Musical Instruments

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Did humans first create musical instruments by accidentally noticing that certain objects produced pleasant or intriguing sounds when struck? Perhaps humans first noticed that their voices carried better in caves or hollows, or reflected against water. Humans may have incorporated the sounds made by striking different parts of their bodies when singing or dancing, or by cupping the hand in front of the face while talking, shouting or singing. Sticks and other objects beaten together initially used to frighten game and drive them into a trap as part of the hunt may have been used later in recreations of the hunt or because of the pleasant and powerful associations that a successful hunt may have had for the group. All or any of these might have been the origin of humans' first attempts to develop sound producing bodies.

After sounding bodies had been adopted as instruments, the long slow process of developing them further and refining the sounds then began. Many instruments, like the flute or violin, even a melodic line played on a guitar, sound very much like they are being played to imitate the human voice. We often use instruments to contrast and alternate with human voices. Many of the first instruments were used by humans to imitate the human voice, or to serve as an interesting modification of it. If all instruments sounded like flutes and fiddles we might logically accept the idea that instruments were modeled after man's own voice. We assume that the man's first instrument was his own voice. He may have even used it to do something like singing before using it to speak. When we look at instruments like the great variety of drums used around the world, and at unique and unusual instruments like, for example, the *cora* of West Africa, or a xylophone or a pipe organ, its hard to think that any of these were modeled on the human voice.

Histories of Instruments

If we look all over our planet, we find that the most common instruments, those found in the greatest number of different societies are the flute and the drum. These two instrument types appear in so many isolated places that we must assume that they may have been invented in several places independently of each other. Future research may find that these instruments were only invented once and so long ago that it was at a time before humans separated into different communities in different parts of the globe. At the moment that appears less likely than that the invention of

the flute, like that of the drum, happened in many different places and at different times.

This does not mean that the flute and some kind of drum were the first instruments. While they are certainly widespread and this does suggest great age, it is also possible that other instruments came even earlier but that the flute and drum spread widely and continued to be used in many contexts while other ancient instruments, say the hunter's bow, slipped out of use. It is possible that hunting may have given rise to some of the first instruments. Early humans must have noticed the resonant sound of the bow when plucked. Early hunters may have used sounds to force animals into traps for freighting them into a small area where they could be easily hunted. Over time these noise producing instruments, such as shakers, rattle, whistles and drums, may have come to be associated with important events and gradually used for other than hunting.

There is no proof that humans developed music along fixed stages or levels, like first using the voice alone, then later using the hunter's bow and rattles and later arriving at a percussion and drum stage, followed by a flute stage. We simply don't have enough documentary evidence to make such a claim and most like never will. We can only say that every human society known to us has first of all, the singing voice and then most, but not all seemed to have developed or borrowed instruments in addition to the voice.

After that things get quite complex. The peoples of Africa developed a wide range and an amazing variety of different music instruments. The many cultures of Asia have likewise been the source of another great body of very different instrument types, very different from those of Africa. The Americas although they produced virtually no stringed instruments, are the source of thousands of different types of flutes, whistles, pan-pipes, drums, beaters, scrapers, and rattles.

Instrument Types and Classifications

Instruments for many human societies show similarities along certain lines. Sometimes it is the manner in which they are played or at other times the material of which they are made sets them apart. Many societies evolved ways of classifying their instruments. No one system of classification is so logical that it is agreed upon in all societies. The ancient Chinese classified instruments according to the material of which they were made, but recognized that there were eight different "elements" in nature from which they could be made. These were stone, metal, bamboo, silk, animal, wood, earth and vegetable. For their purposes it mattered less how an instrument was played or how it sounded than the material of which it was constructed. To the ancient Chinese, the balance of these instruments in an ensemble should reflect the natural balance in the universe between the natural elements of

which the instruments were made.

