CIMCIM ICOM international committee for museums and collections of instruments and music

VOICES FOR THE SILENCED: Guidelines for Interpreting Musical Instruments in Museum Collections

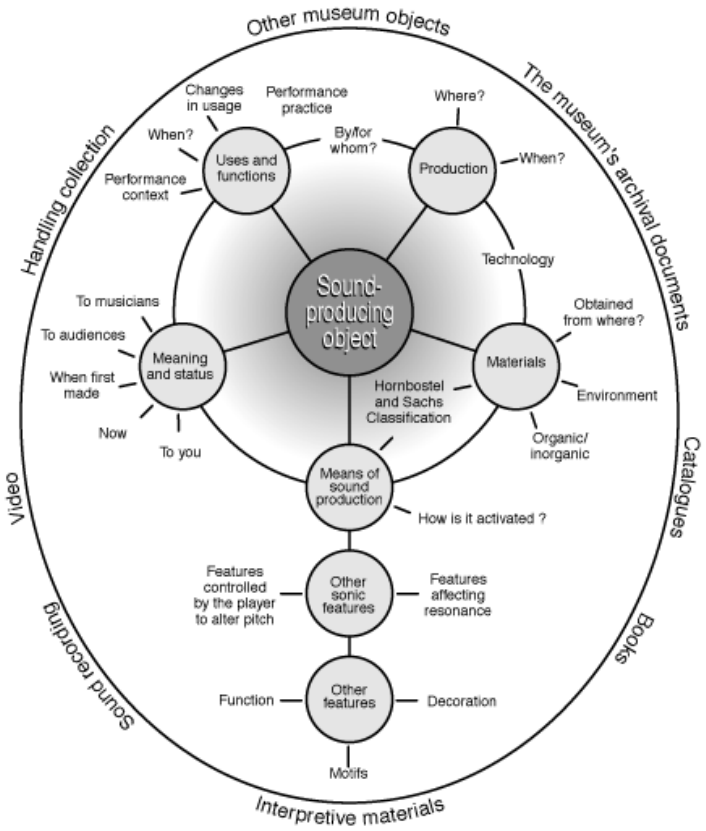
Margaret Birley, Heidrun Eichler, and Arnold Myers, with the CIMCIM Working Group for Education and Exhibitions (Co-ordinator Jos Gansemans)

CONTENTS

1. Introduction
2. Pre-tour training of "non-specialist" interpreters
3. The nature, time and place of the interpretative session
4. General aims for the interpretative session
5. How musical instruments work
6. Demonstrating the science of sounds
7. Technology
8. Music
9. Classification
10. Uses and functions
11. Activities after the interpretative session
12. References cited
13. Further reading

1. INTRODUCTION

Many museums house collections of musical instruments, objects that have been created in order to generate sounds. These guidelines are intended for museum educators and guides who are not specialists in music or in organology, the study of musical instruments, and whose role it is to interpret museum collections for groups of children and adults of all ages. Outlined below are suggestions as to different ways in which the interpretation of musical instrument collections may be approached. A diagram (Example 1) represents a summary of the interconnected themes. Museum educators and guides are invited to select a number or just a few of these different options, depending on their area of expertise and the requirements of the visiting group. The aim of the guidelines is to empower interpreters to formulate their own approaches to the study of the musical instrument collection in their own museum.



Example 1, formatted electronically by the Canadian Museum of Civilisation

2. PRE-TOUR TRAINING OF "NON-SPECIALIST" INTERPRETERS

It is recommended that the specialist staff in the museum should provide the interpreter with a written and/or oral outline of the exhibition's concepts and contents. Supplementary interpretative material, such as catalogues, should be made available. Reading material and recordings can also be suggested.

