



HANDBOOK  
*of*  
INSTRUMENTATION

*Andrew Stiller*

*In memory of*  
MICHAEL PRAETORIUS  
*who got it right the first time*

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# Preface to the CD-ROM Edition

The publication of this CD-ROM edition of the *Handbook of Instrumentation* affords a welcome opportunity to note some recent changes in instrument manufacture and usage. As noted in the Preface to the Second Edition, the world of electronic instruments has been so utterly transformed since this book was written that nothing short of a complete revision could possibly do justice to the new developments. Instruments of other sorts have not altered so rapidly, but it is now seventeen years since I typed the last words of this book, and a number of significant changes have occurred among even some quite traditional instruments.

First of all, there has been a strong growth of interest in the extremes of the saxophone family. The rare **sopranino saxophone in E<sup>b</sup>** has developed a serious constituency and can no longer be dismissed as a mere novelty. The part written for it in Ravel's *Bolero* is now as likely as not to be played on the instrument for which it was written. For all that, however, it is not a very useful instrument, sounding distinctive only in the bottom sixth of its range. Above that, it sounds like the upper register of an ordinary clarinet.

At the opposite extreme lies the extraordinary **contrabass saxophone in E<sup>b</sup>**, two meters tall, with a bell the size of a tuba's. Dead and buried when I first wrote, it is now not only exhumed, but twitching on the slab, its manufacture having resumed after a lapse of almost ninety years. Fifteen of the beasts are now in active use, with more, presumably, to come. Meanwhile, the **bass saxophone**, though still rare, has become much easier to find, and the low A extension of the **baritone saxophone** has become almost standard among professionals.

A recent work that should be studied by anyone interested in the **horn** is György Ligeti's astounding 1982 Trio for horn, violin and piano. Orchestral horn players now increasingly favor a triple horn in F/B<sup>b</sup>/high F, since pieces requiring the top extension tones (not only new works but revived Haydn symphonies and so on) are much more likely to be encountered than formerly. On such instruments the B<sup>b</sup> side of the instrument is often the default configuration, and one of the two thumb valves must be depressed to bring on the formerly normal low F side.

The **cornet** has stepped back from the brink of assimilation into the trumpet, with both players and manufacturers taking pains to recapture the mellow, burnished tone of the instrument's heyday. This has in turn led to a retreat by the **flügelhorn**, less commonly seen than it was twenty years ago. To me this is a pity, since the flügelhorn remains the more distinctive timbre, and when provided with four valves (as the cornet never is) possesses a truly impressive range.

The **contrabass trombone** has undergone an interesting metamorphosis, in that manufacturers are now providing under that name instruments that are really just bass trombones with an unusually wide bore. This gives the instrument the thick, ponderous tone of the true contrabass, and strengthens the pedal tones of the F and E $\flat$  (or D) triggers, so that the range is extended down to at least B $\flat_2$ . In exchange, the upward range is limited, so that it is probably unwise to write above f $^1$  for trombones of this type. Because they are much cheaper than true contrabass trombones, and can also legitimately be used for ordinary bass trombone parts, this type of contrabass has proven quite popular among players—enough so to lift the contrabass trombone out of the “very rare” category into the merely rare.

The **euphonium** has changed not a whit—save that the main American association of tuba players has decided that this should be the preferred general name for that confusing cluster of near-synonymous tenor tubas for which I originally preferred the name “baritone horn.” I accede to the professionals: “euphonium” it shall be.

On the **marimba**, the downward extension tones to A $_0$  have become standard, except on student instruments, and new extension tones, down to C $_0$  are to be found on quite a few new instruments. This in turn seems to have driven the **bass marimba** from the field; I have not done a thorough survey of manufacturers, but it has been a long time since I have seen one of these. In any event, the new extended marimbas are far more common than the bass marimba ever was.

There are three “new” percussion instruments to welcome to the fold, all of them exotics that have been adopted into the ever-growing Western percussion department. The **talking drum** of Africa (usually available) is a waisted, double-headed drum with numerous lashings connecting the two heads, which are tuned to the same pitch. The drum is held under the arm, and by squeezing the lashings the pitch can be raised across approximately an octave from about c $_0$  upward. The value of this drum, however, lies not in an array of fixed pitches, but in its ability to scoop, whoop, and dive in quick glissandos reminiscent of speech contours. For this reason it is best notated without fixed pitches, though the pitch produced is very clear. It is traditionally played, like many African drums, with a curved wooden stick, though it can also be struck with the hands.

The **rain stick** (ubiquitous) is a hollow wooden tube with numerous internal shelves, and containing seeds or gravel that rattle down the shelves in a very realistic rain imitation when the stick is upended. Large sticks are lower-pitched than small ones, and can sustain a longer sound: up to six seconds as opposed to two seconds for the smallest specimens. Large rain sticks are also the loudest, but even the very largest is scarcely louder than *pianissimo*. In order to achieve complete control over the duration of the sound, a player should use two rain sticks of the same size; by alternately inverting the two, the characteristic rain sound can be continued indefinitely, and by turning a stick sideways the sound can be cut short (though a true staccato is impossible).

