

Schenkerian theory and/or later work in related fields, after the students have had formal instruction in the principles of Schenker's theory and are ready to consider his work and the work of those who came after him critically; it certainly provides rich material for discussion and criticism. Schenker scholars will undoubtedly want to read and consider it carefully, and many have probably already resigned themselves to the University of Rochester Press's \$99 price tag and acquired a personal copy. Brown's ideas, analyses, and conclusions are compelling and thought-provoking, and are likely to spawn a good deal of discussion in the theoretical and analytical literature in the future.

Catherine Pellegrino
North Carolina State University

Empirical Musicology: Aims, Methods, Prospects. Edited by Eric Clarke and Nicholas Cook. Oxford: Oxford University Press, 2004. [viii, 229 p., ISBN 0-19-516749-X. \$99.] Music examples, illustrations, index, bibliographies.

Statistics in Musicology. By Jan Beran. Boca Raton: Chapman & Hall/CRC, 2004. [viii, 299 p. ISBN 1-58488-219-0. \$71.94.] Music examples, illustrations, index, bibliography.

Recent decades have witnessed a significant rise in scientifically-inspired music research. This expansion is apparent, for example, in the founding of several journals, including *Psychomusicology* (founded 1981), *Empirical Studies in the Arts* (1982), *Music Perception* (1983), *Musicae Scientiae* (1997), *Systematic Musicology* (1998), and the recently founded *Empirical Musicology Review*.

The dictionary definition of "empirical" is surprisingly innocuous for those of us arts students who were taught to use it as a term of derision. Empirical knowledge simply means knowledge gained through observation. Science is only one example of an empirical approach to knowledge. In fact, many of the things traditional musicologists do are empirical: deciphering manuscripts, studying letters, and listening to performances.

Historically, empiricism began as a uniquely British enthusiasm, so it is entirely

proper that seven of the nine contributors to *Empirical Musicology: Aims, Methods, Prospects* are British. The book adopts a notably broad perspective in describing empirical research in music.

After an introductory chapter, the book begins with a contribution by ethnomusicologist Jonathan Stock, who describes the "participant-observer method" that has been the cornerstone of anthropological field research for the past half century. The chapter provides some concrete advice related to keeping a field notebook, interviewing, and video documenting. Echoing the views of most ethnomusicologists, Stock notes that the participant-observation method has considerable potential value in music research beyond its usual application in studying non-Western musics.

Jane Davidson's "Music as Social Behavior" emphasizes survey methods, distinguishing two broad approaches. The first is the cross-sectional survey which aims to provide a generalized snapshot using quantitative information gathered from a large sample of people. The second is the longitudinal case study that focuses on individual experiences over time. In the first approach, the survey might be based on a formal questionnaire distributed to some group of people. In the second approach, researchers might make use of existing information, such as diaries (e.g., Berlioz) or correspondence (e.g., between Clara and Robert Schumann).

Nicholas Cook contributes a chapter on computational and comparative methods in music scholarship. Since the late 1950s, successive generations of enthusiasts have predicted that computers would revolutionize music research. Cook suggests that recent developments in computational musicology are finally beginning to fulfill the promise glimpsed by earlier scholars. He describes a number of studies carried out over the past decade and concludes that there is significant opportunity for what he calls "disciplinary renewal." Given the availability of large amounts of musical data (often from a wide variety of cultures) Cook recommends that music scholars reconsider the long-standing antipathy toward comparative studies. Throughout his presentation, Cook takes special pains to distance his empirical enthusiasms from past positivist presumptions. "[W]hat I am suggesting," he notes, "is that musicology in

the broadest sense can take advantage of computational methods and transform itself into a data-rich discipline, without giving up on its humanist values." (p. 123)

Perhaps the most extensive empirical efforts in music scholarship are to be found in the areas of performance studies and in studies of musical sound. Eric Clarke provides a fine outline of the history of empirical studies in musical performance, including a convenient list of landmark achievements. His admirable summary begins with Carl E. Seashore's historic studies from the 1930s and progresses up to the present.

Along with Stephen McAdams and Philippe Depalle, Clarke also contributes a chapter on analyzing musical sound. Most music theorists recognize that a proper understanding of music must extend beyond the notation to include consideration of the musical sounds themselves. However, in contrast to the achievements of performance research, the achievements of acoustical analysis remain meager. In particular, spectral analyses of musical works have yet to establish their analytic value. Especially in the realm of timbre, the pertinence of acoustical analysis to musical concerns has remained elusive.

Tia DeNora's chapter on the sociology of music is masterful. Not everyone will share DeNora's enthusiasm for the work of Theodor Adorno, but her critique of Adorno's disdain for gathering evidence in support of his views is a welcome commentary. At some point, speculative theories of music must connect with real-world evidence, and DeNora argues that quantitative modes of analysis, representative sampling, and hypothesis testing are important tools for the musicologist. DeNora describes the popular trend in the sociology of music to link musical organization with some aspect of society, such as ideology, gender, race, or class. She refers to these society-reflected-in-the-music theories as "homological models," and argues that the problem with these homologies is the absence of evidence, more particularly, the failure to document how the purported links arise. Too often, music scholars assume the existence of these homologies without considering how precisely the social organization might end up being echoed in the musical organization.

