

Psophos, Sonus, and Klang

Towards a Genealogy of Sound Terminology

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An English speaker would probably be excused for associating the German term »Klang« with the English word »clang«: something noisy, loud, and irritating. »Clang« is not necessarily a compliment in English. It is an onomatopoeic word used to describe a loud, resonant ringing sound. *Clang* (or its derivatives *clangour* and *clangourous*) is used to describe the sound of trumpets; but also the pealing of church bells or even the banging of garbage cans. These latter definitions suggest how »clangour« was originally associated in Middle English with some kind of metallic ring. But more generally, *clangourous* was also used to describe any kind of loud, irritating, disorganized noise. A verse from Tennyson gives you the flavour:

Where they smile in secret, looking over wasted lands,
Blight and famine, plague and earthquake, roaring deeps and fiery sands,
Clanging fights, and flaming towns, and sinking ships, and praying hands.¹

This is the discordant, cacophonous and violent sound of *clang*. But of course, *Klang* in German means something quite else. It is what we call a false friend – *ein falscher Freund*. A German *Klang* stems from the Middle German word »Klanc« or »clanch« around the eleventh century.² Then it meant a kind of musical sound that might better be translated as *tone* or *ring*. We actually have a word related to that stem in English: »clink« as in the clinking of glasses.

The English pejorative *clangourous*, however, comes from a completely differing stem that originates in Latin: the word for a loud noise, a cry or a wail: »clangor/clangoris«. The word was applied equally to the sound of brass instruments as well as the shrill screaming of birds.³ Latin *clangor* seems to have been derived from the Greek *klázō* [Κλάζω], another onomatopoeic word that also meant a sharp, piercing sound such as the cawing of birds, dogs barking, the sea roaring, wind whistling, and

1 Tennyson, *The Lotus-Eaters*, lines 159–161.

2 Grimm/Grimm, »Klang«.

3 *Oxford English Dictionary*, »Clangorous«.

men shouting.⁴ But the etymology is not clear. In any case, we see that there are two differing stems for words characterizing sound: German *Klang* and English *Clang*. To be sure, these homonymic words soon influenced each other in usage, thus taking on some of the same meanings. (Indeed, in the nineteenth century, several Victorian translators of German texts on acoustics and music theory appropriated the term *Klang* as a possible substantive in English.⁵) In any case, it is important to keep in mind that each comes from a different source, and each retains something of this difference even today. One, the German stem, seems to suggest sounds that are more musical, a more general notion of sound; the other, the English stem, points to a more discordant, grating notion of sound, something perhaps closer to noise than sound.

I have begun with this little excursus in sound etymology between the English and German homonyms *Klang/clang* as it points to the fact that the discursive field for discussing sound is never a clear one, especially when we translate between differing languages. It also suggests that the boundary between music and noise is one that is etymologically blurred. We seem to have a hard time disentangling man-made sounds from natural sounds, between sounds that are intentionally pleasant and those that are not, ultimately between the shrieking of birds and the blaring of trumpets. How do we sort out the difference between noise and music?

As my brief foray into the classical roots of *clang* and *Klang* already suggests, we may not find easy answers by looking into a dictionary. Indeed, when we probe the variety of terms by which sound – musical and otherwise – was designated, we will find a cacophony of overlapping meanings. Yet the effort might be worth it. For in unpacking some of these meanings and usages, we might shed light on some of the problems musicians of our own time have had in thinking about sound. A little etymological clarification might not necessarily resolve all our aesthetic debates about sound in music; but it could at least clarify some of the terms of the argument. And finally, it may be consoling to know that there has always been an inherent challenge in understanding the notion of sound in relation to music. Musicians in the modern period are hardly the first to try and unravel the Gordian knot that is this thick semantic field.

