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The Classification of Musical Instruments Reconsidered¹⁾

Tetsuo SAKURAI*

Until now the Hornbostel-Sachs (HS) system has been the standard one used for the classification of musical instruments [HORNBOSTEL and SACHS 1961: 3-29]. Various criticisms of this system have been offered, the most important of which, in my opinion, is the need to reconsider the main classes used. For example, there is some question about classifying the *Jew's harp* as an IDIOPHONE [LEDANG 1972: 102], or of classifying reed instruments as AEROPHONES [YAMAGUCHI 1969: 190-191]. The other problem of major importance is that there is no uniform standard for establishing lower order categories.

A number of ways of classifying musical instruments have been proposed in order to modify, improve, or replace the HS system. Of these, one noteworthy method is that introduced by Montagu and Burton [1971]. Their system seems to be theoretically complete and should be regarded as one of the best attempts at classification ever made²⁾. However, when applied to use in museums it inevitably becomes unduly complicated. For practical purposes, a classification system should be simple as well as systematic and sound theoretically. In this regard the system proposed in this paper is intermediate between scientific accuracy and practical utility.

Moreover, I find in both the HS and the Montagu-Burton system a problem of nomenclature, since a large percentage of the terminology used, such as Zithers, Harps, Lyres, or Lutes, is derived mainly from European cultures or those circumferential to Europe. This is certainly somewhat ethnocentric, and as a non-European I am unwilling to accept such terminology.

Culture in general is considered to have two fundamental dimensions; material culture and mental culture. Musical instruments, which are regarded as one of many cultural variables, are classified in this paper with reference to these two aspects of culture. Since musical instruments, in their broader meaning, are tools of some sort and physical objects, it seems natural to give special emphasis to the material aspect of culture in classifying them.

The criterion used here for the purpose of classification is the method by

* The 5th Research Department, National Museum of Ethnology.

1) This short paper is based on an oral presentation given at the 26th Conference of the International Folk Music Council (August 1981, Seoul).

2) But recently Dr. Montagu, one of the authors of that paper, wrote to me saying that he had abandoned that idea for the reasons given in Picken's book [1975: 558-570]. I acknowledge with gratitude Dr. Montagu's most useful suggestion.

which sound is produced or the sound-making mechanism. Since the one common feature of all musical instruments is that they produce sound, their most obvious function, it is quite natural to classify them with a special attention to the sound-making mechanism. The classification system described below relies on this principle. But in order to make the system less complicated, the criterion for establishing categories will be defined more precisely. In this classification, the type of primary vibrator is the subject of consideration. A primary vibrator is the substance which exists between the energy source and air vibration and which transforms the direct force given by the energy source into alternating vibration. The main classes of this classification system have been derived from a comprehensive examination of material, shape, and other physical features of primary vibrators.

Although in principle the main classes of this classification follow the four main classes of the HS system, as indicated in Table 1, this system has seven main classes with two sub-classes in each. These sub-classes are based on the number of the primary vibrators of each instruments.

The concept of main classes is as follows:

1. *Solid-vibrating instruments*: The vibration of a solid object is the primary source of sound in these instruments. A large part of energy for the vibration is generated by impact or friction.
2. *Membrane-vibrating instruments*: The vibration of a membranous object, the circumference of which is fixed to another object, is the primary source of sound in these instruments. A large part of energy for the vibration is generated by impact or friction.
3. *Reed-vibrating instruments*: The vibration of a reed is the primary source of sound in these instruments. A large part of energy for the vibration is generated by the elasticity of this reed itself and the difference of air pressure caused by the flow of the air.
4. *Air-vibrating instruments*: The vibration of air or some gaseous body similar to air is the primary source of sound in these instruments. A large part of energy for the vibration is generated by the flowing motion of the air or some similar substance.
5. *String-vibrating instruments*: The vibration of string-like objects fixed at both ends is the primary source of sound in these instruments. A large part of energy for the vibration is generated by friction, impact and elasticity from the tension of these objects.
6. *Combination-vibrating instruments*: More than two kinds of vibrating objects described above are vibrated at the same time in these instruments.
7. *Oscillator-vibrating instruments*: The vibration of an oscillator or oscillator circuit is the primary source of sound in these instruments. The energy for the vibration is generated by electric signals. The loudspeaker system

in these instruments, which convert electric signals into air vibration, can be regarded as a part of the instrument having a similar function to that of the resonance body of other instruments³⁾.

The criterion for dividing each primary class into sub-categories is the abstract shape of musical instruments. This can be defined as the abstract shape of the basic component of an instrument consisting of the primary vibrator(s) and/or the resonance body, the secondary vibrator. Although not all the categories are applicable in practice to every one of the primary classifications, there are six main classes with two sub-classes for each, which are derived from the abstract shape of instruments, as indicated in Table 2.

