

How Music, and Instruments, Began: A Brief Overview of the Origin and Entire Development of Music, from its Earliest Stages.

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How did music begin? Was it via vocalization or was it through motor impulse?

But even those elementary questions are a step too far, because first we have to ask ‘What is music?’, and this is a question that is almost impossible to answer. Your idea of music may be very different from mine, and our next-door neighbour’s will almost certainly be different again. Each of us can only answer for ourselves.

Mine is that it is ‘Sound that conveys emotion’.

We can probably most of us agree that it is sound; yes, silence is a part of that sound, but can there be any music without sound of some sort? For me, that sound has to do something – it cannot just be random noises meaning nothing. There must be some purpose to it, so I use the phrase ‘that conveys emotion’. What that emotion may be is largely irrelevant to the definition; there is an infinite range of possibilities. An obvious one is pleasure. But equally another could be fear or revulsion.

How do we distinguish that sound from speech, for speech can also convey emotion? It would seem that musical sound must have some sort of controlled variation of pitch, controlled because speech can also vary in pitch, especially when under overt emotion. So music should also have some element of rhythm, at least of pattern. But so has the recital of a sonnet, and this is why I said above that the question of ‘What is music?’ is impossible to answer. Perhaps the answer is that each of us in our own way can say ‘Yes, this is music’, and ‘No, that is speech’.

Must the sound be organized? I have thought that it must be, and yet an unorganised series of sounds can create a sense of fear or of warning. Here, again, I must insert a personal explanation: I am what is called an ethno-organologist; my work is the study of musical instruments (organology) and worldwide (hence the ethno-, as in ethnomusicology, the study of music worldwide). So to take just one example of an instrument, the ratchet or rattle, a blade, usually of wood, striking against the teeth of a cogwheel as the blade rotates round the handle that holds the cogwheel. This instrument is used by crowds at sporting matches of all sorts; it is used by farmers to scare the birds from the crops; it was and still is used by the Roman Catholic church in Holy Week when the bells 'go to Rome to be blessed' (they do not of course actually go but they are silenced for that week); it was scored by Beethoven to represent musketry in his so-called Battle Symphony, a work more formally called *Wellingtons Sieg oder die Schlacht bei Vittoria*, Op.91, that was written originally for Maelzel's giant musical box, the Panharmonicon. Beethoven also scored it out for live performance by orchestras and it is now often heard in our concert halls 'with cannon and mortar effects' to attract people to popular concerts. And it was also, during the Second World War, used in Britain by Air-Raid Precaution wardens to warn of a gas attack, thus producing an emotion of fear. If it was scored by Beethoven it must be regarded as a musical instrument, and there are many other noise-makers that, like it, which must be regarded as musical instruments.

And so, to return to our definition of music, organization may be regarded as desirable for musical sound, but that it cannot be deemed essential, and thus my definition remains 'Sound that conveys emotion'.

So now we can ask again, 'How did music begin?'

But then another question arises: is music only ours? We can, I think, now agree that two elements of music are melody, i.e. variation of pitch, plus rhythmic impulse. But almost all

animals can produce sounds that vary in pitch, and every animal has a heart beat. Can we regard bird song as music? It certainly conveys musical pleasure for us, it is copied musically (Beethoven again, in his *Pastoral Symphony*, no.6, op. 68, and in many works by other composers), and it conveys distinct signals for that bird and for other birds and, as a warning, for other animals also. Animal cries also convey signals, and both birds and animals have been observed moving apparently rhythmically. But here we, as musicologists and ethnomusicologists alike, are generally agreed to ignore bird song, animal cries, and rhythmic movement as music even if, later, we may regard it as important when we are discussing origins below. We ignore these sounds, partly because they seem only to be signals, for example alarms etc, or ‘this is my territory’, and partly, although they are frequently parts of a mating display, this does not seem to impinge on society as a whole, a feature that, as we shall see, can be of prime importance in human music. Perhaps, too, we should admit to a prejudice: that we are human and animals are not...

So now we can turn to the questions of vocalization versus motor impulse: which came first, singing or percussive rhythms? At least we can have no doubt whatsoever that for melody, singing must long have preceded instrumental performance, but did physical movement have the accompaniment of hand- or body-clapping and perhaps its amplification with clappers of sticks or stones, and which of them came first?

Here we turn first to the study of the potentials of the human body. There is a large literature on this, but it has recently been summarized by Iain Morley in his *The Prehistory of Music* (Morley, 2013). So far as vocalization is concerned, at what point in our evolution was the vocal tract able to control the production of a range of musical pitch? For although my initial definition of music did not include the question of pitch, nor of rhythm, once we begin to discuss and amplify our ideas of music, one or other of these, does seem to be an essential – a single sound with no variation of pitch nor with any variation in time can hardly be

Studies based on fossil remains of the cranium and jaw formation of the early species of homo suggest that while *Homo ergaster* from between two million and a million and a half years ago could produce some variation of pitch but perhaps without much breath control, *Homo erectus* may have had greater ability, and *Homo heidelbergensis*, and certainly its later development from around a million years ago into the common ancestor of *Homo neanderthalensis* and *Homo sapiens*, could certainly 'sing' as well as we can, though of course we can have no evidence of whether they could control such ability, whether they used it, and if so to what extent, for we know much less about the capabilities of the brain than we do about the vocal tract. So we can say that vocalization, while absent from the capability of our cousins the great apes and of the early forms of *Homo*, could be as old as at least a million years.

However, there is little point in being able to 'sing' unless one can also perceive the results aurally and can control and appreciate the results mentally, so again Morley looks at the fossil record, this time for the ears and the interior of the cranium, and studies of the brains of modern humans and just what parts of the brain provide the necessary controls and perception. For the ears, the evidence seems to go back to *Homo erectus* and indeed seems to be linked to the normality of an upright (hence 'erectus') posture, a posture that also implies bipedalism, the custom of moving on two feet rather than combining the feet with knuckle-walking such as we see with gorillas and other anthropoid apes.

The brain has to do far more of the work. Once both the vocal tracts and the ears are suitably developed, the brain has to be able control physiologically all the many muscular operations required to be able to 'sing' and then to provide neurologically all the perceptions, without which we cannot process what the vocal tract can produce and the ears admit. It would seem that *Homo heidelbergensis* had the muscular abilities, but perhaps not the full

mental capacities and that it was not until *Homo sapiens* arrived that all the requirements for vocalization were in place, both exported and imported, and possibly not even in the earliest stages of the evolution of *H. sapiens*. It is here that there is controversy over the relative musical abilities of *H. neanderthalensis* and *H. sapiens*, to which in due course we shall return.

Much of this work also discusses the origins of speech as well as that of music. The two processes seem to have much the same physiological requirements, the ability to produce the various consonants and vowels that enable speech, and the ability to control discrete musical pitches. But this capacity goes far beyond the ability to produce sounds.