In the court music of ancient Korea there is a class of music called, "*kwan ahk*", or music for winds, however, this ensemble always includes bowed stringed instruments, because their tone quality and style of playing blends with the winds. This is a case in which the sound of the instrument was the important factor in its classification rather than the material from which it was made, or the manner of playing it.

In ancient India they devised a system for classification which was based on the method of sound production. Instruments were classified as stretched string, vibrating membranes (drums), hollow or pierced pipes (winds) and struck bodies which produce sounds, (bells, etc.). At various points in time performing musicians have created categories which are useful for their immediate purposes. Jazz bands were often thought of as divided into horns and the rhythm section and larger bands subdivided the horns into saxes or reeds, and brass. In the European tradition, musical instruments were thought to be divided in three types, winds, strings and percussion. The European symphony orchestra was traditionally thought of as being divided in this way with the winds further subdivided into brass and woodwinds. This does not strictly work as a classification system, because the flute, for example, is classed as a woodwind and yet it is made of metal. Further, the old Baroque trumpet, called a *cornetto*, was actually made of wood.

These classifications worked so long as one was talking about only those instruments usually found in that single tradition and even then some adjustment had to be made. The study of organology, which is the study of musical instruments, required a way of looking at all instruments and describing them according to some principle. Late in the 19th Century, a Belgian museum curator, Victor-Charles Mahillon, attempted a systematic classification system for all instruments. It was in part modeled after the ancient Indian system recognizing for main categories, strings, wind instruments, drums and idiophone, that is instruments in which the vibrations of the instrument itself produces the sounds. In 1914, two musicologists, Curt Sachs and Erich von Hornbostel devised a very thorough system of instrument classification. A few attempts have been made to modify it or improve one it, but the Sachs-Hornbostel system continues to be encountered most often. In essence the system is like the one from ancient India and uses a basic subdivision into four broad categories according to the nature of the sounding body. These are I: idiophones, that is solid and non stretchable materials which sound of themselves, II: membranophones, actually drums of all types, III: Chordophones, or instruments using stretched strings, and finally IV: aerophones, instruments in which the air column vibrates to produce the sound. It is beyond the basic division into four parts that the Sachs-Hornbostel system really proves useful. Based on the Dewey decimal system, this system of instrument classification allows for numerous sub categories

under each type. For example, there are seven broad sub categories under idiophones. These include concussion idiophones, struck idiophones, stamped or tapped idiophones, shaken idiophones, scraped idiophones, friction idiophones and plucked idiophones (not including stringed instruments). There are several sub categories under each of these seven sub types, allowing for a wide range of different types of sound producing bodies to be categorized. In the same way, each of the four main categories has numerous sub divisions, enough to allow for the classification of every known instrument type known thus far.

The Sachs-Hornbostel System

I: Idiophones
II: Membranophones
III: Chordophones
IV: Aerophones

It is also possible to classify instruments according to the way in which they are played. The Norwegian musicologist, Tellef Kvifte has proposed just such as system in order to accommodate the electronic instruments which have become increasingly familiar and widespread.[1)]

Electronic Instruments

There is no denying that in our times a strong relationship exits between music and electronics. Today we use electronics as an aid to listening as well as in producing music. Amplifiers, CD and cassette players, sound systems, car stereos all use electronics to amplify and make recorded sound audible to us. Electronics are used to amplify live sound in concerts. Traditional musicians in the European classical style insist that the natural sound of un-amplified instruments in a good concert hall or chamber is the way music was meant to be heard. Others have joined in and a small wave of acoustic instrument aficionados has arisen. Still there is no denying that electronics are around and in wide usage.

Following upon the idea of a classification system for musical instruments, we can see that what might be called electronic and electronically aided instruments includes a range of different things. It is reasonable to say that an electric guitar is still a chordophone in which electronics are used to amplify and modify the sound of the string. There are however, other instruments like synthesizers that use electronics to produce the actual sound waves we hear and samplers which take naturally recorded sounds as well as electronically generated and modified sounds and make them available one on each key of an electronic keyboard. These instruments use

electronics in different ways by amplifying, generating or manipulating sounds.

