: '4 études de rythme'" ("il ne faut surtout pas mettre: '4 études de rythme'"), suggesting that the collective title was already used. See, further, Murray, "Le développement du langage musical," 438–40.

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work as "fantastic music of the stars."[3] Stockhausen's and Goeyvaerts's subsequent pursuit of a so-called punctual aesthetic constructed by integral-serialist means cemented the association between *Mode de valeurs* and the early serialist movement. But if *Mode de valeurs*'s legacy as a launchpad for total serialism is uncontroversial, this distinction relates primarily to reception history and occludes other important dimensions of Messiaen's process.

The extent to which *Mode de valeurs* is itself "serial" has generated impassioned debate over the past half century. Messiaen's early interest in the Second Viennese School is well documented, and there is no denying emergent serialist aesthetics as one ingredient in the conception of his étude.[4] Several specialists of serialism and of Messiaen protest that the work is not serial, since it operates not according to ordered rows but rather according to a collection of thirty-six notes, each assigned a pitch, duration, intensity, and attack, and deployed —unordered—in three-part counterpoint.[5] Others argue for more inclusive definitions, evoking Joseph Straus's "myth of serial orthodoxy" to suggest that serialism never denoted a stable and prescriptive compositional technique.[6] Peter Hill and Nigel Simeone found evidence of Messiaen's intention to develop "timbres, durations and nuances according to the principles of serialism" in diary entries dating from 1946; but their assumption that *Mode de valeurs*, composed years later, represents the realization of this idea is more colored by subsequent reputation than corroborated by direct historical link.[7] Messiaen for his part expressed ambivalence about the "absolutely excessive importance

3. See Richard Toop, "Messiaen/Goeyvaerts, Fano/Stockhausen, Boulez," *Perspectives of New Music* 13, no. 1 (1974): 141–69, at 142; Karel Goeyvaerts, *Een Zelfportret* (Ghent: De Nieuwe Muziekgroep, 1988), 36; and Martin Iddon, *New Music at Darmstadt: Nono, Stockhausen, Cage, and Boulez* (Cambridge: Cambridge University Press, 2013), 59.

4. On Messiaen's engagements with the Second Viennese School, see Yves Balmer, Thomas Lacôte, and Christopher Brent Murray, *Le modèle et l'invention: Messiaen et la technique de l'emprunt* (Lyon: Symétrie, 2017), 287–312, and Max Erwin, "Who Is Buried in Webern's Tomb? Orientations in the Reception of Serial Music from Messiaen to Stockhausen," *Perspectives of New Music* 58, no. 2 (2020): 93–128, especially 95–100.

5. See M. J. Grant, *Serial Music, Serial Aesthetics: Compositional Theory in Post-War Europe* (Cambridge: Cambridge University Press, 2001), 61–63; Robert Sherlaw Johnson, *Messiaen* (London: Dent, 1975), 105; Toop, "Messiaen/Goeyvaerts," 144; Roger Nichols, *Messiaen* (Oxford: Oxford University Press, 1975), 48; and Paul Griffiths, *Modern Music and After*, 3rd ed. (New York: Oxford University Press, 2010), 36.

6. Vincent Benitez, "Reconsidering Messiaen as Serialist," *Music Analysis* 28, nos. 2–3 (2009): 267–99; Iddon, *New Music at Darmstadt*, xii. Benitez rightly identifies the importance of rhythm to Messiaen's serialism, and traces continuities in Messiaen's "rhythmic-serial path" extending back to the 1930s in connection with Messiaen's reflections on time and eternity (269). Allen Forte also viewed Messiaen affirmatively as a "serialist," but places the emphasis on works other than *Mode de valeurs*. Allen Forte, "Olivier Messiaen as Serialist," *Music Analysis* 21, no. 1 (2002): 3–34.

7. Peter Hill and Nigel Simeone, *Messiaen* (New Haven: Yale University Press, 2005), 169.

given to [*Mode de valeurs*] because it supposedly gave rise to serial explosion in the area of attacks, durations, intensities, timbres—in short, to all its musical parameters." His passive construction and use of the word "supposedly" raise doubts about its serialist status. And while he acknowledged the work's "prophetic" nature, he disparaged it as musically worthless, "next to nothing."[8]

The overwhelming focus on serialism in discussions of *Mode de valeurs* has distracted attention from other salient factors in Messiaen's compositional thought during this period. Recent scholars have posited, for example, John Cage's piano preparations (experienced by Messiaen and his class in 1949), André Mocquereau's theories of plainchant accentuation (cited by Messiaen in pedagogical contexts), and Messiaen's "borrowing technique" as neglected ingredients in the composition of *Mode de valeurs*.[9] While these contexts productively shift the center of gravity away from the straightforward serialist genealogy, one major factor remains curiously unaddressed: what makes *Mode de valeurs* a *rhythmic* étude? Given the work's myriad novelties, including its formalist approach to articulation and dynamics in addition to duration and pitch, what is the significance of rhythm as a privileged parameter? This seemingly anodyne question, I argue, points toward significant yet unfamiliar entanglements between intellectual history and musical composition across the interwar and postwar years.

To approach an answer, we may revisit the actual premieres of the four *études de rythme* in November 1950—the year before the exalted reactions to *Mode de valeurs* at Darmstadt—when Messiaen, on tour in the French protectorates of Tunisia and Morocco, trialed the new pieces at some remove from Parisian punditry. Accounts of these performances offer a glimpse of how Messiaen presented *Mode de valeurs* before others seized upon it. One such account, a review published in *Maroc-Monde*, describes the lecture with which he prefaced his works in Rabat:

8. Olivier Messiaen and Claude Samuel, *Music and Color: Conversations with Claude Samuel*, trans. E. Thomas Glasow (Portland: Amadeus Press, 1994), 47. For another reading of Messiaen's reticence in discussing twelve-tone aspects of his music, see Wai-Ling Cheong, "Symmetrical Permutation, the Twelve Tones, and Messiaen's *Catalogue d'oiseaux*," *Perspectives of New Music* 45, no. 1 (2007): 110–36, at 110–11 and 131.

9. John-Philipp Gather, "The Origins of Synthetic Timbre Serialism and the Parisian Confluence, 1949–52" (PhD diss., State University of New York at Buffalo, 2003); Tatiana Tsaregradskaya, "Sound Attack in the Works of Olivier Messiaen: Total Serialism Revisited," *Lietuvos Muzikologija* 14 (2013): 152–59; Jonas Lundblad, "Universal Neumes: Chant Theory in Messiaen's Aesthetics," *Journal of the Royal Musical Association* 147, no. 2 (2022): 449–93; Balmer, Lacôte, and Murray, *Le modèle et l'invention*, 393. Even Balmer, Lacôte, and Murray, who have pioneered a revisionist understanding of Messiaen's compositional technique, reinscribe the teleology from Schoenberg to *Mode de valeurs* in the first sentence of their chapter on Messiaen's borrowings from the Second Viennese School (287).

> "If you don't like modern [art], pay attention not to my music, but rather to the rhythm," he declared before performing the world premiere of his four still unpublished études on rhythmic combinations.[10]
>
> Messiaen is, above all, in our view, a researcher of rhythm, which is, according to all the treatises, "the principal element in the performance of any musical work." One must be a musical technician to fully appreciate Messiaen. Therefore, before playing his études, he gave a sort of introductory course on rhythm. He began with an observation: rhythm is everywhere in creation—the rotations of planets in the sky and of electrons in an atom, the beating of a heart, economic cycles, the balance of architecture, and the cadences of dance and poetry. But it is in music that rhythm is king. Messiaen tapped with his hands the principal Greek and Hindu rhythms, and analyzed a page of Mozart and of Stravinsky.
>
> And so the newly initiated were able to penetrate, at least a little, the mysteries of his work, and seize upon some of the curiosities of these four études, curiosities that adhere to what one might call the tonic accents, the prosody, the rules of versification of music.[11]

This review is striking for several reasons, not least the absence of any allusion to serialism, and also Messiaen's preemptive sensitivity to the public's likely bemusement in the face of "modern art." The conception of rhythm to which Messiaen draws attention—as an all-encompassing feature of cosmology, physiology, sociology, and all manner of art forms—is grandiose: it is difficult to imagine how his études should relate to the phases of Venus or the rise and fall of GDP. The final paragraph, meanwhile, directs us more precisely to the linguistic structures of verse—a reference less likely conjured by the critic than echoing Messiaen's own terms.

10. The world premiere of the four études is usually given as November 6, 1950, in Tunis; despite the appearance of all four études on the program, however, reviews suggest that only three of them were performed. It is possible that the performance in Rabat on November 14, 1950, was the collective premiere.

11. P.V., "O. Messiaen s'explique," *Maroc-Monde*, November 25, 1950: "'Si vous n'aimez pas le moderne, ne faites pas attention à ma musique mais au rythme,' a-t-il déclaré avant de jouer en première audition mondiale ses quatre études encore inédites sur des combinaisons rythmiques. En effet, Messiaen est, avant tout, à notre avis, un chercheur de rythme, lequel est au reste, suivant tous les traités, 'l'élément principal de l'exécution d'une œuvre musicale.' Il faut être technicien de la musique pour goûter pleinement Messiaen. Aussi fit-il, avant de donner ses études, une espèce de cours d'introduction sur les rythmes. D'abord, une constatation: le rythme est partout dans la création: la révolution des planètes dans le ciel et des électrons dans l'atome, les pulsations du cœur, les cycles économiques, l'équilibre dans une œuvre d'architecture, les cadences dans la danse ou la poésie. Mais c'est dans la musique que le rythme est roi. Messiaen frappa dans ses mains les principaux rythmes grecs et hindous, décomposa une page-type de Mozart et de Stravinsky. Et les néophytes purent alors pénétrer tant soit peu les arcanes de son œuvre et saisir quelques-unes des curiosités de ses quatre études, curiosités qui tiennent dans ce qu'on pourrait appeler les accents toniques, la prosodie, les règles de versification de la musique."

In this article I suggest that the allusion to prosody, far from being incidental, reflects Messiaen's engagements with the scientific study of poetic rhythm. Attention to this facet of intellectual history has the potential to reshape our understanding of his experimental practice in the late 1940s and early 1950s, reinforcing continuities both across Messiaen's oeuvre and with intellectual histories beyond composition. The article contributes to a wave of revisionism concerning postwar French modernism, further questioning the self-conscious narratives of "rupture" and "renewal" that have structured prior accounts of music at the "Zero Hour" but masked important crosscurrents between the interwar and postwar years.[12] Specifically, *Mode de valeurs* serves as a point of entry for retracing entanglements between interwar studies of poetic rhythm and postwar composition. Focusing on Messiaen's engagements with scientific poetics helps join up two significant strands of his rhythmic technique: the seemingly externalist exoticism of his famed debts to nominally Indian rhythms from the 1930s onward, and the apparent swerve to an internalist formal rationalism epitomized by *Mode de valeurs*. These two models of rhythmic organization are not as disconnected or eclectic as they might appear, since they correspond to two initiatives in the field of poetics. First, Messiaen's interest in Indian metrical patterns as a means of structuring an additive approach to musical rhythm was nourished by the rhythmic theories of French linguist Antoine Meillet, whose breakthroughs in the field of comparative metrics led him to propose a quantitative principle for early "Indo-European" poetry. Second, Messiaen's rationalization of multiple musical parameters was indebted to the "mathematical aesthetics" of Romanian expatriate poet-mathematician Pius Servien, whose multidimensional analyses of French prosody were further popularized by his compatriot Matila Ghyka.

Meillet's and Servien's studies of language's rhythms belong to the largely forgotten history of "rhythmics," a radically interdisciplinary domain established by a constellation of artists and scientists—musicologists and linguists, experimental psychologists, sociologists, economists, biologists, and others—active during the interwar period. "Rhythmicians"—a term popularized by composer and pedagogue Émile Jaques-Dalcroze—viewed rhythm as a capacious and transcendent category with the potential to link periodic phenomena unfolding in diverse domains of

12. Examples of these revisionist works include Anne-Sylvie Barthel-Calvet, ed., *Propositions pour une historiographie critique de la création musicale après 1945* (Metz: Centre de Recherche Universitaire Lorrain d'Histoire, 2011); Laurent Feneyrou, "Le temps musical selon Gisèle Brelet et Olivier Messiaen," in *De la Libération au Domaine musical: Dix ans de musique en France (1944–1954)*, ed. Laurent Feneyrou and Alain Poirier (Paris: Vrin, 2018), 486–501; and Anne-Sylvie Barthel-Calvet and Christopher Brent Murray, eds., *Revisiting the Historiography of Postwar Avant-Garde Music* (Abingdon: Routledge, 2022).

time and space, from linguistic structures and architectural forms to physiological processes, social formations, and planetary movements, as sketched in Messiaen's preconcert lecture. The intellectual history of rhythmics and its connection to creative production have received more attention from literary studies than music studies. Recent scholarship on "critical rhythm" has exposed myriad intellectual and ideological contexts for formal rhythmic experimentation in modernist poetry.[13] Historicizing rhythmics in the anglophone sphere, Laura Marcus observes how "rhythm became, in the philosopher John Dewey's phrase, 'the tie' between science and aesthetics, linking natural and environmental rhythms, the movements of physical matter, the processes and patterns of mental life, and the 'periodicities' of human sexuality, to the rhythmic patterns of poetry, art, and music."[14] Marcus's attention to the way artists translated theories of rhythm's scientific, cultural, and even allegedly racial significance into formal features affords illuminating hermeneutic readings of works by writers like Virginia Woolf and D. H. Lawrence, and painters like John Duncan Furgusson and Marsden Hartley.

