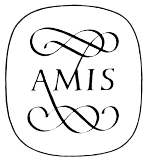
Journal of the American Musical Instrument Society

VOLUME VIII • 1982



is included in the chapter on organ restoration and comprises a major part of the writing. Other chapters deal with historical and musical background, the characteristics of the organs and their cases, and the dispositions of the instruments. Four appendices provide valuable reference material and occupy nearly as many pages as the text itself. These are: a checklist of organs in Mexico, Peru, and Ecuador; a provisional list of organ builders; documents related to organ building; and a glossary. A bibliography and index complete the written portion of the book, the printing of which is handsomely and accurately executed.

A large selection of photographs, the majority of which are by Mr. Odell, complements the text and provides visual material heretofore unavailable in print. Case design and interior mechanical detail alike are treated. The reproduction quality for both the color and black-and-white plates varies, but is generally good.

This is a well-written book, one which should be valuable as a reference work, especially since the field has not been extensively treated. As a summary of the present knowledge of organ building in Mexico from the beginning of the colonial period through the nineteenth century, it is a unique work.

ARTHUR LAWRENCE

Herbert W. Myers. *The Practical Acoustics of Early Woodwinds.* D.M.A. dissertation, Stanford University, 1981. Ann Arbor: University Microfilms International, order no. 8109026. 140 pp.

M. Castellengo, F. Drouin, and P. Sechet. *La flûte traversiere à une clef.* Bulletin du Groupe d'Acoustique Musicale. University of Paris, 1978. 58 pp. (Available from Librairie La Flûte de Pan, Attn: M. Monier, 55 Rue de Rome, 75008 Paris). 40 F.

Both of these works deal with the physical acoustics of early woodwinds, a subject very sparsely represented in the literature. Myers, who has devoted many years to the study and design of antique wind instruments, presents in his thesis a summation of his accumulated knowledge of the effects of design variations, and an explication of why the instruments were designed as they were. The work deals with the principal woodwinds of the renaissance and baroque periods, with the major emphasis on the former. Included are the transverse flute and recorder, capped and uncapped cane-reed instruments of the renaissance

period (such as the shawm, curtal, crumhorn, sordun, and rackett), the "lip-reed" cornett and serpent, and the flute, recorder, chalumeau, clarinet, oboe, and bassoon of the baroque period.

Rather than taking the conventional approach of discussing each instrument in turn, Myers has organized the text in sections dealing with the principal factors and components responsible for acoustic behavior—tone holes, bore shapes, materials, mechanics of keywork, and sound generators. The behavior of the various instruments is discussed in each of these contexts. This is an excellent arrangement, as it not only avoids the duplication encountered when discussing each instrument by itself, but also allows a basic understanding of a particular factor and shows how the various instruments may be affected by it. The factors of design are presented in terms of cause and effect, much as they would have been understood by early makers, although briefly stated modern acoustical concepts are used for clarification.

Unfortunately, Myers's avoidance of quantitative relationships amounts almost to a phobia. I believe it is accurate to state that there is not a single numerical value, or even a ratio such as "twice as great," in the entire text. All of the phenomena are discussed solely in comparative terms: larger, smaller, greater, less. For example, the well-known fact that enlarging a finger hole raises the pitch is stated, but nowhere is there any information as to how much of a change may be expected in a given set of circumstances. One wonders if the title "The Practical Acoustics of Early Woodwinds" is appropriate in view of the total absence of quantitative information. Perhaps it is "practical" in the limited sense that it describes some of the early makers' *practices*—the undercutting of tone holes, perturbations of the bore, variations in mouthpiece cup depth, and shaping of reeds.

