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Classification of Musical Instruments
translated from the original German by Anthony Baines and Klaus Wachmann, with additions and revisions by Febo Guizzi[1]

1 The translation into English of Febo Guizzi's additions and revisions are by Cristina Ghirardini, a revision of the English language was carried out by Matilda Colarossi. In this version of the Hornbostel-Sachs classification, the 1961 translation by Baines and Wachsmann has been maintained for the introduction and the *taxa* that do not change in Guizzi's version of the Hornbostel-Sachs classification. Guizzi's additions and remarks are in blue. Guizzi's original Italian text was distributed to the participants in the international meeting on *Reflecting on Hornbostel-Sachs' Versuch a century later*, organised by the Fondazione Levi, Venezia, 3-4 July 2015.

Classification of Musical Instruments

1. Treatises on systems of classification are by and large of uncertain value. The material to be classified, whatever it may be, came into existence without any such system, and grows and changes without reference to any conceptual scheme. 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.

2. These considerations bring special difficulties to the classifier, though also an attractive challenge: his aim must be to develop and refine his concepts so that they better and better fit the reality of his material, sharpen his perception, and enable him to place a specific case in the scheme quickly and securely.

3. A systematic arrangement for musical instruments concerns first of all musicologists, ethnologists, and curators of ethnological collections and those of cultural history. Systematic arrangement and terminology are urgently needed, however, not only for collections of material, but also for their study and in its interpretation. He who refers to a musical instrument by any name or description he pleases, being unaware of the points which matter, will cause more confusion than if he had left it altogether unnoticed. In common speech technical terms are greatly muddled, as when the same instrument may be indiscriminately called a lute, guitar, mandoline, or banjo. Nicknames and popular etymology also mislead the uninitiated: the German *Maultrommel* is not a drum, nor the English *Jew's* (properly *Jaw's) harp* a harp, nor the Swedish *mungiga* a *Geige* [fiddle], nor the Flemish *tromp* a trumpet; only the Russians are correct when they call this same instrument, a plucked lamella, by the uncommitted term *vargan* (from Greek ὀργανον, 'instrument'). Homonyms are no less dangerous than synonyms: the word *marimba,* for instance, denotes in the Congo the set of lamellae usually called *sansa,* but elsewhere it denotes a xylophone. Ethnological literature teams with ambiguous or misleading terms for instruments, and in museums, where the field-collector's report has the last say, the most senseless terms may be perpetuated on the labels. Correct description and nomenclature depend upon knowledge of the most essential criteria for the various types, – a condition which, as a visit to a museum will show, is hardly ever met. One will find, for instance, that oboes, even when still in the possession of the double reed which unmistakably proclaims them for what they are, are noted as flutes, or at best as clarinets; and should the oboe have a brass bell one may be certain of the label 'trumpet'.

4. A system of classification has theoretical advantages as well as practical uses. Objects which otherwise appear to be quite unrelated to each other may now become associated, revealing new genetic and cultural links. Herein will always be found the leading test of the validity of the criteria upon which the system is based.

5. The difficulties which an acceptable system of classification must surmount are very great, since that which suits one era or nation may be unsuitable as a foundation for the instrumental armoury of all nations and all times. Thus the Ancient Chinese based their classification on material, distinguishing between instruments made of stone, metal, wood, gourd, bamboo, hide and silk; consequently, to them, trumpets and gongs, stone harmonicas and marble flutes, shawms and clappers, each belonged together.

6. Our own present-day practice does not amount to much more. Sound-instruments are divided into three major categories: stringed instruments, wind instruments, and percussion instruments. This cannot be defended even on the grounds that it satisfies day-to-day requirements. A large number of

instruments cannot be fitted into any of the three groups without placing them in an unnatural position, like the celesta, which, as a percussion instrument, is brought into close proximity to drums and so on. As a remedy one introduces a fourth group under the disconcerting heading 'miscellaneous' – in any systematic grouping an admission of defeat. Moreover, the current classification is not only inadequate, but also illogical. The first requirement of a classificatory system is surely that the principle of demarcation remains the same throughout for the main categories. Our customary divisions, however, follow two different principles, stringed instruments being distinguished by the nature of the vibrating substance but wind and percussion by the mode of sound-excitation ignoring the fact that there are stringed instruments which are blown, like the Aeolian harp, or struck, like the pianoforte. The customary subdivisions are no better. Wind instruments are divided into woodwind and brass, thus giving a subordinate criterion of differentiation, namely, material, an unjustifiable predominance and flagrantly disregarding the fact that many 'brass' instruments are or were once made of wood, like cornetts, serpents and bass horns, and that in any case many 'woodwind instruments' are optionally or invariably made of metal, as flutes, clarinets, saxophones, sarrusophones, tritonicons, etc.

7. The objections which can be raised against the crudity of the customary divisions are now familiar to organology [*Instrumentenkunde*], and in recent decades scholars have made more than one attempt to attain something more satisfactory. Leaving aside classifications which have owed their structure to the peculiarities of this or that collection, catalogues have latterly in general adopted a system which Victor Mahillon has used since 1888 for his comprehensive catalogue of the Museum of the Brussels Conservatoire.

8. Mahillon takes the nature of the vibrating body as his first principle of division, and thus distinguishes between instruments 1) whose material is sufficiently rigid and at the same time sufficiently elastic to undergo periodic vibration, and named by him 'self-sounding instruments' [*instruments autophones*[2]]; 2) in which sound-waves are excited through the agency of tightly-stretched membranes; 3) in which strings vibrate; and lastly 4) in which a column of air vibrates. Thus he distinguishes four categories: self-sounders, membrane instruments, stringed, and wind instruments. Besides the uniformity of its principle of division, the system has the great advantage in that it is capable of absorbing almost the whole range of ancient and modem, European and extra-European instruments.

9. Mahillon's system of four classes deserves the highest praise; not only does it meet the demands of logic, but also it provides those who use it with a tool which is simple and proof against subjective preferences. Moreover, it is not so far removed from previously-used divisions as to offend well-established custom.

10. It has seemed to us, however, that the four-class system stands in pressing need of development in fresh directions. Mahillon started on the basis of the instruments of the modem orchestra, with which, as an instrument manufacturer and musician, he was in closest contact, and it was these which gave him the initial challenge to work out his system. Then, as the collections of the Brussels museum grew under his direction, he explored over years of relentless effort the limitless field of European and exotic organology. Inevitably a newly-acquired specimen would now and then fail to fit into the system, while certain subdivisions which figure importantly among European instruments – e.g. those of keyboard and mechanical instruments – assumed an unwarrantably prominent place. Mahillon had indeed been led for the sake of the European instruments, to juxtapose categories which did not logically build a uniform concept. Thus he divided the wind

2 For reasons which Sachs has explained in his *Reallexikon der Musikinstrumente* [1913, 195a], we prefer the term *idiophones.*

instruments into four branches, 1) reed instruments [*instruments à anche*], 2) mouth-hole [*instruments à bouche*], 3) polyphone instruments with air reservoir, and 4) cup-mouthpiece instruments [*instruments à embouchure*]. Consider too the drums, which he grouped as frame drums, vessel drums, and double-skin drums; he consequently divided the skin drums corresponding to our side- and kettle drums – and likewise the autophones – into instruments of untuned pitch [*instruments bruyants*] and those of tuned pitch [*à intonation déterminée*]. This is an awkward distinction, since a wide range of transitional sounds occurs between pure noises and noise-free tones; indeed, save for a few laboratory instruments, there are no sound-producers that can truly be said to yield either pure noise or pure tones, the sounds of all the usual musical instruments being more or less wrapped in noise. Mahillon later seems to have sensed this when he contrasted noise-instruments with those *à intonation nettement* or *intentionellement déterminée;* but the criterion is subjective and as a rule incapable of proof.

11. In general, Mahillon was right to subdivide the four main classes into 'branches' differentiated by playing action. Yet for stringed instruments it was a dubious procedure; a violin remains a violin whether one bows it with a bow, plays it pizzicato with the fingers, or strikes it *col legno*. Perhaps this seems a lopsided argument, since the violin is, after all, designed to be bowed. But there are other instances. One could cite instruments whose playing action has changed in the course of time but whose form has remained unaltered. This was the case, for example, with the ancient Celtic crowd, which can be proved to have been plucked in the earliest times, but which came to be bowed in the High Middle-Ages: should the history of instruments therefore deal with it half in a chapter on plucked stringed instruments and half in one on bowed, although the instrument itself remains just the same? Then there is the psaltery, which is turned into a dulcimer [*Hackbrett*] when the player uses beaters; should one, in a collection, separate the psalteries, otherwise indistinguishable from each other, into two groups on the ground that in one country of origin it was customary to pluck it but in another to beat it? Should I place the clavichord and the pianoforte side by side but house the harpsichord with the guitars because its strings are plucked?

12. All these considerations have persuaded us to undertake afresh the attempt to classify musical instruments. We were fortunate in having at our disposal as a ready-made base the large and extensively described collections of the Brussels museum out of which Mahillon's system had grown. At the same time we are aware that with increasing knowledge, especially of extra-European forms, new difficulties in the way of a consistent classification will constantly arise. It would thus seem impossible to plan a system today which would not require future development and amendment.

13. Like Mahillon, we accept the physical characteristics of sound-production as the most important principle of division; but even at this point considerable difficulties are met since acoustic physics has so far covered but the smallest fraction of the preliminary investigations. Thus inadequate research has yet been undertaken on the sound-production of the bull-roarer, the vibratory manner in north-west American 'ribbon- reeds', the vibration events in bells, gongs, kettledrums, plucked drums, and wind instruments with free reeds and fingerholes. To such difficulties must be added others arising from the morphology of instruments. The problem of defining the term 'frame drum' (*tamburin*) for example, is scarcely capable of satisfactory solution; undoubtedly the typical frame drum represents a concise concept not to be disregarded in any classificatory system, but the transition between this and the pronouncedly tubular drum occurs without a break, often making it impossible to decide on the basis of shape whether a specimen belongs to the one kind or to the other.

14. Other obstacles in the path of the classifier are instruments showing adulterations between types

[*Kontaminationen*]. The fact of adulteration should be accounted for by placing such instruments in two (or more) groups. In museums and catalogues these cases will be arranged according to the dominant characteristic, but cross-references to other characteristics should not be omitted. Thus, among instruments of every class one may find rattling devices which belong to the inventory of idiophones – a feature which cannot be taken into account when placing the instrument in the classification. But where the adulteration has led to an enduring morphological entity – as when kettledrum and musical bow combine in a spike lute-it must have a place of its own within the system.

15. We must refrain from arguing our subdivisions in detail. Whosoever will check these critically, or test them in practice, will doubtless repeat the lines of thought which are not set out here, with minor variations of his own.

16. In classifications it is often customary to indicate the ranking·of divisions within the system by means of specific headings, as especially in zoology and botany with expressions like class, order, family, genus, species, variant. In the study of instruments, Mahillon himself felt this need and met it by introducing the terms *classe, branche, section, sous-section;* on Gevaert's advice he refrained from using the term 'family' on account of its widely-known use for instruments of like design but of different sizes and pitches.

17. We consider it inadvisable to maintain consistent headings throughout all rubrics for the following reasons. The number of subdivisions is too big to manage without bringing in a petty superfluity of headings. Moreover, in any system one must leave room for further division to meet special cases, with the result that the number of subdivisions could for ever increase. 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. Thus terms like 'species' may refer in one case to a very general concept but in another to a highly specialized one. We therefore propose that the general typological headings be restricted to the topmost main groups, though one could, like Mahillon, speak of the four main groups as classes, of the next divisions (with a two-unit symbol [*zweiziffrig*]*)* as sub-classes, the next (three-unit) as orders, and the next (four-unit) as sub-orders.[3]

18. We have refrained from providing a subdivision containing no known existing representative, save in cases where a composite type may be assumed to have had a precursor in a simpler type now extinct. Thus it can be assumed from analogy with numerous types that Man rubbed a solid, smooth block of wood with the moist hand before he ever carved a series of differently-pitched tongues by cutting notches into the block, as in the friction block of New Ireland. Again, where the wealth of forms is exceptionally vast, as with rattles, only the more general aspects of their classification can be outlined in the scheme, and these will certainly require further elaboration.

19. In general we have tried to base our subdivisions 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. Here one has had to consider the needs not only of museum curators but also of field workers and ethnologists. We have carried the subdivisions as far as seemed important for

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Translators' [Baines and Wachsmann] note: It is not clear whether the authors here refer to Mahillon's letter-symbols or to their own numerical coding described further on.

the observation of cultural history and detail, though the plan of the whole classification makes possible its application to the material either summarily or in great detail as desired; general treatises and smaller collections may not require to follow our classification to its last terms, while specialist monographs and catalogues of large museums may well wish to extend it in further detail.

20. The application of our findings in describing and cataloguing is substantially facilitated by use of the Dewey numerical system.[4] If those in charge of large collections who issue catalogues in the future decide to accept our numerical arrangement, it will become possible to find out at first glance whether a given type of instrument is represented in the collection.

21. The ingenuity of Dewey's idea lies in the exclusive use of figures, replacing the more usual conglomeration of numbers, letters and double letters by decimal fractions. These are so used that every further subdivision is indicated by adding a new figure to the right-hand end of the row; the zero before the decimal point being always omitted. Thus it becomes possible not only to pursue specification to whatever limits one desires and with never any trouble in the manipulation of the numbers, but also directly to recognize from the position of its last figure the ranking of a given term with the system. It is also feasible in a row of numbers to divide off any set of figures by points. Say, for example, that it is a bell chime [*Glockenspiel*] which is to be coded and placed in the system. In the context of the system we are dealing with an idiophone, the class to which the initial code-figure 1 is allotted. Since the instrument is struck it belongs to the first sub-class, and so another 1 is added (struck idiophones = 11). Further addition of relevant code-figures produces the ranking 111 since it is struck directly; and then, as a struck-upon [percussion] idiophone, it earns a fourth figure, in this case 2 (1112 = percussion idiophones). Further specification leads to 11124 (percussion vessels), 111242 (bells), 1112422 (sets of bells), 11124222 (sets of hanging bells), and 111242222 (ditto with internal strikers) – obviously, everyone must decide for himself how far to go in a given case. Instead of the unmanageable number now arrived at, we write 111.242.222. The first cluster shows that we are dealing with an idiophone that is struck directly, while the second and third together imply that we are dealing with bells.