Music and musicians were central to the broader, transcendent discourses relating to rhythm in the late nineteenth and early twentieth centuries, with major interventions from figures including Mathis Lussy, Jules Combarieu, Marie Jaëll, and René Dumesnil, although interdisciplinary rhythmics has received relatively little attention from contemporary musicologists.[15] Music pedagogues trumpeted the primordiality of rhythm where previously harmony and counterpoint had reigned supreme. In his *Cours de composition musicale*, Vincent d'Indy asserted, "*Rhythm* is universal, appearing in the movement of the stars, in the periodicity of the seasons, or in the regular alternation of day and night. We find it in the life of plants, in the cry of animals, and in the behavior and language of mankind."[16] And in 1926 Jaques-Dalcroze mobilized

13. See, in particular, Ben Glaser and Jonathan Culler, eds., *Critical Rhythm: The Poetics of a Literary Life Form* (New York: Fordham University Press, 2019), the edited volume that has defined the field, taking up Deleuze and Guattari's formulation of meter as "dogmatic" and rhythm as "critical" (42). Relevant monographic studies include Michael Golston, *Rhythm and Race in Modernist Poetry and Science: Pound, Yeats, Williams, and Modern Sciences of Rhythm* (New York: Columbia University Press, 2007); Ben Glaser, *Modernism's Metronome: Meter and Twentieth-Century Poetics* (Baltimore: Johns Hopkins University Press, 2020); Ewan Jones, *The Turn of Rhythm: How Victorian Poetry Shaped a New Concept* (Charlottesville: University of Virginia Press, 2023); and Laura Marcus, *Rhythmical Subjects: The Measures of the Modern* (New York: Oxford University Press, 2023).

14. Marcus, *Rhythmical Subjects*, 1.

15. A relevant exception is Jillian Rogers's account of rhythmics scholarship in *Resonant Recoveries: French Music and Trauma between the World Wars* (New York: Oxford University Press, 2021), chap. 3. Rogers's focus on rhythmic regularity/periodicity and neoclassicism contrasts with my focus here, for reasons to become clear.

16. Vincent d'Indy, *Cours de composition musicale*, ed. Auguste Sérieyx (Paris: Durand, 1903), 1:20: "Le *Rythme* est universel, il apparaît dans le mouvement des astres, dans la

academics across several disciplines by organizing the Premier Congrès du Rythme in Geneva, featuring forty presentations and aiming "to establish closer relations between the diverse manifestations of rhythmic forces of the individual and of society."[17] The case of Messiaen, who claimed the professional title of "rhythmician" and consumed literature on rhythm from wide-ranging intellectual and musical traditions, allows us to bring the intellectual history of rhythmics into dialogue with the musical history of rhythm.[18] His rhythmic études in particular represent concerted attempts to apply ideas from rhythmics scholarship in compositional contexts.

The following discussion falls into three main parts. The first two parts sketch the two major interventions in scientific poetics mentioned above—Meillet's comparative metrics and Servien's "mathematical poetics"—documenting their links to Messiaen's compositional process in the 1930s and 1940s. A brief interlude places these discourses relating to poetic rhythm in the context of interwar constructions of racial identity, emphasizing the dubious role assigned to rhythm in efforts to link biology and culture. The final part shows how these approaches to rhythm open new hermeneutical pathways through Messiaen's compositions from 1949–50, interpretations rooted less in formal abstractions than in contingent (and sometimes ideologically charged) intellectual histories extending back several decades. In a concluding analytical twist, I return to *Mode de valeurs* to suggest that placing the work within the contrapuntal contexts of scientific poetics enables us to more fully understand the work's serialism.

Rhythms Added: Antoine Meillet's Comparative Metrics

Before Curt Sachs coined the terms "additive" and "divisive" rhythm, a similar binary opposition structured Messiaen's thinking.[19] Describing

périodicité des saisons, dans l'alternance régulière des jours et des nuits. On le retrouve dans la vie des plantes, dans le cri des animaux et jusque dans l'attitude et la parole de l'homme."

17. Albert Pfrimmer, ed., *Compte rendu du Ier Congrès du rythme* (Geneva: Institut Jaques-Dalcroze, 1926), 3: "établir des relations plus intimes entre les diverses manifestations de forces rythmiques de l'individu et de la société."

18. Messiaen's engagements with other facets of rhythm's intellectual history are discussed in Yves Balmer, "Religious Literature in Messiaen's Personal Library," in *Messiaen the Theologian*, ed. Andrew Shenton (Farnham: Ashgate, 2010), 15–27; Wai-Ling Cheong, "Ancient Greek Rhythms in Messiaen's *Le Sacre*: Nietzsche's Legacy?," *Muzikologija/Musicology* 27 (2019): 97–136; and Feneyrou, "Le temps musical."

19. Curt Sachs, *Rhythm and Tempo* (New York: Norton, 1953), 24–26. My use of the terms "additive" and "divisive" in this section is heuristic and advised; though anachronistic, this binary was widespread in early twentieth-century thought, and central to comparisons of Indian and European music. For thoughtful critiques, see Martin Clayton, *Time in Indian Music: Rhythm, Metre, and Form in North Indian rāg Performance* (Oxford: Oxford University

his approach to rhythm in advance of the publication of his precocious composition method *Technique de mon langage musical* (*TLM*) (1944), Messiaen stated, "The great innovation of my rhythmic language is the search for an 'unmeasured music' in which the notions of measure and beat are replaced by the feeling of a short value and its free multiplications."[20]

"Unmeasured" music had been gaining currency since the *fin de siècle*, partly as a consequence of expanding musicological knowledge of early and folk music, empirical studies of which consistently demonstrated that neither adhered to the regular isochronic meters taught in school.[21] Unmeasured music would, nevertheless, remain the exception rather than the rule in musical composition for another generation. One important figure in this narrative is the Benedictine monk André Mocquereau, whose doctrine of "free rhythm" in Gregorian chant helped to upend the mensuralism that had prevailed throughout the nineteenth century.[22] Messiaen cited Mocquereau as a pioneer of unmeasured rhythm in *TLM* and continued to draw upon his notions of *arsis* and *thesis* as a framework of rhythmic feeling alternative to the isochronic bar line.[23]

When developing concrete models by which to structure unmeasured rhythm, Messiaen exalted one source above all: "Hindu rhythms," the generic term by which he referred to a catalog of 120 rhythmic formulas known as "deśītālas," tabulated in the *Saṅgītaratnākara* of Śārṅgadeva, a thirteenth-century Sanskrit treatise that he read about in the *Encyclopédie de la musique et dictionnaire du Conservatoire*.[24] From the mid-1930s until the end of his life Messiaen never exhausted his appreciation of these rhythmic patterns: in *TLM*, Indian rhythms and their attributes are given pride

Press, 2000), 37–41, and Kofi Agawu, *Representing African Music: Postcolonial Notes, Queries, Positions* (New York: Routledge, 2003), 86–91. Sachs never intended the terms to be mutually exclusive, observing that many rhythms may be interpreted as additive and divisive (*Rhythm and Tempo*, 26).

20. Olivier Messiaen, "Technique de mon langage musical," *Musique et radio*, November 1942, 253–54, at 254: "La grande innovation de mon langage rythmique est la recherche d'une 'musique amesurée' où les notions de mesure et de temps sont remplacées par le sentiment d'une valeur brève et de ses multiplications libres."

21. On the history of plainchant and "free rhythm," see Benedikt Leßmann, *Die Rezeption des gregorianischen Chorals in Frankreich im 19. und frühen 20. Jahrhundert: Studien zur ideen- und kompositionsgeschichtlichen Resonanz des "plain-chant"* (Hildesheim: Olms, 2016), 165–80. The history of discourses concerning rhythmic variety in folk song remains to be written, but for an influential source see Louis-Albert Bourgault-Ducoudray, *Trente mélodies populaires de Basse-Bretagne* (Paris: Lemoine, 1885), 13–15.

22. Mocquereau detailed his theories in *Le nombre musical grégorien, ou rythmique grégorienne*, 2 vols. (Tournai: Desclée, 1908–27). See Daniel K. S. Walden, "Dom Mocquereau's Theories of Rhythm and Romantic Musical Aesthetics," *Études grégoriennes*, 23 (2015): 125–50.

23. For a recent study of Messiaen's engagements with Mocquereau, see Lundblad, "Universal Neumes."

24. Joanny Grosset, "Inde: Histoire de la musique depuis l'origine jusqu'à nos jours," in *Encyclopédie de la musique et dictionnaire du Conservatoire*, ed. Albert Lavignac, 11 vols. (Paris: Delagrave, 1913), 1:257–376, at 301–4.

of place as early as the second chapter ("Râgavardhana, rythme hindou"). The litany of deśītālas became a famous (or infamous) unit of Messiaen's analysis and composition pedagogy, in which his rote enumeration of the formulas belied the musical dynamism he derived from them.

When asked how he had encountered the medieval Indian rhythms so fundamental to his compositional technique, Messiaen replied, "It was a stroke of luck. I accidentally came across Śārṅgadeva's treatise and the famous list of 120 [deśītālas]; that list was a revelation."[25] Even if consulting the Conservatoire's recently published encyclopedia was more likely the result of a homework assignment than a "stroke of luck," Messiaen's reply conceals the extent to which the ground had been laid for this "revelation" by generations of scholarly research into classical prosody. Examination of his own training reveals that his lifelong interest in Indian (and Greek) meters was nourished by recent philological breakthroughs regarding the metrical organization of lyric poetry in the earliest Indo-European languages.

The notion of an Indo-European language family is a legacy of nineteenth-century comparative philology and linguistics, and in particular the hypothesis that a wide range of languages—including Romance, Germanic, Slavic, and Celtic languages, many Indian languages, Persian, Armenian and others (but not Arabic or Hebrew)—are the modern idioms of a common ancient source. Philologists believed that by comparing Indo-European languages across history, they could distinguish older forms from newer, and thence reconstruct the "original," so-called "proto-Indo-European" mother tongue. The identitarian stakes of this project should not be ignored. Conflating notions of the linguistic with the "ethnic" in the wake of Romantic philosophies of *Volksgeist*, philologists like Max Müller and Ernest Renan believed the Indo-European language family reflected an underlying human kinship—that is, an Indo-European, also known as "Aryan," "race" constructed in opposition to Arabic- and Hebrew-speaking "Semites."[26]

Antoine Meillet (1866–1936), widely considered the leading French linguist of the early twentieth century, sought within the comparative philological tradition to push the boundaries of the cultural knowledge that could be gleaned from the analysis of Indo-European languages beyond etymologies and verb forms. He believed that the comparative

25. Messiaen and Samuel, *Music and Color*, 77.

26. The history of the Indo-European hypothesis is the subject of abundant scholarship. Good overviews include Léon Poliakov, *Le mythe aryen: Essai sur les sources du racisme et des nationalismes* (Paris: Calmann-Lévy, 1971); Maurice Olender, *Les langues du Paradis: Aryens et Sémites: un couple providentiel* (Paris: Seuil, 1989); and Stefan Arvidsson, *Aryan Idols: Indo-European Mythology as Ideology and Science*, trans. Sonia Wichmann (Chicago: University of Chicago Press, 2006).

study of lyric verse, specifically of the meters and rhythms of ancient Greek and Vedic Sanskrit, could reveal formal characteristics of the earliest "Indo-European" poetry. Although Meillet was relatively circumspect about deriving "racial" conclusions from linguistic data, he held that the stakes of this advance nevertheless amounted to the discovery of an element of "Indo-European civilization," a cultural artifact from France's earliest presumed ancestors. Such a breakthrough would be afforded via "rhythm" at the juncture between a language's "natural" stress structures and the poetic meters that emanated from that language.[27]

Broadly speaking, by the late nineteenth century philologists interested in historical phonology had codified three main parameters of phonetic stress pertinent to the analysis of Indo-European languages: accents of tone (a stressed syllable rises in pitch), intensity (a stressed syllable rises in volume), and duration (a stressed syllable is prolonged in time). Philologists had also determined that both ancient Greek and Sanskrit were governed by accents of duration, yielding patterns of long and short syllables known as "quantitative meters." This typological commonality prompted comparison between early Greek and Sanskrit verse—with particular attention given to hendecasyllabic Aeolic (e.g., Sapphic) and Vedic meters—in search of shared properties that suggested an older common source. Yet by the early twentieth century efforts in this vein remained unconvincing. The sticking point lay in how Greek meter apparently subdivided into regular repeating "feet" somewhat like musical measures, whereas Vedic meters resisted consistent subdivision.