3. THE NATURE, TIME AND PLACE OF THE INTERPRETATIVE SESSION

The "non-specialist" educator or guide will be interpreting the musical instrument collection to audiences of both adults and children. In most museums talks to such groups last from forty-five minutes to one hour. The talk should be informative, entertaining and not over-theoretical; listeners should be participants as well as observers. If the visiting group is small enough most members should, ideally, be given an opportunity to make a verbal contribution. Where possible the talk should begin at the entrance to the museum, since this creates a special rapport between the guide and the visitors, who will feel that they are guests at the museum. The educator or guide should be informed of any particular interest which the non-specialist group may have, so that s/he may have the opportunity to link this to the talk.

4. GENERAL AIMS FOR THE INTERPRETATIVE SESSION

The talk or tour can help to further the understanding of the relationship between abstracted facts and material objects. It can also enhance the audiences' investigative and perceptive abilities, by offering not only a variety of different theoretical perspectives, but also different modes of learning about musical instruments. Examples of musical instruments in showcases may be duplicated or replicated by a handling collection of instruments that can be played, an important interpretative resource. Handling, and even playing such instruments will strengthen the impression of the visit. Research in the field of education has demonstrated that the more senses are involved in the learning experience, the greater the retention for adults and children alike (Davidson, Heald and Hein 1994, p.193).

The interpretation of musical instruments lends itself to interdisciplinary studies bringing in the sciences, design and technology, the arts, history, geography, anthropology and sociology. An extensive exploration of these different subject areas, from the specific to the general, can be aided by the application of the interrogatives how?, where?, for/by whom? when? and why? (see example 1). For many people, a visit to a musical instrument museum will represent their first encounter with the music of another temporal period or cultural area. The interpretative session can represent an opportunity to teach science empirically, through the instruments' world of sound, its production and transmission.

5. HOW MUSICAL INSTRUMENTS WORK

A musical instrument acts as a transformer, converting the energy from an outside source into a series of sound waves. It is the sound of a musical instrument which we can hear and appreciate. All sound is the result of vibration. A drum skin, for example, vibrates when it is hit. Its movement causes the air around it to vibrate in a series of push-and-pull vibrations travelling outwards from the drum head. The vibrations in the air, on reaching the human ear, cause the ear-drum to vibrate in sympathy. These vibrations pass to the inner ear and are there converted into nerve impulses which are sent to the brain to be interpreted as a note.

A pure musical note, such as that produced by a tuning fork, consists of a simple vibration of the air at equal intervals. Normally, however, a fundamental note is heard together with other notes, called overtones. With some instruments there is a simple mathematical relation between the frequencies of the overtones, in which case they are said to be harmonics. The length of the waves of the harmonic overtones is half, a third, a quarter, etc.

of the wavelength of the basic (fundamental) pure note. Any note produced on any instrument is in fact accompanied by a varying number of attendant notes called overtones.

The study of sound is called acoustics, and acousticians try to understand how sounds are produced, modified, transmitted, affected by buildings, and heard. The acoustics of musical instruments are extremely complicated, but always relate the sound-producing mechanisms of instruments and the voice to the hearing characteristics of our ears and brains. Instruments can be divided into two classes, those which produce sounds in the air in a tube, or other container partially open to the outside air, and those which produce vibrations in a solid such as a string, drum skin, or the moving parts of a loudspeaker which are subsequently transmitted to the air. Instruments which produce sounds in the air include those usually called wind instruments (and the human voice). Most wind instruments use one or more tubes, such as those of flutes, trumpets and pipe organs, because tubes can be made to produce patterns of sound which relate closely to the recognition capabilities of the human ear and brain.

Similarly, many instruments use vibrating strings because the vibrations of the strings also closely correspond to the human capacity to recognise sounds. Every object has natural frequencies of vibration, but because strings do not produce much sound directly, there is usually some device, such as the body of a violin or guitar, which modifies the vibrations and transmits them to the air as sound. Resonance is the enormous increase in the strength of the vibration that occurs when the frequency generated by the applied force, which is used to make the instrument sound, happens to equal the natural frequency of the object. The resonance makes certain overtones louder than others, and this is a significant factor in the characteristic tonal quality of different instruments.