22. Common considerations among all instruments of a class – e.g. with membranophones the method of fixing the skin, and with chordophones the playing method – may be noted with the aid of figures appended to the essential code-number by a hyphen: the pianoforte would be entered as 314.122-4-8 and the harpsichord 314.122-6- 8, because 8 represents the keyboard, 4 the hammer playing-action, and 6 the plectrum playing-action, both instruments having the same main number indicating board zithers with resonator box.

23. Any of the subordinate criteria of division may, if desired, easily be elevated and treated as a higher rank in the classification, by switching the positions of figures. Thus, for a bagpipe in which chanter and drone are both of the clarinet type, the code-number would read 422.22-62, i.e. a set of clarinets with flexible air reservoir. But if, for instance in a monograph on bagpipes, one wished to especially distinguish these [chanter and drone] features, one could write 422-62:22, i.e. reed instrument with flexible air reservoir whose pipes are exclusively clarinets.

24. Conversely, in order to bring closer together groups which are separated in the system, it is possible to tum a main criterion of division into a subordinate one without destroying the system:

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4 Since the numerical arrangement for the Bibliographie internationale of musical instruments applies only to European instruments, and is anyhow as inadequate as can be, we have planned our own numerical order independently.

one simply replaces the first relevant figure by a point (.) and then adds it after a square bracket] at the end of the number. Thus in the example of bagpipes, it might be important to specify these instruments as always polyorganic[5] but with components which are sometimes clarinets and sometimes oboes; instead of 422-62:22 = reed instrument [*Schalmeien-Instrument*], with flexible air reservoir, polyorganic, composed of clarinets, it might be preferable to write 422-62:.2 = set of reedpipes [*Schalmeienspie*l] with flexible air reservoir = bagpipe, and then to differentiate further by writing 422-62:.2]1 = bagpipe of oboes, or 422-62:.2]2 = bagpipe of clarinets.[6]

25. Other specifications applying to a subordinate group are suffixed to the code-figures of the latter, e.g. 422-62:.2]212= a bagpipe of clarinets with cylindrical bore and fingerholes.

26. These innumerable cases in which an instrument is composed of parts which in themselves belong to different groups of the system could be indicated by linking appropriate figures by a plus sign. One then avoids repetition of a number common to both such parts, writing this number once and following it with a point: a modem trombone with slide and valve would then appear not as 423.22+423.23, but as 4232.2+3, and similarly bagpipes composed partly of clarinets and partly of oboes as cited above, would become 422-62:.2]1+2.

27. In certain circumstances it may be necessary not only to re-arrange the rankings of the concepts and create new subdivisions, but also to incorporate into the higher ranks of the classification some criterion which has purposely not so far been used. There is nothing to prevent this being done, and we should like to illustrate it by a final example, at the same time showing how we envisage the development of our system for special purposes. Let us imagine the case of a monograph on the xylophone. The system divides struck idiophones (111.2) by the shape of the struck bodies, thus: struck sticks (111.21), struck plaques (111.22), struck tubes (111.23), and struck vessels (111.24). Xylophones could fall into any of the first three, but the shape of the sounding bodies is here of little relevance – the transition from sticks to plaques being quite fluid – and so the fifth figure may be removed, and, if desired, added as]2 at the end. For the sixth figure we insert 2, if the description is to concern only multi-tone instruments, giving 1112..2 = sets of struck idiophones [*Aufschlagspiele*]. We must, however, exclude sounding bodies of metal, stone, glass, etc., and must therefore create a subdivision according to material which the system does not already provide, thus:

1112..21	= xylophone	sounding bodies of wood
1112..22	= metallophone	sounding bodies of metal
1112..23	= lithophone	sounding bodies of stone
1112..24	= crystallophone	sounding bodies of glass.

28. Further stages in this classification of the xylophone would make use of morphological criteria significant from an ethnological point of view:

Classification

1112. .21.1 Bedded xylophone The sounding bodies rest on an elastic

5 Polyorganic means composed of several single instrumental units.

6 This use of the symbols - : and] is slightly different from that of the Classification bibliographique Décimale, but is nevertheless within its spirit. The rules are: the hyphen is employed only in connection with the appended figures listed in the tables [at the end of each of the four main sections]; subdivisions beyond these are preceded by a colon (thus 422-62 =reed instrument with flexible air reservoir, but 422-6:2 = 422.2-6 = oboe with air reservoir); subdivision answering to the omission of a figure is preceded by a square bracket.

foundation

1112. .21.11 Log xylophone The foundation consists of separate logs.
N.B. There is generally a shallow pit in the ground beneath the sounding bodies
Oceania, Indonesia, E. and W. Africa

1112. .21.12 Frame xylophone The bearers are joined by cross rods or bars

1112. .21.121[7] **Rail xylophone** The frame hangs from the player's neck on a sling and is kept clear of his body by a curved rail
S.E., E. and W. Africa

1112. .21.122[8] **Table xylophone** The frame is borne on a trestle
Senegambia

1112. .21.13 Sledge xylophone The sounding bodies lie across the edges of two boards
C. Africa

1112. .21.14 Bedded) trough xylophone
The sounding bodies lie across the edges of a trough- or box-shaped vessel
Japan

1112. .21.2 Suspension xylophone
The sounding bodies lie on two cords without any other foundation

1112. .21.21 (Free) suspension xylophone
Without case
Cochin China

1112. .21.22 (Suspension) trough xylophone
With trough-shaped box
Burma, Java

29. The systematic survey of musical instruments which now follows in tabular form is meant equally to serve the purposes of identification. Hence the descriptions of characteristics are here and there expanded to include warnings against likely misunderstandings and confusion.

Explanations and examples are kept to a minimum; the former are not intended as descriptions, nor the latter as notes on the history of cultures. Also, visual study of specimens far outvalues pages of written description. The expert will know what we are driving at, while the layman will be able to find his bearings with the aid of a visit to a museum.

7
To be further subdivided thus:
1 Without resonators
2 With resonators
21 With resonators suspended singly
22 With resonators stuck into a common platform
The resonators, in most cases gourds, often have holes sealed by a membrane, showing adulteration with 242 (vessel kazoos). Possibly he method of mounting the membranes (directly, or over a cone-shaped frame) will demand another subdivision. One can, however, dispense with adding another number since frame xylophones without resonators are unknown.

8
See note 7.

Classification	Characteristics	Examples
1 Idiophones	The substance of the instrument itself, owing to its solidity and elasticity, yields the sounds, without requiring stretched membranes or strings	
11 Struck idiophones 111 Idiophones struck directly	The instrument is made to vibrate by being struck upon The player himself executes the movement of striking; whether by mechanical intermediate devices, beaters, keyboards, or by pulling ropes, etc., is immaterial; it is definitive that the player can apply clearly defined individual strokes and that the instrument itself is equipped for this kind of percussion	
111.1 *Concussion idiophones or clapper*[9]	Two or more complementary sonorous parts are struck against each other	
111.11 Concussion sticks[10] or stick clappers 111.12 Concussion plaques or plaque clappers		Annam, India,[11] Marshall Islands China, India
111.13 Concussion troughs or trough clappers		Burma
111.14 Concussion vessels or vessel clappers	Even a slight hollow in the surface of a board counts as a vessel	
111.141 Castanets	Vessel clappers, either natural, or artificially hollowed out	
111.142 Cymbals 111.15 Concussion tubes or tubular clappers	Vessel clappers with everted rim Hollow stick	
111.2 *Percussion idiophones* 111.21 Percussion sticks	The instrument is struck either with a non-sonorous object (hand, stick, striker) or against a non-sonorous object (human body, the ground)	

9 Hornbostel and Sachs use the specific term *Klappern* to condense the general definition «concussion idiophones». The term exists in English as well (*clappers*), and it is supposed to be onomatopoeic in origin, since the verb 'to clap' means 'to applaud' (i.e. hit your hands – which are pre-eminently symmetrical – against each other). The Italian language does not have a similar onomatopoetic, universally widespread term. However, in Italian the signifier historically used to mean this type of concussion in cultivated language is *crotalo*, a word of Latin origin, which in turn comes from the Greek. It is as univocal as its English and German linguistic equivalents, even if it is limited to literary usage [Battaglia 1964].

10 In Italian *bacchetta* or *barra* (as in 111.21): it may have a cylindrical or polygonal (with edges) section; it may be solid or hollow (tubular); it may have a linear shape or a ring shape (the latter is a significant morphological variant, which may be located slightly under the distinctive level corresponding to 'sticks / plaques / troughs / vessels'). It is important to notice that while later the taxon referring to «percussion tubes» (111.23) is provided, the tubes are not autonomously considered among the clappers. However, it is easy to add the systematics with the taxon 111.15 Concussion tubes or tubular clappers.

11 In German *Vorderindien*, a geo-political denomination, which in 1914 identified the Western part of India belonging to the British Empire; it includes the actual Pakistan, Kashmir and the Western territories of continental and peninsular India. It is opposed to *Hinterindien*, which is the Eastern part that reaches to modern-day Myanmar.

111.211 (Individual) percussion sticks		Japan, Annam, Balkans; also the *triangle*
111.212 Sets of percussion sticks	Several percussion sticks of different pitch are combined to form a single instrument	All *xylophones,* as long as their sounding components are not in two different planes [nicht biplan][12]
111.22 Percussion plaques 111.221 (Individual) percussion plaques 111.222 Sets of percussion plaques 111.23 Percussion tubes		In the oriental Christian Church *Lithophone* (China), and most *metallophones*
111.231 (Individual) percussion tubes[13] 111.232 Sets of percussion tubes		*Slit drum, tubular bel.* *Tubaphon, tubular xylophone*
111.24 Percussion vessels 111.241 Gongs		
111.241.1 (Individual) gongs		South and East Asia; including the so-called *metal drums,* or rather *kettle-gongs.*
111.242.2 Sets of gongs [*gong chimes*]		South and East Asia
111.242 Bells 111.242.1 (Individual)	The vibration is weakest near the vertex	

12 Initially, this problematic – in its conciseness – expression lead me to think that the bi-dimensionality had to be intended in a virtual sense, that is as a geometric shape in which length and width largely prevail over height (or thickness): which is directly pointing to the specific case of the plaques that is given immediately after [i.e. the sticks], according to the idea that the sounding parts of a xylophone not corresponding to that shape should be included in *taxon* 111.222 «Sets of percussion plaques». In any case, the distinction regards the different morphologies of sticks, on the one hand, and of plaques, on the other hand, which is accomplished by the provided autonomous morphologies of sets of percussion tubes (111.232) and sets of percussion vessels (111.241.2 gongs or 111.242.2 bells). The original German term is *biplan*, in Italian *biplanare*, an adjective having a Latin root and scarcely used in German. The necessity to give a literal translation may appear obvious, however, this option leads to something hardly explainable: one cannot understand what a xylophone with its sounding parts 'resting in two different planes' means, moreover one cannot understand why such xylophones cannot be referred to with the taxon of sets of percussion sticks. This, however, is the option chosen by Baines and Wachsmann in their English translation: «as long as their sounding components are not in two different planes». The fact that even the two renowned English organologists were not fully convinced is evident from the fact that this translation is cautiously followed by the original German expression in square brackets [*nicht biplan*]. Carlos Vega [1946], on the other hand, keeps the original term without any elaborations or interpretations («si sus componentes sonoros no son biplanos»). It is important to underline that Vega was a pupil of Curt Sachs and that, what matters most, he submitted his translation to Sachs who personally verified it. All things considered, the point is the arrangement of the sounding elements (referring to all the given options): a xylophone is characterised by the fact that it has a plurality of percussion elements which are aligned, which is to say 'on the same plane'. This justification should not be strictly intended in the sense of planarity, since in many xylophones (in Africa as well as South-East Asia) the series of sounding elements is suspended in order to obtain a curve with its ends up and its centre down. An arrangement on two planes involves the hypothesis that various sounding elements of different sizes are arranged both on a horizontal plane and on a vertical plane or on intermediate planes between them.

13 Here the concept of tube includes the elongated bodies, cylindrical and polyhedral, naturally or artificially hollowed, with the internal part longitudinally communicating with the exterior or not: this justifies the coexistence [in this *taxon*] of both tubular bells and slit drums. Moreover, the latter might be easily confused with vessels; on a morphological and functional ground, the distinction is very difficult, especially in the case of wooden bells with a separate clapper («suspended bells struck from the outside»), which are not rarely hollowed in a polygonal shape, and very similar to many wooden slit drums: to solve the problem one needs to consider the context of use and the different destination.

bells 111.242.11 Resting bells	The cup is placed on the palm of the hand or on a cushion; its mouth faces upwards	China, Indo-China, Japan
111.242.12 Suspended bells	The bell is suspended from the apex[14]	
111.242.121 Suspended bells struck from the outside	No striker is attached inside the bell, there being a separate beater[15]	
111.242.122 Clapper bells	A striker (clapper is attached inside the bell)	
111.242.2 Sets of bells [*chimes*]	(subdivided as 111.242.1)	
112 Indirectly struck idiophones	The player himself does not go through the movement of striking; percussion results indirectly through some other movement by the player. The intention of the instrument is to yield clusters of sounds or noises, and not to let individual strokes be perceived	
112.1 *Shaken idiophones or rattles*	The player executes a shaking motion	
112.11 Suspension rattles	Perforated idiophones are mounted together, and shaken to strike against each other	
112.111 Strung rattles	Rattling objects are strung in rows on a cord	Necklaces with rows of shells
112.112 Stick rattles	Rattling objects are strung on a bar (or ring)	*Sistrum with rings*
112.12 Frame rattles	Rattling objects are attached to a carrier against which they strike	
112.121 Pendant rattles	Rattling objects are hung from a frame	Dancing shield with rattling rings
112.122 Sliding rattles	Non-sonorous objects slide to and fro in the slots of the sonorous object so that the latter is made to vibrate; or sonorous objects slide to and fro in the slots of a non-sonorous object, to be set in vibration by the impacts	*Anklung, sistrum with rods (recent)*
112.13 Vessel rattles	Rattling objects enclosed in a vessel strike	*Fruit shells with seeds,*

14 It is important to specify that among the bells «suspended from the apex» one must include the 'handbells', which is to say the bells that are provided with a handle. The taxonomic principle groups together in one field all the bells whose working depends on the existence of a central pivot, which may also be a handle.