All animals have the ability to produce sounds, and most of these sounds have meanings, at least to their ears. Surely this is true also of the earliest hominins. If a mother emits sounds to soothe a baby, and if such sound inflects somewhat in pitch, however vaguely, is this song? An ethnomusicologist, those who study the music of exotic peoples, would probably say ‘yes’, while trying to analyse and record the pitches concerned. There are peoples (or have been before the ever-contaminating influence of the electronic profusion of musical reproduction) whose music has consisted only of two or three pitches, and those pitches not always consistent, and these have always been accepted as music by ethnomusicologists. So we have to admit that vocal music of some sort may have existed from the earliest traces of humanity, long before the proper anatomical and physiological developments enabled the use of both speech and what we might call ‘music proper’, with control and appreciation of pitch.

In this context, it is clear also that ‘music’ in this earliest form must surely have preceded speech. The ability to produce something melodic, a murmur of sound, something between humming and crooning to a baby, must have long preceded the ability to form the consonants and vowels that are the essential constituents of speech. A meaning, yes: ‘Mama looks after you, darling’, ‘Oy, look out!’ and other non-verbal signals convey meaning, but

The possibilities of motor impulse are also complex. Here, again, we need to look at the animal kingdom. Both animals and birds have been observed making movements that, if they were humans, would certainly be described as dance, especially for courtship, but also, with the higher apes in groups. Accompaniment for the latter can include foot-slapping, making more sound than is necessary just for locomotion, and also body-slapping (Williams, 1967). Can we regard such sounds as music? If they were humans, yes without doubt. So how far back in the evolutionary tree can we suggest that motor impulse and its sonorous accompaniment might go? I have already postulated in my *Origins and Development of Musical Instruments* (Montagu, 2007, 1) that this could go back as far as the earliest flint tools, that striking two stones together as a rhythmic accompaniment to movement might have produced the first flakes that were used as tools, or alternatively that interaction between two or more flint-knappers may have led to rhythms and counter-rhythms, such as we still hear between smiths and mortar-and-pestle millers of grains and coffee beans. This, of course, was kite-flying rather than a wholly serious suggestion, but the possibilities remain. At what stage did a hominim realize that it could make more sound, or could alleviate painful palms, by striking two sticks or stones together, rather than by simple clapping? Again we turn to Morley and to the capability of the physiological and neurological expression of rhythm.

The physiological must be presumed from the above animal observations. The neurological would again, at its simplest, seem to be pre-human. There is plenty of evidence for gorillas drumming their chests and for chimpanzees to move rhythmically in groups. But perceptions of more detailed appreciation of rhythm, particularly of rhythmic variation, can only be hypothesized by studies of modern humans, especially of course of infantile behaviour and perception.

From all this it would seem that motor impulse, leading to rhythmic music and to dance could be at least as early as the simplest vocal inflection of sounds. Indeed, it could be earlier. We said above that animals have hearts, and certainly all anthropoids have a heart-beat slow enough, and perceptible enough, to form some basis for rhythmic movement at a reasonable speed. Could this have been a basis for rhythmic movement such as we have just mentioned? This can only be a hypothesis, for there is no way to check it, but it does seem to me that almost all creatures seem to have an innate tendency to move together in the same rhythm when moving in groups, and this without any audible signal, so that some form of rhythmic movement may have preceded vocalization.

But *why* does music develop from such beginnings? What is the purpose of music?

There are four obvious purposes: dance, personal or communal entertainment, communication, and ritual.

Dance we have already mentioned, though we can never know whether rhythmic motion led to the use of accompaniment, or whether the use of rhythm for any work led to people moving rhythmically in a way that became dance. It is well-accepted in anthropology that when people are working, or moving together, their movements fall into a rhythm, that people may grunt and make other noises into that rhythm. The grunts may move into something that verges on or morphs into song; the other noises may be claps or beating pairs of objects together (concussive) or beating one object on another (percussive). Such objects can only be idiophonic, such as sticks, stones, and other solid objects that require no additional features to help them make a sound, in the classificatory system for instruments (Hornbostel and Sachs, 1914). This is simply because to create a drum with a skin (membranophones) is a complex process, because a skin will not produce sound unless it is under tension.

There is no doubt whatsoever that rhythmic sound without any melodic input must be regarded as music. It appears in many cultures, even if rarely, and we have Varèse's

Ionisation to take as an example from our modern orchestral repertoire.

Our second purpose was personal or communal entertainment. Communal entertainment, to some extent, overlaps with dance and with rhythmic work; personal entertainment overlaps for the mother and baby, mentioned above, with communication, as does the traveller using an instrument to indicate to people or villages that he passes that his purpose is peaceful and that he is not a robber intent on purloining their property, a well-known practice anthropologically but one that we can have no way to measure its antiquity.

Our third purpose, communication by musical means is again widespread. We have the 'bush telegraph' in Africa and other parts of the world with slit drums and other instruments, the alphorn in Switzerland and in other mountainous or marshy regions, the conch in Papua New Guinea, as random examples of the use of an instrument to pass messages. We have the whistling language of the Canary Islands (*silbo*) and many other parts of the world, and the high vocal calls of other peoples as examples of non-instrumental music for the same purpose.

Our fourth purpose, ritual, is a well-known trap in archaeology and anthropology. Any object, any practice that cannot otherwise be explained, is assigned as 'ritual'. But there seems to be no form of religion, to use that word in its widest sense, that does not attract music to its practices. And here we have another conflict, again that between music and speech. Schönberg's 'invention' of *Sprechgesang*, an interface between speech and music, was nothing new. Many forms of ritual chants would be difficult to notate precisely in pitch; the words are spoken but they are inflected up and down quasi-melodically. Some bardic narrative is also an example of this, while often breaking intermittently into song. In both cases, the musical inflection renders the text less boring and helps the speaker with his or her memory of the text. It is undoubtedly speech, for the meaning of the words is the essential part, but there is also the element of pitch variation that would make an ethnomusicologist

claim it to be music even while the practitioner would often vehemently deny any such claim, especially within the stricter forms of Islam, those in which music is forbidden.

Seemingly more important than these fairly obvious reasons for why music developed is one for why music began in the first place. This is something that Steven Mithen mentions again and again in his book, *The Singing Neanderthals* (Mithen, 2005): that music is not only cohesive on society but almost adhesive. Music leads to bonding, bonding between mother and child, bonding between groups who are working together or who are together for any other purpose. Worksongs are a cohesive element in most pre-industrial societies, for they mean that everyone of the group moves together and thus increases the force of their work. Even today 'Music while you Work' has a strong element of keeping workers happy when doing repetitive and otherwise boring work. Dancing or singing together before a hunt or warfare binds the participants into a cohesive group, and we all know how walking or marching in step helps to keep one going. It is even suggested that it was music, in causing such bonding, that created not only the family but society itself, bringing individuals together who might otherwise have led solitary lives, scattered at random over the landscape.