Meillet's breakthrough involved a radical reconsideration of that long-standing assumption. Rather than forcing Vedic lines of verse into Grecian feet, he ventured that the earliest Greek Aeolics were governed not by feet but by a different principle: Vedic and Aeolic lines shared recurrent quasi-formulaic sequences of long and short durations at fixed points (notably at ends of lines), interspersed among syllables of irregular variable durations. Whereas Meillet and others had previously sought "meter" in the guise of isochronic feet based on the assumption that lyric verse would naturally conform to modern conceptions of musical mensuralism, Meillet came to realize that there was no reason to presuppose that the earliest sung verse was mensural and hypothesized instead that proto-Indo-European verse was fundamentally unmetrical. But unmetrical did not mean unrhythmic. In contrast to contemporaneous dictionary

27. For a far more detailed examination of Meillet's theories of "Indo-European rhythm," including the role of music and musicology in Meillet's formulation of this concept, see Peter Asimov, "Antoine Meillet's Music Lessons: Pierre Aubry, Maurice Emmanuel, and the Search for 'Indo-European' Rhythm," in *Sonic Circulations: Music, Modernism and the Politics of Knowledge*, ed. Emily I. Dolan, Emily MacGregor, and Arman Schwarz (Philadelphia: University of Pennsylvania Press, forthcoming 2025).

definitions that described rhythm as the regular distribution of strong and weak beats, Meillet redefined rhythm, and more precisely "Indo-European rhythm," as distinct from isochronism. According to Meillet, rhythm arose instead from the relatively "free" play of quantitative durations. He elaborated this theory in a series of published lectures titled "The Indo-European Origins of Greek Meters," which included a chapter on "natural proto-Indo-European rhythm."[28] Meillet explained that the unremitting "ictus" (that is, "strong beat" isochronism) of Western art music of the eighteenth and nineteenth centuries was the exception rather than the rule, substantiating his claim with reference to recent developments in plainchant scholarship and in ultramodernist composition.[29]

Meillet's striking instrumentalization of musical rhythm to justify his philological breakthrough was warmly received by Maurice Emmanuel (1862–1938), professor of music history at the Paris Conservatoire. Meillet and Emmanuel had been friendly since the 1880s, when both studied Greek philology with Louis Havet at the Sorbonne. Meillet's critique of Western music's metrical regularity closely echoed, and was perhaps even bolstered by, Emmanuel's frequent denunciations of the "brutal, unwavering, monotonous" nature of most European music, with its overreliance on the major scale and the isochronic bar.[30] Emmanuel reworked Meillet's insights on "Indo-European rhythm" for an interdisciplinary audience of rhythmicians in a keynote lecture delivered at Jaques-Dalcroze's aforementioned conference in Geneva three years later.[31] Converting Sanskrit and Greek verse into non-hierarchical strings of quarter and eighth notes, Emmanuel distilled Meillet's research into his own dictum: "*Rhythm*, in music," he wrote, "*is the organization of duration.*"[32] To put it schematically, he reformulated musical rhythm as fundamentally

28. Antoine Meillet, *Les origines indo-européennes des mètres grecs* (Paris: Presses universitaires de France, 1923). These lectures are a founding document in the subdiscipline of comparative metrics, pursued in subsequent generations by scholars including Roman Jakobson and Nikolai Trubetzkoy. More recent scholars of Indo-European poetics broadly uphold Meillet's hypothesis of Indo-European rhythm. See, for example, Calvert Watkins, *How to Kill a Dragon* (Oxford: Oxford University Press, 1995), 19, and M. L. West, *Indo-European Poetry and Myth* (Oxford: Oxford University Press, 2007), 46. The field of Indo-European poetics itself is, however, the subject of critique. See, for example, Jean-Paul Demoule, *Mais où sont passés les Indo-Européens?* (Paris: Seuil, 2014).

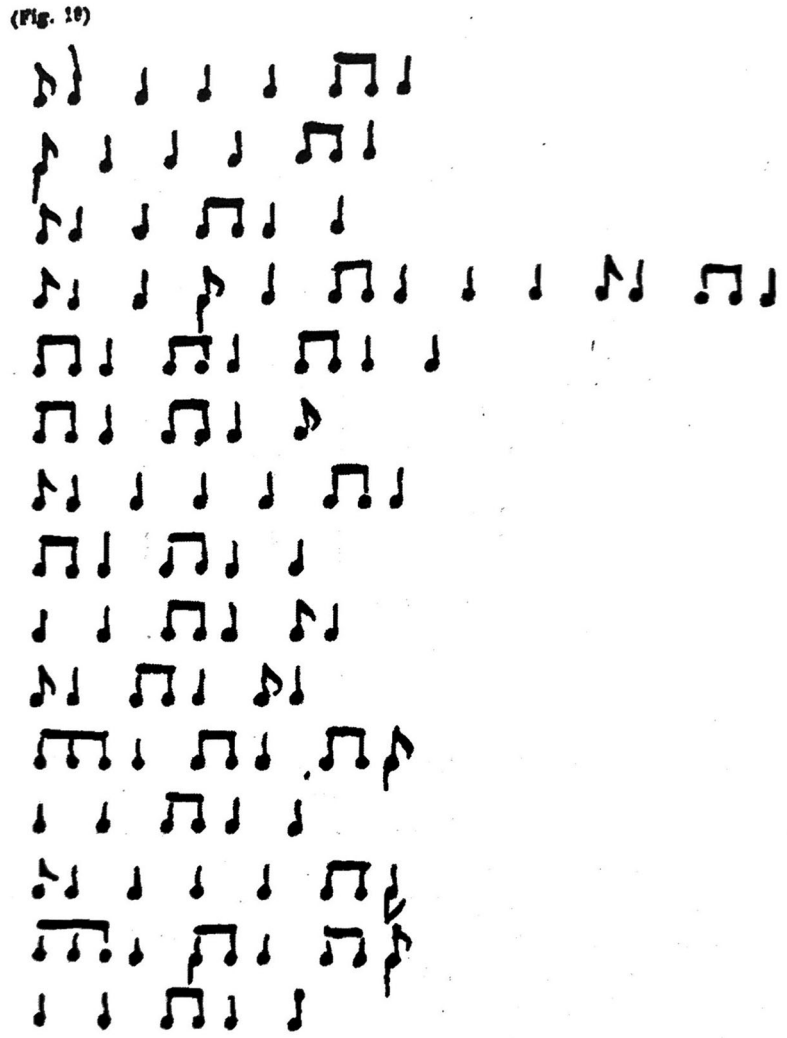
29. Meillet, *Les origines indo-européennes*, 30; see the rhythmic theories of André Mocquereau in *Le nombre musical grégorien*, vol. 1, which are themselves based on Mocquereau's study of poetic and philological scholarship.

30. Maurice Emmanuel, *Histoire de la langue musicale*, 2 vols. (Paris: Laurens, 1911), 1:127: "brutal, régulier, monotone."

31. Maurice Emmanuel, "Le 'rythme' d'Euripide à Debussy," in *Compte rendu du Ier Congrès du rythme*, 103–46.

32. Emmanuel, "Le 'rythme' d'Euripide à Debussy," 141: "*Le Rythme est*, en musique, *l'organisation de la durée*" (Emmanuel's emphasis).

FIGURE 1. Strings of unmetered durations representing Maurice Emmanuel's scansion of Euripedes's *Ion*.



"additive"—the accretion of variegated durational quantities—rather than "divisive"—the segmentation of time between regularly recurring strong beats (see fig. 1).[33]

33. Emmanuel, "Le 'rythme' d'Euripide à Debussy," 120–21.

Emmanuel's definition is both a summation of a philological argument and an incitement to creative action. He lauded the "refined" quantitative rhythm of the early Indo-European languages and idealized the "opulent" or "integral" rhythm epitomized by the ancient Greeks, for whom the rhythms of music, poetry, and dance coalesced in union, in stark contrast to the "indigent" rhythms of the present day.[34] In the years following his keynote, he brought Meillet's theories into the Conservatoire, where composers were required to attend his history course; lecture notes preserved in his private archives echo his adaptation of Meillet's theories, including his redefinition of rhythm as "not the division, but the organization of duration."[35] Among his students sat a young Olivier Messiaen, who won his history prize in 1928 and quoted Emmanuel's definition of rhythm in his own (posthumously published) *Traité de rythme, de couleur, et d'ornithologie* (*TRCO*).[36] There is a direct line of transmission, therefore, from Meillet's breakthrough in identifying the unmetrical, "additive" properties of Indo-European rhythm, through Emmanuel's musical adaptation of Meillet's theories in view of future composers, to Messiaen's turn to Indian and Greek rhythmic models as a means of structuring unmetered additive rhythm in the early 1930s, even if it is unlikely that he ever encountered Meillet or his scholarship directly.

Messiaen's engagement with the 120 deśītālas may be understood as a compositional manifestation of Meillet's scholarship on "Indo-European rhythm." The historical link between the metrical patterns of Vedic recitations and the regional rhythmic patterns enumerated in the medieval treatise of rgadeva is tenuous, although it is possible to see why Messiaen simplistically viewed the latter as a more accessible surrogate for the former. The rhythmic patterns in the rgadeva treatise were reproduced in Western notation in the chapter on Indian music by Joanny Grosset in the *Encyclopédie de la musique* of the Paris Conservatoire,[37] and Messiaen may have consulted these patterns on Emmanuel's advice, as Emmanuel's own chapter on Greek music immediately follows Grosset's.

34. Emmanuel, "Le 'rythme' d'Euripide à Debussy," 141–42: "une Rythmique affinée"; "opulente"; "intégrale"; "indigente."

35. Antony, L'association Les Amis de Maurice Emmanuel, Archives (F-ANT), history lecture notes, 1931–32: "non la division, mais l'organisation de la Durée."

36. Olivier Messiaen, *Traité de rythme, de couleur, et d'ornithologie (1949–1992)*, 7 vols. (Paris: Alphonse Leduc, 1994–2004), 1:41.

37. Grosset, "Inde," 301–4. Grosset's chapter was much used as a source for information on Indian "modes" by composers in Messiaen's orbit in the 1920s, including Emmanuel, Marcel Dupré, Charles Tournemire, and Albert Roussel. See Peter Asimov, "The *Melakarta*s and the République Modale: Naturalizing Indian Scales in French Musical Modernism," *Journal of the Royal Musical Association* 149, no. 2 (2024): 383–439.

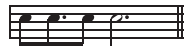
In any case, Messiaen's frequent comparative analysis of deśītālas and Greek rhythms in *TRCO* betrays, in appearance if not in substance, the specter of Meillet's and Emmanuel's comparisons of Sanskrit and Greek meters.[38]

Recent scholarship on Messiaen's borrowings from the deśītālas shows that he did not simply quote the patterns as given in Grosset's chapter, but derived from them structural principles relating to an additive "organization of durations" that he could then apply more broadly.[39] His account of apprehending the deśītālas conveys his analytical, quasi-philological aims: "I immediately sensed that it was an extraordinary find, I studied it, copied it, contemplated and reapproached it from every possible angle, for years, in order to grasp its hidden meaning."[40] The "hidden meaning," it turned out, consisted of the three durational principles he developed over the late 1930s: namely, (1) the "added half unit of value" (later shortened to "added value"); (2) "inexact augmentation/diminution"; and (3) "non-retrogradable rhythms." These principles, entirely personal to Messiaen, have nothing to do with Indian music theory as presented by Grosset or otherwise; in devising them, however, Messiaen effectively responded to the exhortations of Meillet and Emmanuel to replace the prevailing isochronic principle of art music with structures derived from the supposed golden age of classical "Indo-European" rhythm. Though deduced from Messiaen's analysis of the deśītālas, the techniques were in practice also applied as techniques of transformation to rhythms including the deśītālas themselves, a recursive procedure leading to the deśītālas' ultimate dissolution into increasingly abstracted durational patterns. This process is embryonically displayed in chapter 2 of *TLM* with reference to a single deśītāla called "Râgavardhana," which is cast as both the source of Messiaen's durational principles and an object upon which these principles may be exercised (see exx. 1a and 1b). This recursive phenomenon will take on increasing importance in the third part of this article.

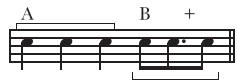
Messiaen's primary takeaway from the deśītālas during the 1930s was thus not simply rhythmic cells to borrow verbatim, but broader principles by which to organize duration. He would extend these principles and add others on the basis of continued rumination over the decades to come, culminating in *TRCO*, which contains scores of pages of remarks on the deśītālas compiled since the 1950s.[41]

38. See, for example, Messiaen, *TRCO*, 1:260–62, 273–305 passim.
39. Balmer, Lacôte, and Murray, *Le modèle et l'invention*, 344–51.
40. Messiaen and Samuel, *Music and Color*, 77.
41. Messiaen, *TRCO*, vol. 1, especially 264–305.

