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ETHNOMUSICOLOGY
AN INTRODUCTION

Edited by HELEN MYERS

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CHAPTER X

Organology

GENEVIÈVE DOURNON

The diversity of instruments is born of the actual union of music with life. It seems that this material condition widens our musical sense. Too limited from the viewpoint of its works alone, music gains from being seen in the naturalism of these instruments as well. (André Schaeffner, 1936)

What is organology?

HISTORICAL SURVEY When Praetorius gave the title *De organographia* to the second volume of his treatise *Syntagma musicum* (1618), he was the first to name the discipline that would become the science of musical instruments – organology.

The term comes from the Greek *organon*, meaning a tool or instrument used in some activity or trade (even an organ of the body). It was used for musical instruments as well as for the organs governing the human voice. When the Latin term *organum* (*organa*) is used to describe certain aspects of instrumental music, it is by analogy with vocal polyphony. A more precise application to instruments, the organ in particular, is found in St Augustine quoted by P. Williams (1984, p.838) in the commentary to Psalm cl. In classical antiquity the musical instrument was denoted by the Latin term *instrumentum*, and in the Middle Ages by the expression *instrumentum organicum*.

The description of medieval instruments is imprecise in the West, perhaps, as André Schaeffner points out (1946, p.16), because of the long pre-eminence of liturgical chant over instrumental music. Only from the 16th and 17th centuries onwards did major Western works on musical instruments appear, including the treatise by Praetorius mentioned above, *Musica getutscht und ausgezogen* by Sebastien Virdung (1511), *Musica instrumentalis deudsch* by Martin Agricola (1529), *Harmonie universelle* by Father Marin Mersenne (1636–7), and Pierre Trichet's *Traité des instruments de musique* (1640). Centuries earlier, however, ancient civilizations had approached the subject of musical instruments methodically. We know about the Oriental instrumentarium from rich and extensive documentation in the chronicles and in the ancient treatises of Chinese, Arab and Indian theoreticians. These works give the names and classifications of instruments, indications of the way in which they were played

and their part in rites and ceremonies, and details concerning musicians and their training.

From the 16th century onwards the great discoveries, explorations and the colonial conquests brought objects, specimens and musical instruments of other civilizations – Arab, Chinese, Indian, Native American and African – back to Europe. As early as 1620, Praetorius published plates in the *Theatrum instrumentorum* showing African instruments, including perfectly recognizable depictions of horn, bell, drum, harp and pluriarc; the *Gabinetto armonico*, an organological work by Father Filippo Bonanni (1722), has some remarkable illustrations of African musicians.

The opening of the Western mind to the customs and arts of other civilizations owes much to the observations of travellers, navigators and missionaries, and to the works of those scientists who travelled the world after the 16th century. Such works included *Mémoire sur la musique des Chinois tant anciens que modernes* by Jean-Joseph-Marie Amiot (1779), and the *Description historique, technique et littéraire des instruments de musique des Orientaux* by Guillaume-André Villoteau (1813). Foreign music, musicians and instruments aroused the curiosity of the great travellers. Accounts of African music span the centuries from the *Journal of the Voyage of Vasco da Gama* (1497–8) and O. Dapper's *Description de l'Afrique* (1674), to the works of W. Burchell (1822–4), G. Schweinfurth (1873) and many others, up to André Gide in our own period describing the fanfares blown on great wooden trumpets in his *Voyage au Congo* (1927) (see bibliography of Schaeffner, 1936, and Arom, 1985). Other sources are the observations of the Chevalier Chardin in Persia (1711), the accounts of Captain Cook's voyages in the Pacific (1785), the Abbé J. A. Dubois's work on the customs and ceremonies of India (1825) and the monumental *History of Java* (1817) by Sir Philip Raffles, the first to bring a Javanese gamelan to Europe. All these preceded the first works by anthropologists.

Valuable musical instruments from distant lands found their way into the 'cabinets of curiosities', the pride of princely courts since the Renaissance (such as Louis XIII's 'Cabinet du Roy'), into royal libraries, and into the collections of powerful religious orders and enlightened amateurs.

Subsequently, they became the initial stock of collections in museums of art and ethnography, in conservatories of music and in universities. The late 19th century saw the first publication of methodical catalogues, notably by C. Engel (1869), G. Chouquet (1875) and Victor-Charles Mahillon (1880–1922). The systems of classification then worked out provided organology with its scientific basis, making an important contribution to the development of the new discipline of ethnomusicology.

Organology (Ger.: *Instrumentenkunde*) covers the field of musical instruments in general, from every musical tradition – 'classical' or 'art' music, 'folk' or 'ethnic' music, 'Western' and 'non-Western' music (the terminology in present use). It is hardly surprising that its boundaries are not precise, and that perspectives differ between historical musicology and ethnomusicology. Nevertheless the contribution of ethnomusicology (organology included) has been very important for the study of music.