Function, Playing Technique and Timbre

As we recognize and think about or think in music, pitch or tone and rhythm are the elements which come first. Timbre, the quality of the sound or the character of the sound may come soon after these elements in importance.

Whenever we are able to recognize an instrument, for example, on a recording, it is its timbre, or tone quality which allows us to tell which instrument is making that sound, without ever seeing it. The timbre, or sound quality, is similar to that which helps us to recognize a voice when we hear it on the telephone. The sound of each human voice is a different because of differences in the structure of the throat and mouth, the vocal cords, their size and such factors. Voiceprints, a graphic representation of the sound quality of a human voice, as an accurate representation of the sound of a voice and can be used as an identifier, just like a fingerprint. Timbre is what we see when we look at a voiceprint. In the same way because of the way in which they were made, instruments produce different timbre patterns. The proportion of different partials of the natural overtone series produced by each instrument creates a different pattern. The pattern of these sound differences can be seen with an oscilloscope, a scientific instrument that shows wave patterns. With the oscilloscope we can see that the sound of a violin, for example consists of a much more complex wave pattern that a flute.

Timbre is very important to musicians beyond the basic fact that each class of instruments produces a different timbre. It is the timbre of each particular instrument that makes musicians choose one instrument over another as their best one for playing. It is also what makes players of reed instruments so careful about their selection and treatment of reeds. Everything about the structure of an instrument affects its timbre. All violins may show similar sound spectrum patterns, because of the similarities in the method of construction. However, violins which are considered by violinists to be of the highest quality like those made by Guarneri or Stradivarius have refinements of structure, of the choice and seasoning and treatment of the wood which, in the eyes of many musicians, make them exceptional in tone quality.

Details like the smoothness or roughness of the inside of a barrel drum affect the tone quality as does the thickness of the skin and the animal from which it was made. Strings can be made of many different materials. In modern times, increasingly musicians are choosing and adapting to strings made of steel or nylon whereas in former times many of these same instruments used strings of animal intestine which produced a sweeter, mellower quality. The durability and easy availability of steel and nylon has been a more important factor. Some instruments

used string made of brass that also produced a rich smooth sound, but since brass strings often broke these too have come to be replaced by steel. The kind of wood or bamboo from which flutes and other wind instruments are made affects their tone and careful seasoning, sometimes smoking in the case of bamboo helps to achieve the desired tone quality.

The manner by which a drum is struck is vitally important to its sound. Different sounds are produced if it is struck by the bare hand or a stick. The kind of stroke makes a difference, which part of the hand or with which fingers, all affect the tone quality. The kind of stick if one is used and whether the stick is thin or thick and has a knob on the end or is padded makes a difference in tone.

For reed instruments, how far the reed is inserted into the mouth has an effect and does the thickness of the reed and the manner in which it was treated in preparation for its use. The manner in which strings are plucked, with which finger, or which a plectrum, or pick, or if they are bowed all has a great effect on the sound quality. All of these things are predetermined in the culture or the musical tradition. At the same time, small individual differences in the playing technique by each musician within the same tradition also affect the tone quality and help to distinguish one player from another even when they are part of the same tradition.

It is tone quality that guides the blending of different kinds of instruments in a mixed sounding ensemble like a Western symphony orchestra with its strings, woodwinds and brass instruments. It is also tone quality which guides the blending of large ensembles like the Javanese and Balinese gamelans in which most of the instruments are metallic idiophones, gongs and chimes. Tone quality is what enables us to distinguish individual instruments and voices in ensembles and is our key to separating mixed sounds into discrete and identifiable units.

It is what instruments tell about the process of diffusion and spread of ideas between cultures that is most interesting and about what it tells us about the people who are making the music. The path of diffusion of music and the manner in which these musics have been modified at each point tells us much about the individual cultures.