EXAMPLE 1A. Olivier Messaien, *Technique de mon langage musical* (*TLM*) (1944), ex. 3: "Râgavardhana, Hindu rhythm."



EXAMPLE 1B. *TLM*, ex. 5: Râgavardhana, retrograded and subdivided by Messiaen, thereby illustrating three durational principles: the "added value" (marked by "+"), "inexact diminution" (cell B in relation to A), and "non-retrogradability" (cells A and B individually).



Rhythms Multiplied: Pius Servien's Mathematical Poetics

Messiaen's additive approach to rhythm is a preliminary but insufficient precondition for his multidimensional formalism of the late 1940s, of which *Mode de valeurs* is the most conspicuous example. In that work, an additive, integer-based system of rationalizing durations is "multiplied," as it were, across other musical parameters including pitch, dynamic, and attack or timbre. I argue in this section that the rationalization of these other parameters also constituted an experiment in "rhythm" based on the work of two little-remembered theorists whose work Messiaen read in the year preceding his étude.

The argument for the relevance of "rhythmics" to those other parameters was advanced by the Romanian expatriate scholar Piu-Śerban Coculescu (1902–59), who published in French under the name Pius Servien. Servien's education in 1920s Paris encompassed advanced study in mathematics, literary history, philosophy, music, and philology—with teachers who included Meillet.[42] Servien sought to reconcile his dual vocation as poet and mathematician, beginning by analyzing the "tonic rhythms" of the French language in his doctoral research (1925). Already in that volume, he stretched the boundaries of rhythm's pertinence. In the introduction Servien established an analogy between symmetries experienced in space and rhythms experienced in time, suggesting that geometrical symmetries were fundamentally rhythmic: "all the arts," he ventured, "are governed by rhythm."[43] Rhythm's scope was further

42. See the excerpts from Servien's diary in Magda Stavinschi, *Nicolae Coculescu, o viață printre stele* (Bucharest: Eikon, 2016), 189, 193. Servien described Meillet as "the first linguist in France to find something in my book that interested him" ("primul lingvist al Franței care a găsit în cartea mea ceva care-l interesa"), following Meillet's favorable review of his work in the *Bulletin de la Société de linguistique* (1925). Quoted in Stavinschi, *Nicolae Coculescu*, 214.

43. [Pius] S[ervien] Coculescu, *Essai sur les rythmes toniques du français* (Paris: Presses universitaires de France, 1925), 15: "tous les arts sont régis par le rythme."

expanded in *Les rythmes comme introduction physique à l'esthétique*, with a subtitle indicating "new methods of analysis and their application, especially to music, the French language, and Doric meters" (1930). In this work Servien cast rhythm as a portal through which to translate "aesthetic facts" into numerical structures.[44] His ultimate ambition was to establish general methods for a mathematical aesthetics, for which his precondition was objective analysis by means of quantitative rationalization.

Servien developed a technique for quantifying the rhythms of French literary prose. His theories of linguistic rhythms perpetuated an essentialistic notion of language purity inherited from philology. He quoted Meillet's belief in meter's "spontaneous" emergence as though from within, a sublimation of "language's natural rhythm" rather than as an imitation of a "foreign" or external model.[45] He also followed Meillet's reversal in locating rhythm not in isochronic verse but in the "natural" rhythms of prose: "Prose, compared to verse, appears to us not more impoverished in its rhythms, but more free in its rhythms, often spontaneous and pure, untarnished by rhythms learned in advance." "Free," he insisted, "does not mean without rhythms."[46]

Servien illustrated prose's rhythmicity with a passage from Jean-Jacques Rousseau's *Julie, ou La nouvelle Héloïse*, which he often cited in published work and even read aloud during an eight-part program he presented on the Radio Nationale in 1948:

> le vorace épervier, le corbeau farouche,[47] et l'aigle terrible des Alpes, faisaient seuls retentir de leurs cris ces cavernes; . . . tout respirait ici les rigueurs de l'hiver et l'horreur des frimas; les feux seuls de mon cœur me rendaient ce lieu supportable, et les jours entiers s'y passaient à penser à toi.[48]

Representing the passage first with classical symbols (see ex. 2), Servien converted the scansion into a string of integers based on the number of unstressed syllables occurring between each stressed syllable: 3332 233 3333 132 3333 33323 32332.[49] This metadurational sequence constituted,

44. Pius Servien, *Les rythmes comme introduction physique à l'esthétique: Nouvelles méthodes d'analyse et leur application, notamment à la musique, aux rythmes du français et aux mètres doriens* (Paris: Boivin, 1930), 19–20: "faits esthétiques."

45. Meillet, *Les origines indo-européennes*, 14, quoted in [Servien], *Essai*, 98: "spontanément"; "le rythme naturel de la langue"; "quelque modèle étranger."

46. Servien, *Les rythmes*, 75: "La prose, comparée au vers, nous apparaît, non plus pauvre en ses rythmes, mais plus libre en ses rythmes, souvent spontanée et pure de rythmes appris d'avance"; and 77: "Libre, insistons, ne veut pas dire sans rythmes."

47. Oddly, Servien consistently misquoted Rousseau, who wrote, "le corbeau funèbre."

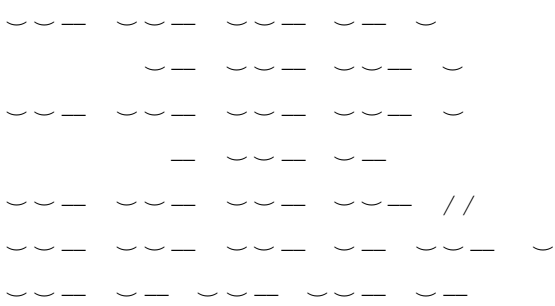
48. Jean-Jacques Rousseau, *Julie, ou La nouvelle Héloïse*, in *Collection complète des œuvres de Jean-Jacques Rousseau, citoyen de Genève*, 17 vols. (Geneva: Du Peyrou et Moultou, 1782), 3:178. Servien quotes this passage, or excerpts from it, in several of his published writings. See, for example, *Essai*, 29. For an audio recording of the radio broadcast, see Pius Servien, "Les rythmes prédominants en français" (broadcast July 7, 1948), Paris, Institut national de l'audiovisuel, INA thèque (F-Pinat), PHD86022826.

49. [Servien], *Essai*, 29.

EXAMPLE 2. Pius Servien's scansion of a passage from Rousseau's *Julie, ou La nouvelle Héloïse.*

Mais considérons le schème :

Le vor*a*ce épervier, le corb*eau* far*ou*che
Et l'*ai*gle terr*i*ble des *Al*pes
faisaient *seul*s retent*ir* de leurs c*ris* ces cav*er*nes
tout respi*rait* i*ci*
les rigu*eur*s de l'hi*ver* et l'horr*eur* des frim*a*s
les feux s*eul*s de mon c*œur* me rend*aien*t ce l*ie*u support*a*ble
et des j*our*s enti*er*s s'y pass*aien*t à pens*er* à *toi*



Est-ce du Pindare ?…

according to Servien, the passage's "quantitative rhythm"—which though irregular was not arbitrary, its recurrent but non-repeating patterns generating a quasi-poetic cadence.

While Servien's analysis of Rousseau followed convention in linking rhythm to the parameter of duration, he next sought to generalize rhythm further as "the perception of periodicity" ("périodicité perçue").[50] Periodicity was measured by the recurrence of an aesthetic phenomenon measured in integer values. As he would later put it, rhythm could be understood numerically as "a succession of whole numbers in which one can discover a simple law."[51] This principle of "periodicity" could apply not just to duration, but to any of the multiple parameters that composed a sound-unit. Servien explained:

> *Take a syllable of French: it is a sound-unit possessing intensity, duration, timbre, and pitch.* Pitch may vary by reader, so we'll set it aside. As for the other elements, they are more or less objective, and provide four different means of establishing a rhythm by means of syllables.

50. [Servien], *Essai*, 13.
51. Servien, *Les rythmes*, 22: "Suite de nombres entiers où l'on découvre une loi simple."

> *We must therefore, theoretically, distinguish four rhythmic components: an arithmetic rhythm based on the number of syllables; a prosodic rhythm based on their durations; a tonic rhythm based on their division into unaccented and accented; and a rhythm based on timbre.*[52]

Servien's sonic "components" loosely echo Mocquereau's notion of the "orders" of sound—"quantitative" (representing duration), "dynamic" (intensity), "melodic" (pitch), and "phonetic" (timbre), to which Mocquereau also added the "cinematic," or "properly rhythmic," referring to the ebbs and flows of phrasing.[53] For Servien, however, each of these "orders" generated rhythms through the periodic recurrence of recognizable attributes: a distinct level of intensity or volume; a distinct durational length; a distinct timbre; and, if not in language then in music, a distinct pitch. Such "periodicity"—which, he clarified, did not imply isochronism but just the perception of recurrence—produced so-called rhythmic "resultants" ("résultantes"). Servien mapped out recurrences and resultant rhythms by measuring each parameter on a numerical scale. The metadurational quantification illustrated by the Rousseau example could be applied to similar recurrences in other parameters. He also translated stress patterns from one parameter to another, positing equivalences between resultant rhythms of, say, intensive and durational stress.

Having first defined these categories with respect to language, Servien illustrated his theories using music.[54] Music, he wrote, consisted of "sonic matter capable of generating multiple simultaneous rhythms" in the dimensions of pitch, intensity, and duration. "One must pay attention to each of these rhythmic layers, not just one," he advised, "in order that their effects converge in the desired way."[55] He devised a system by which to numerically represent the metapitch and metadurational patterns of neumes and leitmotivs, as a means of hypothesizing the laws and limits governing the way

52. [Servien], *Essai*, 18: "*Découpons une syllabe dans une phrase française: c'est une unité sonore douée d'intensité, de durée, de timbre et de hauteur.* La hauteur seule semble presque entièrement soumise au gré du lecteur; nous la laisserons donc de côté. Quant aux autres éléments, ils sont plus ou moins objectifs et fournissent quatre manières différentes d'établir un rythme à l'aide de syllabes. *Nous devons donc, théoriquement, séparer quatre rythmiques composantes: une rythmique arithmétique, fondée sur le nombre des syllabes; une rythmique prosodique, fondée sur leur durée; une rythmique tonique fondée sur leur distinction en atones et accentuées; une rythmique fondée sur le timbre*" (Servien's emphasis).

53. Mocquereau, *Le nombre musical grégorien*, 1:28–30: "ordres"; "quantitatif"; "dynamique"; "mélodique"; "phonétique"; "cinématique"; "rythmique proprement dit"; "résultante." These "orders" were frequently cited by Messiaen; see Lundblad, "Universal Neumes," 486–87.

54. Servien's considerations on music were published in his *Introduction à une connaissance scientifique des faits musicaux* (Paris: Blanchard, 1929), summarized and expanded the following year in chapter 4 of his more widely read *Les rythmes comme introduction physique à l'esthétique*. Incidentally, Servien was also an amateur composer who self-published a series of constellation-inspired pieces for piano in the late 1950s.

55. [Servien], *Essai*, 122: "matériel sonore susceptible d'engendrer plusieurs rythmiques simultanées"; "on doit porter son attention sur toutes ces rythmiques, non sur une seule, de manière à faire converger leurs effets dans le sens voulu."

musical motifs could be transformed one parameter at a time while retaining a recognizable core identity, which he called an "invariant" (see ex. 3).[56] The niceties of Servien's eccentric analyses of musical themes are less significant for the present argument than three general characteristics of his analytical practice: his method of rationalizing all component sonic parameters in order to represent musical themes; his attention to the perception and transformation of recurrent features or "invariants"; and his consideration of all forms of recurrence as essentially *rhythmic*.

Servien worked peripherally to institutionalized musicology; certain ideas were developed more fully in philosophy and critical theory, where he was cited by scholars including Gaston Bachelard and Étienne Souriau. He was admired by Romain Rolland—who wrote that Servien's work constituted the "open-sesame" of French poetry[57]—and promoted by Paul Valéry, who contributed prefaces and afterwords to more than one of his books.[58] His theories are difficult to describe as rigorous: in Nicolae Balotă's apt appraisal, Servian's calculations often have the "naive appearance of primitive arithmology. . . . One may speak of flashes of insight, intuitions of an aesthetician unable to organize his ideas into a unified system."[59] It is easy to appreciate why his quixotic approach fell out of favor in the academy, even as it sparked various artists' inspiration.

Perhaps Servien's greatest advocate was his compatriot a generation his senior, Matila Ghyka (1881–1965), an aristocratic Renaissance man whose life of globe-trotting and hobnobbing makes for dizzying reading.[60] Ghyka, more than Servien, infiltrated Parisian artistic circles as a friend of Valéry and Léon-Paul Fargue and a frequenter of Natalie Clifford Barney's salon during the 1920s.[61] As an aesthetician, he is best remembered for his writings on the

56. Servien, *Introduction à une connaissance scientifique*, 12ff.: "invariant." Servien's notion of motivic transformation calls to mind Messiaen's "deforming prism," the composer's own method of transforming borrowed materials, including neumes (see Balmer, Lacôte, and Murray, *Le modèle et l'invention*, 42–46); any historical connection, however, is unlikely, as Messiaen established his technique before his first attested encounters with Servien's work.