Some ethnomusicologists, like Mantle Hood, try to distinguish between organography and organology, intending to separate simple description from

the information that bears on problems of taxonomy (1971). In 1941 Nicholas Bessaraboff used the term 'organology' in a narrower sense, to distinguish 'the scientific and engineering aspects' of musical instruments from the wider study of music. To André Schaeffner (1946, p.13), the essential subject of organology is 'the enumeration, description, localization and history of even the least of the instruments used in all human civilizations and periods to produce tones or sounds either for purely aesthetic ends or solely for some religious, magical or practical purpose'. Organology should be primarily the study of actual musical instruments (inventory, terminology, classification, description of construction, shapes and technique of playing) but the study cannot disregard musical production (the analysis of acoustic phenomena and musical scales) or data on the use of the instrument, socio-cultural factors and beliefs which determine that use, or the status and training of the players. Even study of the symbolism and aesthetics of the instrument, both as an artistic object and a musical 'tool', are relevant to organology.

The history, origin and relationship of existing and obsolete instruments are also legitimate parts of the discipline. Knowledge of this kind may be acquired from the iconographic sources provided by Sumerian, Hittite, Assyrian, Egyptian, Greek and Roman, Celtic and Etruscan sculptures, vase ornamentation, paintings and carvings. Other evidence is provided by the New World codices and the rare depictions carved in the rocks of prehistoric cave dwellings. Archaeological excavations regularly dig up instruments made of material that has resisted the passage of time. Most of them are related to instruments still played today, in different places but in an almost unchanged form: they include lyres and harps from Ur, Chinese lutes from the treasure of Shosoin of the 8th century AD, bronze bells of the 1st millennium BC, brass horns from Scandinavia, and the reed or clay pipes used as wind instruments by the ancient Egyptians and the Amerindians. Many even older finds have been made in Europe, including a Magdalenian bull-roarer of reindeer horn (discovered in southwest France) and fragments of prehistoric bone aerophones some 15,000 years old, already showing the little 'slot' typical of air duct flutes. The number and variety, as well as the great age of surviving depictions of instruments and players, bear witness to the importance of music in almost all civilizations of the world.

Like a kaleidoscope, organology presents many facets. Two fundamental aspects of the study of musical instruments are dealt with here: the theoretical and the practical playing, and musical context of the instrument.

Musical instruments: definition and classification

WHAT DO WE MEAN BY A MUSICAL INSTRUMENT? Organology considers any apparatus or device made by man in order to produce a sound or sounds as a musical instrument. The definition given by Alexander Büchner (1980, p.14) is both more elaborate and narrower: 'A musical instrument is a source of intentionally produced sound, constructed and employed for musical production, objectively capable, by virtue of its acoustic properties, of participating in a musically artistic effect, since its acoustic properties correspond to the cultural standards of a given people at a specific historical period.' Erich M. von Hornbostel's view (1933, p.129) was that 'for purposes of research

everything must count as a musical instrument with which sound can be produced intentionally'. However, he distinguished between musical instruments in the conventional sense and sound-producing instruments. It fell to Schaeffner (1936, p.9) to formulate the question properly: 'If an object can produce a sound, how do we recognize that it is musical? What qualities, of what kind, cause it to be ranged with other musical instruments?' He provided the reply himself in a later work (1946, p.13), in stating that all musical instruments share 'a characteristic timbre, either for producing a sound or sounds of a definite pitch, or at least for providing material for noises produced successively in a time sequence, which may be described as musical rhythm'. This definition, which sets out the parameters of timbre, pitch and rhythm, opens up the organologist's field of investigation to all the 'usual tools of music' – from the tapping of a bamboo to the harpsichord – independently of their construction, however rudimentary or sophisticated it may be, of the way in which they are used, of their geo-cultural origin and their history. The concept of an instrument, like the concept of music itself (when such a notion exists), differs from one culture or period to another depending on the function it is seen to fulfil. Tools, weapons, vessels and other utensils may be used as rhythmical instruments during a festival or a ritual and are then returned to their ordinary use.

Empiricism is the rule in instrument-making, the aim of which is usually to increase sound resources. The aesthetics of every culture appear in the choice or combination of the means employed: the multiplication of sounds by augmenting the size or number of components (as in panpipes) or the improvement of the component (finger-holes), the addition of resonators (xylophones, chordophones), the combination of timbres (small pellet bells on the bows of fiddles in India), and other jingling devices added to some chordophones and membranophones in Africa. The result is an extraordinary quantity of more or less affiliated instrumental types showing the imaginative diversity of which the human mind is capable in the structure of its musical instruments. Only acoustic instruments will be dealt with here. For mechanical (automatophonic) and electrical (electro-acoustic and electronic) instruments, the reader may consult the works of Alexander Büchner (1956, 1980) and the authors he mentions in his bibliography, as well as the relevant articles in *The New Grove Dictionary of Musical Instruments* (also see Reference Aid 3).

Systematics

Classification is preliminary to all studies of general organology or of organology applied to the musical instruments of a region, culture, religion or specific socio-cultural group (ethnic, social, caste etc). To understand and select the most useful of the various systems devised in the West since the end of the 19th century, we must look at their theoretical bases and practical application.

