

[Epigraph]**[Slide 1]**

One of the special properties of music. . . is that we may often abuse, even with success, the liberty we have to vary it infinitely.

—Rameau, *Treatise on Harmony*, p. 135

[Introduction]

Who may speak for music? On what authority may one divide what music is from what it is not, by declaring certain sounds as music and others as noise? How may those who are not musicians stake a greater claim to this authority than musicians themselves, and what compels musicians to acknowledge such a claim? And how might such an acknowledgement transform the sense of hearing that makes music audible? I ask these questions to come to terms with a unique event in music history: the birth of acoustics at the beginning of the eighteenth century. While today we canonize the so-called “common practice” of Baroque musicians, we forget the Baroque acousticians’ claim to musical expertise, based not on their ability to mimic the sounds of practice, but rather to reinvent music with the sounds of reason. The acoustic community’s disruption of the musical community is a *political event* in the sense of Jacques Rancière: that is, a demonstration of equality produced through the logic of sound itself.

[Politics of language]

Rancière founds his politics on a radical equality: namely, the equal capacity of all to speak intelligibly. A community defines itself through a rejection of this equality: those within the community hear their own voices as meaningful speech, and the voices of the excluded as meaningless noise. In other words, the community’s principle of exclusion is a listening apparatus that distinguishes sense from nonsense. For an action to be *political*, it must disrupt and reconfigure this apparatus, not through an exchange of power, but through a demonstration of logic—*logos* in the most basic sense—that exposes the apparatus’s contradiction. Rancière illustrates this political logic through the fable of the Roman plebeians’ secession, as written by Ballanche. “The entire issue at stake,” writes Rancière, “involves finding out whether there exists a common stage where plebeians and patricians can debate anything.”

The position of the intransigent patricians is straightforward: there is no place for discussion with the plebs for the simple reason that plebs do not speak.

They do not speak because they are beings without a name, deprived of *logos*—meaning, of symbolic enrollment in the city. . . . Between the language of those who have a name and the lowing of nameless beings, no situation of linguistic exchange can possibly be set up, no rules or code of discussion. This verdict does not simply reflect the obstinacy of the dominant or their ideological blindness; it strictly expresses the sensory order that organizes their domination, which is that domination itself. Before becoming a class traitor, the consul Menenius, who imagines he has heard the plebs speak, is a victim of sensory illusion.

The hallucination of consul Menenius is a political event: it creates a paradoxical situation in which the social inequality of the plebs as excluded members of the community contradicts their theoretical equality as speaking beings. The contradiction is exposed most fully when Menenius *addresses* the plebs:

From the moment the plebs could understand Menenius's apologia—the apologia of the necessary inequality between the vital patrician principle and the plebeian members carrying it out—they were already, just as necessarily, equals. The apologia implies an inegalitarian partition of the perceptible. The sense necessary to understand this division presupposes an egalitarian division that puts paid to the former, but only the deployment of a specific scene of revelation gives this equality any effectiveness.

We see here the tension between politics and what Rancière elsewhere will call *ethics*. Ethics, as defined by Rancière, “amounts to the dissolution of norm into fact”:

Before signifying a norm or morality, the word *ethos* signifies two things: both the dwelling and the way of being, or lifestyle, that corresponds to this dwelling. Ethics is the kind of thinking in which an identity is established between an environment, a way of being and a principle of action.

Menenius's speech writes off the plebs' lack of *logos* as a condition of being and an unavoidable property of the city. “‘Your misfortune is not to be,’ a patrician tells the plebs, ‘and this misfortune is inescapable.’” This ethical logic explains the norm as a fact, to justify the principle that the city *should remain* unequal. But this logic is contradicted by the logic of politics: the very fact that he is speaking to the plebs, who understand him and are understood in turn, exposes their equality as speaking beings and transforms the environmental norm. In this way, Rancièrian ethics and politics always work at cross purposes. Ethics tries to prove that there is no possibility other than *what is*; politics

works, instead, by eradicating that possibility.