15 The external percussive devices are normally separate from the bell, not only as far as the structural aspect of the mechanical connexion is concerned, but also from a functional one: the separate beater is normally struck against the stationary bell, while the attached clapper, which is normally internal, moves as a consequence of (even if not only) the oscillation of the bell. However, there are also suspended bells with separate hammers, which are external but joined to the same device which supports the bell and which strikes the bell as a consequence of its movement. This is the case with Indo-Chinese bells for animals, made of wood or bamboo, or even of metal, having a double external beater. Some misunderstandings may arouse among non-experts, who tend to classify bells, as well as rattles used as noise makers during the holy week, as indirectly struck idiophones, among shaken idiophones. Actually, the possibility to obtain clearly defined individual strokes, which the structure of these instruments offers the player, excludes any misinterpretations.

	against each other or against the walls of the vessel, or usually against both N.B. The Benue gourd rattles with handle, in which the rattling objects, instead of being enclosed, are knotted into a net slipped over the outer surface, count as a variety of vessel rattle	*'pellet bells' enclosing loose percussion pellets*
112.2 *Scraped idiophones*	The player causes a scraping movement directly or indirectly: a non-sonorous object moves along the notched surface of a sonorous object, to be alternately lifted off the teeth and flicked against them; or an elastic sonorous object moves along the surface of a notched non-sonorous object to cause a series of impacts . This group must not be confused with that of friction idiophones	
112.21 Scraped sticks	A notched stick is scraped with a little stick	
112.211 Scraped sticks without resonator		*South America. India (notched musical bow), Congo*
112.212 Scraped sticks with resonator		Usumbara,[16] East. Asia (*tiger*)
112.22 Scraped tubes		South Indi
112.23 Scraped vessels	The corrugated surface of a vessel is scraped	*South America, Congo region*
112.24 Scraped wheels or cog rattles[17]	A cog wheel, whose axle serves as the handle, and a tongue fixed in a frame which is free to tum on the handle; when whirled, the tongue strikes the teeth of the wheel one after another	Europe, India
112.3 *Split idiophones*	*Instruments in the shape of two springy arms connected at one end and touching at the other: the arms are forced apart by a little stick, to jingle or vibrate on recoil*	China (*huan t'u*), Malacca, Persia *(qăsik),* Balkans, Calabria [La Vena 1996, 89-90]
12 Idiophones elastically dislocated[18]	Thin elastic elements, normally metallic plaques, small or big, wide or linear, fixed at one end and free at the other, are displaced from their position of rest, where they return with an oscillatory or sussultatory movement	
121 Directly dislocated or plucked	Lamellae, i.e. small elastic plaques fixed at one end, are flexed and then released	

16 Mountains in the actual Tanzania, ex Tanganyika.

17 In analogy with what is later provided for friction drums with cord (232), which are subdivided into stationary (232.1) and with whirling stick (232.2), it is advisable to provide this *taxon* with the further subdivision in stationary cog rattles (112.241) and rotating cog rattles (112.242). The former are cog rattles whose wheel is moved by a handle, while the frame, generally of medium or large size, remains still; the latter are cog rattles that fit the Hornbostel and Sachs description more precisely, and are made of a frame (incorporating the flexible tongue) which is caused to rotate, thanks to the centrifugal force, around the wheel, which remains still, joined with the handle kept by the player.

18 The existence of shaken metallic plaques, which produce sound by virtue of the dislocation that their elastic structure allows as an effect of the action of shaking, leads to propose an emendation of the taxonomy of idiophones concerning the actual *taxon* 12 Plucked idiophones, according to the sequence inserted in the table, which is composed of new entries as well as existing ones that have been located differently.

	to return to their position of rest, thanks to their elasticity	
121.1 *In the form of a frame*	The lamella vibrates within a frame or hoop	
121.11 Clack idiophones (cricri)	The lamella is carved in the surface of a fruit shell, which serves as resonator	Melanesia
121.12 Guimbardes (Jew's harps)	The lamella is mounted in a rod- or plaque-shaped frame and depends on the player's mouth cavity for resonance	
121.121 Idioglot guimbardes	The lamella is carved in the frame itself, its base remaining joined to the frame	India, Indonesia, Melanesia
121.122 Heteroglot guimbardes	A lamella is attached to a frame	
121.122.1 (Single) heteroglot guimbardes		*Europe, India, China*
121.122.2 Sets of heteroglot guimbardes	Several heteroglot guimbardes of different pitches are combined to form a single instrument	*Aura*
121.2 *In board- or comb-form*	The lamellae are tied to a board or cut out from a board like the teeth of a comb	
121.21 With laced-on lamellae		
121.211 Without resonator		All *sansas* on a plain board
121.212 With resonator		All *sansas* with a box or bowl below the board
121.22 With cut-out lamellae (musical boxes)	Pins on a cylinder pluck the lamellae	Europe
122 Indirectly dislocated or shaken	Wide elastic plaques, fixed at one end, are shaken in order to produce one or more displacements, even contemporary and distributed all along the whole surface, which, thanks to the elasticity of the plaque itself, cause an indefinite series of oscillatory or sussultatory movements. The player executes a dislocatory action only indirectly, it is a consequence of other movements, normally the act of shaking. By definition, the instrument allows us to hear only complex sounds or noises, not single controlled impulses	
122.1 *Pivoted*	The plaque, normally large, is pivoted on a vertical support, which leaves the opposite end free, where the player acts	The thunder sheet in symphonic orchestra
122.2 *Freely held*	The plaque, normally of small-medium size, is held by the player's hands. The plaque is made to oscillate by shaking it, normally by carrying out a horizontal movement	The plaque used to call the swarms of bees or the one used in Calabria as a noise maker during the Holy Week
13 Friction idiophones	The instrument is made to vibrate by friction	
131 Friction sticks	The rubbed element is a stick	
131.1 *(Individual) friction sticks*	A single stick is rubbed	
131.11 With direct friction	The stick is rubbed by means of a rigid device	The call for larks made of a small wooden cylinder which is internally rubbed by a lead rotating device

131.12 With indirect friction	The stick is joined to other devices, which are rubbed. The devices convey the vibration to the stick	
131.2 *Sets of friction sticks* 131.21 With direct friction	The sticks themselves are rubbed.	*Nail fiddle, nail piano, Stockspiele*
131.22 With indirect friction 132 Friction plaques	The sticks are connected with others which are rubbed and, by transmitting their longitudinal vibration, stimulate transverse vibration in the former	Chladni's *euphon*
132.1 *(Individual) friction plaques*[19] 132.11 Single rigid friction plaques or rubbed plaques proper	A metallic plaque is rubbed The plaque is rigid	 The quadrangular Chladni's plaque, which is rubbed by a bow in order to visualise, through the movement of iron filings, the pattern of the vibratory waves
132.12 Single flexible plaques or ramellae	The plaque is flexible	Harmonic saw
132.2 *Sets of friction plaques [livika]*	Two or more plaques, which are separate or obtained from a single frame, are rubbed	New Meklenburg (New Ireland)
133 Friction vessels[20]		

19 Among the friction plaques, Hornbostel and Sachs have considered only those in sets, exemplified by the *livika* or *lunel*, employed in the *malagan* funeral ceremonies of New Guinea. The authors also underlined this in the introduction, where this rank was taken as an example of an exception, because despite the fact that they had «refrained from providing a subdivision containing no known existing representatives», this case was one «where a composite type may be assumed to have had a precursor in a simpler type now extinct». Therefore, the *taxon* 'individual friction plaques' exists but the corresponding instrument resulted unknown. However, they failed to notice that there exists an instrument made of a single plaque which is rubbed by a violin bow: it is the so-called 'harmonic saw', that is, the long carpenter's saw (actually it is constructed for musical purposes with high quality steel) which is rubbed by a bow and bent to various degrees to obtain different pitches. However, it may create another problem about the classification of this instrument: its shape results more properly considered among the lamellae, that is, as Hornbostel and Sachs wrote about plucked idiophones (*taxon* 12) «small elastic plaques fixed at one end», which are bent and then released, making good use of their elasticity. Even if lamellae are a kind of plaque, rather than leaving things as they are, including the harmonic saw as a generic example of a single friction plaque, one can not only stress the peculiarity of lamellae in themselves, but also oppose them to the rigid plaques, of which at least Chladni's laboratory device, invented for his experiments, is a non-negligible example. It is advisable to remember that the sets of friction plaques of the instrument of New Ireland are made of a series of flat and sharpened surfaces, differently tuned, obtained by engraving a massive block of wood, solid and polished, therefore, the two instruments are morphologically very distant. Another hypothesis may suggest to add another rank for friction lamellae, with *taxon* 134. However, I prefer the first solution, since the morphological differences should not prevail over the common criteria of the basic functioning.

20 The existence of some interesting toy instruments in various Italian traditions (they can exist also elsewhere, even if not yet identified) suggests the integration of the systematics with some non-secondary specifications: within the friction idiophones in fact, there exist some vessels (which may be considered similar to gongs as far as the shape and probably the acoustic behaviour is concerned) which are rubbed not by hands (this is the case of the Brazilian tortoise shell and of the *Glassharmonika*) but through some systems comparable to those described in the class of membranophones, in taxa 232.1 «Stationary friction drum with cord» and 232.2 «Friction drum with whirling stick». In Calabria, Vincenzo La Vena [1996, 51-52] has documented the usages of friction 'drums' with whirling stick (even if they are used also as stationary friction drums) whose box and 'membrane' are obtained from a recycled tin box. Another instrument related to this one is the *mitraglia* of the Parmesan Apennines – preserved in the Museo Ettore Guatelli in Ozzano Taro [Ghirardini 2006, 275-276] – made of a big tin box, which is held still while the cord is rubbed through a stick that rotates in the noose of the cord. I now believe that both cases may be considered vessel idiophones, even if the contiguity between plaques and membranes is very close, and virtually uninterrupted. Laurence Picken [1975, 160-161] introduces the taxon 232.3 «Single-skin stationary drums with friction cord and rotated stick or cylinder», therefore he distinguishes the rotating friction drums from those which are kept still, and whose stick rotates in a loop of the cord). Picken chose to insert among the membranophones the toy 'telephones' built in Turkey using small cardboard boxes for matches: his opinion was based on the already explained idea of contiguity between idiophones, in the case of plaques, and membranophones. His argument also established a border between the two sound sources, which was placed in the point where

133.1 *(Individual) friction vessels*		
133.11 Directly rubbed vessels (hand friction vessels)	The friction is carried out directly by the player's hand on the body of the instrument	Brazil (tortoise shell), single crystal glass
133.12 Indirectly rubbed vessels	The player executes a different movement than that of direct friction, or s/he rubs something different than the body of the instrument, from which the transmission of the impulse determined by that friction to the body of the instrument results	
133.121 Stationary	The body of the instrument is still	
133.121.1 Friction vessels with stick	A rotating stick rubs the body of the instrument	*Giranoci* (Italia) [Guizzi 2002, 351]
133.121.2 With cord	A cord is rubbed	
133.121.21 With cord rubbed by the hand	The player's hand rubs the cord which is fixed to the body of the instrument, creating an impulse	Calabria (Italy): *rùocciola* played by rubbing the cord directly [La Vena 1996, 49-52]
133.121.22 With cord rubbed by the stick	The impulse is determined by rubbing the cord fixed to the body of the instrument through a stick	*Mitraglia* (Italia: Emilia)
133.122 Rotating	The body of the instrument is rotated, allowing the cord to rub the groove in the stick, which constitutes the handle	Calabria: *rùocciola* played by allowing the cord to rotate around the stick [La Vena 1996, 49-52]
133.2 *Sets of friction vessels*		
133.21 Directly rubbed sets of vessels (hand friction vessels)		
133.121 Stationary		*Glass harmonica* with fixed glasses
133.122 Rotating		*Glass harmonica* with a pedal movement
133.22 Indirectly rubbed sets of vessels		
133.221 Stationary		Unknown
133.222 Rotating	A whirling stick rubs a vessel, which in turn is rubbed by one or two similar sounding vessels, which are reciprocally involved in the friction	The *giranoci* (Italia) made of more than one vessel rubbed by the stick [Guizzi 2002, 351].
14 Blown idiophones	The instrument is made to vibrate by being blown upon	
141 Blown sticks		

membranes stop to be elastomers. This border has resulted of such relevance that one cannot authorise the inclusion of rigid plaques, which cannot be stretched, among membranes, that are made of elastomers, and not only can they be stretched, but, to work as sonorous identified) they must be stretched. Even if the acoustic behaviour may be similar in circular plaques that are extremely thin, and in true membranes, I believe that it is not easy to demonstrate that the secondary modes of vibration coincide, as well as the consequently generated series of harmonic or non-harmonic partials. However, the solely acoustic arguments, even if very relevant, are not enough to elude the general criteria of systematic arrangement elaborated by Hornbostel and Sachs, where the morphological and functional characters often determine the distinctions of the main classes. Therefore, I propose the integration to the systematics in the following table.

141.1 *(Individual) blown sticks* 141.2 *Sets of blown sticks*		*Unknown* *Aeolsklavier*
142 Blown plaques 142.1 *(Individual) blown plaques* 142.2 *Sets of blown plaques*		 *Unknown* *Piano chanteur*
15 Singing idiophones (idiophonic mirlitons): idiophones solicited by the pressure of sounding waves.[21]	The instrument is made to vibrate by speaking or singing into the hollowed space between two symmetrical valves put one above the other. The vibration of the valves does not yield a note of its own but merely disguises the voice	*Ravi (*Monferrato, Piedmont), *cuse* (Riva presso Chieri and area of Asti, Piedmont), *sücchetta* (Ponente ligure)
Suffixes for use with any division of this class (idiophones):[22]		

21 This subclass is absent in the original German, since, at the time it was written (and also later for a long time), examples of voice disguisers that did not make use of membranes were unknown, and their existence had not been potentially speculated. It was the study of the *ravi* in Monferrato and of the *sücchette* in Liguria which led to the discovery of this further subdivision in the field of idiophones. Many other discoveries have been made since 1914 in the field of instrumental music, however it is not always possible to integrate the text by Hornbostel and Sachs, especially if one considers that many instruments may be taken into account in the existing *taxa*, eventually integrating the subdivisions to fulfil the need for more careful distinctive layers. I believe it is necessary to make an exception when, like in this case, the discovery affects a high level of the taxonomic hierarchy. See Guizzi [1985].