Classification is essential for keepers of collections, organologists, musicologists, ethnomusicologists and anthropologists, who emend or even devise new systems themselves. It is not surprising that classifications tend to arise from the researches of curators of instrumental collections, particularly collections consisting entirely or partially of instruments relevant to

ethnomusicology. Johannes de Muris' (14th century) conventional tripartite division into strings (*tensibilia*), wind (*inflatibilia*) and percussion instruments (*percussibilia*) has proved notoriously inadequate in this area. Such curators include V. C. Mahillon (Musée Instrumental du Conservatoire Royal de Musique, Brussels), Curt Sachs (Instrumental Museum of Berlin), G. Montandon (Musée d'Ethnographie, Geneva), A. Schaeffner (Musée de l'Homme, Paris), and N. Bessaraboff (Museum of Fine Arts, Boston).

The objectives of classification and the methods of practitioners differ from those of theoreticians. Practitioners base their theory on the analysis of collections of musical instruments, in order to determine a common concept, so that the whole range of ancient and modern, European and extra-European instruments may be placed in large categories. Once broad categories have been defined, subdivisions and hierarchy must be worked out, so that the multiplicity of specimens may be logically arranged and types and sub-types defined. One of the difficulties, as Hornbostel and Sachs pointed out, is that 'the objects to be classified are alive and dynamic, indifferent to sharp demarcation and set form, while systems are static and depend upon sharply drawn demarcations and categories' (Hornbostel and Sachs, 1914; Eng. trans., 1961, p.4; hereafter all references to this article refer to the English translation. See Reference Aid 3). The classificatory process is a difficult exercise which must compromise between principles and reality; consequently, though some systems are more satisfactory than others, none is perfect.

Theoreticians try to look beyond the material structure of the instrument and take account of acoustics, scales, the musician, performance practice, and to integrate historical and genetic data as well as socio-cultural factors and beliefs which determine the function of the instrument. These two approaches, the first organological, the second holistic, have produced works that are two complementary stages in the study of instruments.

The aim of the first approach is to provide a conceptual tool with a view to practical application. The second aims for an 'ideal organology', developing a body of linked data to produce a schematic model of analysis which requires the assistance of the computer. H. Heyde (1975), O. Elschek and E. Stockmann, (1969, pp.11–41) and W. P. Malm with his 'Musinst' project (1974) represent the second approach; their differences are well summed up by Klaus Wachsmann (1984) in the article 'Classification', in *The New Grove Dictionary of Musical Instruments*, in which he sets out his own principles for 'the study of instruments as objects and as aspects of biological and social musical activity . . .'. Thinking along similar lines Mantle Hood (1971) aims to go 'beyond the usual requirements of a descriptive taxonomy' and establishes a 'symbolic taxonomy' taking into account a complex ensemble of considerations to be codified as 'organograms'.

Heyde (1975) distinguishes between 'natural' and 'artificial' approaches to classification, and suggests that we should 'take into account the historical genesis and development of the instruments; the latter are based on any arbitrary viewpoint that disregards "genetic" factors'. According to him, the Hornbostel and Sachs system belongs to the 'artificial' category. Heyde's 'natural' system uses 11 constituents to establish the analytical profile of an instrument. As Wachsmann remarks, 'The desire, evident in Heyde's book, to

place musical instruments in some kind of evolutionary sequence had already found strong expression in Sachs's *Geist und Werden der Musikinstrumente* (1929)' (1984, p.410).

Hans-Heinz Dräger's important study, *Prinzip einer Systematik der Musikinstrumente* (1946) stands by the principles of his masters Hornbostel and Sachs, and extends them into more fields, thus extending the limits of classification towards a global approach to musical instruments.

Although scientifically attractive, the 'global' approach which aims to generate an 'ideal organology . . . would require for its applications a wealth of data . . . not available on a worldwide scale', and the application of such systems to everyday organological analysis is not easy in practice. This kind of analysis involves a more exhaustive and analytical study of instruments than the necessarily reductive process of classification.

Supporters of the organological approach set about satisfying two imperatives: 'a system of classification has theoretical advantages as well as practical use . . . the first requirement of a classificatory system is surely that the principle of demarcation remains the same throughout for the main categories . . . Herein will always be found the leading test of the validity of the criteria upon which the system is based' (Hornbostel and Sachs, 1961, pp.5–6).

Since we are dealing with sound-producing tools, the fundamental principle of classification must be related to the vibrating material itself. This basic concept was developed not in the West but in other civilizations, with or without a written language.

THE CHINESE SYSTEM The science of musical sounds and notes dates from ancient China. The classification of instruments integrated was the Chinese concept of the world, including cosmic forces and elements. In about the 8th century BC, Chinese theory classed musical instruments into eight groups corresponding to the eight winds and defined by the material destined either to produce the sound (the silk of strings, the skin of drums, the metal of bells, the wood of scrapers and clappers, the stone of lithophones) or to contain the vibrating air (the bamboo of tubular flutes, the clay of globular flutes, the gourd for the air chamber of the mouth organ). This division into eight classes, conceived for a precise instrumentarium (i.e. a finite number of instrumental types), could not be adopted on a universal scale, unlike the Indian system.