1. Word Fields of »Sound« in Antiquity and the Middle Ages

So let us go back once more to where the problem started in the first place: ancient Greece. I have already mentioned one Greek word that was used to designate noise: *κλάζω*. But there is a far more important word we should know that was used to designate

4 Liddell/Scott, »Κλάζω«.

5 For instance, the nineteenth-century English translator of Moritz Hauptmann's *Die Natur der Harmonik und der Metrik* translated »Klang« directly as »Clang«. See Hauptmann, *The Nature of Harmony and Meter*, passim.

nate sound: *psophos* (Ψόφος). *Psophos*, as I have learned from the excellent entry by Albrecht Riethmüller in the *Handwörterbuch der musikalischen Terminologie*, was a term used in Greece since at least the sixth century before the modern era to describe both noise and music.⁶ And indeed, the Latin word »sonus« which derived directly from *psophos*, maintains some of this dual meaning, as we will see.

In the earliest Greek writings that have come down to us, no difference seemed to be made between sound as noise and sound as music. Both were kinds of sound because each originated in the percussion of air – one of the earliest definitions given to sound in pre-Socratic philosophy. Music was simply one kind of noise, one species of *psophos*, along with the barking of dogs, the rustling of tree branches in the wind, and the clap of thunder. In these earliest writings, there seemed to be no urgent need to distinguish these. At the least, the word *psophos* would not do the work for us. To return to the remarks I made at the very beginning of this article, *psophos* is *clangourous* in the English sense of aural cacophony and plurality.

It was only with Aristotle, we might not be surprised to learn, that we find the first attempts to strongly demarcate and categorize musical sounds. In several of his writings on natural philosophy – in particular his treatise on the senses and on the soul – Aristotle distinguished non-musical sounds that were undifferentiated in tone (*psophos*) – what we might call noise today – from sounds that had some specific pitched tone, or at least the intentionality of musical tone. For this latter musical concept, he employed two other terms: *phthongos* (Φθόγγος) and *phoné* (Φωνή).⁷ Though Aristotle did not coin these words himself, he was one of the first to try to clarify their distinct meanings.

For Aristotle and his followers, a *phthongos* came to have a very specific meaning in music theory as a discrete musical tone produced by an instrument. It was not discrete in that it had a determined pitch or frequency, as we might first think; rather it was discrete in being a tone having a specific function (say, as one term of an intervallic ratio, as one note in the tetrachord, or as part of a musical system). It was, for Nichomachus, the »smallest musical element«.⁸ Thus it was often compared in Greek music theory to an atom in physics, point in geometry or the number one in arithmetic.⁹

A *phoné*, on the other hand, was a sound produced by the voice. While it might have a discrete pitch, that was not essential to its nature. The point was that it was a natural, intentional vocalization. Like Latin *vox* or English *voice*, there is a sense of a sound coming from some animate source. *Phthongos* thus emphasizes the tone as a functional, acoustical element. *Phoné*, however, is concerned with the source and ani-

6 Riethmüller, *Psophos*. See also Riethmüller, *Musik zwischen Hellenismus und Spätantike*, 271.

7 Aristotle, *de sensu*, 447b, quoted after Riethmüller, *Phthongos*.

8 Riethmüller, *Phthongos*.

9 Ibid.

mate quality of the tone or sound. It could be that a *phoné* is also a *phthongos* (and vice versa). But it must not necessarily be.

Now for Aristotle, both a *phthongos* and a *phoné* were subsets of *psophos*. Some Greek writers, such as Ptolemy, used *psophos* in a more narrowed, musical sense of pitch, and more specifically, in the sense of simultaneously sounding musical tones.¹⁰ But that was somewhat of an exception. For most Greek writers from Aristotle onwards, *psophos* was a term for any kind of acoustical event or sound – air that is agitated by some physical force and then conducted to the ear. As such, it could include the musical subsets of *phthongos* and *phoné*, in addition to non-musical noises that would have been designated as *klázō*.

We can see, then, how already in ancient Greece, drawing a line between musical sounds and non-musical sounds became complex. One could not define a musical sound simply on the basis of pitch, since some sounds – like certain vocal inflections, the *phoné* – might not be pitch-like at all. At the same time, certain »pitch« aspects covered by *phthongos* might not be heard at all, since they could represent more abstract, theoretical relations of sound measured by numbers – or perhaps even by the silent revolutions of planets and stars in *musica mundana*. And then again, there was the description of the *aulos* by some Greek writers that likened its piercing sound to that of the squawking of geese or the buzzing of wasps.¹¹ In other words, an instrumental sound could also become *klázō* – noise.