6. DEMONSTRATING THE SCIENCE OF SOUNDS

The interpreter can introduce some basic concepts relating to the physical acoustics of instruments into the talk or tour, using the museum's handling collection of instruments:

Sounds are made when objects, *e.g. strings on musical instruments*, vibrate. Vibrations from sound sources can travel through a variety of materials. The sound source: the primary vibrating agent can usually be identified, as can the means by which it is made to vibrate.

The pitch and loudness of sounds produced by some vibrating objects *e.g. a drum skin or a plucked string* can be changed. Concepts relating to pitch levels can be explored. The different levels of pitches may be correlated with aspects such as the length of a string/column of air in a tube.

7. TECHNOLOGY

The technology involved in the manufacture of musical instruments involves a diverse range of subjects for consideration. Among those directly related to an instrument's structure are the materials used (and there may be environmental or other reasons for selecting one material rather than another), the specific techniques for manufacturing both its internal its external components, the pattern or model adopted for the instrument, and the specialist tools required. The finishes used in an instrument's manufacture should also be considered. Instruments may have some components which are purely decorative, with distinct stylistic

traits, or other features which have some function that is not directly related to the instrument's sound.

Some museums are located in cities or regions that have a long tradition of musical instrument building, which should be of interest to visiting groups.

8. MUSIC

While handling collections make museum objects more accessible, an audience can sometimes gain from them a false impression as to how instruments should be played, and how they should sound. Some museums will be able to employ musicians who can demonstrate professional performance practice in musical instruments, and close observation of such performances should be encouraged. Video and audio recordings are also important media for interpretation. The following very basic elements of musical cognition are suggested as subjects for discussion with children by the museum educator or guide:

- Duration of notes - long/short
- Dynamics - loud/quiet/silence
- Tempo - fast/slow
- Timbre - quality of sound e.g. tinkling, rattling, smooth, ringing
- Texture - several sounds played or sung at the same time/one sound on its own
- Pitch - high/low

In museums in areas where music is a strong feature of general education the "non-specialist" guide/educator's fundamental knowledge of music will be quite extensive, and interpretative sessions conducted by such individuals can encompass related subjects in some depth. These might include:

- Groups of musical instruments e.g. within the European orchestral tradition (woodwind, brasswind, strings, percussion)
- Families of instruments e.g. violin, viola, violoncello ('cello), double bass, and the correlation between the size of an instrument and its sound
- The history of musical instruments; their development and diffusion
- The influence of materials on the sound of instruments (e.g. the use of plastics in woodwind instruments)
- The correlation between the construction of musical instruments and their sound (e.g. the difference between instruments of the viol and violin families)
- The scales obtainable on different instruments (e.g. chromatic/diatonic)
- Sources for further reading are suggested in Further reading.

9. USES AND FUNCTIONS

The uses and functions of musical instruments provide an inexhaustible line of enquiry. The place of musical instruments within the cycle of human life, their significance within a culture, or to particular individuals is infinitely varied. Suggestions for aspects to be considered are as follows:

- the cultural contexts in which instruments are played
- the people for whom they are made and/or played

- the place of instruments in the cycle of human life; in daily life, social life, political life, religious life
- the status conferred on individuals through the ownership or performance of different types of instruments
- the ways in which instruments are suited to the locations where they are played (e.g. indoors, out of doors etc.)
- the association of instruments with religious or other types of ritual when they are played or made
- the use of musical instruments as media for communication
- the use of musical instruments for imitating animals and birds
- the local names of the different components of musical instruments
- the symbolism of instruments
- musical instruments as *objets d'art*
- the relationship between musical instruments and other museum objects
- the history of the museum's collections, and how instruments are cared for within the museum.

10. CLASSIFICATION

Not all cultures have an inclusive term for "music", as distinct from other elements of secular or sacred performance, and this is one of the reasons why "sound-producing objects" rather than "musical instruments" is often the preferred term in museums which present a diverse range of traditions. A number of everyday objects such as spoons or glasses can have a musical function, should the occasion demand it, but they are not primarily musical instruments.