Thus it may be that the whole purpose of music was cohesion, cohesion between parent and child, cohesion between father and mother, cohesion between one family and the next, and thus the creation of the whole organization of society.

Much of this above can only be theoretical – we know of much of its existence in our own time but we have no way of estimating its antiquity other than by the often-derided 'evidence' of the anthropological records of isolated, pre-literate peoples. So let us now turn to the hard evidence of early musical practice, that of the surviving musical instruments.¹

This can only be comparatively late in time, for it would seem to be obvious that sound-makers of soft vegetal origin should have preceded those of harder materials that are more difficult to work, whereas it is only the hard materials that can survive through the millennia.

Surely natural materials such as grasses, reeds, and wood preceded bone? That this is so is

strongly supported by the advanced state of many early bone pipes – the makers clearly knew exactly what they were doing in making musical instruments, with years or generations of experiment behind them on the softer materials. For example, some end-blown and notch-blown flutes, the earliest undoubted ones that we have, from Geissenkl österle and Hohle Fels in Swabia, Germany, made from swan, vulture wing (radius) bones, and ivory in the earliest Aurignacian period (between 43,000 and 39,000 years BP), have their fingerholes recessed by thinning an area around the hole to ensure an airtight seal when the finger closes them. This can only be the result of long experience of flute making.

So how did musical instruments begin? First a warning: with archaeological material, we have what has been found; we do not have what has not been found. A site can be found and excavated, but if another site has not been found, then it will not have been excavated. Thus absence of material does not mean that it did not exist, only that it has not been found yet. Geography is relevant, too. Archaeology has been a much older science in Europe than elsewhere, so that most of our evidence is European, whereas in Africa, where all species of *Homo* seem to have originated, site-archaeology is in its infancy. Also, we have much evidence of bone pipes simply because a piece of bone with a number of holes along its length is fairly obviously a probable musical instrument, whereas how can we tell whether some bone tubes without fingerholes might have been held together as panpipes? Or whether a number of pieces of bone found together might or might not have been struck together as idiophones? We shall find one complex of these later on here which certainly were instruments. And what about bullroarers, those blades of bone, with a hole or a constriction at one end for a cord, that were whirled around the player's head to create a noise like thunder or the bellowing of a bull, or if small and whirled faster sounded like the scream of a devil? We have many such bones, but how many were bullroarers, how many were used for some

So how did pipes begin? Did someone hear the wind whistle over the top of a broken reed and then try to emulate that sound with his own breath? Did he or his successors eventually realize that a shorter piece of reed produced a higher pitch and a longer segment a lower one? Did he ever combine these into a group of tubes, either disjunctly, each played by a separate player, as among the Venda of South Africa and in Lithuania, or conjointly lashed together to form a panpipe for a single player? Did, over the generations, someone find that these grouped pipes could be replaced with a single tube by boring holes in it, with each hole representing the length of one of that group? All this is speculation, of course, but something like it must have happened.

Or were instruments first made to imitate cries? The idea of the hunting lure, the device to imitate an animal's cry and so lure it within reach, is of unknown age. Or were they first made to imitate the animal in a ritual to call for the success of tomorrow's hunt? Some cries can be imitated by the mouth; others need a tool, a short piece of cane, bits of reed or grass or bone blown across the end like a key or a pen-top. Others are made from a piece of bark held between the tongue and the lip (I have heard a credit card used in this way!). The piece of cane or bone would only produce a single sound, but the bark, or in Romania a carp scale, can produce the most beautiful music as well as being used as a hunting call. The softer materials will not have survived, and with the many small segments of bone that we have, there is no way to tell whether they might have been used in this way or whether they are merely the detritus from the dining table.

We have many whistles made from an animal phalange or toe bone, blown between a pair of protrusions at one end, across a sound hole near the center. Two of them come from the Mousterian period of the Middle Palaeolithic, over 50,000 years ago, and there are many from the Aurignacian down to the Magdalenian and later; most, but not all, are reindeer

phalanges. D'Errico has warned us, though, that the 'sound hole' on many of these look as

though they were made from a carnivore bite (D'Errico, 2003). It was in the Mousterian period that the Neanderthals co-existed with *H. Sapiens*; the latter arrived in Europe between fifty and forty thousand years ago (though far earlier in the Near East), whereas Neanderthals had long been established in Europe, perhaps as long as 200,000 years before. Whether any that were blown by humans were used for signalling, or whether they were also used for music we cannot know, but whistles are certainly regarded as musical instruments.

More controversially in this Mousterian period, and certainly associated with other Neanderthal remains, is the young cave bear femur from the Divje Babe cave in Slovenia, dated to around 60,000 years BP (Before the Present). This has two holes in it and what might be three others at the broken-off ends, two on one side and one on the other. The fragment of bone is just over 10 cm long and while many people have claimed it as a flute, for it can certainly produce several pitches when reproductions of it are blown, many others have claimed that the holes are the result of other carnivores gnawing it, especially at the ends. As for the two complete holes, some writers have claimed that they are just the right size, shape, and spacing to have been produced by bears, for whose presence in the cave there is ample evidence, nor does there seem to be any trace of any possible human work on the bone. There is a very considerable literature on this possible instrument, well summed up and cited by Morley and by D'Errico et al., and the general consensus had been that it was not a musical instrument but simply the result of animal action. Nevertheless, the original discoverers have returned to the attack with a recent publication (Turk, 2014) which goes to show that human agency not only could have but did pierce those holes. For now we can only leave this question open, with all the problems of an unicum; there are convincing conclusions on both sides of the argument, with at present rather greater weight on the 'yes' side, partly due to this recent publication, and partly to the evidence in the following paragraph. What we really

need are more examples from the Mousterian period.

This bone does raise the whole question of whether *H. neanderthalensis* knew of or practised music in any form. For rhythm we can only say surely, as above – if earlier hominids could have, so could *H. neanderthalensis*. Could they have sung? A critical anatomical feature is the position of the larynx (Morley, 2013, 135ff.); the lower the larynx in the throat the longer the vocal cords and thus the greater flexibility of pitch variation and of vowel sounds (to put it at its simplest). It would seem to have been that with *H. heidelbergensis* and its successors that the larynx was lower and thus that singing, as distinct from humming, could have been possible, but ‘seems to have been’ is necessary because, as is so often, this is still the subject of controversy. However, it does seem fairly clear that *H. neanderthalensis* could indeed have sung. It follows, too, that while the Divje Babe ‘pipe’ may or may not have been an instrument, others may yet be found that were instruments. There is evidence that the Neanderthals had at least artistic sensibilities, for there are bones with scratch marks on them that may have been some form of art, and certainly there is a number of small pierced objects, pieces of shell, animal teeth, and so forth, found in various excavations that can only have served as beads for a necklace or other ornamentation – or just possibly as rattles. There have also been found pieces of pigments of various colors, some of them showing wear marks and thus that they had been used to colour something, and at least one that had been shaped into the form of a crayon, indicating that some reasonably delicate pigmentation had been desired. Burials have been found, with some small deposits of grave goods, though whether these reveal sensibilities or forms of ritual or belief, we cannot know (D’Errico et al., 2003, 19ff). There have also been found many bone awls, including some very delicate ones which, we may presume, had been used to pierce skins so that they could be sewn together. All this leads us to the conclusion that the Neanderthals had at least some artistic and other feelings, were capable of some musical practices, even if only vocal, and

were clothed, rather than being the grunting, naked savages that have been assumed in the past.