57. Quoted in Pierre Lhoste and Jean Cassou, "Rencontre avec . . . Pius Servien" (audio recording of radio broadcast), F-Pinat, PHD88023057: "Pius Servien a trouvé le sésame-ouvre-toi de la poésie française." Servien dedicated *Introduction à une connaissance scientifique* to Rolland.

58. See Marin Bucur, "Valéry, promoteur des valeurs roumaines," *Europe: Revue littéraire mensuelle* 49 (1971): 133–39.

59. Nicolae Balotă, *Arte poetice ale secolului XX: Ipostaze românești și străine* (Bucarest: Minerva, 1976), 240: "Uneori calculele lui Servien au aspectul destul de naiv al unei aritmologii primitive. . . . Se poate vorbi, mai degrabă, de fulguraţii ale unei gîndiri, de intuiţii ale unui estetician care nu-ș i poate organiza ideile într-un organism unitar."

60. See Ghyka's autobiography, published in English as *The World Mine Oyster* (London: Heinemann, 1961). Ghyka described first meeting Servien when the latter was a ten-year-old boy accompanying his father, the astronomer Nicolae Coculescu, to view Halley's Comet. Stavinschi, *Nicolae Coculescu*, 162.

61. Ghyka's friend and relative Prince Georges Ghika was married to Liane de Pougy from 1910 until 1926.

EXAMPLE 3. Numerical representations of pitch and durational patterns of four leitmotivs in Wagner's *Tristan und Isolde* out of twelve analyzed by Servien. For "intervals," digits represent semitones ascended or descended (italics); for "durations," digits represent units of eighth or quarter notes, depending on the time signature, with primary accents in bold, secondary accents in italics. From top to bottom: "Longing" (in 6/8 and transformed to common time); "Desire" (in 6/8 and transformed to common time); "Glance" (in 6/8 and transformed to common time); "Deliverance by death" (in 6/8 and transformed to 3/4).

L'aveu :

	INTERVALLES	DURÉES
I)	8 *1* *1*	6/8 1 **5** 1 **6**
II)	*id.*	C 1 **4** 2 **2**

Le désir :

I)	1 1 1	6/8 **5** 1 **1** 3
II)	*id.*	C **3** 1 **1** 3

Le regard :

	INTERVALLES
I)	2 1 0 *10* 10 2 2 0 *2* 2 1 *7* 10 1 2 0 2
II)	*id.*

	DURÉES
6/8	*2* 3 1 **4** *2* *2* 3 1 **2** *6* 3 1 **2** 2 *4* 3 1 **2** 2
C	**6** *5* 1 **4** *4* **4** *3* 1 **4** **6** *4* 2 **2** *4* **6** *3* 1 **4** 4

La délivrance par la mort :

	INTERVALLES	DURÉES
I)	*3* *4* *4* 1	6/8 *2* 3 1 **2** 1
II)	*id.*	3/4 **2** 3 1 **2** 2

ce motif étant introduit par une petite gamme ascendante rapide.

Golden Section: his *Le nombre d'or: Rites et rythmes pythagoriciens dans le développement de la civilisation occidentale* (1931) is divided into two volumes on "rhythms" and "rites" respectively, and also features a glowing preface by Valéry. Rhythm is more pointedly the object of Ghyka's *Essai sur le rythme* (1938), in which he construed rhythm as a transcendent structural device permitting the "scientific" (by which he meant the numerical, often numerological) understanding of so-called "temporal" and "spatial arts," and especially prosody and geometry. He singled out Servien in his introduction for "the most remarkable writing on music and prosody since the day, long ago, when the Father of Mediterranean Aesthetics [Plato] established the intervals of the Great Scale—of what he called the Rhythm or the Number of the World Soul."[62] Ghyka cites several definitions of rhythm from Aristoxenus to a number of more contemporary references, but the work of Servien is by far his most frequent touchstone.[63] In Ghyka's chapter on music, Servien takes center stage: Ghyka paraphrases and condenses Servien's definition of rhythm as "the perception of periodicity," noting that "recurrences of intervals and of chords can introduce periodicities, and thus rhythms." He references the "parallelism" drawn by Servien between different types of accents (notably intensity and duration). And he echoes Servien's contention that melodies are characterized by multiple rhythms: a "rhythm of intensities, rhythm of durations, rhythm of pitches."[64]

It is possible to trace Messiaen's readings of Ghyka and of Servien in the archive and in *TRCO*. Judging by his notes and publications, it was likely Ghyka's work that Messiaen encountered first, and via Ghyka that he encountered Servien.[65] Messiaen copied the just-cited passage ("rhythm of intensities, rhythm of durations, rhythm of pitches") on a sketch page from the late 1940s, advising himself to consult Servien's book on the tonic rhythms of French.[66] Messiaen's library contained two of Ghyka's books, including *Essai sur le rythme*, and two of Servien's, including *Les rythmes comme*

62. Matila C. Ghyka, *Essai sur le rythme* (Paris: Gallimard, 1938), 11: "ce qu'on a écrit de plus remarquable sur le Rythme en musique et en prosodie depuis l'époque lointaine où le Père de l'Esthétique méditerranéenne établissait dans le *Timée* les intervalles de la Grande Gamme, de ce qu'il appelait le Rythme ou le Nombre de l'Ame du Monde."

63. Ghyka, *Essai sur le rythme*, 80. Messiaen poached several of these definitions in *TRCO*, 1:41–42.

64. Ghyka, *Essai sur le rythme*, 98–99: "les récurrences d'intervalles et d'accords peuvent réintroduire des périodicités, donc des rythmes"; "parallélisme"; "rythme des intensités, rythme des durées, rythme des hauteurs."

65. Messiaen's close friend and associate André Jolivet was also an enthusiast of Ghyka's *Essai*. Jolivet's annotated copy is preserved at Paris, Bibliothèque musicale La Grange-Fleuret, fonds André Jolivet. Former students also recall Messiaen's use of Ghyka, especially, in his teaching. See Alexander Goehr, *Finding the Key: Selected Writings of Alexander Goehr* (London: Faber and Faber, 1997), 52, and Gilbert Amy, "La classe Messiaen," in *Messiaen: La force d'un message: Actes de Colloque, Bruxelles, 04 et 05 mai 2012* (Brussels: Académie royale de Belgique, 2018), 25–34, at 27.

66. Paris, Bibliothèque nationale de France, Département de la Musique (F-Pn), VMC MS-174, 5.

introduction physique à l'esthétique.[67] In volume 1 of *TRCO*, he cites Ghyka and Servien frequently alongside Henri Bergson and Gaston Bachelard, philosophers of time and duration who have received far greater attention from intellectual historians and Messiaen specialists alike.[68] Citing his definition of rhythm as "périodicité perçue," Messiaen credits Servien with revealing "the rhythmic secrets of French prose and poetry" and identifying the "rhythm of intensities" and the "rhythm of timbres."[69] He transcribed wholesale Servien's analysis of Rousseau ("le vorace épervier . . . "), which he could have read in either of the Servien volumes he possessed, or perhaps even heard in Servien's hypnotic radio recitation in 1948. Servien's theories inspire rhythmic readings of poetic excerpts by Mallarmé, Éluard, and even Messiaen's mother, Cécile Sauvage.[70] Building on Ghyka and with additional reference to Mocquereau and Bachelard, Messiaen described the various rhythmic "orders" or "languages"—including the "rhythmic language of durations," the "rhythmic language of intensities," the "rhythmic language of pitches," and the "rhythmic language of timbres," followed by further rhythmic parameters of his own devising. Together, he wrote, these rhythms engender "polyrhythmic audition": a listener might perceive one plane of rhythm at a time; the totality of all the rhythmic languages at once; or an emergent, "supplementary rhythm, which is neither written, nor played, nor struck, but which is the *resultant* of all the other rhythms brought together."[71]

Interlude: Rhythms and "Race"

Before pivoting back to Messiaen's compositions, it is worth picking up the thread of race and identity, which was central to the question of

67. F-Pn, VM FONDS 30 MES-3 (12); VM FONDS 30 MES-5 (50). He also owned Servien's *Science et poésie* (1947) and Ghyka's *Philosophie et mystique du nombre* (1952).

68. Messiaen, *TCRO*, 1:41–42, 44, 55, 62–65. Bachelard also cited Emmanuel and Servien in his *Dialectique de la durée* (1936), while Servien begins his *Essai* by invoking Bergson's *Essai sur les données immédiates de la conscience* (1889). Bergson and Bachelard are the focus of Benitez, "Reconsidering Messiaen as Serialist." See also Andrew Shenton, "Observations on Time in Olivier Messiaen's *Traité*," in *Olivier Messiaen: Music, Art and Literature*, ed. Christopher Dingle and Nigel Simeone (Aldershot: Ashgate, 2007), 173–89; Benedict Taylor, "On Time and Eternity in Messiaen," in *Olivier Messiaen: The Centenary Papers*, ed. Judith Crispin (Newcastle upon Tyne: Cambridge Scholars, 2010), 256–80; and Christophe Corbier, "Bachelard, Bergson, Emmanuel: Mélodie, rythme et durée," *Archives de philosophie* 75 (2012): 291–310.

69. Messiaen, *TRCO*, 1:62: "les secrets rythmiques de la prose et de la poésie françaises."

70. Messiaen, *TRCO*, 1:62–63.

71. Messiaen, *TRCO*, 1:44–47: "le langage rythmique des durées"; "le langage rythmique des intensités"; "le langage rythmique des hauteurs"; "le langage rythmique des timbres"; "audition polyrythmique"; "un rythme supplémentaire, qui n'est ni écrit, ni joué, ni battu, qui est la résultante de tous les autres rythmes réunis" (my emphasis: recall the term "resultant" from Servien).

"Indo-European" rhythm and played a role in motivating Servien's and especially Ghyka's notion of "Mediterranean aesthetics."

If questions of race were only obliquely addressed in Meillet's comparative metrics, the historical role of race as a driver of Indo-Europeanist research, briefly sketched above, resonated more strongly in Maurice Emmanuel's research. With his own dual credentials as a classicist and a musician, Emmanuel looked to ancient Greek and more broadly "Indo-European" sources to replenish the modal and metrical resources of modern French music, even before his adaptation of Meillet's research on rhythm. In 1919, for example, he cited the rich modal music of the "Aryans of India," which the French—cast as "racial" relatives and inheritors of that tradition—would do well to reclaim.[72] The idea of a "racial" tradition and heritage surely nourished Emmanuel's rhythmic predilections and his conviction that French composers should seek models from ancient India and Greece. It was also part of the historical education he provided for his students at the Paris Conservatoire, as Panos Vlagopoulos has shown,[73] and as can be glimpsed in Emmanuel's archived lecture notes dating from years close to Messiaen's enrolment.[74] Joanny Grosset, the author of the encyclopedia chapter in which Messiaen read about the deśītālas, also evoked the "Aryan" identity of the ancient Indians.[75]

In the realm of scientific aesthetics, Ghyka, more explicitly than Servien, foregrounded the identitarian stakes of his analyses. He opened the *Essai* by referencing "the civilization we can call Mediterranean," highlighting the importance of Greek geometry as the source of "the technical and political supremacy of the white race."[76] The notion of a "Mediterranean civilization" might be understood partly as an extension of "pan-Latinism," an ideology with its roots in France but that had been embraced by large swathes of the Romanian political and intellectual classes since the nineteenth century. In that context, pan-Latinism served

72. Maurice Emmanuel, "Le corps de l'harmonie d'après Aristote," *Revue des études grecques*, 32 (1919): 179–89, at 189: "les Aryens de l'Inde."

73. Panos Vlagopoulos, "Le bras de Vénus et le corps d'Apollon: Généalogie de la morale et de l'idéologie musicale de Maurice Emmanuel," in *L'enseignement de Maurice Emmanuel: Musique, histoire, éducation*, ed. Christophe Corbier and Sylvie Douche (Sampzon: Delatour, 2020), 131–43.

74. In 1931, for example, Emmanuel began a discussion of ancient Greek music by remarking that "the Hellenes are Aryans who have been subjected to Asian influences, both Aryan and Semitic" ("Les Hellènes sont des Aryens sur lesquels se sont exercées toutes les influences des asiatiques, tant aryens que sémites"). See his history lecture notes from the early 1930s, preserved at F-ANT.

75. Grosset, "Inde," 274, 284. For a detailed discussion of Grosset and Indo-Europeanism, see Asimov, "The *Melakarta*s and the République Modale."