[Politics of Sound]

Rancière bases his politics on the equality of *logos*, the faculty of meaningful speech. I propose a similar politics based instead on the equality of *harmonia*: the ability to create meaningful sound relations, or music. Yet to imagine a distinction between *musicians* and *non-musicians* is to claim precisely the opposite: that harmony is a gift reserved for few. At the beginning of the eighteenth century, the intrusion of harmonic politics into music by way of *acoustics* threatens to overturn the foundations of music, and provokes a response that, like the speech of Menenius, can do no more than confirm its own contradictions.

[Sauveur]

[Slide 2] *The occasion on which I have found myself asked to explain the theory of music to enlightened princes, and to persons of profound intellectual qualities, leads me to remark that those who are attached to speculative music have had in view only a limited number of properties of sound, and in particular only the practice of singing in use at their time. With respect to the systems of music, they are content to take what others have changed little by little, as taste in music changes. So far as I know, no one has taken a more serious look at the matter or regards it as the object of a science superior to music.*

Thus, in the second year of the eighteenth century, does Joseph Sauveur invent the science of “sound in general,” which he baptizes “acoustics.” Acoustics is superior to music on two counts. First, as a rational science, it is not subject to the whims of taste, practice, or history. Second, as a rationalization of sound in general, it encompasses and exceeds music’s rationalization of “sounds agreeable to the ear.” These two points, taken together, establish one peculiar acoustic agenda of the eighteenth century: to discover the reasoned harmony that lies beyond an arbitrary musical practice. Sauveur does not establish a science of sound that is indifferent to music; to the contrary, his acoustics will *interrupt* and *correct* music, to transform the false harmony of practice into the true harmony of science. As he writes, acoustics will not only “explain the nature of sound, the organ of hearing and in some detail all the properties of sound,” but will also “reach agreement with respect to the consonance and dissonance of sounds which are of importance in music.” Doubtless, an agreement between sound-scientists is more credible than the agreement of musicians, who understand only the current manner of singing or playing.

Sauveur's contribution to eighteenth-century musical thought is the political logic of harmony: a logic that exposes a harmonic order exterior to music, and imposes that order on musical practice, to rationalize an irrational art. The intervention of eighteenth-century acoustics into music marks a decisive moment in the politics of sound by "making understood as discourse what was once only heard as noise." Musicians, for the first time in history, must defend their practice from the effects of an equalizing harmony.

[Disagreement]

Given the polemical nature of acoustics, Sauveur's prediction that his new science will help speculative musicians "reach agreement with respect to the consonance and dissonance of musical sounds" is ironic. Certainly, eighteenth-century acoustics will transform music by making harmonic sense of noise beyond the boundaries of musical practice. But, in Rancièrist fashion, the effects of these demonstrations will be unpredictable, and the disturbance they produce will not reconcile the ethics of musical practice with harmonic politics. It *cannot*, because these terms are fundamentally irreconcilable; "ethical politics" and "rational practice" are oxymorons.

[Consonance and Dissonance]

Baroque musicians and acousticians will have little trouble agreeing on music's *consonances*; octaves, fifths, and major thirds are pleasant to hear and amenable to various geometrizations of the vibrating string. [Slides 3, 4, 5] Here, the accidents of practice, taste, and history elegantly correspond to the mathematical certainties of science. Consonance, then, is uncontroversial, and if music were simply the art of "sounds agreeable to the ear," as Sauveur first defines it, then the integration of practical and acoustic harmony might be trivial. But musical practice has its own disagreeable noise; Sauveur admits as much when he speaks of consonance *and dissonance*. The dissonance of musical practice contradicts the dissonance of Baroque acoustics. Acousticians can expose the gap between rational and irrational noise, and may substitute one for the other, but they cannot erase the difference between the two. It is these dissonances that make the dream of an acoustically reasonable practice of music impossible, but that also allow acousticians to stake their claim to musical expertise.