22 It is important to note that the common suffixes for idiophones are very few, which may cause surprise if one considers that this is the most numerous class. However, the very nature of this further specifications gives the reason for this only apparent strangeness: the suffixes are intended as further identifiers, which are independent from the basic distinctive criterion of each class or subclass of the taxonomy. Therefore, they do not refer to optional or secondary specifications, and they would not make sense if they were intended as sources of alternative criteria to those already codified, or as tautological repetitions of what the systematics has already chosen as the skeleton of its arrangement. Since the idiophones are primarily subdivided according to the way in which the sound is produced, and therefore, according to basic human actions, the only common suffixes taken into account are those integrating human action with the impressive mediation of the usage of a keyboard, or those separating the time of the human action from performance, deferring it to previously programmed mechanical movements, human action being spent in the action of programming, which is necessary for performance. In the text, inside the column of characteristics, we find, regarding the primary distinction between direct and indirect percussion, that «the player himself executes the movement of striking; whether by mechanical intermediate devices, beaters, keyboards, or by pulling ropes, etc., is immaterial» (also, as an implicit consequence, the absence of intermediate devices, that is the bare hand percussion, is immaterial). This explains why Hornbostel and Sachs did not take into account, among the common suffixes, the variegated field of ways to activate the sound, which are either taken into consideration [in the taxonomy] or considered irrelevant. However, I believe that it is not wrong to underline to the transversal nature of the suffixes (which are common in the sense that they do not depend on a typological segment or on a specific hierarchical zone) by choosing a redundant integration of them, therefore, by introducing hypotheses which were originally not contemplated (also not to compromise the logic by which the authors had declared irrelevant some practical aspects of manipulation), especially in relation to the use of bare hands or of technical intermediates, which are carriers of the gestures produced by human limbs. That's why I have decided to integrate the table of common suffixes of each class with other items, starting from the class of idiophones, to which the hypothesis of percussion with bare hands or with beaters, and that of being played with a friction bow are added. On how to elaborate the classification in order to make it more suitable to study in depth some specific cases, i.e. on how to give a high general value to a suffix, in order to express typological and opposition variants, see the instructions in the introduction, where Hornbostel and Sachs explain the versatile usage of the Dewey decimal system. I think it is interesting to inquire how the numerical series of common suffixes of each class have been conceived, since the authors have not given explanations about that, and since the suffixes appear 'irrational' at first sight, apparently lacking homogeneity and coordination in the four classes. This, of course, is essentially related to the formulation of the numerical equivalents of the suffixes which, in their verbal expression, do not pose any particular interpretative questions. My hypothesis is that Hornbostel and Sachs applied the Dewey decimal system (which, as we know, is based on the decimal series from 0 to 9) starting from the highest number (9) and then applying the other ones in descending order, until the requirements of each class were fulfilled. It is clear that there is no hierarchical value if one considers equivalent layers: the function is only distinctive, therefore, the collocation is irrelevant and the descending or ascending order has no meaning. Since the series of idiophone's common suffixes is limited only to two cases, there are only suffixes -9 and -8; since the most numerous group is that of chordophones (counting only the most general items, which require only one digit), including six entries, we have suffixes from -9 to -4. The fact that in two cases the same digit corresponds to the same definition (three times over four, it is the case of -8 with keyboard and -9 mechanically driven) is a mere coincidence. In turn, the fact that the same digit corresponds to different characteristics in each class does not create confusion: the suffixes are listed at the end of the series, which are characterised by the whole of their components, and by the sense that each component expresses according to the position that it occupies in the series, which is primarily identified by the first digit that indicates its class. If one pays attentions to the hyphen explaining the

-5 struck by hands -6 struck by hammers or beaters		
-7 sounding by friction -8 with keyboard -9 mechanically driven		

Classification	Characteristics	Examples
2 Membranophones	The sound is excited by tightly-stretched membranes	
21 Struck drums	The membranes are struck	
211 Drums struck directly	The player himself executes the movement of striking; this includes striking by any intermediate devices, such as beaters, keyboards, etc.; drums that are shaken are excluded[23]	
211.1 *Kettle drums (timpani)*	The body is bowl- or dish-shaped.	
211.11 (Separate) kettle drums		European timpani
211.12 Sets of kettledrums		West Asian permanently joined pairs of kettledrums
211.2 Tubular drums	The body is tubular	
211.21 Cylindrical drums	The diameter is the same at the middle and the ends; whether or not the ends taper or have projecting disks, is immaterial	
211.211 Single-skin cylindrical drums	The drum has only one usable membrane. In some African drums a second skin forms part of the lacing device and is not used for beating, and hence does not count as a membrane in the present sense	
211.211.1 (Individual) single-skin cylindrical drums		Malacca
211.211.11 Open single-skin cylindrical drums	The end opposite to the membrane is open	West Indies
211.211.12 Closed	The end opposite to the membrane is closed	

nature of the digit immediately following, one is also able to identify, without misunderstandings, the content which is 'concealed' below the numerical formulation.

23 This warning integrally repeats what has been specified for directly struck idiophones, and it justifies the fact that Hornbostel and Sachs did not take into account – among the suffixes of the membranophones – the various ways in which percussion is obtained – with or without beaters, with bare hands, or using both techniques: one beater and one hand. Membranophones too, in fact, are primarily distinguished according to the way in which sound is produced, that is, according to fundamental human actions; secondly, according to the shape of the body and of the membrane; and finally, according to the number of membranes and to the nature and shape of playing devices. Since the playing techniques are without doubt a useful defining element to enhance a classification, they can be taken into account in a more specific taxonomic examination of directly struck membranophones, according to the general criteria established by Hornbostel and Sachs in their introduction

single-skine cylindrical drums		
211.211.2 Sets of single-skin cylindrical drums 211.211.21 Sets of open single-skin cylindrical drums 211.211.22 Sets of closed single-skin cylindrical drums		
211.212 Double-skin cylindrical drums	The drum has two usable membranes	
211.212.1 (Individual) cylindrical drums[24]		Europe (*side drum*)
211.212.2 Sets of cylindrical drums.		
211.22 Barrel-shaped drums[25]	The diameter is larger at the middle than at the ends; the body is curvilinear	Asia, Africa, Ancient Mexico
211.23 Double-conical drums	The diameter is larger at the middle than at the ends; the body is rectilinear with angular profile	India *(mrdanga, banya, pakhavaja)*
211.24 Hourglass-shaped drum	The diameter is smaller at the middle than at the ends	Asia, Melanesia, East Africa
211.25 Conical drums	The diameters at the ends differ considerably; minor departures from conicity, inevitably met, are disregarded here	India
211.26 Goblet-shaped drums	The body consists of a main section which is either cup-shaped or cylindrical, and a slender stem; borderline cases of this basic design like those occurring notably in Indonesia, do not affect the identification, so long as a cylindrical form is not in fact reached	*Darabuka*
211.3 *Frame drums*	The depth of the body does not exceed the radius of the membrane. N.B. The European side-drum, even in its most shallow form, is a development from the long cylindrical drum and hence is not included among frame drums	
211.31 Frame drums (without handle)		
211.311 Single-skin frame drums		*Tambourine*
211.312 Double-skin frame drums		North Africa
211.32 Frame drum with handle	A stick is attached to the frame in line with its diameter.	
211.321 Single-skin frame drums		Eskimo

24 The original Hornbostel and Sachs classification of membranophones shows an inconsistency: the distinction between individual drums and sets of drums was reserved to double-skin cylindrical drums. That is, while in double-skin cylindrical drums the distinction between individual and sets of is immediately after the *taxon* referred to the double-skin cylindrical drums (211.212), in single-skin cylindrical drums, after the *taxon* 211.211 one finds the distinction between open and closed, and not that between individual and sets of, which one would expect. Also single-skin drums, in fact, can be individual or in a set. To re-establish full coherence, in this point the table has been amplified according to this need.

25 To be sub-divided like 211.21.

with handle		
211.322 Double-skin frame drums with handle		Tibet
212 Rattle drums (sub-divisions as for drums struck directly, 211)	The drum is shaken; percussion is by impact of pendant or enclosed pellets, or similar objects	India, Tibet
22 Plucked drums[26]	A string is knotted below the centre of the membrane; when the string is plucked, its vibrations are transmitted to the membrane	India (*gopi yantra, anandalahari*)
221 Directly plucked drums [by hands]	A natural membrane (half of the blade of a lanceolate leaf) is temporarily stretched by the fingers of the player, who plucks the margin near the central nervature	Plucked leaf *kpa-kpàpsɛlɛ* of Pigmy Baka, Northern Gabon [Campagnoli 2010, 113-121]
222 Indirectly plucked drums [by a stretched cord]	A string is knotted below the centre of the membrane; when the string is plucked, its vibrations are transmitted to the membrane	India (*gopi yantra, anandalahari*)
23 Friction drums	The membrane is made to vibrate by friction	
231 Directly rubbed drums [by hands][27]	Friction is obtained directly when the player rubs his hand on the membrane of the instrument	
232 Indirectly rubbed drums	The player executes a different action than that of rubbing the membrane directly, the consequence of which is the transmission of an impulse determined by the friction of the membrane of the instrument	

26

This group has caused and continues to cause misgivings: the fact that the player plucks a string, in fact, immediately recalls the class of cordophones, where these instruments could be rightfully included. One can recall the *gopi yantra*: it is made of a cylindrical or barrel-shaped resonator – or having the shape of a truncated cone – closed by a stretched membrane at the bottom; one or two vertical arms come out of the body, perpendicular to the membrane. One end of the string is fastened to the joint of the two arms, while the other is knotted below the centre of the membrane. This morphological structure recalls taxon 322 Harps: «the plane of the strings lies at right angles to the sound-table [...]». However, this is not sufficient, since normally in these instruments [plucked membranophones] the string meets the membrane at a right angle, while in harps the angle of incidence is normally acute (and, complementarily, obtuse). Picken [1975, 154-155] has noticed that Sachs himself revised his previous definition, when in *Geist und Werden* [1929, 61] and in *History* [1940, 54-55] he included these Indian instruments (*gopi yantra* and *anandalahari*) among the *Erdbogen* (ground bow) in the former title and among the ground harp's miniaturised substitutes in the latter and more recent text. Picken himself has contributed in making this point clear: «in general such instruments should only be transferred to the group of chordophones, however, if it can be shown that the *string* is exhibiting sharp resonance at a frequency immediately related to the wave-length of its transverse motion». One can object that this argument lies outside the general taxonomic organisation criteria, because it is not fully coherent with the goals and the conceptual structure of the classification, therefore, the analysis of the acoustic behaviour of the instruments is not justifiable, especially if it sets to zero other fundamental characteristics, above all the morphological ones, on which the fundamental criteria of taxonomic individuation are grounded. In this specific case we do not run such a risk, however, it is useful and not of minor importance to add an argument that is coherent with the unavoidable morphological elements of the taxonomy, which is valid at least for the *anandalahari*. This instrument is made of two drums: a big one and a small one, which are connected by a string being temporarily, and to a different extent, stretched by the player's muscular strength, while s/he plucks the string. This excludes the presence of a permanent structure which acts as a string bearer and where the string is stretched, as the more general description of chordophones prescribes. One can find the same situation in the toy telephones, made of two pots connected by a string. The *gopi yantra*, on the other hand, has a permanent bearer, sometimes with a peg to regulate the string's tension, however these characteristics do not prevent us from considering it among membranophones, at least by analogy with its corresponding relative *anandalahari*. This does not question the derivation of these instruments, from the ground bow or ground harp, as Schaeffner has demonstrated, which is a different matter; and about these relationships one can object that while the *gopi yantra* shows in its structure the signs of a derivation from the ground harp, the absence of a permanent string bearer in the *anandalahari* may give rise to doubts about its descent from the same origin.

27

Further subdivision, like percussion drums: in each drum, in fact, the membrane might be systematically or temporarily rubbed by the player's hands, according to different playing techniques: by a single finger (usually the thumb or middle finger), by more than one finger held together, by the outstretched hand or by the base of the hand.

232.1 *Stationary*[28]	The body of the instrument is stationary. The drum does not rotate, but it is the cord or the stick that is moved, possibly also by rubbing the cord with the stick to produce the vibration of the membrane	
232.11 Friction drums with cord	A cord, attached to the membrane, is rubbed	
232.111 Single-skin friction drums with cord		
232.111.1 The cord is rubbed by the hand	The impulse is generated by rubbing the hand on the cord attached to the membrane	
232.111.2 The cord is moved by the hand	The player's hand drags a cord withan alternate movement, the cord rubs the membrane	Romagnol *pignata* [Lombardi 2000]
232.111.3 The cord is rubbed by a stick	The impulse is generated by rubbing a cord (which is connected to the membrane) with a stick	
232.112 Double-skin friction drums		
232.12 Friction drums with stick	The friction is caused by the movement of a stick	
232.121 Friction drums with passing stick	The stick passes through a hole in the membrane	
232.121.1 Friction drums with fixed stick	The stick cannot be moved; the stick alone is subjected to friction by rubbing	Africa
232.121.2 Friction drums with semi-fixed stick	The stick is movable to a sufficient extent to rub the membrane when it is itself rubbed by the hand	Africa
232.121.3 Friction drums with free stick	The stick can be moved freely; it is not itself rubbed, but is employed to rub the membrane	Venezuela
232.2 *Rotating friction drums*	The drum is whirled on a cord which rubs on a [resined] notch in the holding stick	Europe, West Africa
24 Singing membranes (Kazoos)[29]	The membrane is made to vibrate by speaking or singing into it; the membrane does not yield a note of its own but merely modifies	Europe, West Africa

28 As already explained, Picken [1975, 160-161] has introduced taxon 232.3 «Single-skin stationary drums with friction-cord and rotated stick or cylinder». It refers to drums structured like the rotating ones, having a cord and a stick that rotate inside the loop of the cord, where the stick also works as a handle. However, in these instruments the relationship between the fixed part and the moving part, where friction is produced, are inverted: the stick is rotated to produce the friction of the cord, which is transmitted to the membrane to produce the sound. However, this new entry produces better results if it is part of a reorganisation of subclass 23, «Friction drums», as it is proposed in the table.