Finally, there is the rare (on these shores) **Chinese opera gong**, a small, domeless gong whose pitch scoops on the attack, giving it a characteristic “bwee” or “bwang” sound. This unique timbre is only available at dynamic levels between *p* and *f*; at louder or softer levels the scooping effect will not occur.

Andrew Stiller  
August 30, 2000

# Preface to the Second Edition

Save for this preface and the correction of a number of typographical errors, the Second Edition of the *Handbook of Instrumentation* is an unaltered reprint of the first. I have, however, reduced both the size and the price of the volume so as to make of it what its title declares, and what it was always intended to be: a practical desk-reference for composers and arrangers.

The instruments in the core of the book (Chapters I - VII and IX) have changed very little in the ten years since it was first published. Any changes I would introduce today would be largely matters of tone and emphasis, not content. I would, however, add two musical examples: for the harp, R. Murray Schafer's *The Crown of Ariadne*, and for the harmonica, William Russo's entertaining *Street Music*.

Electronic instruments, on the other hand, have undergone such a ferment of evolution that my Chapter X is now, I fear, of purely historic interest. Were I to undertake a thorough revision of the book Chapters VIII and X would be reorganized into three chapters, the first dealing with acoustic and electroacoustic keyboard instruments in much the same terms as they are here described, the second devoted to MIDI controllers (including string, percussion, and wind controllers), and the third devoted to the maddening intricacies of MIDI itself. The age of analog electronics, captured at its height in my original Chapter X, is over. As far as electronic keyboards are concerned, the digital revolution has collapsed a number of instruments together, melding the electric organ, the electronic piano and harpsichord, and the studio and performance synthesizers into a single (if highly variable) instrument now called "synthesizer" or, baldly, "electronic keyboard." Electronic organs, properly so called, are now built solely as pipe-organ substitutions. The electric (i.e., electroacoustic) piano, however, remains what it always was. The melotron, poor clumsy thing, and all its analog ilk have been replaced by the elegant and potentially very powerful sampling keyboard, of which, like everything else in this paragraph, you will have to read elsewhere.

And Part II? The early-music revival having reached a plateau, surprisingly little has changed here. One major alteration must however be noted in Chapter XI: it is now generally accepted that except for dance music and keyboard transcriptions, all polyphony before 1450 was intended for performance by the human voice alone.

Andrew Stiller  
February 1, 1995  
Philadelphia

# Preface and Acknowledgments

As no book of this sort has previously appeared in English, it will perhaps forestall misunderstandings if its scope and intent are outlined at the start.

Handbook of Instrumentation is a guide to the potentials and limitations of every instrument currently in use for the performance of classical and popular music in North America. Non-Western, folk, and educational instruments are not covered; and while over ninety percent of what is included here applies equally well to Europe, Central and South America, and Australia, no special attempt has been made to delineate the differences between the musical practices of those regions and of North America. Further, the book is strictly limited to current practice and is in no sense a history either of instruments or of instrumentation. It is for this reason that, at least in Part One, very few of the works cited as examples pre-date the twentieth century.

Within these limits I have endeavored to be as comprehensive as possible, and to anticipate every question, naïve or sophisticated, that could conceivably arise from any quarter. I am well aware that such an attempt can never be entirely successful, and I would like to beg of my readers not only their indulgence for any sins of omission or commission perpetrated in these pages, but their aid in pointing out to me any areas where expansion or correction might be desirable.

In order that the book be as useful as possible to students as well as professionals, I have not cast it in dictionary or encyclopedia form, but in that of a text, which may profitably be read straight through. Instruments are covered in standard orchestral order, and those who wish to look up a specific point will find that most instruments can be easily located simply by flipping through and looking at the illustrations and chapter subheads. The index is designed for quick reference and glossary use. The main or defining entry for each term is given in boldface.

A compendium of this sort cannot be put together without the aid of many people. I must of course bear the final responsibility for the information contained between these covers, but that does not make any less real my debt to all those who have patiently borne my constant badgering for information, or who have submitted their instruments to strange experiments in order to determine under what conditions such-and-such an effect is possible or impossible. I am particularly grateful to Dr. Charlotte Roederer for convincing me to begin the project; to my uncle, Richard Stiller, for guiding me through the ins and outs of book publishing; and to Carol Bradley and the rest of the staff of the Music Library at the State University of New York at Buffalo for their unfailing and unflappable help in locating and even acquiring for the library "many a quaint and curious volume of forgotten lore." Donald Miller, Ernestine Steiner, and Robin Willoughby provided valuable advice in the rendering of the musical examples.



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