THE INDIAN SYSTEM The ancient Indian classification of musical instruments into four classes is presented in one of the many technical treatises of Sanskrit literature, the *Bhāratiya-nātya-shāstra*, or 'teaching of dramatic art', attributed to Bhārata. This encyclopaedic work, dated around the beginning of our era, deals with the theatre and its associated arts, particularly poetry and music. Musical instruments, *vādhya*, are divided into four classes, determined by the nature of the vibrating component: *tāta* (from *tan*, to stretch) *vādhya* corresponding to strings; *avanaḍha* (attached or covered) *vādhya* to drums covered with a skin; *sushira* (hollow or pierced) *vādhya* for pipes into which the player blows; and *ghana vādhya* (from *han*, to strike a solid material, particularly metal), forming a distinct category. Western organologists undoubtedly drew inspiration from the quadripartite Indian system.

ETHNIC SYSTEMS (BASSARI AND 'ARE'ARE) The Bassari system (Senegal) was drawn to Western attention by two French ethnologists, Marie-Thérèse de Lestrange and Monique Gessain (Paris, 1976, pp.92–4). Bassari class their musical instruments into four groups, depending on the way they produce sounds: 'horned' instruments (flutes, clarinets, trumpets), including what are usually called wind instruments; 'rung' instruments (rattles, bells etc), including instruments that are shaken; 'beaten' instruments, including percussion like the xylophone and drums as well as such chordophones as the zither and harp; and 'cut' instruments including the fiddle (to-and-fro movement of the bow rubbing the strings) and the scraper (the stick rubbing on the indented body).

Hugo Zemp's study (1978) tells us that the 'Are'are of the Solomon Islands distinguish different types of 'bamboo music' and classify their instruments as 'struck bamboos' and 'blown bamboos', each group subdividing according to whether the playing is individual or collective. These two examples suggest that other cultures with an oral tradition may have implicit or explicit classificatory systems or 'folk classifications' based on quite different concepts which have yet to be elucidated (see van Thiel, 1969).

THE MAHILLON AND HORNBOSTEL–SACHS SYSTEMS At the end of the 19th century Victor-Charles Mahillon, Curator of the Musée Instrumental of the Conservatoire Royal de Musique in Brussels, developed his *Catalogue analytique et descriptif du Musée Instrumental*, an 'attempt at methodical classification of all instruments, ancient and modern, based on the different nature of the bodies employed as sources of sound'. Based on the classification devised ten years earlier by his director, F. G. Gevaert, dividing instruments into four classes – string instruments, wind instruments, membrane instruments, and autophones – Mahillon adopted a subdivision into branches and sections on the Linnaean model. His work gave organological definitions to the large categories, in particular the new class of autophones 'made of solid bodies, elastic enough in themselves to maintain the vibratory movement set up by one of the three following modes of agitation: percussion, plucking or friction'.

The concept of 'the physical characteristics of sound production as the most important principle of division' was taken up again by Hornbostel and Sachs in 1914, in their 'Systematik der Musikinstrumente' (translated into English by A. Baines and K. P. Wachsmann, 1961). The four categories are: chordophones, in which 'one or more strings are stretched between fixed points'; aerophones, in which 'the air itself is the vibrator in the primary sense'; membranophones, in which 'the sound is excited by tightly stretched membranes'; idiophones, in which the substance itself, 'owing to its solidity and elasticity, yields the sounds, without requiring stretched membranes or strings'. The principles, problems and weaknesses of the system are set out in an introduction which is of great interest to organologists.

By comparison with Mahillon's system, the two German theoreticians modified the principle and number of the subdivisions, determined 'only on those features which can be identified from the visible form of the instrument avoiding subjective preferences and leaving the instrument itself unmeddled with'. The ranking of data follows the Dewey decimal system.

The regrouping of idiophones (the term preferred to autophones) into a class distinct from membranophones (as in ancient Indian theory) splits up

the heterogeneous section of 'percussion' instruments, including instruments of any material functioning by various modes of sound production.

One of the contributions made by 'ethno-organology' has been to render obsolete the conventional tripartite division into string, wind and percussion instruments. That classification is still current in the Western orchestra, although it is described by Hornbostel and Sachs as 'not only inadequate but also illogical'; Schaeffner, like most organologists, saw it as 'inapplicable to the exhaustive and scientific study of instruments'. For the complete text of the Hornbostel–Sachs classification, *see* Reference Aid 3.

The works of early organologists uncovered the amazing richness of many 'sounding objects' that are rattled, shaken, rubbed or struck, which often appear primitive but are living or extinct witnesses to the power of the human imagination in sound production; it also gave them a status as real musical instruments.

The Hornbostel–Sachs classification was widely adopted by organologists, musicologists, ethnomusicologists, ethnologists and keepers of collections, to whom it was particularly addressed. They followed the main principles, adding modifications or developments – as in the case of Dräger (1946) – in the light of their objectives or the type of collection concerned. Weaknesses, particularly the lack of consistent criteria for the subdivisions, are discussed by Jaap Kunst (1959, p.5).

