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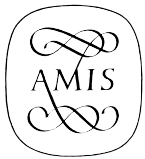

BOOK REVIEWS

Owen H. Jorgensen. *Tuning: Containing the Perfection of Eighteenth-Century Temperament, the Lost Art of Nineteenth-Century Temperament, and the Science of Equal Temperament: Complete with Instructions for Aural and Electronic Tuning.* East Lansing: Michigan State University Press, 1991. 798 pp.; 146 tables, 29 figures, 120 tuning methods in musical notation. ISBN: 0-87013-290-3.

Some 2500 years ago Pythagorus discovered that the lengths of strings giving harmonious musical sounds were simply related as whole numbers. This demonstration gave birth not only to mathematical physics but also to the metaphysics of numerology. The Pythagoreans attempted to answer the questions of the origins of natural phenomena and of moral concepts in terms of the properties of numbers.

Elaboration of musical scales to provide twelve tones to the octave, the rise of polyphony in music, and the institution of keyboard instruments with fixed note frequencies brought artists and artisans face to face with an unpleasant fact: it was mathematically impossible to assign simple ratios to all the intervals and still fit them exactly into an octave. Thus was born the art and science of temperament. It is an art because it involves adjusting or "tempering" the intervals so as to be pleasing to the ear. It is a science because the process can be guided somewhat by a knowledge of certain mathematical relationships. Often this science has degenerated into a form of numerical mysticism, the proponent of a particular scheme holding his plan as superior because it satisfies some imagined law of nature. Such persons are known as theorists. Many scientists are well known for their work in other fields. I might mention Galileo, Thomas Young (1773–1829), and the astronomer Herschel, all of whom have been intrigued by the subject of temperament. Some have contributed much to our understanding of the physical basis for its empirical and numerical rules. Musicians, scientists, and theorists have all indulged in the sport of devising temperaments. Jorgensen is (like most, of course) a mixture of all three, but I believe he leans somewhat closer to the theorist. The present volume displays amply the interplay of all three of these intellectual pursuits.

One's first impression on encountering this book is certain to be astonishment at its size. Approximately 9 by 11 inches and 2½ inches

thick, it weighs in at six pounds and contains 798 pages—more than large enough, one might think—to do sufficient justice to its subject. But a perusal of the contents will give heart to the intimidated reader. Most of its 233 sections are really short articles which can stand by themselves. They treat a particular tuning by giving a historical account of the person who devised it, the circumstances under which it was developed, and the theory and practice behind that particular temperament. These anecdotes are generally quite readable and have copious references to other sections of the book as well as to external sources. Following each historical account, instructions for achieving the particular temperament are provided so that one may duplicate this tuning either by the technique proposed by the maker or by more modern techniques. The so-called bearing plans—the order in which the notes are to be compared with one another and the prescription of tests to ascertain whether the desired interval has been obtained—are written in standard musical notation. Short instructions, annotations, and measures of beat frequencies are placed on the staff with the notes. The need to make these plans very legible so that they can be followed during an actual procedure is the reason for the large page size. There are appended tables giving the intended result in actual frequencies, deviations from equal temperament, and properties of particular intervals. Much of the book's contents consists of "music" and tables, so that the amount of text is much less than the ponderous size would suggest.

In describing this extensive collection of temperament schemes dating back as far as the 1300s, Jorgensen has found it necessary in many cases to infer from vague and incomplete teachings what an author really intended, e.g., "Observe all Sharp thirds must be as Sharp as ye ear will permit." Jorgensen uses his extensive knowledge of the practices of the day and other clues discerned in the text to provide his specific interpretation of what a particular author intended. He usually shares with the reader his reasoning.

The sections on various temperaments are arranged largely in historical order, so that, as one reads along, he derives a picture of how this art developed over the years. But one can browse through the volume and pick up quite a few interesting accounts, and he can also use it as a reference to study or perform a particular tuning.

