

MUSIC AS BIOLOGY: THE TONES WE LIKE AND WHY.

By Dale Purves. Cambridge (Massachusetts): Harvard University Press. \$29.95. x + 165 p.; ill.; index. ISBN: 978-0-674-54515-1. 2017.

Since Darwin, many theorists have pointed to vocal communication as a significant factor in the structure and evolution of music, but Dale Purves' *Music as Biology* summarizes fairly recent work that has brought this approach to a new level. Anyone seriously interested in questions regarding the origins of music needs to become familiar with the work of Purves and his colleagues—this concise and eloquent book is an excellent way to do that.

Scholars across a variety of disciplines have long recognized relationships between prosodic patterns in affective signals and emotional features of music. But these observations, although interesting, do not typically explain the more intricate characteristics of musical structure. According to Purves, widespread consistencies across the world's musical systems are due, in large part, to perceptual mechanisms shaped by evolution to extract meaningful information from naturally occurring periodic sound stimuli, including most notably, vocalizations.

From this perspective, the author covers the perception of consonance and dissonance in musical intervals, universal predilections for certain musical scales over others, the relationship between intervals and vocal emotions, and tonal preferences across cultures. For example, analyses of spectral slices of spoken utterances, normalized and examined in octave bands, reveal amplitude peaks in spectral distributions that map quite nicely to the frequency ratios of most intervals in the chromatic scale. This strikes me as some of the best evidence ever presented regarding the structural origins of musical systems. It is certainly not the entire story, but likely a major theme. Overall, the chapters are crisp and succinct—in fact perhaps too succinct at times, as the explanations might require some technical understanding beyond average readers. That said, I found the volume to be very well written and definitely to the point.

The approach described in these pages could be central to a pure byproduct account of the evolution of this complex capacity, but Purves addresses neither phylogenetic nor adaptationist issues at all—a little curious for a book about the biology of music. He does provide an interesting final chapter titled Implications that delves into the sometimes thorny philosophical issues concerning unconscious inference, naïve realism, and the role of evolution in designing perceptual systems. But I am not sure he quite makes the connection to music that he intends. I also felt the brief discussion regarding culture did not do justice to the enormous role that cultural evolution plays in the shaping of musical phenomena. It

is simply not enough to argue that our preferences are due purely to neurocognitive predispositions. People are highly motivated to create communicative music, often in groups, in elaborate cultural contexts; and across most societies, musical aesthetics interact with people's social lives within and across generations. Consequently, music evolves in ways that require explanations beyond proximate generalizations. I doubt Purves would disagree but, in the end, scholars who approach music from a cultural or historical perspective might be unfortunately put off by the apparent reductionism. I would encourage such thinkers to give Purves the benefit of the doubt, as he is sticking to what he knows, and that is cognitive neuroscience. Understanding the nature of music is a long-term, interdisciplinary enterprise—I believe the work described in *Music as Biology* contributes in a very important way.

GREG BRYANT, *Communication, University of California, Los Angeles, California*

VOICE LEADING: THE SCIENCE BEHIND A MUSICAL ART.

By David Huron. Cambridge (Massachusetts): MIT Press. \$38.00. viii + 263 p.; ill.; index. ISBN: 978-0-262-03485-2. 2016.

Students and masters of musical composition follow a core set of principles in arranging musical ensembles. In this volume David Huron provides the science of why certain core principles of composition result in the qualitative experiences of music listeners. The author systematically takes readers through the core sets of voice leading rules: for each he provides the expectations for how the rule influences perception, generates testable hypotheses for how our sensory system processes music shaped by the rule, predictions for those hypotheses, and summarizes research testing those predictions, with discussion and interpretation. Although we generally take for granted that music sounds good because of compositional approaches, *Voice Leading* brings a new appreciation to the complexity of our sensory system and the care with which strong composers play to the rules of human auditory perception.

The first three of the book's 17 chapters provide a comprehensive overview, briefly covering: the main principles of voice leading, the operation and limitations of our auditory system, definitions of sound and how it is produced (although Huron focuses on only airborne sound), the formation of sound images and sound localization, the psychology behind the pleasing nature of music, and acoustic versus auditory phenomena. Chapters 4–6 focus on a core set of voice leading principles for Baroque part-writing, and discuss auditory image formation,