The first to adopt and modify the system was G. Montandon (1919), whose catalogue of musical instruments in the Musée Ethnographique of Geneva remains faithful to its model apart from some judicious adjustments, particularly in the chordophone category. N. Bessaraboff (1941), drawing up the catalogue of a collection comprising many classical Western instruments, introduced as the first subdivision the notion of instruments 'controlled directly, by a keyboard, by automatic motion'. More recently the English scholars J. Montagu and J. Burton (1971, pp.49–70) proposed terminology making it possible to define musical instruments without the series of numbers involved in the decimal system. Tetuo Sakurai's *The Classification of Musical Instruments Reconsidered* (1981) questions the Hornbostel–Sachs categories; Sakurai suggests classification on three levels, leading to a division of instruments into 'seven main classes with sub-classes in each. The sub-classes are based on the number of the primary vibrators of each instrument'. This approach, claimed to be 'intermediate between scientific accuracy and practical utility', is not easy to apply.

During the last decade the Comité des Musées et Collections d'Instruments de Musique (CIMCIM) of the ICOM (International Committee of Museums) devised a classification for the use of museum curators and keepers of collections. The principles adhere to the principles of Hornbostel and Sachs, while integrating more subdivisions relating to the material and formal structure of the instrument, so that it is possible to deal more precisely, and conjointly, with instruments of the two kinds of collections known, for want of better terminology, as 'art' or 'historical' and 'folk' or 'ethnic' instruments. The results have been published in various numbers of the *CIMCIM Newsletter* (1983–4; 1985; 1987).

THE SCHAEFFNER SYSTEM André Schaeffner did not entirely adhere to the

system of the two German theoreticians (he published a French translation in 1935), although he freely expressed his esteem for and indebtedness to the work of Hornbostel and Sachs (whose presence, friendship and ideas he was able to appreciate during his years of exile in Paris) (1933–7). From 1930 onwards he worked on another classification, original in being bipartite. The principles of this classification are outlined in 'Projet d'une classification nouvelle des instruments de musique' (1931) and in 'D'une nouvelle classification méthodique des instruments de musique' (1932).

In his contribution to *La musique des origines à nos jours* (1946, p.18), Schaeffner points out that the first bipartite division of musical instruments was made by Arab theoreticians, quoting Al-Fārābī (*d* 950), according to whom 'the striking organ is either the human hand or the respiratory apparatus'. The interest of the Schaeffner system, which Wachsmann describes (1984, p.408) as 'logically perfect and coherent', is that it is based on a uniform principle: the nature and structure of the vibrating material. Schaeffner defines two principal categories: instruments with solid vibrating bodies (subdivided into those 'not susceptible of tension', those that are 'flexible' and those that are 'susceptible of tension') and instruments in which the air itself is the primary vibrator.

The subdivisions are based on 'factors of an immediately appreciable character' (1931, p.21): the material (wood, metal, stone etc), the form or structure of the sound-producing component (stick, lamella, plaque, tube, husk, block) in the case of those 'not susceptible of tension' and those that are 'susceptible of tension' (string, stalk, thong); the membranes are classed by the body of the instrument (vase, tube, frame) on which they are stretched. In the category of instruments with vibrating air, Schaeffner distinguishes those for which the vibrating air is not confined – or 'air-ambient' – as for example the bull-roarer, from wind instruments proper, which are subdivided into single pipe, pipe with natural reeds and reed pipe.

Schaeffner does not introduce the means of setting an instrument in vibration as a criterion of subdivision, but simply as a complementary indication for certain types (concussion sticks, struck boards, scraped bones, plucked lamella, skin set vibrating by direct or indirect percussion etc). He thus makes optional something that was a useful classificatory sub-criterion in Hornbostel–Sachs and Mahillon, at least in three of their four categories.

Schaeffner's has not been widely used, despite its undoubted interest, perhaps because the user must revise and complete the subdivisions himself. Moreover, Schaeffner's work on the origin of musical instruments, which is fundamental to ethnomusicology and organology and includes his classification, has never been translated from its original French into any other language (except a recent Italian version).

Attempt at synthesis

One can say, with Mantle Hood (1971, p.126), that 'tackling the problems of instrumental classification constitutes a worthy exercise for the critical faculties of searchers'. Over 20 years of practical experience, study of the collections of musical instruments in the Musée de l'Homme (some 8000

today), together with fieldwork, teaching and the training of young researchers, and participation in collective works (including those of the CIMCIM, mentioned above) has led me to reconsider the compatible features of the various systems in order to devise the classification below for practical and didactic purposes. My sole aim is to provide the museum curator, the ethnomusicologist and the student with a guide making it possible to identify any (acoustic) instrument, whether in current use or obsolete. I have tried to clarify and arrange in ranking order the criteria differentiating instrumental types and sub-types; those criteria are based on direct observation of the data (structure, shape and material).