29 The subclass of kazoos certainly deserves to be unified, and this was done when the Systematics was conceived, when idiophonic mirlitons (here classed as 15) were unknown. In kazoos, the concept of stretched membrane as the key element of all membranophones seems not to be fulfilled if one considers the morphological and analytical aspects of these instruments carefully. Many of them, in fact, have a membrane simply placed on the support, as in the case of the comb-and-paper, or a membrane inserted in a slot that keeps it in the ideal position to receive the sounding wave's impulse from the primary signal, but it is barely fixed to a frame along its outer edge (as in the modern kazoo). The membrane (which we can continue to call with this name for its uniform thickness, reduced to its minimum when compared with the other two dimensions) reacts to the stimulus of the primary generator for its lightness and not for being stretched and, therefore, is more apt to react to external impulses. It is the same material as the vibrating device that sounds, because of its elasticity and rigidity, without the need of stretching a membrane, which is typical of idiophones. Even if a deviation from the taxonomic principles is allowed in case of similar behaviour, of similar mechanical or acoustical process, or of a strict, historically grounded relationship, it is also true that one of the main objectives of classification is to distinguish items responding to different criteria, even if that means breaking with convention or contradicting appearances. Therefore, it would be reasonable to rethink the membranophonic mirlitons, partly dislocating them into the subclass of the idiophonic ones. Here we are simply raising the issue, without proposing a different solution.

	the voice.	
241 Free kazoos	The membrane is incited directly, without the wind first passing through a chamber	Comb-and-paper
242 Tube- or vessel-kazoos	The membrane is placed inside a tube or box	Africa; while also, East Asian flutes with a lateral hole sealed by a membrane, exhibit an adulteration with the principle of the tube kazoo
Suffixes for use with any division of this class (membranophones)		
-2 mechanically driven		
-3 with snare		
-4 struck by hammers or beaters		
-5 struck by hands		
-6 with membrane glued to drum		
-7 with membrane nailed to drum		
-8 with membrane laced to drum		
-81 Cord-(ribbon-) bracing	The cords are stretched from membrane to membrane or arranged in the form of a net, without employing any of the devices described below	
-811 Without special devices for stretching		Everywhere
-812 With tension ligature	Cross ribbons or cords are tied round the middle of the lacing to increase its tension	Ceylon
-813 With tension loops	The cords are laced in a zigzag; every pair of strings is caught together with a small ring or loop	India
-814 With wedge-bracing	Wedges are inserted between the wall of the drum and the cords of the lacing; by adjusting the position of the wedges it is possible to control the tension	India, Indonesia, Africa
-82 Cord-and-hide bracing[30]	The cords are laced at the lower end to a non-sonorous piece of hide	Africa
-83 Cord-and-board bracing	The cords are laced to an auxiliary board at the lower end	Sumatra
-84 Cord-and-flange bracing	The cords are laced at the lower end to a flange carved from the solid	Africa
-85 Cord-and-belt bracing	The cords are laced at the lower end to a belt of different material	India
-86 Cord-and-peg bracing	The cords are laced at the lower end to pegs stuck into the wall of the drum	Africa
-9 With membrane lapped on	A ring is slipped over the edge of the membrane	
-91 With membrane lapped on by ring of cord		Africa

30 -82 to -86 are sub-divided as -81 above.

-92 With membrane lapped on b by a hoop		
-921 Without mechanism		European *drum*
-922 With mechanism		
-9221 Without pedal		*Machine timpani*
-9222 With pedals		*Pedal timpani*

Classification	Characteristics	Examples
3 Chordophones	One or more strings are stretched between fixed points	
31 Simple chordophones or zithers	The instrument consists solely of a string bearer, or of a string bearer with a resonator which is not integral and can be detached without destroying the sound-producing apparatus	
311 Bar zithers	The string bearer is bar-shaped; it may be a board placed edgewise	
311.1 *Musical bows*	The string bearer is flexible (and curved)	
311.11 Idiochord musical bows	The string is cut from the bark of the cane, remaining attached at each end	
311.111 Mono-idiochord musical bows	The bow has one idiochord string only.	New Guinea (Sepik River), Togo
311.112 Poly-idiochord musical bows or harp-bows	The bow has several idiochord strings which pass over a toothed stick or bridge	West Africa (Fan)
311.12 Heterochord musical bows	The string is of separate material from the bearer	
311.121 Mono-heterochord musical bows	The bow has one heterochord string only	
311.121.1 Without resonator	N.B. If a separate, unattached resonator is used, the specimen belongs to 311.121.21. The human mouth is not to be taken into account as a resonator	
311.121.11 Without tuning noose		Africa (*ganza, samuius, to*)
311.121.12 With tuning noose	A fibre noose is passed round the string, dividing it into two sections	South-equatorial Africa (*n'kungo, uta*)
311.121.2 With resonator		
311.121.21 With independent resonator		Borneo (*busoi*)
311.121.22 With resonator attached		
311.121.221 With free string[31]	The string is not divided by any nooses or any rigid elements	

31 The original version contains 311.121.221 and 311.121.222 pertaining to mono-heterochord bows with attached resonator (therefore not organically or permanently connected). In the first case, there is no noose dividing the string into two parts and obtaining a specific tuning, in the second case, there is a tuning noose. The research carried out by Mauro Campagnoli [2010] on the instruments of the Baka and Aka Pygmies of Camerun and Gabon has shed light on the existence of a musical bow where the string, which is only one, is passed twice around the ends of the curved stick, in order to obtain two different segments. These instruments may be either musical bows with an independent resonator (311.121.21) or with an attached resonator (311.121.22).

311.121.222 With divided string	The string is divided into segments	
311.121.222.1 With tuning noose.	The string is divided by a noos.	*South Africa, Madagascar (gubo, hungo, bobre)*
311.121.222.2 With rigid tuning element.	The string is divided by a rigid element, for example by a stick functioning as a pressure-bar	Two-strings bows of Aka and Baka Pygmy [Campagnoli 2010].
311.122 Poly-heterochord musical bows	The bow has several hetero-chord strings	
311.122.1 Without tuning noose		Oceania (*kalove*)
311.122.2 With tuning noose		Oceania (*pagolo*)
311.2 *Stick zithers*	The string carrier is rigid	
311.21 Musical bow cum stick	The string bearer has one flexible, curved end. N.B. Stick zithers with both ends flexible and curved, like the Basuto bow, are counted as musical bows	India
311.22 (True) stick zithers	N.B. Round sticks which happen to be hollow by chance do not belong on this account to the tube zithers, but are round-bar zithers; however, instruments in which a tubular cavity is employed as a true resonator, like the modem Mexican *harpa,* are tube zithers	
311.221 With one resonator gourd		India (*tuila*), Celebes (*suleppe*).
311.222 With several resonator gourds		India (*vina*)
312 Tube zithers	The string bearer is a vaulted surface	
312.1 *Whole-tube zithers*	The string carrier is a complete tube	

In the first case, the resonator is obtained from a hollow vessel or from a metallic plaque (like the cover of a pot) on which the instrument is placed, in the second case, the resonator is a leaf also serving as a free bridge. Campagnoli [*ibidem*] considers the bow that has a string passing twice through the arms a monochord, because the string is unique and it is the stringer's carrier that divides the string into two segments, like the noose in other instruments. However, another interpretation is possible: the instrument is provided with two strings, even if they are obtained from two segments of the same vibrating body. The main argument in favour of this interpretation is based on the fact that in the second passage around the bow's arm, the string is fastened to its carrier, therefore, from this point, it acquires its own specific tension. In this way, it creates another primary device, even if it is separated from the rest of its length, and the instrument would be considered a two-string bow. However, if one wants to follow the author's point of view, it is necessary to separate the free-string bows from the divided-string bows. The latter should be subdivided between the bows with a tuning noose and those where the string is divided by a rigid element. I believe that in the taxonomy it is necessary to ignore if the second string is effectively used in performance or not, in compliance with Hornbostel and Sachs' suggestion not to consider, in chordophones, the way in which the strings are put into vibration. That is why I do not accept Campagnoli's proposition of a further subdivision into 'monophonic' and 'polyphonic': it evidently does not depend exclusively on morphology, it depends on the effective (and probably occasional) realization of a performance practice. However, Mauro Campagnoli's proposition is extremely interesting because it opens to the possibility of a further morphological specification among musical bows: in fact, the bows where a rigid element divides the strings may be represented by instruments in which the rigid element is a bridge or the very resonator which is inserted between the stick and the string, holding the latter permanently raised. A further study on musical bows is necessary, since the changes proposed here are the result of fieldwork research and are restricted to the concrete case of Aka and Baka instruments. The same specifications may also be applied to other subdivisions, for example to poly-heterochord musical bows (311.122), where, by an act of logic and formal projection, the same characteristics may be potentially assumed.

312.11 Idiochord (true) tube zithers		Africa and Indonesia (*gonra, togo, valiha*)
312.12 Heterochord (true) tube zithers		
312.121 Without extra resonator		South-East Asia (*alligator*)
312.122 With extra resonator	An internode length of bamboo is placed inside a palm leaf tied in the shape of a bowl	Timor
312.2 *Half-tube zithers*	The strings are stretched along the convex surface of a gutter	
312.21 Idiochord half-tube zithers		Flores
312.22 Heterochord half-tube zithers		East Asia (*k'in, koto*)
313 Raft zithers	The string bearer is composed of canes tied together in the manner of a raft	
313.1 *Idiochord raft zithers*		India, Upper Guinea Central Congo
313.2 *Heterochord raft zithers*		North Nyasaregion
314 Board zithers	The string bearer is a board; the ground too is to be counted as such	
314.1 *True board zithers*	The plane of the strings is parallel with that of the string bearer	
314.11 Without resonator		Borneo
314.12 With resonator		
314.121 With resonator bowl	The resonator is a fruit shell or similar object, or an artificially carved equivalent	Nyasaregion
314.122 With resonator box (box zither)	The resonator is made from slats	*Zither, Hackbrett, pianoforte*
314.2 *Board zither variations*	The plane of the strings is at right angles to the string bearer.	
314.21 Ground zithers	The ground is the string bearer; there is only one string	Malacca, Madagascar
314.22 Harp zithers	A board serves as string bearer; there are several strings and a notched bridge	Borneo
315 Trough zithers[32]	The strings are stretched across	Tanganyika

32 The original German word is *Schale*, which is used both for hollow bodies used as containers (bowls, dishes, basins, saucers, etc.) and natural hollow bodies (shells). The same word is also mentioned above (*taxon* 314.121 [Eigentliche Brettzithern] «mit Resonanzschale» = true board zithers with resonator bowl, literally 'shell of resonance'). The description of the characteristics explains that it is a natural fruit/vegetable shell or an artificially carved bowl. *Schale* is used again for «Schalenleiern» (= 321.21 bowl lyres), and for lutes (spike bowl lutes = 321.311 «Schalen-Spießlauten» and necked bowl lutes = 321.321 «Schalen-Halslauten»). Therefore, it is a string bearer which is shaped in order to create a hollow under the plane of the strings. In reality, these zithers, spread in Central-East Africa, are generally made of a bearer in the shape of a deep-set tray or of a long and tight bowl, which is why the English translators preferred to call them trough zithers. In Italian we have chosen *guscio* [Guizzi 2002,

	the mouth of a trough	
315.1 *Without resonator*		
315.2 *With resonator*	The trough has a gourd or a similar object attached to it	
316 Frame zithers	The strings are stretched across an open frame	
316.1 *Without resonator*		Perhaps amongst Medieval *psalteries*
316.2 *With resonator*		West Africa, amongst the Kru (*kani*)
32 Composite chordophones	A string bearer and a resonator are organically united and cannot be separated without destroying the instrument	
321 Lutes	The plane of the strings runs parallel with the sound-table	
321.1 *Bow lutes [pluriarc]*	Each string has its own flexible carrier	Africa (*akam, kalangu, wambi*)
321.2 *Yoke lutes or lyres*	The strings are attached to a yoke which lies in the same plane as the sound-table and consists of two arms and a cross-bar	
321.21 Bowl lyres	A natural or carved-out bowl serves as the resonator	*Lyra,* East African lyre
321.22 Box lyres	A built-up wooden box serves as the resonator	*Cithara, crwth*
321.3 *Handle lutes*	The string bearer is a plain handle. Subsidiary necks, as e.g. in the Indian *prasarini vina* are disregarded, as are also lutes with strings distributed over several necks, like the *harpolyre,* and those like the lyre-guitars, in which the yoke is merely ornamental.	
321.31 Spike lutes	The handle passes diametrically through the resonator	
321.311 Spike bowl lutes[33]		Persia, India, Indonesia
321.311.1 Bowl lutes with internal spike	The handle is inserted inside the box, however, it does not cross it entirely, it comes out from an opening in the sound-table and its end serves as a string bearer	Marocco (*gnbri*), Niger (*halam*)
321.311.2 Bowl lutes with external	The handle comes out from the opposite part of the bowl	

445] for the sufficient metaphorical simplicity of this word.