[Chords]

Rancière writes that "politics occurs when there is a place and a way for two heterogenous processes to meet." Eighteenth-century acoustics and music meet by way of the *chord*, and

its double meaning. **[Slide 6]** As we may see in this example from Rameau's *Treatise on Harmony*, chords make the intersection of acoustics and music possible through an equivocal representation. The musician makes sense of them by interpreting them as sonorities with a certain duration. Though they are blocks of sound lacking rhythmic or melodic variety, they are musical sounds nonetheless, suitable for chorale singing and simple keyboard accompaniment. Furthermore, they are the building blocks of more elaborate realizations: particularly in the Baroque, the chord is pliable, and a good musician knows how to vary chords by arpeggiating them and imposing patterns upon them. The acoustician, on the other hand, may interpret chords in an idealized space and time: the space of the vibrating string, and a mathematical time that may be instantaneous or infinite. In this case, Rameau combines the consonances we heard earlier with other notes to demonstrate a major chord. He aids the acoustician's reading by representing each note as a string divided into equal parts: the notches on each string are the nodes that remain motionless as the string vibrates. He writes the frequencies of each vibrating string as values with respect to the fundamental, which is labeled with the number 1. Meanwhile, he supports the musician's understanding with an appropriate choice of musical clefs and note names. The major chord is doubly meaningful: both taste and science demonstrate its naturalness. But the possibility of a dual representation for sound in general leads to disagreement more easily than agreement. It makes possible the polemical exchange of harmonies; through it, the experimental harmony of acoustics becomes sensible to musicians, who cannot help but reject it as impractical, but whose rejection merely confirms their ability to understand it and put it into practice. In short, the notation of chords makes harmonic politics possible.

[Tables]

The *place* of this politics is the chord table, where acoustics stakes its claim against the harmony of musical practice, challenging it with its own harmony. The ambiguity of chords suggests two distinct principles for their arrangement. As musical objects, chords written in sequence become practical exercises and short compositions. But chords are also objects of acoustic properties, and their layout may expose *harmony* in its mathematical sense, as the ideal relations of a geometry that belongs to everyone in equal measure. If there is no royal road to geometry, then musicians have no privilege to their harmony either. Acousticians dispute the practical limits of dissonance in the chord table's heterogenous space of geometry and composition, to confound the harmony of practice with the harmony of reason.

[Euler]

This reasoned harmony in its most contentious form appears in Leonhard Euler's *Attempt at a New Theory of Music*. In 1739, the young mathematician and acoustician, having already written a dissertation on the propagation of sound, rejects the ethics of musical practice completely. Working from the principle that "nothing happens in the world without a rational basis," Euler argues that "the explanation of pleasure or displeasure should be sought not only in the object itself but in the senses by which the image of the object is represented to the mind; and also attention should be given to the powerful judgement which the mind itself forms concerning the object under consideration." In other words, Euler refuses to acknowledge a taste independent of reason. When "some harmony, initially displeasing, begins to please us, and conversely," it is not because taste and reason follow different logic, but rather because the mind is confused, and unable to perceive the order that would make taste consistent: "our minds are not pleased purely by chance." Euler sets himself the task of illuminating that order through a tabulation of his own. He proposes an infinite gradation of "degrees of agreeableness," and derives a formula, based exclusively on the mathematical relations of tones, to determine this value for any harmony. The unison, of course, is most agreeable of all, and harmonic ratios made up of the smallest and fewest prime factors are most agreeable after that. But Euler's acoustic logic, unlike musical practice, places no limits on sonic disagreeableness. A harmony may have large prime factors, or involve several different factors, but Euler's theory still *accounts for it*. [Slide 7] To demonstrate this, the acoustician produces an immense table spanning three pages and hundreds of chords, from the simple consonances of the unison and octave to noises that defy both the harmonic customs and physical limitations of Baroque musical practice.

Euler does not expect his readers to simply *read* these unfamiliar harmonies, but to *play them* as well. To dispel any impression that his extravagant harmonies are not meant for practice, Euler writes the chord table in two ways: first, in dense staff notation, and second, in figured bass notation—that is, as a bass line with numbers representing intervals above each note: the number 2 for the interval of a second, 3 for a third, and so on. A note, read with its corresponding figures, produces, of course, a chord. Figured bass notation translates Euler's ideal harmonies into practical chord progressions. [Slide 8] This is eighteenth-century acoustics' most radical challenge to the ethics of musical practice. It refuses any concession to musical taste or history beyond the polemical adoption of the musician's notation; it transforms the Baroque listening apparatus by rendering inaudible noise as audible harmony; and it compels the community of musical common practice to acknowledge what it must exclude to define itself.