There are many ways of classifying musical instruments. Any classification system should be considered in its totality, since it is culture-specific, and encodes many covert cultural values. The Chinese classification system, the *bayin*, in which eight different materials were identified as different sources of sound, is thought to have originated in the 23rd century BC and it was used for three millennia. In essence it reflected ideas of cosmology, food production, the dependence of the human race on the forces of Nature, which could be controlled, to some extent, by sympathetic magic. Instruments may be considered as extensions of the human body; and many classification systems performance technique, the actions of the body, constitutes one of the principle factors relegating an instrument to one category or another. In the classification system developed by the `Are `Are people in Malaita (Solomon Islands) a distinction is made between bamboo instruments which are blown and those which are struck (Zemp 1978).

In 1914, E.M. Hornbostel and Curt Sachs devised a classification system for musical instruments from all parts of the world, in order to ensure a consistent taxonomy for music historians and museum curators. This system was particularly suited to the purposes of information storage and retrieval, since it utilised a version of the Dewey decimal system, a hierarchical numerical system used for organising information in libraries. There are four primary divisions in the Hornbostel Sachs system:

- idiophones: "the primary vibrating agent is the substance of the instrument itself, owing to its solidity and elasticity ... without requiring stretched membranes or strings" (Hornbostel and Sachs, tr. Baines and Wachsmann 1961: whole text, pp.3-29). Examples include the gong, the xylophone and the mbira (lamellaphone)

- membranophones: the vibration of stretched membranes generates the sound. Most drums fall into this category
- chordophones: instruments with one or more stretched strings. Zithers, which include pianos in the Hornbostel and Sachs system, violins and harps all belong in this group
- aerophones: "the air itself is the vibrator in the primary sense" (Hornbostel and Sachs, translated Wachsmann and Baines, 1961, p.24). Bullroarers, flutes and trumpets are included in this group.

It has been demonstrated (Jairazbhoy 1990) that this scheme was almost certainly based on the Indian classification dating back to the *Natyasastra* treatise, with chapters on music written around the 4th to the 5th centuries CE (Powers 1980, p.77), which included the following categories of instruments: *tata vadya* (stretched instruments) - instruments whose principle element of sound are stretched strings; *annaddha* or *avanaddah vadya*, (covered instruments) - drums; *susira vadya* ("hollow" instruments) - such as flutes; and *ghana vadya* ("solid" instruments).

The Hornbostel Sachs system has been adopted by many writers and musical instrument museums. In their Introduction to the classification the authors foresaw that their system would require updating in the future. In 1940 a fifth group, "Electrophones", was added by Sachs. Research in the field of acoustic physics has now demonstrated that one or two musical instruments belong in groups other than those to which they were assigned by Hornbostel and Sachs (see for example Adkins, Williamson, Flowers and Picken, 1981).

The classification has been extended by some authors, notably Dräger (1948), and Hood (1982) who incorporated aspects such as performance technique and instruments' status among the categories. It has been revised by others, including the CIMCIM Study Group for Classification which published its work in the Committee's Newsletters in the 1980s (No. XI, 1983-4; No. XII, 1985; No. XIII, 1987) and more recently by Geneviève Dournon, a member of the group, in (1992, pp.260-286) and (1996). André Schaeffner's logical classification system (Davies 1984), (Wachsmann 1984), (Kartomi 1990), as are the other comprehensive systems devised by scholars since Hornbostel and Sachs.

The imperative for a Typology of folk musical instruments, identified by Oskár Elschek and Erich Stockmann (1969, p.30), is one of the informing themes of the series *Studia instrumentorum musicae* (Stockmann 1969-85). Symbolic taxonomies in the form of ideograms which could be used to represent structural details, such as the shape of duct flute mouthpieces, were advocated by Elschek (1969, p.25) as an aid to comparative analysis and the establishment of types and variants of instruments; such sketches were also used by other authors in this series (Stockmann 1969-85; i, 1969 and iii, 1974). The instruments under consideration are closely related and are from a specific area, e.g. bagpipes from Slovakia (Macák 1969). In the field of organology over the past century there has been a general movement away from the comparative study of instruments from many parts of the world to the investigation of instruments from a specific area, and of the work of individual makers.