The final chapter by Luke Windsor provides a quick survey of some of the inferential methods commonly used in empirical research. The chapter includes a cursory tour of various statistical methods and tests, including the *t*-test, linear regression analysis, factor analysis, multidimensional scaling, and analysis of variance.

In the context of the new musicology, *Empirical Musicology* strikes a conciliatory, even deferential tone. Traditionally, empirical methods have largely been used by social and political conservatives. Consequently, for many in the arts community, empirical methods are viewed as the tools of reactionary elements: "empiricism" has become associated with "imperialism." With Cook's emphasis on humanist values and DeNora's emphasis on social conscience, this book goes a long way to exposing the fallacy of this presumed association. In distinguishing empirical methods from positivist philosophy, this volume makes an essential and welcome contribution to the development of music scholarship.

Edited volumes often fail because the quality of the contributions is inconsistent, or because a good over-arching concept disintegrates into a potpourri of unconnected or disparate topics. While *Empirical Musicology* is not without its seams, editors Eric Clarke and Nicholas Cook have succeeded in assembling a whole cloth. Given the increasing interest in systematic and observation-based musical research, this book has appeared at just the right moment in time.

Where systematic observation provides the essential content for empirical research, statistical hypothesis testing represents the heart of modern empirical methodology. In *Empirical Musicology*, Luke Windsor's chapter provides a cursory survey of statistical procedures in musical hypothesis testing. Jan Beran's book, *Statistics in Musicology*, pursues a much more thorough approach.

Beran is a professor of statistics at the Universität Konstanz. (He also happens to be an accomplished concert pianist and composer.) Beran sets out to illustrate how various statistical procedures and tests can be applied to music-related research. Chapters proceed quickly through such topics as exploratory data analysis, time-series analysis, Markov modeling, circular statistics, principal components analysis,

discriminant analysis, cluster analysis, and multidimensional scaling.

The technical material contained in this book will scare away all but the most statistically adroit music scholar. I counted 100 equations in the first forty-four pages, a technical density that is maintained throughout the text. The treatments here are too cryptic to provide much information for readers who do not already have some familiarity with these topics. This is a pity. Beran is right to suggest that the application of statistical methods to music research has the potential to greatly expand our understanding of music. Unfortunately, Beran's technical presentation will have little impact in advancing this argument within the community of music scholars.

Traditionally, music scholars work on a small portfolio of materials. A music theorist might analyze one or two musical works; a historical musicologist might examine a handful of letters; a new musicologist might deconstruct half a dozen concert advertisements. From these small samples, scholars are tempted (even encouraged) to build very large interpretative edifices. Most scholars are appropriately suspicious of making too much from a handful of observations. But if scholars didn't propose some over-arching interpretation, then scholarly writing would degrade to mere description without attempting to make any sense of the materials. The consequence of this way of working is that music scholarship is filled with interpretive claims that range from the patently obvious to the obviously wacky. Since scholars have no way to distinguish the manifest from the mythic, both types of interpretations are treated with equal seriousness.

It is precisely these circumstances where statistics can serve scholarship. The principal value of statistics is in providing methods that allow statements to be characterized along a continuum from the almost certain to the wholly improbable. Statistics does not eliminate speculation, imagination, or interpretation. It merely arranges statements in order of plausibility. It provides guidelines that help scholars distinguish the obvious from the fanciful.

A handful of younger scholars are now using statistical methods to address conventional problems in music scholarship. Notable examples include Joshua Velt-

man's superb work on text-rhythm relations in plainchant and Frauke Jürgensen's ground-breaking study of *musica ficta*. Even in these works however, the statistical arguments are made informally, without recourse to formal statistical tests. This informal or "pre-statistical" form of argument is typical of early scholarship in all disciplines that have come to discover the immense value of statistical inference. We can expect musicology to follow the same historical path seen in linguistics, education, anthropology, and other disciplines.

Beran's book is an admirable piece of work. Regrettably, *Statistics in Musicology* is neither a comprehensive survey nor a "how to" book. Unfortunately, Beran has written a book for which there is almost no audience. Perhaps in twenty or thirty years, there will be enough musicologists with sufficient statistical savvy to appreciate this volume. But by then Beran's musical examples will be sorely out-of-date.

David Huron
Ohio State University

Wired for Sound: Engineering and Technologies in Sonic Cultures. Edited by Paul D. Greene and Thomas Porcello. (Music/Culture.) Middletown, CT: Wesleyan University Press, 2005. [viii, 228 p. ISBN 0-8195-6517-2. \$29.95.] Index, bibliographical references, illustrations.

The role sound engineering plays in determining meaning in recorded music has until recently received little scholarly attention. Possibly due to the ambiguous nature of "engineering" sound itself, this neglect interferes with even the most basic understanding of the way cultures mediate their recorded musical output. This largely excellent collection of essays attempts to offer several new approaches to understanding this oft-thought-invisible layer of meaning embedded in technologically mediated artwork. In his afterward (which serves as something of a key for the essays contained within, and functions better as an introduction than the introduction proper), Thomas Porcello acknowledges the two ways one can interpret the term "sound engineering," both of which are highlighted in this collection. The first, more obvious,

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