It is in the Middle and Upper Palaeolithic, from the Aurignacian period, which starts around 43,000 BP in eastern Europe and around 40,000 in the west, to the Magdalenian and later, ending around 10,000 BP, that we have a very considerable number of instruments, plus a few representations. Many of them, like those from Geissenklösterle above, are end-blown flutes made of bone, most commonly of large birds such as vultures and swans. Some of them are blown via a notch; some appear to be duct flutes, similar to our recorders, though of course the block made of wood, pith, or fibre has not survived – more probably they are likely to have been tongue-duct flutes, using the tongue in the end instead of a block, and some are listed as such in Morley's tables – and others may have been plain-end blown, diagonally across the top, like the Arab *nay*. With these last, though, it is possible that a reed was used as the sound generator, either a double reed like that of our oboe or a split-cane single reed like that of many Arab instruments, or possibly even lip-blown (trumpeted), though the narrowness of the bore makes this seem less likely. It is therefore probably better to refer to this last group as pipes, rather than as flutes.

Reproductions of many can be and have been played, but there is little to be learnt from this practice. We know what pitches and sounds *we* can get out of them, but unless we know their playing techniques, which of course we do not know, we cannot tell what sort of pitches and tone qualities they would have obtained in antiquity. Every recorder and tin-whistle player knows of a number of ways to inflect the pitch and the tone; every Arab *nay* player knows even more, and ethnomusicologists have produced evidence for even more, and our experimental musicians have shown that quite extraordinary pitches and sounds can be obtained from many of our orchestral instruments, sounds that their makers or normal players never conceived. Thus the archaeologists (who are seldom trained musicians), who publish

the scales and pitches of the pipes that they have found, can give us no more than conjecture

and the experience of their own musicality. I have a collection of musical instruments from all over the world; I know the sounds that I can get out of them, but without the presence of the original player, or a field recording of the original player on that very instrument, I have no way to tell what sounds or pitches he or she produced. So much less can we have any idea what sounds and pitches were heard in the Palaeolithic times.

However, there is one salient point, emphasized by D'Errico: a significant number of these pipes has varied spacing of fingerholes. While, it would seem that the majority have the fingerholes evenly spaced along the tube, there are certainly some that have a wider gap between the second and third holes. There are two fairly obvious possible reasons for this: one is that their 'scale' of pitches had intervals similar to wholetones and minor thirds; the other that it was convenient or comfortable to have a wider gap between the two hands. This latter suggestion is raised because it was a standard feature of our flutes from the later Middle Ages right through into the early nineteenth century, and this was not only because from around 1700 the middle joint of the Baroque flute was divided into an upper and lower joint at this point – the earlier one-piece flutes also showed this gap. There are also some Aurignacian flutes or pipes that have one hole closer to another, showing that a semitone or a small wholetone was desired. Thus these details emphasize that not only were these well-developed instruments, with the bodies well-scraped and smoothed, the fingerholes with secure seating for the fingers, a certain amount of incised decoration, but that also there was a desire for precise tuning, and that they were not just made to produce fairly random pitches.

In addition, there is the point that many of these features appear both in Geissenklösterle in Germany, in Isturitz in France, in Spain, and also elsewhere, and over long periods of time, strongly suggesting that populations were not isolated but that there were links between them. This is not so surprising. If *H. sapiens* had travelled across Africa and into Europe, surely

There is little point in listing all these pipes; all the Palaeolithic examples from Europe, or close by, found before 2013 are listed by Morley in his Appendices.

Were there other instruments? There is at least one conch trumpet, found in the Marsoulas cave, in the Haute-Garonne area of southern France, dating from around 20,000 years BP. Shell is a hard material that survives the ages, and although we have so far only this one example from the Upper Palaeolithic, we have a very considerable number from the Neolithic times, some of them much further from the sea, so it is fair to assume a continuous use (Montagu, in progress). So what about animal horns? Here the material is soft, and only in very dry conditions such as desert sands do any survive; none of those that I have heard of or seen were blowing horns, but it seems likely that they existed. For blowing, the horn must be naturally hollow, such as those of the cow family, sheep and goats, antelopes, elephant tusks, hollow wood, gourds, and wide-bore bamboo, with the tip broken or cut off, or a hole bored in the side; such were surely blown in high antiquity (Montagu, 2014). There are several bullroarers from the Magdalenian period that we can be certain were instruments. There are many phalange whistles later than the Mousterian ones noted above. There are rasps, usually bones notched along their length, which would have been scraped with another bone or a stone for rhythmic music.

There is the complex of mammoth bones dating from around 20,000 BP, found in the Ukraine and published by Bibikov (Bibikov, 1981). Many of the bones show signs of wear, almost certainly from repeated striking, and others, though this is not mentioned in the English summary, have striations similar to those of rasps, suggesting that some were scraped whereas others were struck. It is claimed that this was an ensemble, and although it would be difficult to prove that this was so, it would be even more difficult to show that each of these bones was struck only singly as an individual solo instrument. So here perhaps we have the

There are from the Magdalenian period, some 12,000 years BP, the caves themselves, where not only were stalactites struck but the caves themselves were used as resonators for sounds; both Lucie Rault and Lya Dams have brought together a number of convincing reports of this (Rault, 2000; Dams, 1985). Resonant stones must also have been struck outside the caves, the so-called rock gongs, boulders struck on resonant points, and these are of unknown antiquity but many bear well-worn cup marks on their surfaces. Rock gongs were first reported by Bernard Fagg in Nigeria, and following his article (Fagg, 1956), many more have been reported from around the world (Fagg, 1997).

There is no evidence in the Palaeolithic period for stringed instruments nor for skin drums.

At what point in history did someone discover that by cupping the hands together and blowing between the knuckles of the thumbs produced a sound? This is a vessel flute or ocarina whose pitch is varied by moving the fingers to alter the area of open hole. Many peoples have long used gourds and other hollow vegetal objects, and today pottery, to play music in this way, also with the hands as hunting lures, but since there are no animal bones of such a shape we can have no evidence of vessel flutes earlier than the Neolithic, in which period pottery first came into use.