Many of these historical tunings have been described by Jorgensen in his two earlier books: *Tuning the Historical Temperaments by Ear* and *The*

Equal-beating Temperaments: A Handbook for Tuning Harpsichords and Forte-Pianos, with Tuning Techniques and Tables for Fifteen Historical Temperaments. These have been reviewed by Douglas Leedy in the 1979–80 and 1981 issues of this JOURNAL, and readers who are interested in a criticism of Jorgensen's methods and some of his results may wish to read those reviews.

Besides providing an encyclopedia of temperaments and a history of their development, Jorgensen has a mission. He urges the appreciation and use, wherever appropriate, of the earlier temperaments for their properties of lending character to the various keys; he also decries the present reliance on the "homogenized neutral gray coloring" of equal temperament. To bring out one aspect of key coloring, use is made of the deviation of each of the major thirds from the just interval of 5/4. The names of these intervals (C–E, F–A, B♭–D, etc.) are arranged in a circular array, and text is provided showing in which direction the intervals increase, which ones may be the same size, and which are "wolf" intervals. Jorgensen considers that, as one goes around this circle, a well-balanced temperament will show departures that vary gradually and uniformly, returning to the original as the circle is closed. The representation could have been much enhanced had he actually plotted these departures in the form of a polar diagram, where the properties he wishes to display could be comprehended at a glance, rather than relying on textual matter printed at various points on the circle. Whether this concept of balanced harmony is real or simply another instance of reliance on numerology has, as far as I know, yet to be demonstrated.

A very annoying practice is Jorgensen's use of an excessive number of decimal places in presenting calculated ratios and differences in cents. There are a few cases where such extreme precision is useful in demonstrating a mathematical point, but in the vast majority it is as meaningless as stating that the average afternoon temperature over the last seven days was 71.42857 degrees. The extra numbers have no significance whatever and just get in the way of one's obtaining a feeling for the magnitude of the quantities involved.

Jorgensen also has a thesis, expressed in the title as "the lost art of nineteenth-century temperament." He holds that tuning techniques used in this period to obtain equal temperament did not actually achieve it but produced instead a "Victorian" temperament that still contained some key coloring. He relies here on a set of measurements of actual

tunings produced by seven different tuners, as reported by Alexander J. Ellis in 1885.[1] Jorgensen's treatment of Ellis's data (in section 162) is inexcusable. First, he throws out two tuners because of "extremely poor work" even though their deviations from equal temperament were, on the average, no greater than those of one tuner he did not throw out. Then he proceeds to change the data of one of the tuners on the grounds that two weeks had elapsed between tuning and measurement and that a string must have slipped in the meantime. Two data points in another set are changed because there was an "obvious unintended error" and "no doubt . . . the fifths were originally pure." What he has left after tampering with these data to suit his own preconceptions is a set that differs from equal temperament by amounts no greater than four cents, which he considers as representing "Victorian Temperament." Deviations from equal temperament this large or larger are ordinarily encountered today for reasons that lie in the physics of the strings.

Tuners rely to a great extent on the perception of beats. These are produced by slight differences in the frequencies of harmonics that lie close together. For example, the third harmonic of C coincides with the second harmonic of the G above in the case of a just fifth. Principally because of their stiffness, the partials of piano strings are not exactly harmonic, so that the partials of two strings whose fundamental frequencies bear a just relationship will still produce beats. Therefore, following Jorgensen's beat prescriptions will in general result in fundamentals that do not have the expected frequencies he calculates. Modern measurements (see, for example, Schuck and Young[2] and Kent[3]) show that deviations from equal temperament from this cause can be larger than those that occur in Jorgensen's "Representative Victorian Temperament."

1. See the second English edition of Hermann Helmholtz, *Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik* (Brunswick, 1863). Translated by Alexander J. Ellis as *On the Sensations of Tone as a Physiological Basis for the Theory of Music* (London, 1875; 2d ed. with addenda by Ellis, 1885; reprint, with a new introd. by Henry Margenau, New York: Dover Publications, Inc., [1954]), 485.