33 This group should be further subdivided still:
321.311.1 «Bowl lutes with internal spike»
321.311.2 «Bowl lutes with external spike»
In the former, the spike is inserted in the bowl, but it does not go entirely through it, instead it comes out from an opening in the sound-table, and its end becomes the binding for the strings. In the latter, the spike comes out from the opposite part of the bowl. This distinction could work in abstract for all spike lutes, independently from the shape of the box, therefore, it could be proposed after 321.31 «Spike lutes». However, this would force us to modify the notation in a more complicated way, moreover, I do not know of any internal spike lutes that do not have a bowl resonator (in Africa, *halam*, *gnbri*, etc.).

spike		
321.312 Spike box lutes or spike guitars	The resonator is built up from wood	Egypt (*rebab*)
321.313 Spike tube lutes	The handle passes diametrically through the walls of a tube	China, Indochina
321.32 Necked lutes	The handle is attached to or carved from the resonator, like a neck	
321.321 Necked bowl lutes		*Mandoline, theorbo, balalaika*
321.322 Necked box lutes or necked guitars	N.B. Lutes whose body is built up in the shape of a bowl are classified as bow lutes	*Violin, viol, guitar*
322 Harps	The plane of the strings lies at right angles to the sound-table; a line joining the lower ends of the strings would point towards the neck	
322.1 *Open harps*	The harp has no pillar	
322.11 Arched harps	The neck curves away from the resonator	Burma and Africa
322.12 Angular harps	The neck makes a sharp angle with the resonator	Assyria, Ancient Egypt, Ancient Korea
322.2 *Frame harps*	The harp has a pillar	
322.21 Without tuning action		All medieval harps
322.211 Diatonic frame harps		
322.212 Chromatic frame harps		
322.212.1 With the strings in one plane		Most of the older *chromatic* harps
322.212.2 With the strings jn two planes crossing one another		The Lyon *chromatic* harp
322.22 With tuning action	The strings can be shortened by mechanical action	
322.221 With manual action	The tuning can be altered by hand-levers	*Hook harp, dital harp, harpinella*
322.222 With pedal action	The tuning can be altered by pedals	
323 Harp lutes	The plane of the strings lies at right angles to the sound-table; a line joining the lower ends of the strings would be perpendicular to the neck. Notched bridge	West Africa (*kasso,* etc.)
Suffixes for use with any division of this class (chordophones)		
-3 provided with resonance strings or sympathetic strings		
-4 sounded by hammers or beaters		
-5 sounded with the bare fingers		
-6 sounded by plectrum		
-7 sounded by bowing		
-71 with a bow		

-72 by a wheel -73 by a ribbon		
-8 with keyboard -9 with mechanical drive		

Classification	Characteristics	Examples
4 Aerophones	The air itself is the vibrator in the primary sense	
41 Free aerophones	The vibrating air is not confined by the instrument	
411[34] Non-interruptive or displacement free aerophones	The air-stream meets a sharp edge, or a sharp edge is moved through the air. In either case, according to more recent views, a periodic displacement of air occurs to alternate flanks of the edge	Whip, sword-blade
411.1 *Displacement aerophones*		

34 Hornbostel and Sachs distinguish three main groups within free aerophones: displacement aerophones, interruptive aerophones and plosive aerophones. This arrangement has been questioned by Picken [1975, 343-346] who proposed to subdivide free aerophones (except for the group of plosive aerophones, which remains unchanged) into two contrasting groups, depending on the presence or absence of the interruptive effect of the air-stream. Therefore: 411 «Deflection or non-interruptive free aerophones» and 412 «Interruptive free aerophones». The concept that synthetizes the definition of 'displacement' is the presence of an air-stream which is moved directionally while maintaining its dynamics uninterrupted. The concept at the base of interruptive aerophones (which for Hornbostel and Sachs have this characteristic: «the air-stream is interrupted periodically») is defined by the behaviour of the air-stream that is interrupted by the action of a mechanical device. According to Picken, displacement aerophones should be divided in: 411.1 «Displacement aerophones» and 411.2 «Deflective aerophones properly». The latter are described as follows: «Irregularities in a disk or other object throw off pressure waves in directions that sweep round the axis of rotation as the object rotates. These reach a stationary listener as periodic fluctuations in pressure, the frequency of which is determined by the speed of rotation. Disks or rhombs or other centrosymmetric objects are rotated, either in the plane of the disk or rhomb, or in the plane of the longer axis or diameter of the object, round a central point. The rotation is subject to rapid reversal in direction, necessarily linked with phases of acceleration and deceleration» [*ibidem*, 343-344]. Picken is right when he claims that «although rotation, in some sense, is common to both whirring disks and bull-roarers, the former are not 'interruptive' devices. The plane of rotation, in which an air-stream may be thought to exist, is not intercepted by the device, which appears to operate by deflecting air successively in different directions as a result of 'wobble', in the case of whirring disks or other objects» [*ibidem*, 344]. Here Pickens' suggestions are taken into account in the classification.and plosive aerophones. This arrangement has been questioned by Picken [1975, 343-346] who proposed to subdivide free aerophones (except for the group of plosive aerophones, which remains unchanged) into two contrasting groups, depending on the presence or absence of the interruptive effect of the air-stream. Therefore: 411 «Deflection or non-interruptive free aerophones» and 412 «Interruptive free aerophones». The concept that synthetizes the definition of 'displacement' is the presence of an air-stream which is moved directionally while maintaining its dynamics uninterrupted. The concept at the base of interruptive aerophones (which for Hornbostel and Sachs have this characteristic: «the air-stream is interrupted periodically») is defined by the behaviour of the air-stream that is interrupted by the action of a mechanical device. According to Picken, displacement aerophones should be divided in: 411.1 «Displacement aerophones» and 411.2 «Deflective aerophones properly». The latter are described as follows: «Irregularities in a disk or other object throw off pressure waves in directions that sweep round the axis of rotation as the object rotates. These reach a stationary listener as periodic fluctuations in pressure, the frequency of which is determined by the speed of rotation. Disks or rhombs or other centrosymmetric objects are rotated, either in the plane of the disk or rhomb, or in the plane of the longer axis or diameter of the object, round a central point. The rotation is subject to rapid reversal in direction, necessarily linked with phases of acceleration and deceleration» [*ibidem*, 343-344]. Picken is right when he claims that «although rotation, in some sense, is common to both whirring disks and bull-roarers, the former are not *interruptive* devices. The plane of rotation, in which an air-stream may be thought to exist, is not intercepted by the device, which appears to operate by deflecting air successively in different directions as a result of 'wobble', in the case of whirring disks or other objects» [*ibidem*, 344]. Here Pickens' suggestions are taken into account in the classification.

411.2 *Deflective aerophones*	Irregularities in a disk or in another object throw off pressure waves in directions that sweep round the axis of rotation as the object rotates. These reach a stationary listener as periodic fluctuations in pressure, the frequency of which is determined by the speed of rotation. Disks or rhombs or other centrosymmetric objects are rotated, either in the plane of the disk or rhomb, or in the plane of the longer axis or diameter of the object, round a central point. The rotation is subject to rapid reversal in direction, necessarily linked with phases of acceleration and deceleration [Picken 1975, 343-344]	
412 Interruptive aerophones	The air-stream is interrupted periodically	
412.1 *Autophonic*[35] *interruptive aerophones or reeds*	The air-stream is directed against a lamella, setting it in periodic vibration – only by virtue of the air	*Organ reed stops*

35 The original German term employed by Hornbostel and Sachs is *selbstklingende*, which literally means 'being able to sound by itself'. It is the same adjective used in their introduction to translate into German Mahillon's concept of *[instrument] autophones*, which they radically criticize when used as the name of a class, to the point that it has been replaced with 'idiophonic'. In this point of the classification, which deals with reeds conceived as free aerophones, a complicated semantic and conceptual problem concerning this adjective arises again: should we interpret *selbstklingende* as a synonym and a strengthening of 'free' (*freie*), referred to aerophones and their surrounding air, which need to be stressed for reeds, since they are listed contemporarily both in free aerophones and in wind instruments proper? Or did the author consciously refer here to the 'idiophonic' nature of reeds, being the sound produced also by the vibration of the rigid matter of which they are made, as if this were a kind of sub-determination of the vibratory element produced by air when it is set in motion? One would think that the English translators Baines and Wachsmann had agreed with this interpretation, since they translated *selbstkingende* with i'diophonic'. On the contrary, Carlos Vega in his 1946 Spanish translation opted for *autófonos*. As already said, Vega was a pupil of Sachs and, what is most important, he submitted his translation to Sachs' personal supervision. From this situation, which we have only touched upon in its main implications here, a number of problems arise: first among others the chance of a radical and in depth revision/integration of the classification of reeds, which is a difficult task on which we are working. One of its problematic points is just the relationship between the vibration of the periodically interrupted air-stream (which obviously remains the generative moment of sound) and the material of which a reed is made. The latter determines analogies in turns with idiophones, membranophones and chordophones. In this sense, I believe that this attribute [idiophonic] should be maintained in order to allow the expansion of interruptive aerophones by including the case records of devices based on a membranophonic valve, which would constitute a 'new' category, and those with a chordophonic structure, like ribbon reeds. Taking into consideration the terminology used by the authors in 1914 from a 'philological' point of view, my idea is that *selbskingende* was referred to systems where the interruptive effect was generated 'by itself', without recurring to the muscular force (or to an engine) of somebody turning a handle or rotating an object attached to a string or similar. Given the existence of an air-stream and its proper direction and pressure, it is the air motion itself, according to aerodynamics, which activates alternate motion in the mechanic device. This happens in all reeds that are activated by the pressure and depression of air. It does not happen exactly 'by itself' since an external intervention is needed, however this is limited to the production of air-stream, which gives impulse to the whole system. Therefore, the cases of 'idiophonic' reeds, in correspondence with the 'chordophonic' and 'membranophonic' ones do not mean that the sound is 'produced' by the solid body, but that the solid body moves when it acts as an intermittent valve, so it vibrates as well (which distinguishes the reeds from other aerophones). The presence of a mobile solid body is thus strengthened and its properties are distinguished (rigidness, elasticity and flexibility in idiophonic reeds, elasticity submitted to tension in membranophonic and chordophonic reeds). However, since 'idiophonic', 'membranophonic' and 'chordophonic' include the word *phoné* (= sound) – the component that may generate misinterpretation in the use here considered – in order to avoid mistakes, I propose to adopt other compound terms based on ancient Greek, that is 'idiokinetic', 'membranokinetic' and 'chordokinetic', incorporating the word *kinesis* (movement), referring to the material whose alternate motion produces the interruption of the air-stream. Consequently, according to the formal asset (not the acoustical one) of the instrument, one could propose the terms 'idiomorphic', 'membranomorphic' and 'chordomorphic', which are obviously based on *morphé* (form). The sequence of *taxa* should start from 'idiokinetic' concussion reeds and among them from those made of rigid matter, in order to respect the original structure of the 1914 classification. In reality, a more coherent arrangement should be arranged from the 'simple' to the 'complex', or from the 'marginal' to the 'mainstream', therefore, the sequence of taxa should be largely reversed.

	pressure itself – to interrupt the stream intermittently. In this group also belong reeds with a 'cover', i.e. a tube in which the air vibrates only in a secondary sense, not producing the sound but simply adding roundness and timbre to the sound made by the reed's vibration; generally recognizable by the absence of fingerholes	
412.11 Reeds made of rigid and flexible matter or 'idiokinetic' reeds	The material of which reeds are made is endowed with its own elasticity, as in lamellae or in elastically dislocated devices	
412.111 Symmetrical concussion reeds	Two or more symmetrical bodies which may be elastically dislocated, are fixed at one end, while the other is free. They create a gap which closes periodically, in relationship with their vibration	
412.111.1 Rigid and elastic concussion reeds proper	The two separated and juxtaposed mobile parts, which create an apical gap, are obtained from rigid and elastic matter	
412.111.11 Double concussion reeds	The two symmetrical parts are obtained by a strip of cane or of synthetic material which is gauged at the centre. From this narrowed strip, the two parts are separated and juxtaposed	
412.111.111 Double concussion reeds with single lamellae	The two symmetrical parts are made each of one single element.	
412.111.112 Double concussion reeds with multi-layered lamellae	The two symmetrical parts are made each of multi-layered bodies, they move jointly in a symmetric and concussive motion	The reeds made of palm leaves in South-Central Asia (Tibet, Nepal, India, Birmania); the *foglia verde arrotolata* ('rolled green leaf') from Calabria [La Vena 1996, 73-74]
412.111.12 Tubular concussion reeds with terminal vibration[36]	An internode of cane is cut at the closed end, in order to offer the air-stream two or more mobile	

36 According to Francis W. Galpin [1902-1903], who was the first to dedicate an important study to many rare aerophones from the New Continent – among them we find many reeds: these devices should be considered terminal specimens of the kind of reeds that he called 'retreating reeds' [*ibidem,* 128]. However, I believe that there is a contradiction here. Retreating reeds are described as the opposite of concussion double reeds, because in the latter the two lamellae, in a position of rest, are separated, and the air-stream creates a periodical valve motion when they dilate them. On the contrary, in retreating reeds the mobile parts produced by the cut are perfectly in contact, therefore, the air-stream must force this closed position in order to generate a valve periodical motion. In the reeds that I know of where a terminal cut was applied, the elasticity of the cane, weakened by the cut (simple or double, that is cross-shaped), leaves the two ends slightly moved away, providing a space for the air-stream to move inside them. This behaviour is comparable to that of concussion reeds. It is true that the sequence of the mechanical movements of the turbulence is more complex than one can imagine, therefore the movement of the mobile elements is not only the effect of a 'push from inside' but also of the rarefaction outside the mobile parts, that raise themselves; however, it is very important that the air-stream should find a way between the two symmetrical stoppings. This double action occurs in symmetrical reeds blown from their apical end, when they are made both of a couple of lamellae and of the quarters of a cylinder. Retreating reeds, instead are inserted in the mouth from their closed end: the air-stream expands outside the cylinder, causing a turbulence that determines the opening of the duct and it does not pass inside the tube. That is why I prefer to class reeds obtained from a terminal cut together

	symmetrical parts which open and close jointly or alternatively	
412.111.121 Double, or with simple symmetry	The cane is cut in two symmetrical part	Calabria
412.111.122 Four-part or pluri-symmetrical	A cross cut divides the cane in four symmetrical parts or slices	Calabria, Sardegna (*ischéliu*) [Dore 1976, 115-119; Spanu 2014, 192-193]
412.111.13 Retreating reeds: concussion reeds by retreating, with lateral or median cut, blown coplanarily[37]	Two symmetrical parts are obtained by a longitudinal cut, made laterally on a natural hollow cane. An air-stream is directed against them, temporarily retreating them and causing a periodical series of opening and closing. Coplanarity refers to the fact that air expands outside the external surface of the cylinder	
412.111.131 Single	The mobile device is obtained from only one slit	Calabria, Turkey, Lapland (*fadno*), North America (West Coast)
412.111.132 Sets of retreating reeds	More than one slit determine the contemporary vibratory action	Madagascar, East Africa, The Horn of Africa, Turkey
412.111.2 Elastic concussion reeds made of flexible material which is flattened	The mobile parts, separated and juxtaposed, are obtained from **pliable** material	
412.111.21 Soft flattened reeds	A soft cylinder is flattened at one end in order to leave a tight opening between the two symmetrical juxtaposed sides, where the air-stream is forced. The flattened wall remains relatively soft	The reeds obtained from the corolla of the flowers or from hollow cylindrical stems, like the stems of *taraxacum officinalis* or of an onion which are flattened at one end, the reeds made of green bark and the reeds made of *phragmites australis*
412.111.22 Rigid flattened reeds	An originally soft cylinder or cone is flattened at one end, in order to leave a tight opening between the two symmetrical juxtaposed sides, where the air-stream is forced. The reed is then left to dry, thus acquiring the consistency of a rigid elastic body	The reeds of the cylindrical oboes that according to Baines [1991, 202-203] derive from the *monaulos: mey* (Turkey), *duduk* (Armenia), *duduki* (Georgia), *balaban* (Azerbaijan, Kurdistan-Iraq), *guan zu* (China), *hichirichi* (Japan)
412.112 Asymmetrical (simple)	Only one mobile part acts as a	

with those made of concussion lamellae.