76. Ghyka, *Essai sur le rythme*, 13: "la civilisation que l'on peut appeler méditerranéenne"; "la géométrie grecque et le sens géométrique tel que le définit Platon . . . donnèrent à la race blanche sa suprématie technique et politique."

to enfold Romania within a broader confederation of the "Latin" nations of western Europe on the basis of their shared Romance languages and, by dubious extension, Latin "racial" heritage—and thus as a form of resistance against powerful Russian and Ottoman neighbors to the east.[77] Servien, for example, argued (echoing a cliché) that the lyricism of a "race" was reflected in its musical production, and proposed that renewing attention to the rhythms of the French language might bring about a veritable "musical drama of the Latin races" to rival Bayreuth.[78] Ghyka's substitution of Latinism with Mediterraneanism expanded the sphere "to highlight, beyond Ancient Greece, the role of Egypt and the Hebrew and Arab Semites."[79] Ghyka's inclusion of "Semites" in his construction of the "white race" has a precedent in nineteenth-century theories of racial classification (including those of Arthur de Gobineau and Ernest Renan), although the gesture is nominal inasmuch as Ghyka's principal frame of reference for "Western civilization" throughout his aesthetic theory remained Greece.

The racialized framing of these interwar studies—whether "Indo-European" or "Aryan" (following Meillet and Emmanuel), "Latin" or "white" (following Servien and Ghyka)—emerges as a counterpart to a competing, contemporaneous, and perhaps more familiar discourse regarding the rhythmic complexity of Black and especially African American musics, well established in studies of "Jazz Age" Paris.[80] Specifically, the additive, unmeasured notion of rhythm emergent from scientific poetics contrasts with the terms in which jazz rhythm, and frequently (by essentializing association) Black musical rhythm, was described by so many French authors around the beginning of the 1920s—with an emphasis on, as Darius Milhaud put it, "the constant use of syncopation."[81] This emphasis, however reductive, was omnipresent:

77. See Lucian Boia, *History and Myth in Romanian Consciousness* (Budapest: Central European University Press, 2001), chap. 1. Paul Valéry's support for Servien and Ghyka was bound up with his own support for the broader pan-Latinist and "Mediterranean" cause.

78. [Servien], *Essai*, 32, 126–27: "Drame musical des races latines."

79. Ghyka, *Essai sur le rythme*, 13: "pour souligner, en plus du rôle de la Grèce antique, celui de l'Égypte et des sémites hébreux et arabes."

80. As Jeffrey Jackson writes, "Despite the confusion during these early days, there was at least one common musical meaning when people in France invoked the term *jazz*: it meant rhythm and the instruments used to make it." Jeffrey Jackson, *Making Jazz French: Music and Modern Life in Interwar Paris* (Durham, NC: Duke University Press, 2003), 29. For critical discourse analyses of jazz and "race" in early twentieth-century France, all of which substantiate the emphasis on rhythm and syncopation, see Matthew F. Jordan, *Le jazz: Jazz and French Cultural Identity* (Urbana: University of Illinois Press, 2010); Jeremy F. Lane, *Jazz and Machine-Age Imperialism: Music, "Race," and Intellectuals in France, 1918–1945* (Ann Arbor: University of Michigan Press, 2013); Andy Fry, *Paris Blues: African American Music and French Popular Culture, 1920–1960* (Chicago: University of Chicago Press, 2014); and Laurent Cugny, *Une histoire du jazz en France*, vol. 1, *Du milieu du XIXe siècle à 1929* (Paris: Outre Mesure, 2014).

81. Darius Milhaud, "L'évolution du jazz-band et la musique des nègres d'Amérique du Nord" (1923), in Darius Milhaud, *Notes sur la musique: Essais et chroniques*, ed. Jeremy

Ernest Ansermet, writing in 1919, ventured to identify "syncopation" as the rhythmic manifestation of Black expression.[82]

If both jazz and poetics offered potential pathways toward rhythmic enrichment, the musical and cultural significance of these two models in French discourse could hardly be more different. Musically, the "syncopation" of jazz rhythm was "superposed on a backdrop of silent regularity, as essential as the circulation of blood or the beating of the heart," as Milhaud put it; in André Schaeffner's view, syncopation engendered "conflict" between "rhythm" and "measure."[83] In other words, syncopation, *ipso facto*, relied upon underlying mensural stability (i.e., isochronism). It is thus the exact opposite of the rhythmic potential afforded by scientific poetics—namely, the absence of a background isochronic metrical structure—that became the hallmark ideal of Emmanuel and Servien. Furthermore, the "free," additive rhythms of prose—whether Sanskrit, Greek, or French, whether described by Meillet, Emmanuel, Servien, or Ghyka—were cast as products of France's own cultural and "racial" heritage. Jazz's rhythmic qualities, conversely, were marked by an essential, racialized alterity at their source—an alterity that fostered either attraction or revulsion among French critics and composers.

Whether or not Messiaen was aware of or cared about "race" in formulating his rhythmic technique (he did not address the matter explicitly), these questions were part of his intellectual formation, embedded in the research agendas and findings of his sources with enduring musical and discursive resonances. Messiaen's own rejection of jazz, in contrast to many of his contemporaries, reflects his absorption of this opposition of rhythmic values, filtered through the largely naive discourses of the interwar critics, though without explicit racialization. His most revealing comments on the subject arose in discussion with Claude Samuel, who baited him by opining, "Traditional jazz is said to be 'rhythmic music.'" Messiaen's reply: "Jazz is based on a foundation of equal note values. Through the use of syncopation, it also contains rhythm, but these syncopations exist only because they're placed over equal note values, which

Drake (Paris: Flammarion, 1982), 99–105, at 100: "l'emploi permanent de la syncope." Surveying French jazz criticism, Matthew Jordan asserts that rhythmic syncopation or its absence mapped onto binaries of sickness and health, of Blackness and Frenchness (*Le jazz*, 26–28, 51).

82. Ernest Ansermet, "Sur un orchestre nègre" (1919), in Ernest Ansermet, *Écrits sur la musique*, ed. Jean-Claude Piguet (Neuchâtel: Éditions de la Baconnière, 1971), 171–78, at 175. Stéphen Chauvet, citing André Gide, also drew a racialized connection between Blackness and syncopation in his study of African music. Stéphen Chauvet, *Musique nègre* (Paris: Société d'éditions géographiques, maritimes et coloniales, 1929), 18.

83. Milhaud, "L'évolution du jazz-band," 99: "posée sur un fond d'une régularité sourde aussi essentielle que la circulation du sang, que les battements du cœur"; André Schaeffner, "Notes sur la musique des Afro-Américains" (1926), in André Schaeffner and André Cœuroy, *Le jazz* (Paris: Jean-Michel Place, 1988), 33–35.

they contradict. In spite of the rhythm produced by this contradiction, the listener once again settles down to the equal note-values that bring great tranquility."[84] Because of its reliance upon background meter, jazz represented for Messiaen the very negation of rhythm—it was no more rhythmic than a "military march." Messiaen perhaps had no desire or need to racialize a binary that could be expressed in "purely rhythmic" terms. However, the French constructions of racial difference that nourished scientific poetics at multiple junctures structured the opposition on which Messiaen's rhythmic theories and tastes were predicated.

Messiaen's Rhythmic Poetics, ca. 1949

In this final section I return to Messiaen's compositions to suggest how these two strands of scientific poetics—the "additive" organization of durations, following Meillet's comparative "proto-Indo-European" metrics, and the rationalization of multiple stress parameters to generate "resultant rhythms," following Servien's mathematical aesthetics—helped him develop novel rhythmic techniques, broadly conceived. Messiaen does not carry out a rigorous or transparent "application" of these theories to composition; rather, concepts and modes of thought introduced by these theorists sparked new ideas and connections, which he pursued with artistic license. This article is not the appropriate place for an exhaustive genetic account of Messiaen's rhythmic techniques as they developed over the 1930s and '40s.[85] Nor do I propose analyses of individual works in their entirety, which would entail broader attention to many other ingredients that contribute to his music. Rather, these readings illustrate how these two intellectual histories converge and manifest themselves in works from the late 1940s and early 1950s, with the aim of offering new contexts in which to interpret Messiaen's so-called experimental period, and ultimately, *Mode de valeurs*, the rhythmic étude that frames this article.

To view this convergence, it makes sense to begin by revisiting Messiaen's *Cinq rechants* (1948), the final installment of his so-called Tristan Trilogy (alongside the song cycle *Harawi* and *Turangalîla-Symphonie*), in which the programmatic Catholicism that had dominated his output to that point yielded to the cosmic romance shrouded in rich harmonies that Pierre Boulez found nauseatingly anachronistic. (In the conventional

84. Messiaen and Samuel, *Music and Color*, 68.

85. With Messiaen's archive at the Bibliothèque nationale de France having become increasingly accessible to researchers since 2016, such an examination merits fuller treatment elsewhere. For one reading of Messiaen's developing engagement with Indian rhythms from the 1930s based on preliminary sketch study, see Peter Asimov, "Comparative Philology, French Music, and the Composition of Indo-Europeanism from Fétis to Messiaen" (PhD diss., University of Cambridge, 2020), chap. 8.

periodization of Messiaen's oeuvre, *Cinq rechants* stands at the threshold of the "experimental period," his last published work before the *études de rythme*.) Commissioned to compose a choral piece for Marcel Couraud, Messiaen offered a new variation on the old theme of the fusion of poetic meter and musical rhythm. This idea is evoked in the work's title: "rechants" pays homage to Claude Le Jeune, whose sixteenth-century innovations in modeling rhythm on classical prosody, known as "musique mesurée à l'antique," gave Messiaen conceptual inspiration.[86] For Le Jeune and his contemporary *académiciens*, the "strictly quantitative meter of Greek and Roman poetry" provided a model for the treatment of musical rhythm.[87] Similarly, it was precisely the "quantitative" nature of meter in the early Indo-European languages that had been highlighted by Meillet via Emmanuel's 1926 paper.

In *Cinq rechants*, it is as though Messiaen "updated" Le Jeune's project in light of more recent philological research: rather than Greece and Rome, Messiaen upheld India as his model. Lyrically, he concocted what he called in the preface an "imaginary or pseudo-Hindu language,"[88] featuring such lyrics as "Niokhamâ palalan soukî mon bouquet tout défait rayonne" and "oumi annôla sarîsarîfloutî," liberally capped with circumflexes (the diacritic used in early twentieth-century francophone transliterations of Sanskrit instead of the macron favored today). And rhythmically, Messiaen foregrounded the deśītālas more pointedly than ever before, borrowing these formulas both verbatim (as unmodified durational patterns imported directly from Grosset's chapter)[89] and conceptually (applying the principles of durational organization that he derived from his analysis of them). These two modes of engagement are used jointly—recursively—in the unmeasured opening solo: Messiaen borrows the deśītāla called "laksmiça" (see ex. 4), characterized by the "inexact augmentation" of its durational ratios [2:3:4:8];[90] he then reapplies that principle to the same deśītāla, augmenting its durations in either

86. For a perspective on Messiaen's *Cinq rechants* from a Le Jeune specialist, see Isabelle His, "La Renaissance à défaut d'Antiquité: Olivier Messiaen analyste du *Printemps* de Claude Le Jeune," in *La musique, de tous les passetemps le plus beau: Hommage à Jean-Michel Vaccaro*, ed. François Lesure and Henri Vanhulst (Paris: Klincksieck, 1998), 235–49, and Isabelle His, *Claude Le Jeune (v. 1530–1600): Un compositeur entre renaissance et baroque* (Arles: Actes Sud, 2000), 407–15.

87. Downing Thomas, *Music and the Origins of Language: Theories from the French Enlightenment* (Cambridge: Cambridge University Press, 1995), 21. For a detailed study of Le Jeune and his techniques, see His, *Claude Le Jeune*, especially chap. 4.

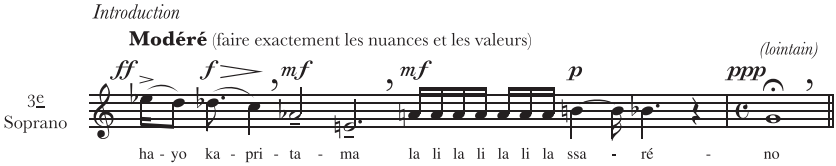
88. *Cinq rechants: Pour douze voix mixtes* (Paris: Rouart, Lerolle, 1949): "langue imaginaire ou pseudo-hindoue."

89. Sherlaw Johnson listed the deśītālas in *Cinq rechants* (*Messiaen*, 99).

90. Messiaen analyzed "laksmiça" precisely in terms of "inexact augmentation" in *TRCO*, 1:296.

EXAMPLE 4. The deśītāla called "laksmiça," as given in Western notation in Joanny Grosset, "Inde," in *Encyclopédie de la musique et dictionnaire du Conservatoire* (1913), with durational ratio [2:3:4:8].