2. O. H. Schuck and R. W. Young, "Observations on the Vibrations of Piano Strings," *Journal of the Acoustical Society of America* 15 (1943): 1–11. Also reprinted in Kent, "Influence"; see note 3 below.

3. Earle L. Kent, "Influence of Irregular Patterns in the Inharmonicity of Piano Tone Partials upon Tuning Practice," *Musical Acoustics: Piano and Wind Instruments,* ed. Earle L. Kent, Benchmark Papers in Acoustics, no. 9 (Stroudsburg, PA: Dowden, Hutchinson, and Ross, 1977): 58–68.

The section on inharmonicity in the appendix deals with this effect. It contains an attempted explanation that is utter nonsense and has no basis in fact. Jorgensen concentrates attention on the octave stretching that results from this inharmonicity and ignores the irregularities that show up in actual pianos. For these, the subtle differences that Jorgensen prescribes for many of the temperaments are quite meaningless. This criticism is less cogent for harpsichords and does not apply to continuous-tone instruments like the organ or electronic keyboards.

The volume does bring together a very extensive collection of temperaments and tuning schemes, analyzes them, and places them in a historical perspective that lends a great deal of flavor to the work. Whether or not one believes everything the author has to say merely illustrates the long, contentious history that characterizes the subject of temperament.

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Roberto Regazzi, comp. *The Complete Luthier's Library: A Useful International Critical Bibliography for the Maker and Connoisseur of Stringed and Plucked Instruments.* With a foreword by Charles Beare. Revision of the English text by Jane Helen Johnson. Bologna: Florenus Edizioni, 1990. xviii, 556 pp. ISBN: 88-85250-01-7.

This bibliography is recommended, with some qualifications, for music libraries and individuals with a practical or scholarly interest in stringed instruments. Its 3,723 entries represent the essence of a bibliographic database of about 100,000 items compiled by the respected Bolognese violin maker Roberto Regazzi. Each entry may be a composite of various imprints, editions, and translations of a single work or a series of different publications with more or less the same title. Item no. 670, for instance, lists more than sixty Christie's auction catalogues published from 1766 to 1989.

Regazzi intended to include "all the printed works . . . which might be useful to someone involved in the sector," [i.e., classical lutherie] (p. xi). His titles range from a twelfth-century treatise by Theophilus Presbiter (not the only manuscript included in this list of printed sources) to publications of the U.S. Department of Agriculture. A fair number of

dissertations are included, a few novels, and at least one computer database. Well over 700 titles were first published in the 1980s, and an almost equal number date from the nineteenth century. Periodical articles are excluded unless they have been issued as offprints, although a useful list of relevant periodicals does appear in the appendix. Articles within encyclopedias are also excluded, but there are several superfluous entries for encyclopedias and other general works. One such entry lists all sixteen printings of *The Harvard Dictionary of Music* plus *The New Harvard Dictionary of Music;* another cites *The Concert Companion* by Robert Bagar and Louis Biancolli but gives no imprint. However, the entries for the *Encyclopaedia Britannica, The New Grove,* and Lavignac's *Encyclopédie de la musique* . . . may be justified by references in the annotations to articles within the larger works.

Regazzi is obviously acquainted with most of these works and even states in the introduction that he has "been fortunate enough to get hold of a copy of at least the majority of the text [*sic*] considered" (p. xiii). This makes it even more puzzling that only about sixteen percent of the entries give any indication of current locations. The only collection referenced consistently is the Goodkind Library at Oberlin College, although the location of some of the more rare items may be noted in the annotation. The holdings of the Library of Congress are mentioned in the introduction but not referenced in the text. The Sibley Music Library also owns many of the titles listed, as well as a few additional titles which Regazzi might consider including in the next edition.[1]