Did voice-changers precede instruments? Did someone sing into a hollow object to change his voice from that of a human into that of a spirit or a deity? Was a shell sung into before ever a shell was blown? This precedence is something that has at times been suggested, but it can never be more than a hypothesis for we have no evidence to prove it. We do know that certain Greek statues had voice changers built in, usually a tube with a skin over one end, our kazoo, and there are many African masks with such a device.

Stringed instruments probably originated by the Mesolithic period, and certainly by the

Neolithic, for it is in those periods that we begin to find flint arrow-heads, and the archer's bow and the musical bow are symbiotic as we shall see below (Balfour, 1899).

Skin drums (membranophones), as we said above, need the skin to be under tension to function. At what stage could there have been frames to which a skin could have been fastened securely enough to be tight enough to play? One can only say as early as skins were dressed, wetted, and dried on a frame, but since neither skins nor wooden frames, nor hollow logs, can ever have survived, this is simply an unknown; ceramic bodies rigid enough to support the skins can only have been available in or shortly before the Neolithic period.

So far we have been discussing instruments only from Europe or its immediate environment. Simply, this is because where the evidence is. Archaeology has been going on longer in Europe than elsewhere, as we have said. Much is being found now in China, but since most of it has been published in Chinese, much of this information is inaccessible, at least to me.

All the instruments that we have discussed above continued through the Neolithic and, with archery and pottery available, many others have joined them.

The earliest stringed instrument is undoubtedly the musical bow (Balfour, 1899) . The one string instrument that might possibly be earlier is one that is identical with an animal trap – a noosed cord, presumably gut or sinew, running from a bent stick or branch to a peg in the ground. When an animal puts its head or leg into the noose, the cord is jerked from the peg and the stick or branch springs up and traps the animal. It has been suggested by Sachs, Balfour, and others that the hunter may also have plucked the string, so creating the ground bow, varying the tension of the cord, and thus the pitch, by bending the stick or branch. The ground harp is of unknown antiquity – our only evidence for the existence of the instrument is nineteenth-century reports from anthropologists.

Bows themselves, of course, never survive, but the presence of arrowheads in the lithic

evidence proves their existence. Whether the archer's bow preceded the musician's or vice

versa is arguable, but man's addiction to warfare, and even more to hunting, makes the

archer's the more likely. We have ethnographic evidence for the use of the same bow for both

purposes by the same person, but each developed in different ways, the archer's for strength

and the musician's for producing musical sounds in different ways. The string of the musical

bow is most commonly tapped by a light stick, initially presumably by an arrow, and is held

to the player's mouth where, by changing the shape of the mouth, different overtones are

sounded as with the jews harp (better and less prejudiciously called trump, which is the

earlier English name). By dividing the string with a loop of cord linking the string to the

stave, or by shortening the string at one end by the thumb of the holding hand, two

fundamentals, each with their own overtones, makes a much greater range of pitches

available. Attaching a gourd resonator to the stave creates greater volume, and opening or

closing the mouth of the gourd against the player's chest will again elicit overtones. Both

these forms survive to the present day in various modifications and many parts of the world,

especially in Africa south of the Sahara (Kirby, 1934). A third form consists of attaching

several bows to one resonator to form a pluriarc, as is still found in Central Africa.

One can postulate developments from both the gourd bow and the pluriarc. The gourd,

eventually of wood, can be built on to one end of the stave to create both the category of

instruments called lutes, with a straight stave as the neck, and of harps, with a curved stave. If

the two outermost bows of the pluriarc become rigid, with a cross-bar running between them

to hold the distal ends of the strings of the inner bows, which then become redundant, the

instrument is then much more stable and is called a lyre. Whether such developments took

place, or whether lutes, harps and lyres were independently invented, we can never know, but

my own guess, based partly on various intermediate forms in various cultures, is for this

process of development.

As for drums, frame drums are still ubiquitous around the world today, not only with our own tambourine, but a wooden or pottery body of manifold shapes exists almost everywhere. One possible early source for another type of drum is created by fixing the skin of the animal just eaten, over the top of the pot in which it had been cooked, so creating the instrument very appropriately called the kettledrum, using the word kettle in the sense of a cauldron.

Another very common use of pottery is to create a rattle, a vessel containing seeds, pebbles or nodules of pottery. Such vessel-rattles must have been long-preceded by gourds or woven leaves or baskets, all of which are still common today.

Once humanity entered the metal ages, the potentialities of instruments becomes infinite.

We can never know to what extent any groups of instruments or voices played together in high antiquity, though the existence of the group of mammoth bones above, does strongly suggest an ensemble. Not until the days of representational iconography, as in Mesopotamia and Egypt, or with the introduction of literacy, such as our Bible, do we have any real evidence. We have plenty of information from these sources.

What then did music sound like? We have early notations from Sumeria (Galpin, 1936) and Ancient Greece, the well-known hymn to Apollo, covering a wide range of pitches; Hickmann tried to derive a notation from hand-signals, called cheironomy, portrayed in Egyptian paintings and carvings (Hickmann, 1961). It has been thought by ethnomusicologists that less-advanced cultures than those, used pentatonic scales (five steps to the octave) such as we can still hear today in some areas, and perhaps even fewer steps with or without knowledge of the octave. But for these, naturally there is no evidence. Even with Sumerian, Greek, and Egyptian systems, the various transcriptions of which are all controversial, we cannot know the actual sounds, for not until the later classical Greek period do we have written evidence of the sizes of scalar steps.

We do know, from the transcription of cuneiform tablets, that it was the Babylonians, and

very possibly the Sumerians before them, who catalogued the skies and their constellations, establishing thus the basics of the calendar and of time that we use today, and who invented the hexadecimal system of mathematics. They turned their attention to sound also, and the Sumerians developed a system of diatonic scales based on alternating fourths and fifths. The Greeks, who took such knowledge from them, devised a diatonic scale based on the ratios of the harmonic series, starting from the eighth partial, a scale today called Just Temperament, one that is still used today by unaccompanied voices and sometimes by bowed string players or wind instruments playing without keyboards. For other instruments, such as lyres and harps, Just Temperament could also serve well, but only and until the players wished to change key; as soon as they did so, for reasons more complex than are needed here but are discussed below, chaos would ensue. Nevertheless, despite the purity of such a scale, we know that even the Greeks used other and more complex scales (Barbour, 1951) as, from the anthropological record, did many other peoples. Therefore, despite such transcriptions as we have of the ancient texts above, we can have no certain knowledge of what the music sounded like, for we do not know the exact sizes of the steps of the scales.