The descriptive approach is nevertheless quite successful. The author calls attention to a number of acoustical phenomena and interrelationships that are usually buried in texts too technical and theoretical for many readers. While most of these are properly described and accounted for, there are several instances in which the real reasons for them are hidden or mistaken. For example, it is stated that a higher window (the distance from windway to edge) in a recorder results in a louder sound. While this is true, it is not the size of the opening per se that is responsible: the increased distance calls for a higher jet velocity to keep the same travel time; to achieve this, the player must blow harder, making the sound louder. Similarly, the discussion of conical bores and the effect of bore angle on the frequency spread of reso-

nance modes is confused by the failure to state how the reed volume is changed while the bore angle is varied. A complete cone of any reasonable angle would have upper resonances that are very nearly harmonics of the fundamental or first mode. It is only because the tip of the cone has been removed and replaced by a reed and its cavity that the modes are inharmonic. Unless it is specified how much of the tip was cut off and what it was replaced by, the mode spread is not determined. Such confusing interactions always bedevil an empirical approach.

It is also true that in a good many respects, especially those which involve timbre, our present knowledge of the real acoustical mechanisms at work is meagre. Here Myers's careful cataloging of relationships deduced from observation and experience, as well as from acoustical principles, provides a useful reference for those who wish to inquire more deeply into the workings of some of these mechanisms. An appendix summarizes the effect of each design variation in a well-organized tabulation.

* * *

In sharp contrast to Myers's work, Castellengo's treatise on the one-keyed baroque flute is replete with measured quantities and the results of careful experimental research. There are more than fifty figures displaying dimensions of historical instruments, fingerings, sonograms, and sounding frequencies. Introductory sections deal with the definition of the instrument, the general mechanisms by which the sound and the various notes are produced, the role of the musician, and some remarks on the uncertainties encountered by the student of ancient instruments. There follows a chapter on the predecessor of the baroque flute, the simple cylindrical renaissance instrument, amply illustrated with drawings and fingering charts from contemporary sources.

The main body of the work is a complete exposition of the acoustical properties of the baroque flute, supplying very impressive data. Castellengo and his colleagues at the Groupe d'Acoustique Musicale have been engaged for many years in experimental studies of wind instruments; they have developed some very good techniques and have carried out the work with a thoroughness and care that is highly commendable. The use of the *champ de liberté*—the range over which the player can vary the frequency of a given note—has given some very consistent results by which the intonation of various instruments can be characterized in a way that is reasonably independent of the player.

Liberal use is made of the sonograph, an instrument capable of displaying the intensities of the partials of a given note as a function of time. Thus there are quantitative data on the timbre of the instruments studied: on how the timbre varies with different fingerings or perturbations in the bore, for example, and on the transient changes in emitted sound with the attack.

In addition to the experimental results on the instruments themselves, there are chapters on the method of playing the flute and on the methods of manufacture and materials and tools used. These draw extensively on the contemporary literature, supplemented by modern knowledge of such matters as the species of wood available.

The writing style is concise, often using an outline form, so that the facts and conclusions are clearly visible and easy to follow. One could not ask for a more definitive, knowledgeable, and complete treatise on this instrument.

JOHN W. COLTMAN

Nancy Toff. *The Development of the Modern Flute*. New York: Taplinger Publishing Co., 1979. 268 pp. $19.95.

Aptly titled, Nancy Toff's book is primarily a detailed examination of the Boehm flute concentrating on details of mechanism added or subtracted during the nineteenth century. In her acknowledgements, Toff recognizes Dayton C. Miller, the "patron saint" of the flute, and his collection of instruments, books, trade catalogs, music, and correspondence now housed at the Library of Congress, which constitute the major source for scholars and performers engaged in flute research. (The instructional treatises in the Miller collection, over 200 in number, were made available on microfilm a few years ago and can be obtained from the Library of Congress.) The introduction stresses the importance of studying mechanical developments in relation to the music for the instrument. Toff tells us later that this view of the evolution of the flute—a recognition of the influence of music on mechanism—was first put forth by Richard Carte in 1851. In 1906 Miller himself had begun a manuscript concerning the "synthesis of the art and science of the flute"; Toff's *Modern Flute* is a continuation and updating of this pioneering work.

The first chapter treats pre-Boehm flutes from their emancipation from vocal music in the Renaissance to their use by Beethoven. This chapter is much less detailed than those which follow. Three important