When we now turn to Latin terminology of the Middle Ages, matters do not get much clearer. *Psophos* became directly translated by the Latin term *sonus*, which in turn, of course, became the root of the English term *sound* or its Romance cognates *son* and *suono* in French and Italian. Indeed, in the Middle Ages, the number of meanings of *sonus* seemed to multiply even further. By 1703, when Sébastien de Brossard tried to define »Suono« in his *Dictionnaire* of musical terms, he came up with 24 differing meanings for the word. And even then, he confessed: »Il y auroit une infinité de choses tres curieuses à dire icy«.¹²

In his superb study of »sonus« in the *Handwörterbuch der musikalischen Terminologie*, Frank Hentschel traced some of the usages of the term *sonus* in musical discourse from the earliest Roman and Carolingian writers through the seventeenth century.¹³ Like Brossard, he too admits that any encompassing definition was self-defeating. There is, of course, the general sense of sound as any sensory stimulation of the ear, including noise. But Latin had other terms for non-musical sounds like shouting or clapping that were more common: *strepitus* and *crepitus*, among others. *Sonus* was a word that by and large was employed to designate more musical sounds. Still, there were many more subtle distinctions in musical contexts to designate the duality we

10 Riethmüller, *Psophos*, III (2b).

11 West, *Ancient Greek Music*, 105.

12 Brossard, *Suono*.

13 Hentschel, *Sonus*.

already have seen in Greek theory between discrete pitches (*phthongos*) and the sound of the voice (*phonê*). *Sonus* could be used in both these senses, although Latin writers more often used the term *vox* for the latter sense of »human voice«. But it was by no means a consistent usage. And *vox*, too, might have been used to designate more abstract kinds of sound, such as solfège syllables: *voces*.¹⁴

Let us return to the term *sonus*. It could also be employed to cover a variety of other musical concepts: it could refer to the sounds of intervals; it could be used as general term for consonance and dissonance; as sounds of scales or modes; of rhythms and genres of music; it could even refer to a whole piece of music. Think of how we today use sound in ways ranging from the tonal quality of a singer or pianist, the mood or feeling of a certain piece of music, or the qualities of a given musical genre or style of music. In all of these senses, we use the word *sound*, thereby confusing or mixing differing semantic, cognitive, or functional meanings.

In pursuing Frank Hentschel's comprehensive inventory of meanings with which *sonus* has been used, I come up with the following 14 general uses, although there are many more finer distinctions that could be drawn out. *Sonus* can refer to:

1. any noise or sound,
2. anything that is perceived by the ear,
3. the agitation of air (*percussio aeris*),
4. the sound of some musical instrument (cf. *vox*),
5. a single musical tone or pitch,
6. the principle of all music,
7. a vibrational frequency,
8. a tonal function,
9. certain intervals or chords,
10. a qualitative impression of the listener (*affect*),
11. a characteristic rhythm,
12. musical notation or specific notational signs,
13. the character of a composition,
14. any piece of music.

This list may remind you of the amusing essay by Jorge Luis Borges that is quoted at the beginning of Michel Foucault's *Les Mots et les choses*, in which some two dozen incongruous ways of describing and labelling animals in a mythical Chinese encyclopaedia are given.¹⁵ *Sonus* as a musical label entails an equally motley mix of diverse meanings and uses.

Of course, *sonus* is not the only term in music with such a range of meanings. Just consider the case of »tonus«, from which English and German musicians derived our

14 Bower, *Sonus, Vox, Chorda, Nota*, 52.

15 Borges, *John Wilkins' Analytical Language*, 231.

terms *tone*. We invoke »tone« to speak of a specific note, to designate the interval of a whole step (or the whole tone), or to speak of some general aesthetic quality of music or a person, as in »I do not like his tone of voice«.

Obviously, the whole process of distinguishing layers of meanings and derivations for sound can be terribly confusing. But rather than trying to purge this multiplicity and insist on a narrow definition – not that any of us have the power to do so – it is perhaps best to think of sound as do linguists: as a kind of semantic word field of related discursive terms with varying shadings and networks. I have tried to offer such a word field in Table 1. This is hardly a comprehensive or rigorous mapping of terms and their etymologies. But it does make clear how terms in Greek usage transformed and migrated through various languages over time to capture differing meanings and usages for sound.