Even within Europe the 13th partial, the so-called alphorn fa, halfway between F and F-sharp appears in vocal music and on bagpipes as well as on natural horns and trumpets; the neutral third, between E and E-flat also appears, and as we shall see, the third is the most mutable interval in in our classical music. In the Balkans, people sing in close seconds rather than wider intervals or unisons.

One thing that the ethnomusicologists can tell us is that either humanity has no inbuilt sense of consonant tonality, or that other people's sense of consonance is different from ours. The musical bow will by its nature produce the pitches of Just Temperament, for all its pitches are the overtones of the harmonic series, but despite this some peoples, who use the bow, will sing in seven equal steps to the octave. The one interval that does seem to be

common to almost all peoples is the octave; this most probably originates with men and women singing in 'unison' together, for women's voices tend to be an octave higher than men's. It is also a natural step to recognize when any piece of music extends beyond the range of one octave, and this repetition of scalar steps beyond the octave is built into many woodwind fingering systems.

We have many other examples of other scales that do not use what we, in our culture, may consider to be pure tuning. Let us take just one example that may be familiar to many of us today, the Javanese gamelan. This uses two different scales, *slendro* and *pelog*. Both employ the octave, but neither uses a pure fifth or third, the notes that make up our 'common chord'. *Slendro* has five almost equal steps to the octave; *pelog* has seven rather less equal steps. Not one of the steps of *slendro* is the same as those of *pelog*. Nor were the *slendro* or *pelog* in Java exactly the same between one gamelan and another, though similar, before the recent days when almost all gamelans are tuned to the pitches used by Radio Yogyakarta.

Nor are the scales of the Near and Middle East compatible with ours (Wizārat al-Tarbiyah wa-al-Ta'lim, 1934). Nor even, save for the octave, are the pitches of Just Intonation the same as those of the Equal Temperament that we use on our pianos today. Each culture develops the tuning system that best suits its ideas of musicality. It is up to the cognitive scientists to determine why this should be so, but they have to admit, if they are willing to listen to the exotic musics of the world, that these differences exist.

Let us now return to the history of music and of the instruments on which it was played.

At least we do know what instruments some peoples used in the later millennia BCE, for not only do we have a few survivals in our museums from the Sumerian, Babylonian, Egyptian, Greek, Etruscan, and Roman periods, and also from the Orient, but we also have a wealth of iconography, much of it published in the *Musikgeschichte in Bildern* series by the Deutsche Verlag für Musik in Leipzig from the 1960s onwards. This series is, alas,

We see among the Sumerians and Babylonians lyres and harps of various kinds, the latter quite small, a horizontal or vertical soundbox with, at the distal end, a forepillar standing up at 90 degrees, whereas in Egypt harps were normally curved, some of them as tall as the player, others, called the bow harp, were small enough to be held on the shoulder, and these last gradually passed into Central Africa where they are still found today. We see also lutes, a hollowed sound box like a small trough, with the open top covered with a skin to form the belly. A rod acts as the neck and passes through slits in the skin to hold it in place. These also still appear in Africa today. All these instruments were plucked, either with the fingers or a plectrum – the bow, such as we use on our fiddles, was as yet far in the future. There were pipes, usually double, held one in each hand, though sometimes, especially later in Egypt, lashed together so that the fingers of each hand could reach across both pipes. There were occasional drums, some very large, and many forms of rattles. We also see many of these instruments combined into what appear to be ensembles. This use of bands of instruments is confirmed in literature, for example in chapter 3 of the book of Daniel in our Bible where, when all the instruments play together, all those present bow down to the deity. Again in the Bible (II Samuel 6), a band of instruments escorts the Ark of the Covenant to David's city, with David dancing before them to the scorn of his queen. ⁱⁱ Beware, however, of the huge choirs and groups of instruments in the two books of Chronicles; this is a late account, written long after any of the events it records, and smacks strongly of a child's playground exaggeration: 'my brother is bigger and better than yours'.

In ancient Greece, the lyre and the double pipe, the *aulos*, predominated. Lyres came in three forms. The simplest, the *chelys* or *lyra*, had a tortoise-shell body with two vertical curved wooden rods or horns, set in the shell with a third rod running horizontally as the cross-bar. The strings were attached at one end to the bottom of the shell and at the other were

twisted with *kollopes*, strips of skin, and wound round the horizontal bar. These *kollopes* set firmly enough on the bar to hold a tuning, but could be turned on the bar to retune. This type of lyre was taught to, and used for after-dinner symposia, by all educated people. It travelled up the Nile to the Meroitic people, probably in the Hellenistic period, and eventually throughout East Africa, where it is still used today, with the skin *kollopes* replaced with strips of cloth and the tortoise-shell with a gourd or wooden body as the resonator, and a skin belly. A more elegant form of Greek lyre, with longer curved arms, was called the *barbiton*. The professional musician's version, the *kithara*, was much more elaborate, with a wooden box-body and with what appears to be some form of semi-mechanized tuning devices. All three had gut strings that were normally plucked with a plectrum of wood, bone, or ivory, and all three are seen on many Greek vases and statues.

The *aulos* was a reed-pipe, shorter and somewhat stouter than the Sumerian and Egyptian; whether with a double reed like that of the oboe or a single reed like that of early folk clarinets as in the Near East today, is much argued, but Schlesinger's illustrations clearly show both types, though probably more often with the double reed (Schlesinger, 1939). The *aulos* passed on to Rome, where it was known as the *tibia*, to which quite elaborate tuning mechanisms were applied, with rings that could be turned to close off one hole and open another slightly differently placed, so as to play in a different key or mode. There was also a single pipe, the *monaulos*, and that is still found today, with a large double reed, all down the Silk Road, from Turkey, Kurdistan, and Armenia to China, Korea, and Japan. Whether it travelled east from Greece, or whether it originated in Central Asia like a number of other instruments and then travelled both east and west, is debatable.

That several instruments originated in Central Asia, probably somewhere between Persia and the Caspian Sea, is undoubted. The gong started there and was known in the Near East by St Paul (I Corinthians 13:1) as *chalkos ēchon* (Montagu, 2001, 123). The Chinese

encyclopedias said that they got the gong from the West, which also suggests a Central Asian origin. The long trumpet seems to have started there also and it spread across the whole of Asia and to Greece, Etruria, and Rome, and in the Middle Ages through to North Africa as *alnafir* and, with the Moors, up into Spain as the *añafil*, and thence into the rest of Europe, and with the Hausa down into Ghana and Nigeria as the *kakaki*.

According to Al Farabi the Arab *'ud*, that became the lute in mediaeval Europe, also originated there, and so, around the eighth century CE, did the fiddle bow (Bachmann, 1969). Initially this was a rough stick or reed scraping the string, but it was not long before it was modified with the strands of horsehair that we still use today.

This at last allowed stringed instruments to produce a sustained sound, something that could emulate the human voice, as all wind instruments had been able to do ever since their introduction.

