

To The Editor:

BASKET CASES

This summer I had the good fortune to hear a lecture by Paulus Gerdes, a lanky, charismatic mathematician from Mozambique. Gerdes has spent a good portion of his life studying African basket weaving, and he has a prodigious knowledge of basketry traditions throughout the continent—a knowledge matched only by his infectious love for the subject. During the lecture, Gerdes told a series of astonishing stories which clarified a number of issues I had been struggling with in my own music-theoretical work.

One concerned a twelve-week period during which he encountered a series of *gipatsi* baskets, most likely made by a single Tonga artisan (or perhaps a small group), and together exemplifying all possible symmetry groups consistent with that type of weave.¹ Given the constraints inherent in the style, some symmetry groups could be instantiated by two distinct patterns, in which case a single basket would illustrate both possibilities.² Gerdes described these as “didactic” baskets designed to chart the space of creative possibilities. It was, he (half)-joked, a kind of mathematical research paper presented in an unusual forum.

Gerdes’s story is a useful parable for music theory, and perhaps cultural interpretation more generally. For it is all too natural to suppose that there are just two options open to us:

- (1) providing accurate historical descriptions of how creators actually thought; or
- (2) declaring that interpretation is largely an aesthetic enterprise, whose standards are ultimately defined by whether *we* consider its descriptions to be interesting, amusing, or compelling.

The first of these leads to historicism, which in music has been championed by figures such as Richard Taruskin and Robert Gjerdingen; the second leads to aestheticism, which I associate with my late teacher, David Lewin.³

But notice that neither of these options seems to capture Gerdes’s relation to his baskets. For on the one hand, it is almost certain that the didactic basketmaker was *not* explicitly thinking about symmetry groups or orbifolds. (Many basketmakers live traditional lifestyles, in villages whose schools do not teach topology or group theory.) And yet these ideas seem particularly appropriate to Gerdes’s story. The basketweaver, one wants to

say, may not have encountered the *terms* “orbifold” or “symmetry group,” yet he or she clearly had implicit access to these very ideas. (Otherwise, it would be astronomically unlikely that anyone would construct exactly one basket for each symmetry group.) The maker, it seems, was explicitly setting out to illustrate “the various types of baskets,” with symmetry groups providing an effective way to model the classification into types. Indeed, it is quite easy to imagine how the basketweaver would come to be aware of the differences between “basket types” (and hence symmetry groups): after all, when one is constructing a basket, the various iterations of the fundamental pattern will be rotated or reflected with respect to one another, and these relationships will require the maker to turn the basket in different ways. This suggests that there might be a fairly robust mapping between some terms of advanced mathematics (e.g., “orbifold”) and those of basketry (e.g., “repeating pattern from which a basket is constructed”).

It follows that there are options lying between historicism and aestheticism. For if we accept strict historicism, then we must abjure terms like “orbifold” and “symmetry group” in describing the basketweaver’s practice, limiting ourselves to descriptions the maker would actually use.⁴ (From this point of view it may seem like “illicit” theorizing to use mathematics to prove that there is some specific number of basket types.) Yet if we accept aestheticism, we abandon the claim that terms like “symmetry group” are figuring in *causal explanations of how the baskets came to be made*, explanations whose truth is in principle independent of any aesthetic pleasure we might happen to take in the story.⁵ That is, we abandon the thought that mathematics can provide *straightforward and explanatorily relevant idealizations of concepts that the basketmaker actually had*.

In our recent debate, Taruskin insinuates that I am singing an old and evil song, embracing the aestheticism of my theoretical forbears. This gets me completely wrong. In fact, I have always felt deeply suspicious of analyses that seem too disconnected from any cognitive processes that might be going on in a composer’s mind. As an undergraduate in David Lewin’s classes, I constantly responded to his analyses by asking, “Do you think we’re *meant* to notice that?”—provoking various lectures on formalism, aestheticism, and the so-called “intentional fallacy.” Yet these lectures could never shake my conviction that there is a fundamental difference between analyses that genuinely elucidate the underlying mechanics of a piece, and those that merely reflect the analyst’s fantasies. In this respect, I am (strange as it may sound) Taruskin’s ally. I believe that music theory *has* to be founded on more than our own aesthetic feelings, since absolutely any idea—in any field whatsoever—could be justified with a simple “Well, I enjoy thinking in this way.”

¹ Many baskets are constructed by iterating a single basic pattern or tile; adjacent tiles can relate to each other in various ways, with these relations specifying a group. See Figures 3.1.5 and 3.1.6 in Tymoczko (2011, 68).

² For more details, see Gerdes (2004). (I am adding a few extra details I remember from the presentation, so *caveat lector*.)

³ Buchler (2010) takes aim at Lewin’s fanciful “segmentations” (groupings of notes into functional units), a hallmark of the aestheticist tradition.

⁴ Of course, the basketmaker is our contemporary, whereas historicism typically considers the artifacts of the past. Nevertheless, it seems to me that the same issues would be raised if the baskets had been made long ago and preserved in a museum.

⁵ One might try to evade aestheticism’s extreme conclusions by arguing that we enjoy the story because it provides a true explanation. This would be to surreptitiously abandon aestheticism’s core philosophical commitment.

WORKS CITED

Yet like Paulus Gerdes, I refuse to be bound by rigid historicism. I see nothing wrong with analytical methods, such as Roman-numeral analysis, that provide a systematic redescription of concepts composers actually had. It is truly amazing that we can give such an accurate Roman-numeral description of Bach's harmonic practice, knowing that the composer conceptualized music in figured-bass terms. Roman-numeral analysis must be capturing *something* in Bach's mind, though it can be difficult to specify exactly what.⁶ In much the same way, I believe that geometrical models of voice leading can help us systematize the implicit contrapuntal knowledge of previous composers, formed during thousands of hours of improvisation, yet conceptualized only crudely by contemporary theoretical standards. Like the basketweaver's implicit knowledge of symmetry groups, this is genuine, embodied knowledge, even if it may have been articulated in an unfamiliar and occasionally untheoretical way.

Beyond historicism and aestheticism, then, lies the project of *systematizing implicit compositional know-how* so as to provide *causally relevant explanations* of why music is the way it is.⁷ If this project is to be successful, it must begin with concepts that composers actually had: "chord," "scale," "key," "voice leading," and so on. It must tread cautiously in idealizing these concepts, seeking to tease out their implications without straying too far from issues of plausible compositional concern.⁸ And it must justify its idealizations by returning to music, offering analyses that explain why particular pieces (or perhaps general stylistic features) are the way they are. This may seem ambitious, but I think it is exactly what we do when we ask, "What makes some scales better than others?" or "How does Chopin's E-minor Prelude work?" or "How can we represent the geometry induced by the notion of 'voice-leading distance?'" or even, "Why did someone make just these particular baskets?"

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6 Of course, it is worth trying to do so. I have recently managed to redescribe the "thirds-based grammar" in Tymoczko (2011, §7.1) in figured-bass terms. One advantage of the thirds-based approach is that the translation is fairly smooth.

7 My actual view is that historicism, aestheticism, and the causal-explanatory approach are three poles in a broad continuum of approaches. Many theory and analysis papers sensibly partake of multiple approaches.

8 Sometimes we might model constraints that apply to composers whether they know it or not (these might be analogous to the differential equations that constrain our motion through physical space), but sometimes we might try to model knowledge that the composer had only implicitly. For example, Chopin's pieces, taken together, suggest he had a very comprehensive understanding of the voice-leading relations among familiar four-note chords, a knowledge that is equivalent to the knowledge of certain four-dimensional geometrical structures. This, I submit, is a beautiful and useful fact.