GREEK	LATIN	GERMAN	ENGLISH
Psophos Ψόφος	sonus	Ton/Schall/Laut (Klang)	sound/tone (noise)
Phoné Φωνή	vox (sonus)	Stimme/Klang (Ton)	voice/sound (tone)
Phthongos Φθόγγος	sonus musicus (vox/nota/chorda)	Ton (Klang)	pitch/tone/note
Tonos Τονος	tonus/modus	Tonart/Ganzton (Ton)	tone/key/mode whole tone (mood, sound)
Klázō Κλάζω	clangor (strepitus/ crepitus/sonus)	Geräusch/Lärm (Middle High German: Klang/Klanc/Clanch)	noise (Middle English: clung → clangorous)

Table 1: Word field for »sound«.

2. Sound as Fusion

If there is one distinction that is perhaps useful to us in all of this today, though, it is the distinction some of these early writers made between sound as an acoustical object and sound as a perceptual phenomenon. They are not by any means the same things. We can see this difference first by looking at a canonical definition of sound by Boethius. *Sonus*, Boethius tells us, is a melodic instance of pitch. Intervals are distances between pitches, while consonance is a mixture of high and low pitches »falling pleasantly and uniformly on the ears«. ¹⁶ This is a Platonic notion of consonance as consisting of two discrete elements related in some harmonious manner – or in the Pythagorean tradition, in numerical concordance. The point is that all music, no matter how complex, is made up ontologically of discrete elements – *phthongoi*, the Greeks would

¹⁶ Boethius, *Fundamentals of Music*, 16.

say – in some kind of relation. Any interval is made up of two distinct and discrete *soni*.

But there is another tradition in which we analyze not the individual sounds, *soni*, that make up something like an interval, but rather the composite impression these *soni* make. Then sound becomes not multiple, but singular, as it is perceived by the ear as a single impression. Aristotle laid out this phenomenological argument in a famous chapter of his treatise on the senses that was first translated and circulated in the Latin world in the twelfth century. Almost immediately, it made a deep impression upon readers, if you will forgive the pun. It offered an empirical epistemology of sound that would soon open the way for a far more expansive notion of musical sound. Here is briefly how Aristotle made his argument:

Aristotle agreed with Plato that any two equal and homogeneous elements might be perceived »coinstantaneously«, that is, as a single impression upon our senses. But he took this idea one step further and argued that even if the elements are unequal in some way, or each of them has something distinctive about it alone, perceiving them as a single unit tends to repress or equalize those special characteristics. One of the examples Aristotle offers, appropriately, is that of the octave. While the *phthongos* of the *nete* has the quality of lowness, and that of the *hypate* that of highness, when the two *phthongi* are combined, each note tends to lose this quality and be fused into a single phenomenon that we call a *diapason*.¹⁷ To express this in the logic of Aristotle, we hear not the material cause of the interval, which is the notes of which it is composed; rather we hear the formal cause, which is the sweetness of their relation. This is the critical difference from the Platonic and Pythagorean traditions, in which the pitches of an interval retain their ontological identity, so to speak. For true *harmonia* depends on the distinctions of the elements that are brought into relation. (This is why Boethius insisted that any interval was a relationship of high and low. It was also, by the way, the reason why the unison was never accepted as a true musical interval by Boethius and his followers, as it lacked just that quality.) However, for those who subscribed to the Aristotelian tradition, it was the resulting perception of consonance or dissonance in any interval that was fundamental. In the former, the octave is defined as a compound of two *soni*, in the latter, it is a singular consonance of just one *sonus* – that is why it is a *con*-sonance, a sounding together.