Like the Hornbostel–Sachs system (to which it is faithful in broad outline), this classification adopts the Dewey numerical system rather than a tree-like presentation. This 'open' system allows the development of certain headings and the integration of new data, necessary because 'with increasing knowledge especially of extra-European forms, new difficulties in the way of consistent classification will constantly arise' (Hornbostel and Sachs, p.8). Attempts to improve the system constitute a fascinating challenge.

What vibrates? How does it vibrate? These are the first questions to be asked in classifying any musical instrument. The data will concern the main vibrating material, the way in which it is set in vibration, and the structure of the instrument. These data constitute the organological definition of the instrument and should allow anyone to identify it.

Schaeffner's opposition between solids and air for the main vibrating material which produces the sound has the advantage of allowing a primary, unambiguous distinction, and lends itself to logical combination with the Hornbostel–Sachs quadripartite system. Those instruments for which the vibrating solid material (either rigid or flexible) is not stretchable come into the category of idiophones. When the vibrating material (membrane or string) is stretchable, instruments belong either to the category of membranophones or to that of chordophones. When air is the prime element set in vibration, we are dealing with aerophones.

The distinction of instruments within each of the categories thus defined is based on the relation between the ways in which they are set in vibration and the structure of the instrument.

Although the guiding principle must be scrupulously followed throughout, there are sometimes good reasons to invert the hierarchy of secondary data, in order to adapt them to the logic of the instrument itself and respond better to the purposes of classification: intelligibility and practical application. Like the German systematicians, 'we have purposely not divided the different main groups according to one uniform principle, but have let the principle of division be dictated by the nature of the group concerned, so that ranks of a given position within a group may not always correspond between one group and another' (Hornbostel and Sachs, p.9).

Thus the method of setting the instrument in vibration may not occur at the same level of subdivision in all four categories. Let us see how this combination of characteristics may operate in view of the logic peculiar to instruments belonging to the same category.

CHORDOPHONES All chordophones consist of one or more strings stretched at

A. Schematic chordophone types

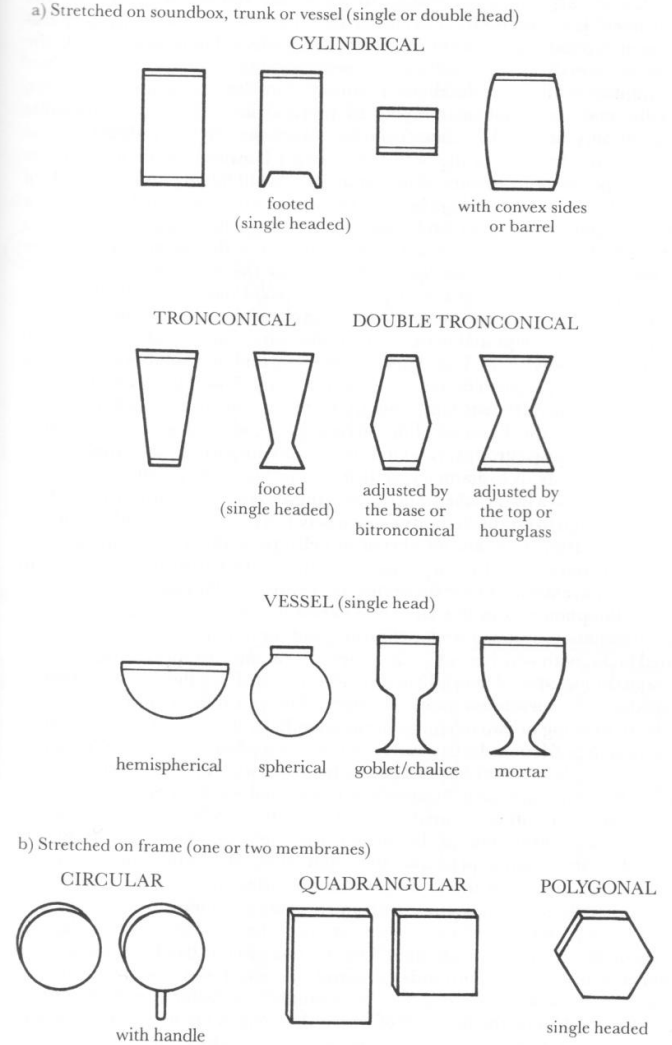
the two extremities on a supporting structure or sound body. A classification of chordophones according to the way they are set in vibration – by plucking, friction, striking, blowing – would have the disadvantage of dispersing instruments belonging to the same type (for instance, zithers) because in some the strings are plucked, in others struck or rubbed, or even agitated by the wind, and at the same time would group together instruments of different types (lute, lyre, harp, musical bow, zither etc) simply because their strings are plucked.

It is more useful to prefer an obvious structural characteristic of the instrument: the relationship between its construction and the disposition of the strings. The body structure of the instrument follows either a straight or a curved line, separating two organological groups: that of the zither and lute, the other of the musical bow, which gave rise to the pluriarc and the harp (fig.A). Another distinctive feature is the existence of a neck, a distinct component connected with the body of the instrument (the soundbox), and to which one end of the string is attached. The presence or absence of a neck will ensure a practical distinction between zithers and other string instruments. The strings of zithers (or at least of their vibrating portion) are arranged parallel to each other and to a soundbox the structure of which determines the sub-type (bar, stick, tube, raft, board, box). (The principle of the box zither is found combined with a mechanism in keyboard instruments such as the clavichord, spinet, harpsichord and piano.)