The concept of main classes is as follows:

1. *Stick type*: A stick-shaped object forms a body of this instrument.
2. *Tube type*: The essential part of this instrument is formed by a tubular body, which is represented by a curved surface.
3. *Plate type*: A plate-like object forms the basic part of the instrument.
4. *Vessel type*: The essential part of this instrument is formed by a vessel-shaped body, which is represented by several planes and/or curved surfaces.
5. *Box type*: The main shape of this instrument is formed by box-like body consisting of several planes and/or curved surfaces.
6. *Projection type*: The main body and the projecting part of that body form a basic shape of this instrument. In other words, this type can be regarded as a combination of Plate, Vessel, or Box type and Stick or Tube type.

Even if no information can be obtained with regard to the method of producing sound or the sound itself which emerges from an instrument, it is still possible to classify the instrument according to the criteria given here, so long as the instrument is well-preserved. But this is not enough. In order to understand the real nature of a musical instrument it is also necessary to know its musical function as an active part of a particular culture. Hence, it is necessary to describe the instrument in terms of the mental culture as well as the material culture.

The mental aspect of culture in relation to a musical instrument can be explained as the concept via which a particular sound or music is created by using a certain kind of musical instrument. The sound which has been created, or music as an organic whole, consisting of sounds, can be regarded as the product and result of mental culture. Once such results, the created sound and music, are known we can, in turn, make inferences about their wellspring.

Sound as a component of music has a number of qualities; pitch, strength, duration and tone. Of these the most adequate on which to base a classification

3) Instruments which fall under the class of Oscillator-vibrating instruments can be called MUSICAL APPARATUSES to distinguish them from musical instruments.

Table 1. Framework for the Primary Classification of Musical Instruments as *Object sui Generis*.

Main Class	Sub-class
1. Solid-vibrating Instruments	11. With Single Vibrator 12. With Plural Vibrators
2. Membrane-vibrating Instruments	21. With Single Vibrator 22. With Plural Vibrators
3. Reed-vibrating Instruments	31. With Single Vibrator 32. With Plural Vibrators
4. Air-vibrating Instruments	41. With Single Vibrator 42. With Plural Vibrators
5. String-vibrating Instruments	51. With Single Vibrator 52. With Plural Vibrators
6. Combination-vibrating Instruments	61. With Single Vibrator 62. With Plural Vibrators
7. Oscillator-vibrating Instruments	71. With Single Vibrator 72. With Plural Vibrators

Table 2. Framework for the Secondary Classification of Musical Instruments as *Object sui Generis*.

Main Class	Sub-class
1. Stick Type	11. Straight-stick Type 12. Curved-stick Type
2. Tube Type	21. Straight-tube Type 22. Bent-tube Type
3. Plate Type	31. Plane-plate Type 32. Curved-plate Type
4. Vessel Type	41. Square-vessel Type 42. Round-vessel Type
5. Box Type	51. Square-box Type 52. Round-box Type
6. Projection Type	61. Square-body Projection Type 62. Round-body Projection Type

Table 3. Framework for the Classification of Musical Instruments Based on Sound as Product.

Main Class	Sub-class
1. Single Sound Instruments	11. Single Damping-sound Instruments 12. Single Sustaining-sound Instruments 13. Single Combining-sound Instruments
2. Plural Sound Instruments	21. Plural Damping-sound Instruments 22. Plural Sustaining-sound Instruments 23. Plural Combining-sound Instruments
3. Multiple Sound Instruments	31. Multiple Damping-sound Instruments 32. Multiple Sustaining-sound Instruments 33. Multiple Combining-sound Instruments

of musical instruments seems to be pitch. One of the best ways to distinguish the characteristics of musical instruments is the number of pitches that can be made in the usual manner of playing. A merit of making the number of pitch the standard for classification is that it is related to all three basic elements of music, i.e., rhythm, melody and harmony. Therefore, considering various functions of musical instruments, it seems reasonable to establish main classes related to mental culture on the basis of the pitch function. As indicated in Table 3, it is possible to establish three main classes on this basis. The criterion used for sub-classes concerns the duration and strength of sound. It is virtually impossible to classify tones since it is extremely difficult to describe objectively, using words, the characteristics of tones.

The concept of these main classes is as follows:

1. *Single-sound instruments*: The primary function of these instruments is to create a sound of single or indeterminate pitch. Various noisemakers and rhythm instruments generally belong to this class.⁴⁾
2. *Plural-sound instruments*: Instruments that create two or more sounds of different pitches, usually one at a time and not simultaneously. Various melodyplaying instruments belong to this class.
3. *Multiple-sound instruments*: Instruments that can create two or more sounds of different pitches at the same time. Harmony-creating instruments and many keyboard instruments generally belong to this class.

It is now possible to locate each musical instrument on one plane coordinates, the ordinate of which consists of classes based on the criteria of the *object sui generis* and the abscissa of classes based on *sound as product*. In this way it is possible to list all the musical instruments of a given culture on one plane. It is also possible to compare musical instruments of different cultures by using the same plane. According to this method a single instrument may be placed on different coordinates depending on its cultural context, since its coordinate values are determined by the kind of music dominant in each culture, the prevailing concept of music, and the method of creating sound according to that concept.