In the early thirteenth century, and probably a little earlier, there came a revolution of the instruments we used in Europe. This seems to have been due to the often-interrupted symbiosis of Moorish, Jewish, and Christian cultures in Spain, and possibly also with some effect from returning Crusaders from the Holy Land. A flood of new instruments appeared, as can be seen in the many miniatures of the *Cántigas de Santa Maria*, a series of poems written by Alfonso X, called El Sabio, the wise. ⁱⁱⁱ We see there the Arab *'ud* which became our lute, the small bowed fiddle, the *rebab*, which became our rebec, the reed-blown pipe the *zamr*, which became our shawm, the ancestor of our oboe, several types of bagpipe, harps with a forepillar, various zithers such as the *qanun* that became our canon and then the psaltery, the transverse flute, other types of lute that became our gitterns and eventually citterns and guitars, *alnafir* that became the Spanish *añafil* and our long trumpet, pipe and tabor, the pipe played with one hand and the tabor struck with the other, which became a standard one-man band from the Middle Ages into the sixteenth century, the timbre, a frame drum that became

our tambourine, and the *naqqere*, two small kettledrums, our nakers, that hung low from the belt in front of the player, and eventually became our timpani. Within the ensuing century these spread all over western Europe and can be seen in a great many mediaeval manuscripts, church carvings and other sources.

We know little of the extent that these played together. There are some group scenes in the *Cántigas*, but mostly the miniatures show either one instrument or two of the same sort tuning or playing to each other. We do see large groups of instruments in manuscripts of the following centuries but these are mostly portrayals of biblical scenes or of texts such as psalm 150 and may not represent anything that actually happened in the Middle Ages.

Then in the 14th century came another revolution, this time an industrial one (Gimpel, 1988). All over Europe there had been windmills and watermills, primarily for grinding grain, but often also for minor industrial purposes. Now came the idea of siting watermills under the arches of bridges on major rivers, where the flow of water, restricted by the pillars of the bridge, thus produced far greater force. This powered mills for working metals and, for our purposes, of drawing brass and iron wire to standard quality and in much finer gauges than had been available earlier except in softer, and more costly, metals such as silver and gold. The result was strings for harps, psalteries, and dulcimers and thence to keyboard instruments, first the clavichord, which was a keyed development of the monochord, and then the harpsichord. All, as can be seen in the manuscript of Arnault de Zwolle from around 1440, were established by that date (Le Cerf & Labande, 1932).

The use of keyboards led to a revision of musical pitch and tuning. Just Temperament had served well for unaccompanied voices and some solo instruments, but its inadequacies had now become more apparent. If one depends on the partials of the harmonic series, their ratios makes it obvious that the step from 8 to 9 is greater than that of 9 to 10. To avoid using sharps and flats, let us take these pitches as C for 8, D for 9, and E for 10. And for clarity let us use

the musicologist's interval-measuring system of cents, analogous to the general use of millimetres for linear measurement. The major tone of 8 to 9 is 204 cents; the minor tone of 9 to 10 is 182 cents, and together these make up the third, C to E, of 386 cents. Now if we want to play in C major, all is well, but if instead we want to start a scale on D we are in trouble, for where we need a major tone we have only a minor tone. Voices have no trouble with this for they simply shift the D and the E, but for any instrument with strings such as those of a lyre, a harp, or keyboards, the player has to stop and retune all his strings. The problem was already recognized by the ancient Greeks and it was allegedly Pythagoras who solved the problem and who decided to make all the wholetones the same size, with 204 cents for each. However, adding those together produces a wildly sharp third of 408 cents from C to E, which when used in a common chord with C and G was so intolerable that in the Middle Ages it was regarded as a dissonance. Thus the Pythagorean Temperament was intolerable on the new keyboard instruments, and the music theorist Pietro Aron devised a new temperament in 1523. He returned to the natural third of 386 cents and, taking its mean or average of 193 cents for each whole tone, created the Quarter-comma Meantone Temperament. To the modern ear, accustomed to the Equal Temperament of our piano, with its wholetones of 200 cents and semitones of 100 cents, these differences may seem small, but if one listens to music played in other temperaments, it really does sound different – even today a 400-cent third still sounds quite badly out of tune. This whole subject is quite complex and Barbour, 1951, or the article on Temperaments in the *New Grove Dictionary of Music*, will give fuller details.^{iv} The basic problem is that the natural fifth of 702 cents is incompatible with the octave of 1200 cents; if one piles up a sequence of fifths, C to G, G to D, D to A and so on, the series will never return to C, only to a B-sharp 22 cents higher than C. Somehow those 22 cents, called a comma, have to be brought back into the octave, and this is done, with greater or lesser success, by using one of the various so-called irregular temperaments.

We have been neglecting vocal music. This has continued unchecked through the ages.

When and how choral music, in our modern sense of song, evolved we do not know, but it had certainly appeared by biblical times and by that of the Greek dramatists. While we have mentioned some early suggested musical notations, music was normally taught by rote or simply by listening to others and joining in. What, if any, types of harmony were used, other than singing in octaves, we cannot know for we have no notation system, other than those early ones mentioned above for a basic melody, until we reach the early church chants. Here we meet Gregorian and other church chants. These appear initially to have been purely monophonic, with everyone singing in unison. The earliest notation, called neumes, shows musical movement rather than precise pitches, and can only have served as a reminder of how music, already learned by rote, was to proceed. What pitch the music started on would depend on the preferred vocal range of the singers. Not until the thirteenth century do we start to see music written on a staff, then usually on only four lines rather than our present five-line staff, and with a symbol to tell us which line is C, similarly to our own alto or tenor clefs.

By the end of the twelfth century we have composers such as Perotin writing organum, two or more parallel lines a fifth, fourth, or octave apart, with some slight freedom for each line to ornament a little. Organum probably derives from the organ itself, for while the first organs, which appeared in Alexandria in the second century BCE, were purely monophonic, though with the ability to play a chord, the larger church organs of the ninth or tenth centuries CE, used a system called *Blockwerk*. This meant that each key, when depressed, sounded a chord, a group of fourths or fifths and octaves. We have vivid descriptions of the tenth-century organ of Winchester Cathedral in Britain (Perrot, 1971), and we have surviving pipes from the organ of Bethlehem from the eleventh century of the Latin Kingdom of the Crusaders; the groups of lengths of these pipes show that this organ must also have used *Blockwerk* (Montagu, 2005).

What about secular music? Here our earliest manuscripts seem to be from the thirteenth century with Adam de la Halle and his contemporaries writing motets for singers, and with anonymous, usually monophonic, dance music. Early polyphony, music in more than one part, was normally based on a cantus firmus, or tenor, often derived from a church chant, around which other, more elaborate parts, were woven. Polyphony of this sort seems to have been a purely European development; other cultures then, and in many cases still, prefer a single line or monophony, or if singing in groups or a single line with accompaniment, using heterophony, people all singing much, but by no means exactly, the same. Later motets might have three or four independent lines, sometimes each with their own text, woven together. These, in the early Renaissance led to the madrigals and thence to our various styles of choral music today.