For instruments with a neck, the first distinction depends on whether it is attached directly to the body (lute, harp) or attached indirectly by the means of two arms (lyre). Another primary characteristic is the plane of the instrument: either the neck and the body are on the same plane (lute, harp-lute) or the neck (straight or arched) and the body, which are on two planes, form an angle, or a curve (harp). The plane of the strings – parallel or not parallel – in relation to the plane of the instrument has a direct effect on the method of playing. In the first case, the vibrating length of the string may be modified by pressing it down on a point on the neck (the fingerboard, with or without frets); in the second case, the strings are played open.

These structural data distinguish the principal types of chordophones, especially those whose construction integrates the characteristics of two different kinds, such as the harp-lute and harp-zither. The structure is that of the lute in the first case, and that of the stick or bar zither in the second, and in both cases there is a disposition of the strings (and thus a way of playing) similar to that of the harp, by means of a vertical bridge. Once the main types of chordophones have been thus defined, the way in which the strings are set in vibration (plucking, friction, striking, blowing) is given for each (in full, by a letter or by a symbol).

IDIOPHONES If a care for consistency leads us to try applying structural data to the other three instrumental categories as the first level of subdivision, the idiophones will pose a problem of classification. If structure or shape were retained as the primary subdivision (as Schaeffner does retain it), we would find instruments with nothing in common in the same section: for instance, instruments made of slabs, plates and plaques would include clappers, along with xylophones, metallophones and lithophones, the distinction between



B. Some schematic shapes of skin drums

which must depend on a heading 'material'. By starting with the way the instrument is set in vibration (as in the Hornbostel–Sachs system), the parameter of structure/construction is used to better effect in imposing order on the extraordinary diversity of this instrumental category.

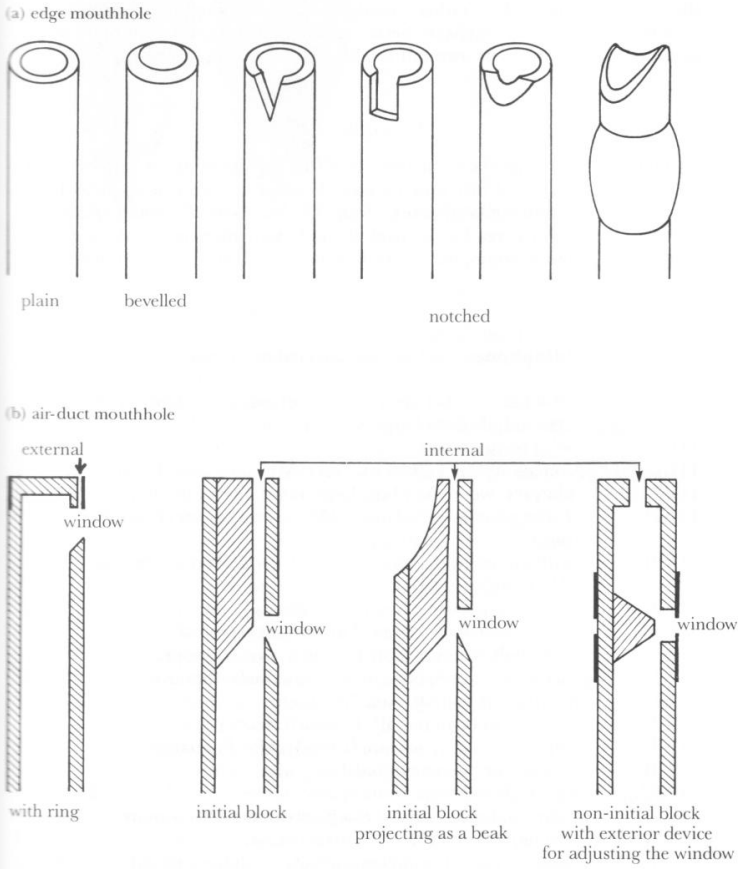
Idiophones, then, are subdivided into seven modes of playing: concussion, striking, stamping, shaking, scraping, friction and plucking. (This is preferable to the subdivisions of Hornbostel–Sachs, 'struck directly' or 'indirectly', that increases the number of digits in the coding.) However, some instruments require specific adjustments. (For instance, to avoid having different kinds of bells under different headings because of the way they are played, bells with a free or separated clapper and those with an attached clapper have been combined under the heading 'striking', although in the second case it is the action of shaking that causes the clapper to strike the inside of the bell.)