On the other hand, each category of this system has numerical string. Thus, for example, the string of 6 figures "11.11.11" indicates Solid-vibrating instruments with single vibrator, Straight-stick type, and Single Damping-sound instruments (see Appendix). With the assistance of a computer this classification system may emerge as a new and powerful tool for the cross-cultural and comparative study of musical instruments.

4) A considerable number of instruments, such as noisemakers, which fall under the class of Single sound instruments, can be called SOUND INSTRUMENTS to distinguish them from musical instruments. But this leads the controversy of *what is music and what is not*. This topic requires a separate discussion.

APPENDIX

Application of the Classification to Some Traditional European Musical Instruments.

- Solid-vibrating Instruments (1)
 - With Single Vibrator (11)
 - Curved-stick Type (11.12)
 - Single Damping-sound Instruments (11.12.11)
 - Triangle*
 - With Plural Vibrators (12)
 - Straight-tube Type (12.21)
 - Plural Damping-sound Instruments (12.21.21)
 - Tubular-bells*
 - Plane-plate Type (12.31)
 - Multiple Damping-sound Instruments (12.31.31)
 - Xylophone*
 - Glockenspiel*
 - Curved-plate Type (12.32)
 - Single Damping-sound Instruments (12.32.11)
 - Cymbals*
 - Castanets*
- Membrane-vibrating Instruments (2)
 - With Single Vibrator (21)
 - Round-box Type (21.52)
 - Single Damping-sound Instruments (21.52.11)
 - Bass-drum*
 - Side-drum (non-snare)*
 - With Plural Vibrators (22)
 - Round-box Type (22.52)
 - Plural Damping-sound Instruments (22.52.21)
 - Tiŕpani*
- Reed-vibrating Instruments (3)
 - With Single Vibrator (31)
 - Straight-tube Type (31.21)
 - Plural Sustaining-sound Instruments (31.21.22)
 - Oboe*
 - Bassoon*
 - Clarinet*
 - Bent-tube Type (31.22)
 - Plural Sustaining-sound Instruments (31.22.22)
 - Saxophone*
 - Horn*
 - Trumpet*
 - Trombone*
 - With Plural Vibrators (32)
 - Square-box Type (32.51)
 - Multiple Sustaining-sound Instruments (32.51.32)
 - Reed-Organ*
 - Accordion*
 - Round-body Projection Type (32.62)
 - Multiple Sustaining-sound Instruments (32.62.32)
 - Bagpipes*

- Air-vibrating Instruments (4)
 - With Single Vibrator (41)
 - Straight-tube Type (41.21)
 - Plural Sustaining-sound Instruments (41.21.22)
 - Flute*
- String-vibrating Instruments (5)
 - With Plural Vibrators (52)
 - Curved-stick Type (52.12)
 - Multiple Damping-sound Instruments (52.12.31)
 - Harp*
 - Square-box Type (52.51)
 - Multiple Damping-sound Instruments (52.51.31)
 - Harpsichord*
 - Piano (upright)*
 - Round-body Projection Type (52.62)
 - Multiple Damping-sound Instruments (52.62.31)
 - Guitar*
 - Mandolin*
 - Multiple Sustaining-sound Instruments (52.62.32)
 - Violin*
 - Viola*
 - Cello*
 - Double-Bass*
- Combination-vibrating Instruments With Plural Vibrators (62)
 - Round-vessel Type (62.41)
 - Single Combining-sound Instruments (62.41.13)
 - Tambourine (with small cymbals)*

BIBLIOGRAPHY

HORNOSTEL, E. M. von and Curt SACHS

- 1961 Classification of Musical Instruments, translated from the original German, 'Systematik der Musikinstrumente. Ein Versuch,' *Zeitschrift für Ethnologie*, Jahrg. 1914, Heft 4 u. 5. *Journal of the Galpin Society* 14: 3-29.

LEDANG, Ola Kai

- 1972 On the Acoustics and the Systematic Classification of the Jaw's Harp. *Yearbook of the International Folk Music Council* 4: 95-103.

MONTAGU, Jeremy and John BURTON

- 1971 A Proposed New Classification System for Musical Instruments. *Ethnomusicology* 15(1): 49-70.

PICKEN, Laurence

- 1975 *Folk Musical Instruments of Turkey*. Oxford University Press.

SACHS, Curt

- 1940 *The History of Musical Instruments*. W. W. Norton and Co.

SAKURAI, Tetsuo

- 1980 An Outline of New Systematic Classification of Musical Instruments. *Journal of the Japanese Musicological Society* 25(1): 11-21 (In Japanese with English summary).

YAMAGUCHI, Osamu

- 1969 Introduction to a Taxonomy of Musical Instruments. *Bulletin of Musashino Academia Musicae* 3: 187-197 (In Japanese with English summary).