11. ACTIVITIES AFTER THE INTERPRETATIVE SESSION

After a talk or a tour, museum audiences are usually given time to explore the musical instrument galleries. An explanation as to how to use the gallery should be provided. Concerts, films and lectures by specialists can be arranged for adult audiences.

In many museums activity sheets are devised in the form of questionnaires about the collections, which are to be completed by visiting children, and they are also encouraged to learn about instruments by making observational drawings. The museum's handling collection gives children the opportunity of using multisensory modes to learn about the materials, pitches and timbres of instruments. Some museums encourage children to improvise short performances using the instruments, creating pictures or stories in sound. Other organised activities allow children to explore the world of musical instruments in different ways, by conducting experiments in sound and by making their own instruments. Musical instrument making projects can represent an activity to be initiated after the information-gathering museum visit. The most successful instances of such projects are usually those that set out to fulfil design criteria, and subsequently to evaluate the achievement. Sources for making simple musical instruments are given in *Further reading*.

12. REFERENCES CITED

C.J. ADKINS, R.C. WILIAMSON, J.V. FLOWERS, and L.E.R. PICKEN (1981): "Frequency-doubling chordophones". *Musica asiatica* III. London: Oxford University Press, pp.1-9.

Betty DAVIDSON, Candace Lee HEALD, and George E. HEIN (1994): "Increased exhibit accessibility through multisensory interaction". *The Education Role of the Museum* edited by Eilean Hooper-Greenhill, London and New York: Routledge, pp.179-194.

Hugh DAVIES (1984): "Electrophone". *New Grove Dictionary of Musical Instruments* edited by S. Sadie. London: Macmillan, I, pp.694-695.

Geneviève DOURNON (1992) "Organology". *The New Grove Handbooks in Music*: Ethnomusicology, an Introduction edited by Helen Myers. London: Macmillan. pp.245-300.

Geneviève DOURNON (1996): *Guide pour la collecte des musiques et instruments traditionnels*. Paris, UNESCO. (ISBN 92 3 203304 6).

H.-H. DRÄGER (1948): *Prinzip einer Systematik der Musikinstrumente*. Kassel: Bärenreiter.

O. ELSCHEK (1969): "Typologische Arbeitsverfahren bei Volksmusikinstrumenten". *Studia instrumentorum musicae popularis*, I, ed. E. Stockmann. Stockholm, Musikmuseet. pp.23-40.

O. ELSCHEK and E. STOCKMANN (1969): "Zur Typologie der Volksmusikinstrumente". *Studia instrumentorum musicae popularis*, I, ed. E. Stockmann. Stockholm, Musikmuseet: I, pp.11-22.

Mantle HOOD (1982): *The Ethnomusicologist*, 2nd edition. Ohio, Kent: Kent University Press.

E.M. HORNBOSTEL and Curt SACHS (1914): "Systematik der Musikinstrumente". Zeitschrift für Ethnologie, XLVI, pp.553-90; Eng. trans. by A. Baines and K.P. Wachsmann in *Galpin Society Journal*, XIV (1961), pp.3-29.

N. JAIRAZBHOY (1990) "On the beginnings of organology and ethnomusicology in the West: V. Mahillon, A.Ellis and S.M. Tagore". *Selected Reports in Ethnomusicology, 8: Issues in Organology*, pp.67-80.

Margaret J. KARTOMI (1990): *Concepts and Classifications of Musical Instruments*. Chicago: University of Chicago Press.

Ivan MACÁK (1969): "Typologie der slowakischen Sackpfeifen". *Studia instrumentorum musicae popularis*, I, ed. E. Stockmann. Stockholm, Musikmuseet: I, pp.113-127.