EXAMPLE 5. The unmeasured opening solo of Olivier Messiaen, *Cinq rechants* (1948), with durational ratio [1:2:3:4:8:12].



direction such that laksmiça dissolves into the extended durational pattern [1:2:3:4:8:12] (see ex. 5).[91]

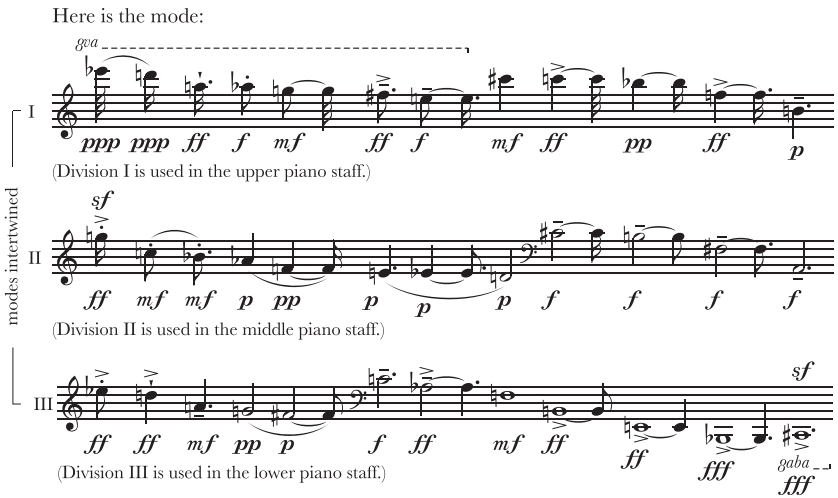
Such rhythms as are used in *Cinq rechants* bear no truer relation to Indian music than Messiaen's nonsense Sanskrit does to Vedic lyric. Even so, what prior commentators considered a "surprising amalgam" of Le Jeune's *rechants* and Indian-inspired music and text appears as less of a "contradiction" in light of Indo-Europeanist poetics.[92] Not just a site of Messiaen's exoticist fantasy, India becomes aligned with a classical poetic tradition, albeit an invented one, stretching from ancient Sanskrit via Greek and Latin to modern French, while the homage to Le Jeune invokes a French tradition of modeling musical rhythm on classical prosody.

The descending pitches, augmenting durations, and varied dynamics and articulations of the opening of *Cinq rechants* are strikingly similar to the modal profile of *Mode de valeurs*, such that one might even speak of this sequence of expanding durations as yet further extensions of laksmiça (see ex. 6). Here again the laksmiça rhythm evanesces into a prolonged sequence of inexact augmentation, with any explicit Indian associations airbrushed into a *style blanc*. But this incremental step short-circuits a significant leap: for what makes *Mode de valeurs* a "rhythmic

91. These ratios may be read as augmentation in two ways: three groups of two notes, augmented inexactly; or two groups of three notes, augmented exactly. The articulation markings favor the former reading.

92. His, *Claude Le Jeune*, 414.

EXAMPLE 6. The "mode" of *Mode de valeurs et d'intensités.*



étude" is more than its durational organization. The rhythms of *Mode de valeurs* extend to the multidimensional distribution of notes, each "component" of which has been assigned discrete values in a manner recalling Servien's rationalized system of musical representation, thereby generating simultaneous rhythms of pitches, rhythms of durations, rhythms of intensities, and rhythms of timbres, as Ghyka phrased it. The result is a radical dehierarchization of musical organization: rather than applying a melody (or a series) to a rhythm (in the conventional sense), pitch, duration, volume, and attack are fixed in each of the thirty-six notes of the "mode," and their deployment generates a composite, resultant "rhythm" across all parameters.

But if Servien's rationalizing representations undergird the conceptual construction of *Mode de valeurs,* this reformulation of rhythm as "the perception of periodicity" invites us to redirect attention from score analysis to our perception of the étude as it unfolds. As Messiaen instructed his étude's first listeners in Tunis, "Pay attention to the rhythm." For amid this gleaming constellation of thirty-six recurring sound-units, the listener must be selective. We might attune our ear to the periodic recurrences of a single sound-unit: the uppermost E*f*, for instance, with its frequent, chirping return at irregular intervals; or the lowermost C*s*, the bellowing return of which divides the duration of the work into three unequal periods; or anything in between. We might attune our ear transversally to a given intensive level, registering the notes marked "fortissimo" that

puncture the texture as they appear across the three staves, or the delicate *pianissimi* that stud the intensive accents like unstressed syllables tripping off the tongue. Messiaen's concept of "polyrhythmic audition" opens up innumerable perceptual pathways through the work, which may renew or complement themselves at each listening, generating the "infinitude of irregular periodicity" that is, as he puts it in *TRCO*, the etymological essence of rhythm.[93] If Messiaen's notion of "musique amesurée" was, following Mocquereau, Meillet, and Emmanuel, equated with a notion of "free rhythm," in *Mode de valeurs* that "freedom" is multiplied across dimensions of sound now considered properly "rhythmic." That is why Messiaen could claim that the apparent "constraint" of *Mode de valeurs* in fact "contained the potential of freedom, multiple freedoms, other freedoms."[94]

The logical progression that joins the apparently distant worlds of the Indian-inspired *Cinq rechants* and the rationalist *Mode de valeurs* thus begins to emerge in light of Messiaen's interest in scientific poetics as a source of rhythmic renewal. But these worlds are brought closer together in *Cantéyodjayâ*, a stand-alone work for solo piano composed in 1949 but withheld until 1953.[95] Initially described as an "essai rythmique" before Messiaen effaced the subtitle,[96] the work is a collage of intertextual references: its verse-refrain form recalls the *rechants*; its "albas" reference the troubadours; and myriad borrowings embed melodic and harmonic allusions to Ravel, Jolivet, and Messiaen's own earlier oeuvre.[97] (There is even a fleeting, unmarked passage of genuine twelve-tone technique, with prime, transposed, inverted, and retrograde forms, lasting only five measures—a reminder that the contexts of serialism are not absent from

93. Messiaen, *TRCO*, 1:39: "l'infini de la périodicité irrégulière." Citing the word's proto-Indo-European etymology (*√*sreu*, "to flow"), Messiaen writes, "Rhythm emerges from the movement of swells, the undulations of the waves of the sea. Early on, therefore, it was related to movement, but to movement that is repeated, with constant and new variation—that is, the infinitide of irregular periodicity."

94. Messiaen, *TRCO*, 3:131: "une contrainte qui contenait en puissance la liberté, plusieurs libertés, d'autres libertés."

95. The dating of *Cantéyodjayâ* is the subject of some confusion. The manuscript bears the date "juillet 1949" (F-Pn, RES VMA MS-1928); Messiaen crossed this out, and dated the work to 1948 on concert programs (Murray, "Le développement du langage musical," 439); Hill and Simeone, without reference to the manuscript, also argue that it was more likely composed in 1949 (*Messiaen*, 180). Messiaen may have misremembered the year he first attended Tanglewood, or have retrospectively wished to backdate the roots of the "total serialist" concept as much as possible.

96. F-Pn, RES VMA MS-1928; see also F-Pn, RES VMA MS-1537.

97. On borrowings from Jolivet and Ravel in *Cantéyodjayâ*, see Balmer, Lacôte, and Murray, *Le modèle et l'invention*, especially 206, 228–35; on self-allusions, see Gareth Healey, "Messiaen's *Cantéyodjayâ*: A 'Missing' Link," *Musical Times* 148, no. 1898 (2007): 59–72, at 61–62.

Messiaen's process, but neither are they where they have been most sought.)[98]

Cantéyodjayâ also combines both Indianist and rationalist approaches to structuring rhythm, further cementing the association between the two.[99] As in *Cinq rechants*, Messiaen employed deśītālas, now taking the novel step of labeling these rhythms in the score itself. Alongside these deśītāla markers, he elaborated his faux-Sanskrit lexicon, not only in the work's title, but also in designating various sections throughout the score's verse-refrain form. Interspersed among the pseudo-Indian refrains are verses of rationalist experimentation. One of these episodes is a "gamme chromatique des durées"—a rationalized technique of durational organization deployed in various prior works since *Vingt regards sur l'Enfant-Jésus* (1944); though the technique has been viewed as proto-serialist, Messiaen cast it as yet another durational conceit derived from the deśītālas, related to the principle of augmentation.[100]

Moreover, *Cantéyodjayâ* contains a prototype of the multidimensional rhythmic rationalism that Messiaen subsequently honed in *Mode de valeurs*. In the context of *Cantéyodjayâ*, this conceit is confined to about two pages, bearing the technical label "mode de durées, de hauteurs et d'intensités" ("attaques" were not yet part of the equation).[101] Messiaen places deśītālas and formal procedures on a similar paratextual plane, as though to restage the sublimation of deśītāla principles into their rationalized essence (see figs. 2a and 2b). But compared to *Mode de valeurs*, the technical description—with its references to duration, pitch, and volume (and with the term "intensités" in place of the "nuances" mentioned in *Cinq rechants*)—more precisely echoes the terms used by early twentieth-century philologists and scholars of poetics (including Meillet and Servien) to describe the parameters of linguistic stress. Messiaen's preoccupations with rhythmic Indianism and rationalism at the end of the 1940s thus represent neither a conceptual contradiction nor a dramatic swerve from the former to the latter, but rather two manifestations of his underlying interest in the intellectual field of scientific poetics, substantiated in his sketches and pedagogy.

Whereas *Cantéyodjayâ* teems with allusions, in *Mode de valeurs* Messiaen excised external references, adopting a technical and formalist language in a way that was new for him: for perhaps the most salient distinction

98. Healey, "Messiaen's *Cantéyodjayâ*," 69.

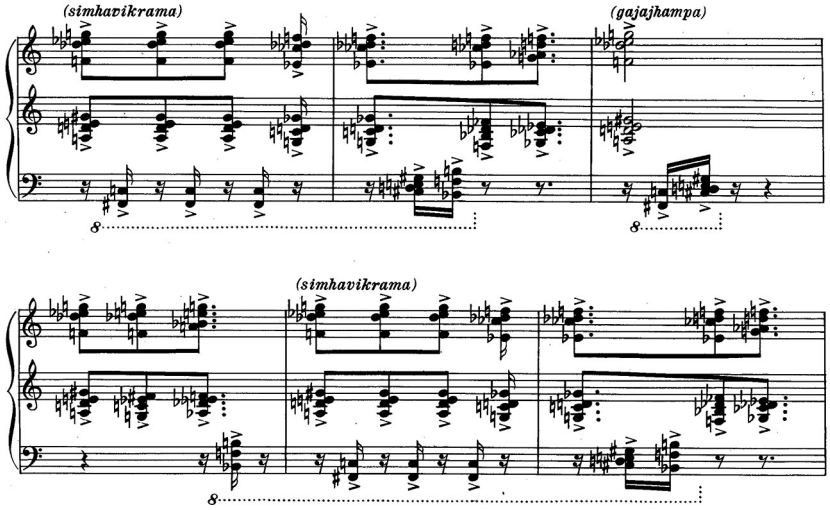
99. Healey also described *Cantéyodjayâ* as a crucial "link" in Messiaen's oeuvre, although for different reasons: Healey finds nothing to say regarding rhythm, summarily dismissing Michèle Reverdy's opinion that rhythm is the work's most interesting parameter ("Messiaen's *Cantéyodjayâ*," 68).

100. Messiaen, *TRCO*, 1:269, 304.

101. Notwithstanding the questionable chronology of *Cantéyodjayâ* (see above, n. 95), the consensus is that this "modal" section was composed prior to *Mode de valeurs*.

FIGURE 2A. *Cantéyodijayâ*, p. 8, mm. 1–8, above, with "mode de durées, de hauteurs et d'intensités."

FIGURE 2B. *Cantéyodijayâ*, p. 12, mm. 8–13, below, with deśītālas "simhavikrama" and "gajajhampa."



between *Mode de valeurs* and its predecessors is to be found not so much in any radical change of procedures as in in Messiaen's decision to foreground the technical means in his title rather than subordinate them to programmatic imagery. Boulez compellingly read Messiaen's approach to titles between 1949 and 1951 as an "open declaration of the dilemma in which the composer found himself": suspended between the surrealist imagery, biblical or otherwise, of his "poetic vision"—as in the *Île de feu* études or movements like "Les yeux dans les roues" and "Les mains de l'abîme" from *Livre d'orgue*—and the "aggressively technical" titles of *Mode de valeurs*, *Neumes rythmiques*, "Soixante-quatre durées," and "Reprises par interversion."[102] What sets *Mode de valeurs* apart from *Cantéyodjayâ*, therefore, is Messiaen's decision to make his rhythmic conceit coterminous with the work, in form and title—to allow forms to "generate a new musical poetics," as Boulez put it. By assimilating musical form and content in *Mode de valeurs*, Messiaen renounced the external references—whether to musical sources (borrowings) or his Catholic faith—with which he had previously justified compositional choices. This observation adds a layer of meaning to the notion of serialist "poetics": Messiaen leveraged his own austere, technical paratexts as a means of "performing" serialist aesthetics. To say that this pivot operates at the level of poetics is not to deny it substantive significance, however: the poetics of an apparently self-contained formalism is itself, perhaps, as helpful a way to conceptualize early serialism as any common musical denominator.