Now this difference may sound like scholastic hair-splitting. But if you think about it, it represents an absolutely fundamental difference in the way music theorists often understand and talk about musical sound. And in many ways, it lies at the root of the aesthetic debate that took place in the early twentieth century as musicians polemicized against – or resolutely defended – traditional notions of musical sound. If musical sound was analyzed and understood as a composite of sound components – of individual *phthongi* – then you would have a more objective and »quantitative« notion

17 Aristotle, *de sensu*, 447b, quoted after Riethmüller, *Phthongos*.

of what music consists of, I would suggest, than if you instead considered sound to be a phenomenological, subjective impression. For the latter perspective allows you to consider dynamic elements of sound that are not essential to the Pythagorean tradition, such as loudness, duration, and timbre, not to mention sounds lacking discrete pitch. This was precisely what Aristoxenos argued for in his protests against the Pythagoreans.

3. Mattheson's »Ton-Klang« and the acoustical turn in the seventeenth and eighteenth centuries

While it is beyond the scope of this essay to explore in detail the history of this dialectic, I want to end by looking at one later chapter in this history: the *acoustical turn* in the seventeenth and eighteenth centuries. For it was then that a number of scientists developed the tools necessary to understand more fully the physical complexities of sound production and propagation, and perforce its physiological reception by the ear. You might think that this knowledge would have resolved the many disputes about the nature of musical sound and therefore the many terminological misunderstandings that had arisen. But you would be wrong. Again, we will see that developments in the practice and theory of musical science exceeded the capacity of received language to adequately describe these advancements.

Let me offer just one example. With the research on overtones by John Wallis and Joseph Sauveur at the end of the seventeenth century, it was soon realized that most musical tones emit higher frequencies above their fundamental tone that stand in a quasi-harmonic relationship.¹⁸ Tones, it turned out, are not simple entities, but complex phenomena. More interestingly, Sauveur was able to show that tone colour was a direct result of these higher frequencies – which he called »sons harmoniques« or »petits sons«. While the physics of overtones was not formally explained until the eighteenth century, Sauveur's work had important and immediate implications for music theory. For one thing, Jean-Philippe Rameau famously adopted Sauveur's *corps sonore* as his principal of harmonic generation, proving, he thought, that artificial harmony merely replicates the natural series of overtones, underscoring its status as a unified perceptual entity.¹⁹

The new acoustics seemed to seal the fate of Pythagoreanism, though not because it disproved the importance of aliquot whole number ratios to the theory of consonance. Actually, the new acoustics helped to undergird those relations by showing how intervals could be measured as ratios of fundamental tone frequencies. Rather,

18 On this history, see Cohen, *Quantifying Music* and Dostrovsky/Cannon, *Entstehung der musikalischen Akustik (1600–1750)*.

19 See my discussion in Christensen, *Rameau and Musical Thought in the Enlightenment*, particularly in Chapter 6.

what it did was to destroy the idealized notion of the *phthongos* – music being composed of individual discrete entities. For it could now be shown with the development of the new *calculus* (as Daniel Bernoulli and Jean d’Alembert did in the 1750s) that even the most complex musical sounds could be resolved as a single function, that is to say, a single wave impression on the ear. It was much the meaning that Hermann von Helmholtz had in mind when he designated the whole sound spectrum of a single tone as constituting a *Klang*.²⁰

Now in turning to the reception of these sound waves by the ear, critics could also begin to analyze the affect of music more empirically. For it was commonly recognized that the cathartic affects of music upon the sentient soul were ones that could now be explained as the stimulation of our auditory nerves. No theorist better represents this shift – this confluence of acoustics and psychology – than Johann Mattheson, arguably the most important and prolific German music writer in the first half of the eighteenth century. Mattheson was an avid empiricist, no doubt reinforced by his readings of English writers such as John Locke and David Hume. In his many publications, Mattheson would again and again return to the thesis that music was not a science of numbers, but an art of affective experience; in a pithy formulation, he wrote, music was not a *Zahl-Kunst*, but a *Klang-Kunst*.²¹ (Even more pithily, Ernst Kurth corrected Mattheson almost 200 years later by reminding us that music is more than *Klang*, it is also *Drang*.²²)

Here, by the way, we have finally reached the German term for *sonus* – *Klang* – featured front and centre. While I have found a few scattered uses of the term *Klang* by German writers in the late seventeenth and early eighteenth centuries, it was Mattheson who seems to have self-consciously posited *Klang* as a new and important concept in German musical discourse. Hitherto, as far as I can tell, German writers used the Latin term *sonus* for sound, and *tonus* or *Ton* to designate pitch. Indeed, Mattheson en-