This is a handsomely-printed book. The typeface and layout facilitate browsing the contents, and Jane Helen Johnson has done an excellent job with the English text. Many of the titles and Regazzi's remarks make the reader covet a chance to examine the items. However, looking for a specific work or works related to a particular subject is not easy. The alphabetical arrangement by main entry does not disregard initial articles, and the confusion caused by the irregular filing is only somewhat lessened by *see* references and extensive indexing. Heavy reliance on the index presents its own problems. It is not unusual for one term in the "General Subject Index" to have over one hundred reference numbers. The term "lutherie" has 427 references without any subheadings. The

1. See Louise Goldberg, comp., "Books in the Rare Book Collection about Bowed String Instruments and Their Construction," *The Sibley Muse* 13, nos. 1–2 (January–March 1990): 10–14.

"General Index of Names" is not quite so daunting, although "Stradivari, A." does have 235 entry numbers.

Much of Regazzi's data were collected from publishers' and dealers' catalogues and announcements, catalogues of collections, and bibliographies in other books and articles. His own chart of activities involved in producing this bibliography does not mention any systematic verification of citations.[2] Not surprisingly, completeness and reliability of the information are somewhat uneven. Some entries give full bibliographic references, including various editions, reprints, and translations. Others are curiously brief, often listing only a title. Still others are even more intriguing, such as the reference to an "English Encyclopaedia (unidentified)" (no. 1053) or the listing for "Paracelsus [?]" with the annotation, "Some unidentified writings by Paracelsus are said to include a piece of information on 'How To Prepare a Lute' . . ." (no. 2469). Regazzi substitutes a bracketed question mark [?] for incomplete imprint information in over 500 entries, although much of the missing information is not obscure. Fortunately, over forty percent of the entries are annotated with brief, practical remarks ranging from valuable summations to complete listings of chapter titles. Users of the bibliography will note that Regazzi has carefully included the contents of the annotations in the index.

Regazzi's bibliography holds important information for anyone interested in the art of making stringed instruments. It will be particularly valuable for identifying small handbills, exhibition catalogues, and trade catalogues. Improvements which Regazzi might consider for the next edition include a classified arrangement of the main body of the text, the addition of subheadings to the index, more verification of bibliographic information, and more narrowly focused selection criteria.

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Trevor Herbert, ed. *Bands: The Brass Band Movement in the 19th and 20th Centuries*. Popular Music in Britain. Buckingham: Open University Press; Bristol, PA: [distributed by] Taylor & Francis, 1991. xii, 224 pp.; 14 photographs, 2 facs., 7 tables, 1 map. ISBN: 0-335-09703-0; cloth. ISBN: 0-335-09702-2; pbk.

Here, finally, is a volume which assigns to brass bands their rightful place in nineteenth-century culture. It does so with crusading zeal. No longer will brass bands endure a "ghetto-like existence," declares the editor. Let them shed their "half-caste identity" and their role as "musical Uncle Toms," so that they can be recognized for what they were: important social and cultural ambassadors for more than a century. Is there a touch of defensiveness in all this? Definitely. But the authors, most of whom are brass players, revel in their role as cultural underdogs and scholarly proselytizers, and this enriches their book.

Three articles tracing the history of British bands form the heart of this collection, while a fourth considers whether the band contest movement was a branch of art or sport. All four pieces wrestle with the old caricature of British brass bands as being "northern, masculine, working-class, and hedonistic." The studies are particularly good on questions of sponsorship and professionalism and provide a much-needed typology that recognizes the diversity manifest in factory bands, church bands, and other purely amateur groups. In the end, the standard caricature is qualified on every point. Yet, curiously, the authors neither demolish it utterly nor replace it with any concise alternative. This is a task for the future.