As far as titles go, however, one question remains: what about the "intensities" in *Mode de valeurs et d'intensités*? Why, of the four parameters operationalized in the étude, does Messiaen privilege intensities (i.e., dynamics) alongside the generic "values" in the work's full title?[103] Intensity was, after all, the parameter Messiaen most closely associated with Pius Servien and his analyses of the "tonic rhythms" of French.[104] When Servien recited the Rousseau excerpt on the Radio Nationale in 1948, he contended that its "rhythm of intensities" was born of the "distribution of more intensive syllables among less intensive syllables," and added, "One can see the relationship to music."[105] Tugging at this thread, I would like to suggest that intensities offer another, hitherto unobserved, analytical window into the construction of *Mode de valeurs*.

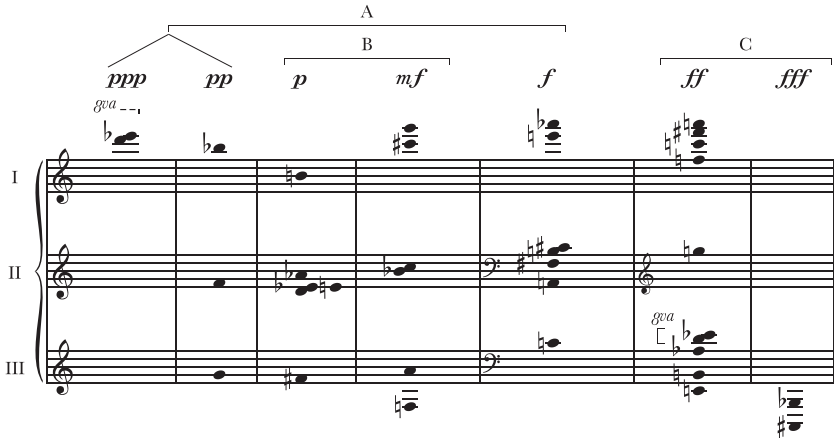
102. Pierre Boulez, *Orientations*, ed. Jean-Jacques Nattiez, trans. Martin Cooper (London: Faber, 1986), 414.

103. Messiaen referred elliptically to a "marked predilection" for intensities alongside durations in *Mode de valeurs* (*TRCO*, 3:131).

104. Messiaen, *TRCO*, 1:64.

105. Servien, "Les rythmes prédominants en français," F-Pinat, PHD86022826: "naît du retour de la distribution de syllabes plus intenses parmi les syllabes moins intenses. On entrevoit la parenté avec la musique." Recall the critic P.V.'s remark about Messiaen's études revealing the "tonic accents" of music.

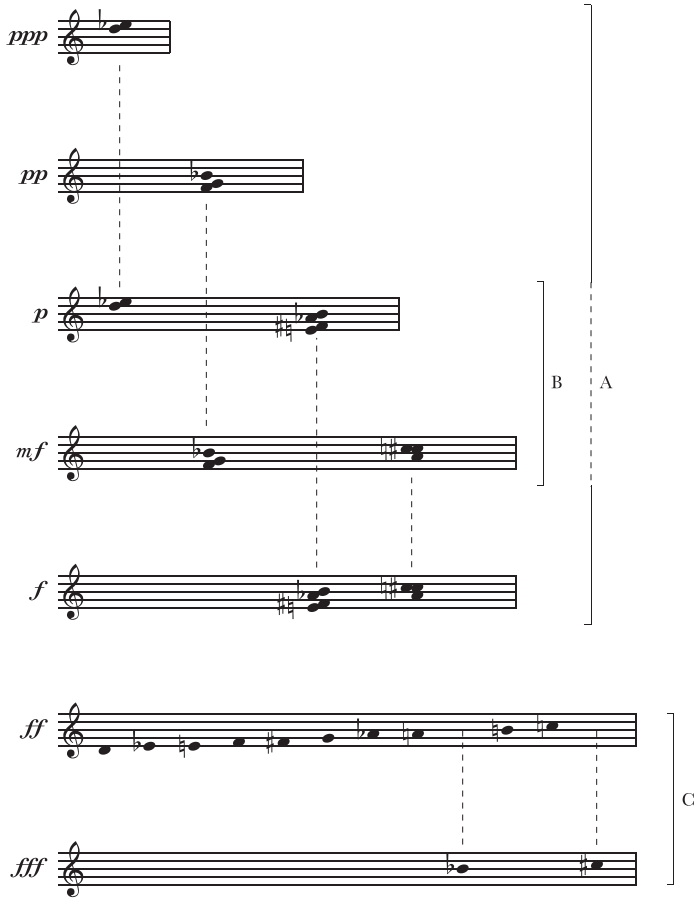
EXAMPLE 7A. The "mode" of *Mode de valeurs et d'intensités*, organized horizontally by Messiaen's three "divisions" and rearranged vertically by intensity (dynamic). The representation shows at once the three twelve-tone aggregates emergent from Messiaen's "divisions" (horizontal), and the three twelve-tone aggregates emergent from dynamic classifications (A: *ppp–pp, f*; B: *p–mf*; C: *ff–fff*).



Messiaen presented the étude's central mode of thirty-six sound-units in terms of three twelve-note "divisions," each comprising the twelve-tone aggregate, and ordered according to increasing multiplications of a basic unit of duration—extending the inexact augmentation principle as discussed above (see again ex. 6). Displayed thus, the distribution of intensities across the mode does not follow any obvious pattern (although analysts have observed the clusters of similar consecutive dynamics, as well as the general trend toward louder dynamics in the lower register).[106] But reorganize the presentation of these same notes by dynamic category instead of by descending pitch, as in example 7a, and a remarkable feature

106. Sherlaw Johnson, *Messiaen*, 105. Other efforts to analyse *Mode de valeurs* in terms that extend beyond Messiaen's own analytical commentary include Klaus Schweizer, "Olivier Messiaens Klavieretude 'Mode de valeurs et d'intensités,'" *Archiv für Musikwissenschaft* 30, no. 2 (1973): 128–46; Toop, "Messiaen/Goeyvaerts," 143–52; Kate Covington, "Visual Perception vs. Aural Perception: A Look at 'Mode de valeurs et d'intensités,'" *Indiana Theory Review* 3, no. 2 (1980): 4–11; Michael Stegemann, "Olivier Messiaen: *Mode de valeurs et d'intensités*," in *Werkanalyse in Beispielen*, ed. Siegmund Helms and Helmuth Hopf (Regensburg: G. Bosse, 1986), 360–69; and, most thoroughly, Paul Francis McNulty, "Olivier Messiaen: The Reluctant Avant-Gardist—a Historical, Contextual and Analytical Study of the *Quatre études de rythme* and the *Livre d'orgue*" (PhD thesis, Durham University, 2014), chap. 6.

EXAMPLE 7B. A schematic representation of example 7a, reduced to pitch class and sorted by intensity, showing complementary pc set relations within groups A, B, and C.



emerges: in addition to the twelve-note aggregates in the horizontal divisions, the distribution of pitches also yields three twelve-note aggregates in the vertical axis, clustered into three groups of dynamic levels: *ppp–pp*, *f* (group A), *p–mf* (group B), and *ff–fff* (group C). The intricately conceived distribution of the aggregate into these three groups is more easily apprehended in example 7b, with pitches consolidated into a single octave-space. This visualization moreover shows how the apportionment of pitches to the dynamic bands of groups A and B is batched into recurring two- to

four-note pc sets, combined in sequence across the first five dynamic bands; group C, meanwhile, features a ten-pitch set at the *ff* level, with the completion of the aggregate at the *fff* level. Intensities therefore offer another twelve-tone pathway through the work, with periodic utterances at a given intensive level amounting to subsets of the twelve-tone aggregate that cut across the stave divisions. The easiest of these to perceive is group C: the *ff* notes already stand out from the texture and build tension as we await the low *fff* attacks that complete the aggregate—a gesture reminiscent of Webern.

Indeed, there is more serialism in *Mode de valeurs* than Messiaen let on, or than analysts have noticed—yet it is to be found where others have not looked. The distribution of the twelve pitches across the seven intensities is so systematic as to suggest that such a schematization may have been a crucial step in Messiaen's conceptual and compositional process. Intensities, thus, are a key parameter in understanding *Mode de valeurs* from a genetic perspective, prompting us to rethink the étude as an exercise in serializing "rhythms of intensities."

Conclusion

If I have focused on *Mode de valeurs* at the expense of the three other rhythmic études of Messiaen's set, it is because of this work's enduring, totemic significance in music historiography and analysis—even as facets of its intellectual genesis and formal construction have remained obscure. The contexts of scientific poetics promise to help elucidate more of Messiaen's work than has been surveyed in this article,[107] but the fullness of his rhythmic mission was hidden at the time by the serialist fervor that grew out of *Mode de valeurs*. In a 1952 radio lecture on compositional trends among young composers, Messiaen acknowledged the significant force of the serialist movement in France: "We may affirm, without fear of error, that nearly all young French composers are serialist dodecaphonists." He placed himself in another category, however: "I remain the only researcher in the realm of rhythm, a fact I must admit with sadness."[108] It is as though he were already lamenting the unexpected manner in which his étude was received.

107. To give one example, Servien's concept of "invariants"—and his application of the concept to "neumes"—is pertinent to *Neumes rythmiques*, the third rhythmic étude, composed immediately prior to *Mode de valeurs*. This context complements Lundblad's reading of *Neumes rythmiques* alongside Mocquereau's "rhythmic orders" ("Universal Neumes," 487–90).

108. Olivier Messiaen, "Jeune musique," episode 4 (recorded 22 January 1952), F-Pinat, PHD88013970: "On peut affirmer sans crainte d'erreur que presque tous les jeunes français sont dodécaphonistes sériels"; "Je demeure le seul chercheur du rythme, il faut l'avouer avec tristesse."

To be sure, Messiaen's students reflected upon rhythm in their own ways. Even so, the distinct intellectual premises underlying Messiaen's and his students' theories, and the disjuncture between his poetically infused theory of rhythm and his students' serialist one, are neatly encapsulated in the well-known objection raised by Stockhausen to Messiaen's approach to "serializing" rhythm. Stockhausen argued that Messiaen's method of establishing a mode of durations (i.e., multiples of a single basic unit), a linear operation, was an inappropriate analogue for the division of the octave into twelve pitches, the result of a logarithmic operation.[109] Yet while Stockhausen's argument reflects the conceptual application of a serialist prerequisite (the twelve-part division of the octave coupled with a principle of octave equivalency) to the durational parameter, Messiaen's mode of durations is, conversely, a creative extension of philological notions of quantitative meter based on integers and their additions. If his wide-ranging statements about rhythm appear esoteric, to his students and contemporary readers alike, that is partly because they have not been understood in the context of the broader, interdisciplinary field of rhythmics with which they are in dialogue.

From the time of its emergence after the "Zero Hour," total serialism derived power from its claims of rationalism and objectivism—qualities presumed to represent a "universal" and self-sufficient formal language devoid of external referentiality. In contrast, the context of poetics shows how the very forms of a work like *Mode de valeurs* bear the imprint of highly contingent intellectual histories and cultural mediations with deep ties to the interwar era, including investments in the very types of identitarian constructions that serialist discourses concerning "formal autonomy" purported to deny or even purge. By recuperating the role played by the field of rhythmics—starting here with the more precise role of scientific poetics—we thicken and complicate a tenacious teleological narrative of modernist music history.

ABSTRACT

Interpretation of Messiaen's piano étude *Mode de valeurs et d'intensités* (1949) as an exercise in the application of serialism to parameters beyond pitch has enshrined the work as a milestone in modernist music historiography. This article brings to light another intellectual current that played at least as significant a role in his formal experimentation during

109. Karlheinz Stockhausen, "... How Time Passes ...," trans. Cornelius Cardew, *Die Riehe* (English version) 3 (1959): 10–40.

this period, namely the scientific study of poetic rhythm. I begin by sketching how Messiaen's pursuit of additive rhythmic techniques drew from linguist Antoine Meillet's breakthroughs in the field of comparative metrics—specifically, his efforts to reconstruct "proto-Indo-European rhythm." I then focus on the efforts of two little-known Romanian expatriate scholars—Pius Servien (1902–59) and Matila Ghyka (1881–1965)—whose efforts to rationalize poetic lyricism, tone, and stress via numerical (and numerological) techniques of literary analysis shaped Messiaen's multidimensional rhythmic formalism, which was applied to parameters other than duration by the late 1940s.

Drawing together published texts, scores, and documents from Messiaen's archive and library, this article addresses both historians and analysts, engaging the emerging field of "critical rhythm" to reveal crosscurrents of knowledge production, identity politics, and composition subsequently obscured beneath the universalizing and objectivizing discourses associated with postwar high modernism. This historical depth culminates in renewed readings of works, including a previously unobserved analytical insight into the composition of *Mode de valeurs* itself, bringing added complexity to long-standing debates regarding Messiaen's so-called experimental period and his serialist practice.

Keywords: Olivier Messiaen, postwar modernism, French music, serialism, scientific poetics, critical rhythm