Harold POWERS (1980) "India". *New Grove Dictionary of Music and Musicians*, ed. S. Sadie. London: Macmillan. II, pp.696-141.

André SCHAEFFNER (1994): *Origine des instruments de musique*. Paris: École des Hautes Études en Sciences Sociales.

Erich STOCKMANN (1969-89): *Studia instrumentorum musicae popularis*. Stockholm, Musikmuseet: I -IX.

Klaus WACHSMANN (1984) "Classification" *New Grove Dictionary of Musical Instruments* edited by S. Sadie. London: Macmillan, I, pp.407-414

H. ZEMP (1978): "`Are `Are Classification of Musical Types and Instruments" *Ethnomusicology*, XXII, pp.37-67.

13. Further reading

Anthony BAINES (1966; reprint, 1983): *European and American Musical Instruments*. London: Chancellor Press.

Anthony BAINES (1992): *The Oxford Companion to Musical Instruments*. Oxford: Oxford University Press, 1992.

An BEKAERT (1993): *Slagwerkmuziek uit Centraal-Afrika*. *Didactische toepassing voor de Basisschool*. (manuscript), KMMA/MRAC - Tervuren.

Evert BISSCHOP BOELE (1991): *Alles in de klas, Niet - Westerse muziek in het muziekonderwijs in de eerst fase van V.O.* Enschede: Institutut voor Leerplanontwikkeling. 39p.

Jack BOTERMANS, en Herman DEWIT, en Hans GODDEFROY, (1989): *Muziekinstrumenten zelf maken en bespelene. Drimmelen*, Trendbook International. pp.71-83.

Marie-Thérèse BRINCARD (ed.) (1990): *Afrique: formes sonores*. Paris, Edition de la Réunion des Musées Nationaux. (ISBN 2 7118 2328 8).

Alex ECKERT (1979): *Das Grosse Instrumentenbastelbuch*. Schönenberger.

Kira von ESSEN (1962): *Musikparaden, De vanligaste instrumenten*. Helsingfors, Musik Fazer.

Jos GANSEMANS tr. A. Vincent (n.d.): *Musique Africaine et instruments de musique*. Tervuren: Ethnomusicologisch Centre/Centre Ethnomusicologique Paul Collaer, EMMA MRCA.

Jan HASPESLAGH (1991): *Didactiek van de school muziek, theortisch gedeelte*. Leuven, Lemmensinstituut. Oktober, 85p.

Ad HEERKENS (1978): "Muziekinstrumenten zelf maken, zelf bespelen". *De Bilt, Cantecleer*: 2, pp.75-78.

Sigmund HELMS (1991): "Das Instrument in der Musik pädagogik". *Musik und unterricht* januari, heft 6, pp.2-8.

Claire JONES (1992): *Making Music: Musical Instruments in Zimbabwe, Past and Present*. Harare: Academic Books. (ISBN 0 949229 22 9).

Jeremy MONTAGU (1976): *Making early percussion instruments*. London: Oxford University Press. (ISBN 0 19 323177 8).

Musikgeschichte in Bildern. Leipzig; Deutscher Verlag für Musik, 1963-89.

Die Musik in Geschichte und Gegenwart. (Allgemeine Enzyklopädie der Musik). Kassel and Stuttgart: Bärenreiter Metzler, 1994 on.

Stanley SADIE (ed.) (1984): *The New Grove Dictionary of Musical Instruments*. London: Macmillan.

Heinrich M. SAMBATH (1951): *Kinder bauen Musikinstrumente*. Mainz: B. Schott & S.

David SAWYER (1980): *Vibrations: making unorthodox musical instruments*, 2nd edition. Cambridge: Cambridge University Press. (ISBN 0 521 20812 2).

Charles TAYLOR (1992): *Exploring Music: The Science and Technology of Tones and Tunes*. London: IOP Publishing.

Sound Works Teacher's Pack
The SchoolWorks Project: Science Projects
20 St James' Street
London W6 9RW, UK.