37 Here again we have to call to mind Galpin in order to clarify a problem: Galpin [*ibidem,* 128] recognizes what he considers a variant in the terminal blown retreating reeds in a Salish (Bella Bella) instrument described by E.H. Hawley, made not from a natural pipe, but from two cedar halves that are cut and juxtaposed in order to leave a «little channel cut in them for an air passage» at the proximal end. Thanks to this construction «where the breath is forced in at the mouthpiece it causes the free ends both to open and close, producing a harsh sound». I believe that it is reasonable to consider this case analogous to concussion reeds, even if in this version the two mobile parts are probably thicker than the normal lamellae made of thinned cane. This would exclude, in this case, words like 'artificial (because they are made of two wooden halves that have been cut and shaped) retreating reeds', instead of 'natural' (made of natural cylinders, like cane or vegetal stems). In conclusion, I believe that the cut that allows the retreating action should be located in a lateral, middle position and should not be extended to the apical position.

percussion reeds	valve by opening and closing a gap striking against a frame at each cycle	
412.112.1 Simple (single) percussion reeds		British Columbia
412.112.2 Sets of simple percussion reeds		The earlier *reed stops of organs*
412.12 Free reeds	The lamella acting as a valve moves from the rest position with no obstacles interrupting its dislocation	
412.121 Free reeds with elastic and rigid lamella with bilateral movement	The air is directed against a rigid lamella, striking it longitudinally, i.e. the plane of the lamella at a position of rest is parallel to the air-stream. Beyond a threshold, the pressure makes the lamella oscillate, thanks to a lateral push, until the movement is repeated in the opposite direction. Thus, the air passage is alternatively opened and closed at the two sides of the lamella	
412.121.1 Open and simply framed reeds	The lamella is inserted inside a frame consisting of two prongs and open at one end	Dried bay leaf Monti Lepini, Lazio (*oro*) [Di Fazio 1997, 58-61], Sardinia (*chigula*); the duck call
412.121.2 Capped free reeds	The lamella is inserted into a hollow body, where it can oscillate on both sides, according to the changes of the internal air pressure[38]	British Columbia [Galpin 1902-1903], Monti Lepini, Lazio (*pifaretta a cifolitto* with tubular resonator) [Di Fazio 1997, 62-66][39]
412.122 Free reeds with elastic and rigid lamella, coplanar with the frame	The lamella is cut from the same matter of which the frame is made, therefore, it can move through the opening in response to an air-stream both in entrance and in exit. This permits the sound to be produced both while inspiring and expiring	
412.122.1 Single		Reed shaman horns from South-East Asia

38
This device still requires a more precise definition of its acoustical behaviour and of the relative morphological applications to concrete instruments. These are difficult to define because of the rarefaction of the living cultural uses of the known instruments, which are extinct or extremely marginalized. The central problematic issue is its different possibility of location in relation to the two subclasses of aerophones, which is among the interruptive free aerophones or among musical instruments proper, where the reed is coupled with a tubular resonator putting into vibration the air inside it. The same mirror-like problem occurs for taxon 422.311.

39
The research carried out by Emilio Di Fazio [1997, 62-66] in the Monti Lepini (Southern Lazio) has not demonstrated the use of this device as a free aerophone, instead it has documented its use as a capped reed, applied to a cylindrical pipe with finger holes. However, a hint of a possible existence of a reed separated by the resonator is given by the name itself, where it is specified that the *pifaretta* (the name of this sound device) in this case is coupled with a tube similar to a recorder (*cifolitto*), as if the reed alone was called with the name *pifaretta*.

412.122.2 Sets		*Mouthorgans* from South-East Asia
412.123 Free reeds with elastic and rigid lamella, not coplanar with the frame	The lamella is fixed to its frame, therefore, it only moves in response to a mono-directional air-stream	
412.123.1 Single		
412.123.2 Sets		*Harmonium, accordion.*
412.2 *Interruptive membranokinetic aerophones* or *reeds made of a tensible membranaceous material*	The air-stream is directed against a stretched membrane which partly or entirely covers an opening. The membrane vibrates interrupting periodically the air-stream.	
412.21 Beating membrane reeds	The membrane presses against the edge of an opening, therefore, at each interruptive cycle the air passage closes periodically, according to the vibrations	The *tornado reed*[40]
412.22 Free membrane reeds	The membrane is stretched against a bearing. The air-stream, which is directed against the membrane, determines its movement in one direction, then, thanks to the elasticity of its material, in the opposite direction	
412.221 Uncapped free membrane reeds	The artificial or natural membrane is blown directly	The ivy leaf [Di Fazio 1997, 58] or the birch bark blown outside the mouth. The ribbon elastomers (made of rubber or polyethylene) from Calabria [La Vena 1996, 67-68; 72-73]
412.222 Capped free membrane reeds	The artificial or natural membrane is blown inside a cavity, whose variations modify the sound parameters	Palatal birds chirping whistle
412.3 *Interruptive chordokinetic aerophones, or reeds made from a tensible ribbon-like material (ribbon reeds)*	The air-stream is forced edgeways against a tight strip stretched at the centre of a long and tight opening. The pressure of the air flux determines the movement of the strip first in one direction, then thanks to the elasticity of its material, in the opposite one, allowing an interruptive and periodical movement of the flux itself	

40 An aerophone instrument with a membranokinetic reed which is stretched on a circular frame whose diameter is slightly larger than the diameter of an internal concentric tube. The membrane is stretched on the larger tube and presses against the edge of the internal concentric tube. Blowing from a lateral hole opened in the larger tube that carries the membrane, the air is forced in the narrow space between the internal and the external cylinders. The pressure temporarily moves the membrane away and the air passes through the opening created, being interrupted an instant later by the fall of the membrane against the edge of the internal cylinder. The concrete realisation of the instrument described apparently discards the possibility of considering it as a free aerophone, since the presence of the cylinder carrying the membrane puts it among reedpipes (wind instruments proper). However, if the tubular part is reduced to the minimum necessary to allow the existence of an interstice between the two tubes for the air-stream, one obtains a device which does not need a resonator, at least not differently from the resonators which are always present in single and double idiokinetic reeds.

412.31 Ribbon reeds temporarily stretched	The ribbon is held between the thumbs and the base of the player's two hands, leaving a tight opening where the ribbon is temporarily stretched by the grip	The blade of grass held between the hands in a vertical position
412.32 Ribbon reeds permanently stretched	The ribbon is stretched inside an opening in the proximal end of spiral twisted vegetal blades flattened at one end or in the opening between two symmetrically cut wooden valves fastened together. We do not know the precise acoustic behaviour of these devices because of their rarity. In particular, we do not know the role of the support for the reed when it has a tubular shape. Therefore, we cannot say if it has the function of a mere amplifier or if it is a true resonator. If the latter hypothesis is true, these instruments would not be free aerophones, but wind instruments proper	Southern America *(the waikoko* of Chóco children, the *adjulona* of the Carajá and Šavajé) [Izikowitz 1935, 252-254]; Northern America (Cree, Naskapé, Penobscot [*ibidem*]; Tsimshian and other peoples from the North-West Coast [Galpin 1902-1903, 129-130].
412.4 *Non-autophonic interruptive instruments*	The interruptive device does not move thanks to an air-stream, but its movement is caused by a muscular impulse or by an impulse determined by a mechanism	
412.41 Rotating aerophones	The interruptive agent rotates in its own	*Sirens*
412.42 Whirling aerophones	The interruptive agent turns on its axis	*Bull-roarer, whirring disc, ventilating fan*
413 Plosive aerophones[41]	The air is made to vibrate by a single density stimulus condensation shock	
413.1 *Compressed air instruments*	The instantaneous impulse is caused by an accumulation	

41 Some doubts may arise about the legitimacy of including plosive aerophones in the sub-class of free aerophones. We are all aware of the effect produced while striking with your palm one of the two ends of an open pipe: a typical, slightly glissando sound is obtained, which is caused by the compression of the air where the tube is stroked, and by the rapid transmission of the compression inside the tube. The pressure wave loses its energy outside, through the opposite open end, thus causing a periodical movement of the surrounding air, which produces waves that the ear perceives as sound. The doubt arises when thinking of the air confined in the tube, which receives the compression and releases it externally: since tubes of different dimensions (containing, therefore, different air masses, shaped as columns) produce sounds of different pitch, one should ask oneself if the air contained inside the tube has a crucial role in the generation of the vibration, which is typical of instruments with confined air, that is wind instruments proper. However, if one uses a non-cylindrical tube, or a tube with openings of a different diameter, when striking alternatively the two ends, sounds of different pitch are produced, even if the internal mass of the air is the same. This seems to support the hypothesis that they act as free aerophones. The dimension of the opening is in relation to the acoustic resistance: when the mass is the same, the acoustic resistance changes in relation to the width of the 'surface' of the hole opposite to the opening which is struck, where the internal air makes contact with the external air. The larger the zone, the lower the resistance against the mass of air which is pressed inside the tube when it is discharged outside, therefore, the sound produced is higher. Also when striking the holes of a flute with one's fingers, without blowing into it, the sounds produced are of different pitch, according to a scale which seems to correspond to the scale of the flute when it is blown (or better, they seem to share the same interval relations of the flute's scale). In reality, the different pitch is not determined by the vibration of air columns of different length, but by the same mass of air which finds different resistance in releasing the pressure caused by the percussion outside. The resistance is in relation to the sum of the openings through which the pressure is transmitted to the surrounding air [Picken 1975, 374-376].

	of compression by the air	
413.11 Free air	A portion of air not confined to a container is compressed	The leaf which is broken by a strong percussive stroke with the hand
413.12 Confined air	The compressed air is inside a closed container, an end of which is suddenly opened	Pop guns (*schioppetto*), the paper bag which is inflated and then struck
413.2 *Deflagration instruments*	The instantaneous compression is caused by a sudden deflagration that follows a chemical reaction	
42 Wind instruments proper	The vibrating air is confined within the instrument itself	
421 Edge instruments	A narrow stream of air is directed against an edge.	
421.1 *Flutes without duct (with no blowing devices)*	The player himself creates a ribbon-shaped stream of air with his lips. The air-stream is not forced or directed by any canalisation devices	
421.11 Edge-tone instruments that are not flutes, or wind instruments orthogonally blown	The air-stream created by the player breaks on the edge of a hole opened in a surface at a right angle to the direction of the flux	
421.111 With closed and fixed chamber	The instrument has an internal chamber shaped as a low cylinder or as an ellipsoid. At the centre of each one of its two juxtaposed faces, there is a hole for the passage of air	The hunting call made by two cartridge bottoms, the whistle obtained by an apricot stone and similar: Europe, Turkey [Picken 1975, 376-378], Brazil [Izikowitz 1935, 284-285]
421.112 With open and variable chamber	The body of the instruments is open at one side. The player's tongue creates a temporary extension of the body of the instrument which contributes to the determination of the sound's parameters	The stone whistle from Milena (Sicily) [Guizzi 2002, 159-160], from Turkey [Picken 1975, 378-380] and South America [Izikowitz 1935, 284-285]. The whistles made from flattened tin bottle-tops Calabria [La Vena 1996, 76-78, 97], Turkey [Picken 1975, 377-380]
421.12 Edge instruments not orthogonally blown	The air-stream created by the player breaks on a sharp-edged border which is not at a right angle with the direction of the flux	
421.121 Tubular flutes	The sharp-edged border is part of a tubular flute.	
421.121.1 End-blown flutes	The player blows against the upper opening of the pipe	
421.121.11 End-blown flutes with no sharp-edged device	The air-stream breaks on the edge of the opening of the flute	
421.121.111 End-blown flutes	The air-stream is directed against the sharp rim at the upper end of a tube	

421.121.111.1 Single		
421.121.111.11 With no fingerholes		
421.121.111.111 Open		
421.121.111.112 Closed		The hollow key
421.121.111.12 With fingerholes		Particularly in New Guinea
421.121.111.2 Sets of flutes or panpipes[42]	A series of straight flutes with different pitch are assembled in a unique instrument	*Panpipes*
421.121.111.21 Open panpipes		
421.121.111.211 Open (raft) panpipes	The pipes are tied together in the form of a board, or they are made by drilling tubes in a board	China, Oceania, Central and Southern America
421.121.111.212 Open bundle (pan-) pipes	The pipes are tied together in a round bundle	*Solomon Islands. Bismarck* Archipelago
421.121.111.22 Stopped panpipes		China, South-East Asia, Oceania, Central and Southern America, Africa, Europe
421.121.111.23 Mixed open and stopped panpipes		*Solomon Islands, South America*
421.121.112 Side-blown flutes	The air-stream is directed laterally towards the opening of the flute	
421.121.112.1 Indirectly side-blown	The flute orbits around its own axis and the surrounding air breaks against the edge of an opening. The vibrating air is contained inside the instrument's tubular structure.	*Parücia* (Piedmont)
421.121.112.2 Directly side-blown	The player blows laterally against the edge of an opening. This taxon deals more with a playing technique than with a structural characteristic	Some bundle panpipes
421.121.12 End-blown flutes with sharp-edged device	The air-stream breaks against a device in the opening of the flute	

42 The panpipes of many areas of the world (European as well, as the case of instruments from the Volga basin in Russia or from the Baltic countries demonstrate), but especially from the Andean Mountains around Lake Titicaca and from Melanesia ('Are'are, Malaita, Solomon Islands) are characterised by a specific feature concerning not only performance practices, but also their structure. Normally a single instrument alone is never played, at least one counterpart is needed, which provides half of the scale needed to play a melody, according to an arrangement of the notes which are subdivided between the two components of the couple. This deserves a careful extension of the taxonomy, since the case records collected during fieldwork have documented complex combinations of flutes with only one row of pipes or with two superimposed rows, with only stopped pipes or composed of a mix of open and stopped pipes.