Other oppositions relating to structure (solid body, vessel-shaped or hollowed-out body; single or serial vibrating element), which if necessary will complement the shape and material of the vibrating component, may be useful in creating subdivisions. Thus, among gongs, we find two 'solid-bodied' types: made of a solid plaque (circular or triangular), and those with a raised rim like vessels. (The size of the rim may range from a few centimetres to a height equal to or greater than the diameter of the circular plate, as for example the 'bronze drum'.) For bossed groups, two kinds of data are important: the proportion of the depth of the body to diameter, or their setting: hung (the Javanese *gong agĕng*) or supported on a frame (the set of *pencon* of the *bonang*). Structural criteria alone are not enough to establish the difference between a struck 'vessel idiophone' of the 'bronze drum' type, and another of the bell type, without taking into account complementary data of a morphological and acoustic nature (the vibrations of the former are stronger near the vertex; the contrary is the case with the latter). Hence idiophones form this large and varied instrumental category, particularly resistant to systematic classification, and containing some of those 'calculated lacks' with which any classificatory system must come to terms.

MEMBRANOPHONES There is little difficulty in identifying the skin drums which constitute the membranophone category. The vibrating material, stretched over an opening or two openings in the soundbox, may be set in vibration by percussion or friction. Indian instruments (the *gopīyantra* and *apang*) regarded by some authors (Hornbostel and Sachs, p.19, and Picken, 1981, p.29) as 'plucked drums' appear to be more at home among the chordophones, because the primary vibrating element is the string which induces resonance of the membrane covering one of the openings in the soundbox. Conversely, but according to the same principle, the small string or 'timbre' underlying the membrane on certain frame drums and vibrating at the same time as the membrane does not make those instruments chordophones.

Once that first distinction has been applied, the diversity of types and subtypes of skin drums is considerable. The organologist must look at the structural elements successively: the number of vibrating membranes (one or two) and the standard or 'schematic' shapes of the soundbox or frame (see fig.B). For a typology of drums, the material of which the body is made is critical (wood, bamboo, metal, earthenware), as is the way in which the membrane or membranes is or are attached: lacing, glueing, nailing, pegging, hooping, and various combinations.

AEROPHONES Aerophones are of two types according to the manner of inducing vibration. For the first (free aerophones or whirling aerophones) the vibrating air is not confined (e.g. with the bull-roarer a sharp-edged spatulate blade provokes an airstream vibration by a spinning motion); for the second type the air is enclosed within a tubular or a globular vessel; its vibration is provoked by action of breath or wind. The way the air is made to vibrate allows us to define the three main types of wind instruments: (i) for flutes, the flow of



C. Endblown flutes

air is directed against an edge situated on the mouthhole or connected with it by means of an air duct (see fig.C); (ii) for reed instruments, the airstream is acting on a lamella, a free or a beating reed (single or double); and (iii) for horns and trumpets the airstream passes through the player's vibrating lips. The position of the mouthhole (end or side of the pipe) combined with the structure of functional devices (mouthpiece or reed) determine the ranking between sub-types.

Kazoos are half-way between two categories because the breath sets in vibration both the air contained in a pipe and the membrane over one end of it; they can be classified as either membranophones ('singing membrane' as defined by Hornbostel–Sachs) or better as aerophones, because the membrane does not yield a note of its own but modifies the speaking or singing.

Beiblatt zur instrumentenkundlichen Analyse:

Instrumentenkunde

Name:

Einordnung nach der Systematik von Hornbostel/Sachs:	

Offizielle Bezeichnung:	

Ortsübliche, auch scherzhafte Bezeichnung:	

Photo/Zeichnung (+ Beschreibung des Produkts, welches nach Ablauf der Informationsphase zur Präsentation des Instruments verwendet wird, z. B. Photostory, Minivitrine, Plakat, Info-Broschüre, graphische Darstellung, Video-Film, CD-ROM-Show usw.):

Objekt:
- Fund:
- erhalten von:
- gekauft von/in:
- beschrieben in (Autor, Buchtitel, Jahr, Seite)

Objektbeschreibung:
- Maße:
- Form:
- Material/-ien
- Verzierungen/Zeichen:
- Kennzeichen (musikbezogen, z. B. Tonleiter, Stimmung usw.):

Kulturtradition, aus der das Instrument stammt:

Hersteller:

Musikkulturen, in denen das Instrument bzw. verwandte Instrumente auch verbreitet sind:

Ortsbelege (z. B. in Büchern, erster Fundort, erster Beleg):

Zeitbelege:

Wer spielt das Instrument?

- mit wem wird es gespielt?
- wann wird es gespielt?
- wo wird es gespielt?
- mit welchen anderen Instrumenten wird es gespielt?
- mit Gesängen?
- welche Handlung wird bei Gebrauch des Instruments ausgeführt?

Symbolische Bedeutung des Instruments:

Legende/Sage:

Örtliche Geschichte/persönliche Erzählung, die mit dem Instrument zu tun hat:

Spieltechnik (Handhaltungen, Handbewegungen, Körperposition, wie erzeugt der Mensch mithilfe seines Körpers den Klang?):

Musikalische Einsatzmöglichkeiten

Musikstücke, in denen das Instrument vorkommt:

Tonaufnahme (eigene Daten; als Tonträger sind zugelassen: Audio-Cassette, Videocassette, CD):
Datum, Spieler, Aufnahmemedium, Name des Aufnahmenden, Ort