20 Helmholtz, *Die Lehre von den Tonempfindungen*, 39.

21 »Die Klänge, an sich, sind weder gut noch böse; sie werden aber gut und böse, nachdem man sie gebraucht. Diesen Gebrauch lehret keine Meß- oder Zahl-Kunst. Wenn auch der Verhalt dem Gehör recht seyn soll, muß die mathematische Richtigkeit allemahl nachgeben.« (Mattheson, *Der vollkommene Capellmeister*, Vorrede, 16). Cf. also the chapter »Vom Klange an sich selbst, und von der musikalischen Natur-Lehre« (ibid., I/3, 9–20) where Mattheson uses the term »Klang-Kunst« along with the more frequent »Klang-Rede« and »Tonkunst«.

22 »Der Blick in die Musik ist durch Klänge verhängt. Die Theorie aber hat das Ohr für das Unhörbare verloren und damit für die Erfassung der Grundvorgänge, die durch Töne und Klänge nur hindurchschimmern. Aus dem Ausströmen drängender Willensspannungen ans Ertönen in Klang und Farbe ergeben sich auch alle typischen Formen, in denen sich die Harmonik entwickelt, und die Eigentümlichkeit ihrer inneren Wirkungen. [...] Die Theorie muß am lebendigen Grundprozeß, dem Ausbrechen und Werden zum Klang, einsetzen, um sich nicht zu Formelwesen und Schematismen in weitem Bogen aus der Musik herauszuverirren [...]. Der Klang ist tot; was in ihm lebt, ist der Wille zum Klang. [...]»

Die übliche Harmonielehre (insbesondere seit Hugo Riemann) bezeichnet den Akkord schlechtweg als Klang; in erster Linie ist er aber Drang.« (Kurth, *Romantische Harmonik*, 3, 11.)

titled one of his most important, yet little known treatises *Versuch einer systematischen Klang-Lehre*.²³ Published in 1748, it lays out the acoustical foundations of music, explicitly linking it to a sophisticated psychological theory of affect. In this work, Mattheson takes an unmitigated empirical stance of music as a perceptual experience. No wonder he cheekily assumed the pen-name of »Aristoxenus the Younger« for this work (Fig. 1).

Aristoxeni
iunior.
Phthongologia
systematica.

Versuch
einer systematischen
Klang=Lehre
wider
die irrigen Begriffe
von diesem geistigen Wesen,
von dessen Geschlechtern,
Ton=Arten, Dreyklängen,
und auch
vom mathematischen Musikanten,
nebst einer
Vor=Erinnerung
wegen der
behaupteten himlischen Musik.

Πᾶσα ἀπλή κίνησις Φωνῆς, τάσις ἢ δὲ τῆς με-
λωδικῆς, ΦΘΟΓΓΟΣ ἰδίως καλεῖται.
ΑΡΙΣΤΕΙΑ. ΚΟΙΝΤΙΑ.

Hamburg,
in Commission bey Joh. Adolph Martini. 1748.

Figure 1: Title page to Mattheson's *Versuch einer systematischen Klang-Lehre* (1748).

23 Mattheson, *Phthongologia systematica. Versuch einer systematischen Klang-Lehre*. See also Christensen, *Sensus, Ratio, and Phthongos*. Tellingly, one does not find an entry for the term »Klang« in Johann Gottfried Walther's *Musicalisches Lexicon* of 1732.

For Mattheson, acoustics and psychology were two sides of the same coin. He even thought up a term – *Ton-Klang* – to capture this dialectic. Now a *Ton-Klang* might sound like a redundancy. But it signifies two differing aspects of a musical tone: the production of sound – the *Ton* – and then the perception of that sound – the *Klang*. In Mattheson’s empirical psychology, a *Klang* was more an experience than an object. He resolutely rejected all canonist traditions by which pitches were measured and counted numerically. A *Ton-Klang*, he reminds us, is an »incorporeal, invisible essence that is a result of the most delicate motions of the smallest parts of some body set into motion by an appropriate instrument, carried through the air to the ear, and received by the hearing soul«. ²⁴ One consequence of this empirical stance is that combinations of pitches were not perceived as numerical ratios but rather as sound qualities. Consonance and dissonance were perceptual qualities, not arithmetic axioms. Thus Mattheson could write:

The true boundaries of musical intervals are incorporeal. Spiritual, indivisible things by themselves know no distances, whether geometric or arithmetic. It is thus impossible for something that has no quantity of size to be measured, counted, or weighed. ²⁵

In some ways, Mattheson resurrects the very arguments Aristotle had laid out over two thousand years earlier. *Klang* – like *psophos* – is a perceptual phenomenon. Of course music is made up of individual pitches, of individual tones. But the important point is how these tones – whether in forming harmony or in succession to form melody – produce affects in the listener. Melody, by the way, was of passionate interest to Mattheson, and he offered some of the earliest and most important analytic treatments of melody in the history of music theory. For Mattheson, it was a perfect analogue to harmony. As numerous phenomenologists taught us in the early twentieth century, we do not perceive individual pitches in melody, rather we hear them together as one idea, one *Gestalt*, unfolded over time. Just so, harmony is not perceived as individual pitches or *phtongoi*, rather, as a singular, composite entity perceived more spatially and instantaneously, more affectively than rationally. It is just this phenomenology of sound that allowed Baroque theorists to posit something like the triad as a conceptual entity, a concept implicit in through-bass practice where chords are in essence, a priori, singular objects.

24 »Der Ton-Klang sey also ein geistiges, unsichtbares Wesen, welches, durch die allerzärtteste, innerliche Zusammenreibung der feinsten Theilchen eines dazu bequemen Werkzeuges rege gemacht, mittelst der äus[s]ern Luft zum Ohre geführt, und in der hörenden Seele empfunden wird.« (Mattheson, *Phtongologia systematica. Versuch einer systematischen Klang-Lehre*, 39.)

25 »Die eigentlichen Gränzen eines musikalischen Intervalls sind unkörperlich. Geistige unsichtbare Dinge wissen, an und für sich selbst, von gar keiner Grösse sie sey geometrisch oder arithmetisch. Was nun keinerley Art solcher Grösse hat, kan[n] unmöglich gemessen, gezählet oder gewogen werden.« (Ibid., 33f.)

But it is worth recalling that there are many manifestations of this new empiricism in the early modern era. It is the same logic by which grammarians argued that the sense of a sentence entails more than understanding its individual parts, the words. It is the same phenomenology by which Pietistic clergy could preach the gospel of Christ knowing that the *logos* of the words will penetrate through the ear to the heart of the devout listeners.

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Since the ancient Greeks, music theorists have tried to discipline the diffuse notions of sound we have into manageable categories and concepts, especially those that are useful to music. But as we have seen, it has not at all been easy. Whether we are dealing with *psophos*, *sonus*, or *Klang*, sound as a perceptual phenomenon seems to exceed or transgress that terminology we have available to describe it as an objective acoustical object. For some two thousand years, theorists have struggled to resolve this tension by quantification and objectification. There is thus a supreme irony when we think how the efforts of many composers in the twentieth century to open up notions of sound in our musical practice essentially have undone this long-lasting undertakings. In some ways, it looks as if we have returned to those capacious notions of sound in ancient Greece – *klázō* and *psophos* – a time, in other words, when there was not a clear distinction between the sound of trumpets and the cawing of crows, between the clanging of swords and those of bells. I do not want to say that there is no difference at all between the ancients and moderns of our own day; that someone like, say, Luigi Russolo in 1913 is simply a latter-day Presocratic philosopher in the way each thought about sound. What I do want to say is that sound has always seemed to resist our efforts to control and define it. There was always lurking in any musical notion of sound throughout history a sense of unruly multiplicity and surplus needing to be tamed by disciplinary music theory and compositional codification. This urge towards reproduction and mutation seems to be something hidden in the very DNA of the genetic makeup of sound. In this sense, the twentieth-century exploration of sound by composers was not so much a discovery or invention as it was a recognition of – perhaps a capitulation to – the psychological realities of a phenomenon that ultimately exceeded the capacity of language and music theory to contain it.

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