421.121.121 With notched device	The air-stream breaks against a notch cut in the opening of the flute	*Quena* (Andes), Eastern Africa
421.121.122 With bevelled device	The air-stream breaks against a bevel on the edge of the flute's opening	*Shakuachi* (Japan)
421.121.2 Transverse flute	The player blows against the sharp rim of a hole in the side of the tube	
421.121.21 Single transverse flutes		
421.121.211 Open transverse flutes		
421.121.211.1 Without fingerholes		*South-West Timor*
421.121.211.2 With fingerholes.		*European flute*
421.121.212 Partly-stopped transverse flutes	The lower end of the tube is a natural node of the pipe pierced by a small hole	*North West Borneo*
421.121.213 Stopped transverse flutes		
421.121.213.1 Without fingerholes		
421.121.213.11 With fixed stopped lower end		*Apparently non-existent*
421.121.213.12 With adjustable stopped lower end (piston flutes)		Malacca, New Guinea
421.121.213.2 With fingerholes		*Eastern Bengal, Malacca*
421.121.22 Sets of transverse flutes		
421.121.221 Sets of open transverse flutes		*Chamber flute-orum*
421.121.222 Sets of stopped transverse flutes		North West Brazil (among the Siusi)
421.122 Vessel flutes[43]	The body of the pipe is not tubular	

43 In the original taxonomy the group of vessel flutes without internal ducts is limited to one *taxon* only. Like other multiple cases of diversification among flutes, for example the transverse flutes, this is a lacuna in the economy of the system invented by Hornbostel and Sachs in 1914, a gap which cannot be easily filled by appealing to the criteria expressed by the authors in the introduction, where they assert the flexible and adjustable nature of their system. In other words, one faces the relative imbalance in the overall consideration of the importance of the subclass of flutes and of its internal articulations. The many cases that allow a series of subdivisions of the group defined by this taxon (421.13) are particularly represented in the musical cultures of the pre-Columbian peoples, having probably experienced all the possible combinations of the constitutive elements of vessel flutes, with or without internal duct or distinct beak. I have attempted a preliminary exploration of this world, of which I have proposed a

	but vessel-shaped	
421.122.1 Freely blown vessel flutes	The air-stream is directed by the player against the opening of the flute without using any devices	
421.122.11 Indirectly side-blown	The flute turns with a circular movement or around its axis and collides with the surrounding air which breaks laterally against the rim of an opening	Europe, Southern America, Asia hollow spinning top
421.122.12 Directly side-blown	The player blows laterally against the rim of an opening	
421.122.121 Without fingerholes		America, Oceania, Africa, Europe (the whistle obtained from a dried orange skin [La Vena 1996, 97-98].
421.122.122 With fingerholes		
421.122.2 Guided blown vessel flutes	The air-stream is directed by the player against the opening of the flute with the help of a special slide	
421.122.21 With no edge-devices	The slide does not include any edge-devices	
421.122.22 With edge-device	The slide includes an edge-devices	
421.2 *Channelled flutes (with blowing device)*	A channel directs the air-stream against the sharp edge of a hole	
421.21 With orthogonal edge-device[44]	The air-stream is directed against the rim of a hole by a channel	
421.211 With external chamber	The air-stream is directed, by a slightly oblique channel, to the rim of a hole. The device is contained inside a hollowed body with some openings that may be opened or closed with one's hands. The primary vibration is therefore coupled with the vibration of the air inside the chamber and the sound may be variated by controlling the external outflow	
421.211.1 With a central hole on the wall of a vessel chamber	Inside an enveloping chamber a device like taxon 421.111 is contained. It is provided with only one hole, where the air-stream, directed by the channel, breaks	Hunting call for partridges
421.211.2 The hole is obtained by the upper end of a tube	The edge where the air-stream breaks is the rim of a tube which is juxtaposed with the channel	
421.22 Flutes with external duct	The duct is outside the wall	

systematisation [Guizzi 1992].

44 Since this taxon refers mainly to hunting calls, the outflow of the air-stream is not perfectly orthogonal to the plane of the hole where the air-stream breaks, because these instruments are not made to produce a 'clear' timbre. The harmonics are determined by a slight shift of the tube carrying the air-stream with respect to the rim where the air-stream is forced, therefore, these instruments produce a particularly 'blown' timbre, which characterises the voice of the birds to be imitated.

	of the flute	
421.221 Tubular		
421.221.1 End-blown	The duct is placed along the longitudinal axis of the tube	
421.221.11 Chamfered flutes with a ring-like sleeve	The duct is chamfered in the wall under a ring-like sleeve	Indonesia (*suling*)
421.221.111 Single		
421.221.111.1 Open		
421.221.111.11 Without fingerholes		China, Borneo
421.221.111.12 With fingerholes		
421.221.111.2 Partly-opened		Malacca
421.221.111.3 Closed		
421.221.112 Sets of end-blown flutes with external duct		
421.221.12 With internal channel, which is deviated against an external cover[45]	The air is directed inside the tube, where it meets a deflector which forces the air to deviate outside the tube, where a rigid or flexible cover directs it against a rim below the deflector	Northern America:(flutes of the natives), Southern America (flutes from Amazonia)
421.221.2 Transverse	The duct is perpendicular to the longitudinal axis of the tube.	Atuñsa from the Motilon Indians, Sierra Perijá, Venezuela [Izikowitz 1935, 375]
421.222 Vessel flutes with external duct	The duct is attached to the outer part of a vessel: the air-stream breaks against an opening	Pre-Columbian America
421.222.1 With single duct	The duct is composed of a unique channel	
421.222.2 With double duct	The air-stream is directed to the two openings of the instrument by two channels	South America (*nazca*), Central America *(chiriqui*)
421.23 Flutes with internal duct	The duct is inside the tube	
421.231 Tubular		
421.231.1 End-blown		
421.231.11 With applied duct	The duct maintains an autonomous shape and is juxtaposed with the blowing hole, or it creates a path which facilitates the introduction of air inside the duct	Europe (*baritone or bass recorder, fujara* in Slovakia). Southern America, Peru and Bolivia (*bass mohoceno*)
421.231.12 (Single flutes) with duct and window	The duct is created inside the body of the flute and it is shaped like	

45 Further subdivisions like 421.221.11.

	a longitudinal slot, leading to a window	
421.231.121 Open		
421.231.121.1 Without fingerholes		
421.231.121.2 With fingerholes		
421.231.122 Closed		
421.231.122.1 Without fingerholes		
421.231.122.11 With fixed stopped lower end		European signalling whistle
421.231.122.12 With adjustable lower end		*Piston pipes* (*swannee whistle*)
421.231.122.2 With fingerholes		
421.231.13 Sets of flutes with duct and window[46]		
421.231.131 Open		
421.231.131.1 Without fingerholes		*Open flute stops of the organ*
421.231.131.2 With fingerholes		*Double flageolet*
421.231.132 Partly stopped		*Rohrflöte stops of the organ*
421.231.133 Stopped		*Stopped flute stops of the organ*
421.231.2 Transverse	The air enters a lateral hole through a duct.	
421.231.21 With applied duct	A duct directs the air through the lateral hole of a tube. The duct is permanently fixed at right angle	*Fifes* provided with duct, *transverse flute* Nazca, made of bone, blown with a perpendicular duct
421.231.22 With duct and window	The air is blown inside a lateral duct, then it reaches the window along the instrument's longitudinal axis	Europe (the harmonic transverse flutes made of bark or wood); Italy (*tituella from Monti Lepini*) [Di *Fazio* 1997, 54-57], *Calabria* [La Vena 1996, 112-118], Tuscany; Norway (*seljefløyte*)
421.232 Vessel flutes with duct		
421.232.1 With applied duct	The duct maintains an autonomous	Central America (Maya)

46 *Taxa* referring to internal duct flutes should be integrated, at least by taking into account the hypothesis of 'sets of vessel duct flutes'. It is not merely theoretical, since it is documented by instruments that have actually existed, particularly in pre-Columbian cultures, where instruments made of two devices are known.

	shape and is juxtaposed with the blowing hole, or it creates a path which facilitates the introduction of air inside the duct	and Southern America (Apinayé, Canella, Pre-Columbian cultures of Ecuador, Peru and Bolivia)
421.232.2 With a chambered duct	The duct is composed of one or more hollow bodies	Pre-Columbian America (*whistling jars*)
421.232.3 With duct and window		
421.232.31 Without fingerholes		*Zoomorphic pottery whistles, Europe, Asia*
421.232.32 With fingerholes		*Ocarina*
421.233 Mixed	The flute presents the characteristics of both tubular and vessel flutes	
422 Reedpipes	The air-stream has, through means of lamellae placed at the head of the instrument, intermittent access to the column of air which is to be made to vibrate	
422.1 *Reedpipes with retreating reeds or reeds with lateral/middle cut*	The pipe is provided with a reed like the one described in taxon 412.111.13	
422.11 Without lateral holes		
422.111 With fixed tube		
422.112 With changeable tube	The length of the air column is modified by the player: the final portion of the tube in fact is made of two jointed parts that may be temporarily separated or joined to the first one	*Southern Sweden* (*netterpipa*) [Emsheimer 1989]
422.12 With lateral holes		
422.2 *Oboes*	The pipe has a [double] reed of concussion lamellae (usually a flattened stem)	
422.21 Single oboes		
422.211 With cylindrical bore		*British Columbia*
422.211.1 Without fingerholes		*Aulos, cromorno*
422.211.2 With fingerholes		*The European oboe*
422.212 With conical bore		
422.22 Sets of oboes		
422.221 With cylindrical bore		*Double aulos*
422.222 With conical bore		India
422.3 *Clarinets*	The pipe has a [single] reed consisting of a percussion lamella	
422.31 Single clarinets		
422.311 With cylindrical bore		
422.311.1 Without fingerholes		British Columbia
422.311.2 With fingerholes		*The European clarinet*
422.312 With conical bore		*Saxophone*
422.32 Sets of clarinets		Egypt (*zummára*)

422.4 *Reedpipes with free reeds*	The reed vibrates through [at] a closely-fitted frame. There must be fingerholes, otherwise the instrument belongs to the free reeds 412.12	
422.41 Single reedpipes with free reeds		
422.411 With free reeds with elastic and rigid lamella with bilateral movement	The interruptive device is a lamella like the one described in taxon 412.121. It is inserted in the proximal end of the tube, its interruptive function determines periodical vibrations in the air contained inside the tube	Monti Lepini (*pifaretta a cifolitto*) [Di Fazio 1997, 62-66]
422.42 Sets of reedpipes with free reeds.		
422.5 *Reedpipes with membranokinetic reed*	The interruptive device is made of an elastomeric membrane which is stretched and coupled with a resonating tube	
422.51 Without fingerholes		*Tornado*
422.52 With fingerholes		
421.521 Single		Calabria [La Vena 1996, 157-158].
421.522 Sets		
422.6 *Reedpipes with chordokinetic reed*	The interruptive device is a stretched strip, coupled with a resonating tube	
422.61 Without fingerholes[47]		
422.62 With fingerholes		British Columbia [Galpin 1902-1903]
423 Trumpets	The air-stream passes through the player's vibrating lips, so gaining intermittent access to the air column which is to be made to vibrate	
423.1 *Natural trumpets*	Without extra devices to alter pitch	
423.11 Conches	A conch shell serves as trumpet	
423.111 End-blown		
423.111.1 Without mouthpiece		India
423.111.2 With mouthpiece		Japan (*rappakai*)
423.112 Side-blown		Oceania
423.12 Vessel trumpets	The vibrating air is confined inside a vessel	
423.121 End-blown	The player's lips are placed	Trumpets with clay vessels

47 This taxon is inserted here for the sake of completeness of the taxonomic scheme, since its definition still requires further in-depth analysis. In general terms, besides considering the single case studies in literature or in museums, one has first to take into account what Hornbostel and Sachs pointed out about taxon 422.3 «Reedpipes with free reeds-»: «**t**he reed vibrates through [at] a closely- fitted frame. There must be fingerholes, otherwise the instrument belongs to the free reeds 412.13», especially concerning the specification in the final part of the description.

	in the more longitudinally distant point to the distal opening	as resonators, Rio Negro [Izikowitz 1935, 236-237]; polyglobular trumpets from Guiana [Izikowitz 1935, 239-241]
423.122 Side-blown		Vessel trumpets from South America (*Buzina 'Masen'*), Matis Atalaya, Javaru Valley; south of Rio Amazonas (*tucurima*)
423.13 Tubular trumpets		
423.131 End-blown trumpets	The mouth-hole faces the axis of the trumpet	
423.131.1 End-blown straight trumpets	The tube is neither curved nor folded	
423.131.11 Without mouthpiece		Some *alphorns*
423.131.111 Single		
423.131.112 Sets[48]		The bark trumpets in different sizes, like panpipes, and played in couples during Christian rites in Bolivia
423.131.12 With mouthpiece		Almost world-wide
423.131.2 End-blown horns	The tube is curved or folded	
423.131.21 Without mouthpiece		Asia
423.131.22 With mouthpiece		
423.132 Side-blown trumpets[49]	The embouchure is in the side of the tube	
423.132.1 Side-blown straight trumpets		South America
423.132.2 Side-blown horns		Africa
423.2 *Chromatic trumpets*	With extra devices to modify the pitch	
423.21 Trumpets with fingerholes		*Cornetti, key bugles*
423.22 Slide trumpets	The tube can be lengthened by extending a telescopic section of the instrument	*European trombone*
423.23 Trumpets with valves	The tube is lengthened or shortened by connecting or disconnecting auxiliary lengths of tube	Europe

48 This taxon refers specifically to instruments made of tubes of different sizes. It does not refer to the plurality of trumpets (and horns) played by groups of people, in which each instrument pertains to a player and the musicians play all together simultaneously, according to a *hoquetus* playing technique. There are remarkable examples in Central Africa, particularly famous is the case of the Banda Linda.

49 This group would benefit from a further distinction depending on the presence or absence of a mouthpiece. If the mouthpiece is intended as a cavity inside a depression of the surface of the instrument where the lips of the player are placed when playing, which communicates with the internal bore through a tight passage, also side-blown horns often have a similar mouthpiece, which is integral with the body of the instrument, and is in relief in the external surface.

423.231 Valve bugles	The tube is conical throughout	
423.232 Valve horns	The tube is predominantly conical	
423.233 Valve trumpets	The tube is predominantly cylindrical	
Suffixes for use with any division of this class (aerophones)		
-5 with further holes not for fingers		
-6 with air reservoir		
-61 with rigid air reservoir		
-62 with flexible air reservoir		
-7 with fingerhole stopping		
-71 with keys		
-72 *Bandmechanik* [presumably a perforated roll or ribbon]		
-8 with keyboard		

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