Trevor Herbert's own essay on the nineteenth-century movement is particularly notable in that it begins to address the question of high versus popular culture. He notes the huge importance of operatic transcriptions in the bands' repertoire. It would have been useful to break down this category of composition further, for it might have revealed that the overwhelming majority of such arias came from Italian and French operas, rather than the solid German classics. If this is so, it would justify some rethinking of the conflict between high and popular culture so beloved by present-day neo-Marxists. Clearly, not all high culture was exclusively elite, and, conversely, not all popular music was the exclusive property of the working class.

Finally, this collection provides information which, by a process of analogy, strikingly elucidates the history of brass bands in America. In

Great Britain the instrumental roots were deeper, the technology of instruments more advanced, commercial patronage more generous, and country-wide networking more intense than in the United States. Duncan Bythell's chapter on Australia provides material for more such parallels and contrasts. None of the essays draw explicit comparisons, but they are grist for the mill of anyone wishing to do so.

The international dimension of the band movement warrants further careful study. Everywhere, from Sicily to Stockholm, from the Urals to the Rockies, bands of brass instruments brought both cultivated and naive music to the masses. This fine book invites researchers to dig deeper into a rich but often belittled legacy.

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Margaret J. Kartomi. *On Concepts and Classifications of Musical Instruments*. Chicago Studies in Ethnomusicology, ed. Philip V. Bohlman and Bruno Nettl. Chicago: University of Chicago Press, 1990. xix, 329 pp.; 2 photographs, 67 illustrations. ISBN: 0-226-42548-7; cloth. ISBN: 0-226-42549-5; pbk.

Margaret J. Kartomi is professor and chairperson in the Department of Music at Monash University in Clayton, Victoria, Australia. She is a specialist in organology and the music of Southeast Asia. Her publications include a book on Indonesian musical instruments,[1] 214 definitions of Southeast Asian instruments in *The New Grove Dictionary of Musical Instruments,* and additional articles in journals and collections of writings. She is a member of the editorial board of the series which published her book, the Chicago Studies in Ethnomusicology.

In Professor Kartomi's words, "this book presents and explains how various of the world's cultures classify their musical instruments and instrumental ensembles, together with the concepts of instruments upon which the schemes are based." Kartomi examines several theories of classifications, discusses cognitive structures resulting from the process of classifying, and defines some of the terminology used in classifications. In some chapters the basic data were derived from case studies

1. Margaret J. Kartomi, *Musical Instruments of Indonesia* (Melbourne: Indonesian Arts Society, 1985).

which she compiled from various cultures. Kartomi writes in a clear style documented by copious references to other authors. She makes use of anthropological studies which provide important insights into the music and instruments of many different cultures.

The book is divided into three sections and eighteen chapters. The first section, "On the nature of classifications of musical instruments," consists of three chapters and discusses general schemes of classification used by several cultures throughout the world. The second section, "Classification in societies oriented toward literary transmission," is the largest and includes nine chapters, which concern oral and written classification systems in China, India, Sri Lanka, Tibet, Java, and the Arab world. Two chapters are historical essays on classifications used in Greece and Europe from the medieval period through the eighteenth century. Another chapter discusses European and American classification systems during the nineteenth and twentieth centuries, and yet another reviews classifications proposed for folk instruments. The third section, "Classification in societies oriented toward oral transmission," discusses oral classifications of the Mandailang people of northern Sumatra, the Minangkabau people of western Sumatra, the T'boli people of the southern Philippines, west Africa, the 'Are'are people of Malaita in the Soloman Islands, and the Finnish-Karelian culture. An epilogue entitled "The Seamless Web" briefly reviews all the classification systems discussed in the book. There are endnotes for each chapter, an extensive bibliography, a short but useful glossary of terms, and a detailed index. Many of the illustrations provide diagrams explaining how a classification system relates to the music, instruments, or other aspects of the culture under discussion.

This book is an important and illuminating contribution to organology. The range and variety of topics covered are remarkable. The richness of information makes it useful as a reference tool for everyone interested in musical instruments and a valuable source book for college study. Kartomi's work is a landmark in this area of organology.

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