[Rameau]

Euler's harmony reveals how much is at stake in the question of harmonic expertise. If acoustics contradicts the logic of musical practice, then the foundations of music are up for grabs. The Baroque musician cannot help but respond to this challenge, by trying to use acoustics to justify practice, not to reinvent it. More than any other musician of the eighteenth century, it is *Rameau* who tries to close the gap between the contradictory harmonies of acoustics and musical practice. But like consul Menenius, he can only expose the contradiction between politics and ethics.

[Slide 9] This chord table from Rameau's *Treatise on Harmony* illustrates the conflict between acoustic taxonomy and the practical principles of composition. The lower staff represents what Rameau calls a "fundamental bass." Without a doubt, one may interpret the fundamental bass as music. Like Euler's example, it is legible as a figured bass. **[Slide 10]** But, Rameau claims, it is more than a figured bass—it is also an acoustic abstraction that generalizes harmonies into two fundamental chords: the triad, which is the source of all consonances, and the seventh chord, which is the source of all dissonances. The notes on the four upper staves, read as they appear, form a progression of chords that negotiates both the mechanical principles of the fundamental bass and the compositional principles of good counterpoint—or, in other words, "the principles of singing in use at Rameau's time." Rameau, torn between composition and acoustics, takes care to realize his fundamental bass as musically as possible: there is little in this particular progression that would offend the Baroque musician's logic. The bass, like any good Baroque bass, is jagged and irregular, while the treble is melodious and smooth. **[Slide 11: bass; slide 12: treble; slide 13: all four parts]** The example also begins and ends as it should, with a root-position triad. Viewed and heard in this way, there is little that is subversive about Rameau's harmony; it may seem, even, that he has squared the circle by finding an acoustic justification of the dissonances of musical practice. But our interpretation cannot stop here: the political logic of acoustics, properly applied, will never stop at the ethical boundaries of practice. We must take into account the generalizing power of the fundamental bass, which leads to Rameau's audacious claim that "the four upper parts may be used either in the treble or in the bass." If we take this claim seriously—which we should, given the figuration of the four upper parts—we discover the example's acoustic noise, which violates the subtle inequalities of good Baroque counterpoint. By substituting the top voice for the bottom, we derive an acoustically equivalent realization of the fundamental bass: **[Slide 14: bass as treble; slide 15: treble as bass; slide 16: all four parts]** The unequal contours of the treble and bass make them bad musical substitutes for each other. The example begins and ends with a six-four chord—a flagrant violation of the norms of Baroque practice. **[Slide 17: root position; slide 18: six-four chord]** For a Baroque ear trained to exaggerate the dissonance of the six-four chord or to expect a

certain smoothness of melody and jaggedness of accompaniment, this inversion of chords is an unacceptable confusion of sounds that are not equal in practice. It is telling that Rameau hides *this* realization in a marginal note, rather than putting it on display. Rameau the ethical musician will never come to terms with the understanding of Rameau the acoustician: that because all inversions of a chord come from the same consonant or dissonant source, they are therefore musically interchangeable. Even when used by musicians, the political revelation of harmonies is impossible to reconcile with the ethical limitations of practice. Or, in Rameau's own words, "Good taste, which dictates most of these rules to us, obliges us sometimes to set them aside."

[Conclusion]

Rameau, who understands the logic of harmony, will continue to protest against it. Late in his life, he will write a letter to Euler asking the acoustician to support his acoustic theories; Euler, who knows that such support contradicts his own harmonic theory, will politely refuse this request. Rameau will then write a treatise called the *Extract of a Response from Mr. Rameau to Mr. Euler on the Identity of Octaves*, in which he will try once more to justify the instincts of musicians with acoustic logic. The more adamantly he argues, the more he makes clear that the community of Baroque musicians may no longer claim music as their own. The music of the eighteenth century belongs, instead, to those who find meaning in musical noise.

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