How do we define public performance, and how far back does it go? If one defines it as making music where other people can hear you, it must be as early as music ever existed. Any dance, whether Australian corroborees, war or hunting dances, people dancing on the village green, or any other similar occasions, must have involved music of some sort – how else could people keep their movement together? Here we return to the use of rhythm, and surely to that of concussion or percussion of some sort, whether just body or hand clapping or that of instruments.

The shaman has always used music of some sort, often to help to throw him- or herself into the necessary trance. The bard has always been a valued member of society – and has always chanted and sung his lays, and always to self-accompaniment on an instrument. All these were ‘public’ performances, either deliberately or at the very least where other people could hear them. At what stage was music deliberately performed to a public? Dance again, of course, and in religious ceremonies. The Christian church could be considered to be the first concert hall, with all free to enter and to hear the chant and, as time went on, listening to

the deliberately composed music for the Mass. The mediaeval mystery plays were enacted in front of or within the church, and these always included music and were designed deliberately to draw in the public and to show them aspects of their religion.

When did people pay to hear music? Surely this is part of our definition of public performance. Bards were certainly paid, domestic ones with board and lodging and presumably some cash, and itinerant ones certainly with cash or its portable equivalent, and shamans and medicine-men or -women always with cash or its equivalent, for that was the only way to be sure of a cure rather than a curse.

Formal concerts are said to have begun in Italy with the *Accademia*, meetings of intellectuals and musicians, in the fifteenth century, and private groups of musicians and musically-interested people proliferated in many places, coming together to hear their own members playing and/or singing, for example the German *Collegia*. Aristocratic courts had their own orchestras, often merely for prestige, but sometimes because the prince was himself a composer and musician. All these were private occasions, with admission confined to their members, their friends, and their guests.

Public concerts, with people paying for admission, began first in England perhaps as extensions of the Elizabethan theaters, where again people paid for admission, and which had often included musical performances along with the plays. England had no princely courts such as were common in continental Europe, and it was the first country to grow a middle class educated enough at the many grammar schools to appreciate musical culture and wealthy enough to pay for its pleasures. John Banister, himself a musician, was the first to invite the public to come, pay, and hear his concerts in 1673, and he was famously followed by Thomas Britton, 'the small coal man', who opened a room above his shop to paying customers in 1678 and continued to provide weekly concerts for 36 years. Very shortly afterwards the first hall designed for musical performance was opened in London. It seems

that in other countries such public performances did not take place until into the eighteenth century, and then in theaters and other improvised places, or out of doors. It was not until 1781 that the Leipzig Gewandhaus was built, the first public concert hall on the Continent.

A more elaborate form of music, the opera, began also as a court entertainment, but it rapidly became a public entertainment for which people paid for admission, probably because the costs of mounting an opera are far greater than chamber or orchestral concerts, and the first public opera house opened in Venice in 1637.

This is as far as we need to go for Europe, but what of the rest of the world? We have historical records and encyclopedias of music for the high cultures of China and India. We have, through archaeology, surviving instruments such as the great assembly of Marquis Yi of Zeng in Suizhou, Hubei Province of China (So, 2000; Von Falkenhausen, 1993). This was found in his tomb of around 433 BCE and elsewhere a Chinese set of Neolithic period bone flutes was found and published widely. Through the treasures of the great Depository of the Shōsōin in Nara, (Shōsōin Office, 1967), we know how the instruments of the Chinese Tang court passed to Japan, and through the work of Laurence Picken and his successors how the music of that court changed in Japan (Picken, 1981 ff). All this tells us nothing further of how music began, but it does tell us that music progressed and developed, analogously with our own, in the high cultures of the world.

But we have little knowledge of how, or even whether, music developed and changed in the rest of the world. We have glimpses, patchily, through the ages due to the iconographical records of some areas that we have mentioned above. We know much that goes on today, thanks to those ethnomusicologists who have been working around the world since the latter part of the nineteenth century, and we are dependent on their work for evidence of any possible sort simply because much of the music and the performances they recorded or described has vanished within our own lifetimes due to the globalised transmission of music.

But even with that evidence, to what extent can we project any of it back in time? We could suggest that before the days of European exploration of the rest of the world, from the fifteenth century onwards, peoples in sub-Saharan Africa were so isolated within their individual areas that their musics never changed from one generation to another. But that is a nineteenth-century attitude, of the time when Europeans refused to believe that sites such as Great Zimbabwe could ever have been built by African peoples, before the recognition of the great metal workers of West Africa and the high artistic levels of the Nok people or of Benin. I believe that any form of back-projection would be dangerous, whether in Africa or anywhere else in the world. I think that we simply have to say that we do not know and to admit that if *H. sapiens* could progress to such an extent as we know that it did in Europe and the Middle and Far East, so it could have done elsewhere.

We do have to say that much traditional music is dying out around the world, driven out by the perceived ‘superiority’ of so-called ‘Western’ music. Throughout the world now there are symphony orchestras, even more widely there are all the manifestations of pop and other such musics. Yes, Bach, Beethoven, Mozart, Stravinsky, and others produced great works of music, but so did those of other cultures, and those musics are vanishing and their cultural contexts are dying out and treasures are being lost. And yet tradition manages to cling on, especially in the areas of pop music. West African versions of all the manifold varieties of popular musics do not sound the same as the New York versions. What we hear as ‘World Music’, although heavily influenced by Western instruments and practices, still retains its local connotations and styles. The Soviet idea was that the individual solo performer from the eastern provinces should be replaced with groups on a concert platform with orchestras of alto, tenor, and bass versions of the instruments, still playing their own musics in modified versions of their own styles. Music is and always has been created by people. It changes with time, and the ease of travel from the days of trains and steamships, and especially now

globalization, has accelerated the rate of change from the nineteenth century onwards. But

travel, even on foot and in log canoes, has been with us since the Palaeolithic and so has

inventiveness. Change in music and change in instruments will always be with us, but

traditions, however changed, will always survive.

All the known archaeological instruments that we have, up to the end of the Neolithic period, are listed in tables by Morley, 2013, and many are illustrated and described in his text.

- ii For descriptions of all the instruments, see Montagu, 2001.
- iii Escorial Library, Madrid, Ms. T I 1 (sometimes T. J. 1).
- iv There is also a comparatively simple explanation available on my website, jeremymontagu.co.uk, as a download: Montagu, *Tuning and Tempering*. 1990.
- v This was published fairly briefly as So, 2000, and in much greater detail as Falkenhausen, 1993.

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