The Interesting History of Brass Bands

We don't often think about the history of things with which we are familiar. Sometimes, however, tracing the development of musical forms and styles can tell us much about the way in which humans share culture and at the same time, by observing the pattern of changes which are made to the newly adopted culture, we can learn about what is considered unique and important in each of those cultures.

Somewhere in the old world, perhaps in Central Asia or in India, but probably not much before the 14th Century, an outdoor ensemble came into fashion. This band of instruments had certain important elements in it. It consists of long straight

trumpets, conch shells blown into like trumpets, some kind of double reed instrument, similar to an oboe, and then a double headed stick struck drum and cymbals. This band of instruments fulfilled two regular and important functions: In the cities where there was a court, or in large cities which were surrounded by city walls, as was often the custom in the ancient world, these bands were stationed in the towers above the city gates. Here they played music to sound the hours of the day and also played music to announce the arrival and departure of important people, like the king, emperor, or maharajah, of the ruler of the palace or city. This is one of the early forms of civic music. It functions not only to announce what is happening by its sound, but also symbolically represents the authority of the ruler.

Fig.64 Small ensembles of musicians have little need for a special conductor or director. By listening carefully to each other, they can make adjustments in expression and tempo, most often without even looking at each other but solely by listening. This is a practice which is found in many cultures of the world, from small Jazz groups, to Asian chamber ensembles and to group such as those depicted here. Odl engraving of a Turkish *mehter*, military band.

Fig.65 The Korean tower band ensemble, *kunahk*. In the days of the Korean Kings bands like this were attached to the city gates and they played special music as the King or other noblemen entered or left the city.

The sound and ceremony of this wind band must have impressed visitors to the places where it was played, because it was soon imitated in many places. The courts of India, China and Korea soon had wind bands of this type attached to the palace gates. With the spread of Islam the use of these watch bands spread throughout the Middle East and as far as the Islamic cultures of West Africa in Nigeria. The Turkish armies of the Ottoman Sultans used these wind band as the basis of their military bands and employed them as they went into battle for the conquest of Europe. Although the Turks did not succeed in conquering Vienna, along with the drinking of coffee, the military bands made a strong impression on Westerners and the military band as we know it. Previously, military bands were simply small bands of wind players employing such instruments as clarinets, horns, oboes and bassoons. Now there began the formation of large ensembles with brilliant brass sections and powerful percussion instruments. This new music soon became adopted as an official music for the populations of large communities. Brass bands were used not only for the military, but as the accompaniment for civic ceremonies and for dance parties and eventually for civic concerts and were the reason that many cities, even in the United States, soon had either a kiosk in the park or a concert shell for concerts by brass bands.

Different cultures within Europe developed their own repertoires and playing styles. The German, French and British band styles developing styles which were

distinctive. During the 19th Century it was the practice for the military bands to wear elaborate and colorful uniforms and to march directly into battle along with the troops, often suffering heavy casualties as well. The French style of military band is particularly important in American musical history because out of the French band music was widely played in the Louisiana area under French and later under American rule. This French style brass band music gave rise to the development of New Orleans Jazz which later evolved into other Jazz forms and went on to become a major influence in American music. Even today the use of brass and saxes in modern popular ensembles traces its roots back to those ancient ceremonial wind bands of India and Central Asia.

The Spread of the Double Reed Pipe

One of the instruments of the outdoor watch or tower bands of ancient Asia was the small double reed pipe which was called *sona* in China and *shahnai* in India. This double reed instrument spread with the popularity of the wind ensembles all the way across Asia to the West and across Muslim Africa where it survives in Nigeria and Morocco where it is known as *algaita*. After it was introduced into the west it went through a series of developments, eventually giving rise to a family of instruments, the oboe, English horn and the bassoon. It was introduced into Spain and Portugal where it was known as *dulzaina* or *chirimia*. The Spanish conquest of the New World introduced the instrument to the indigenous peoples there and bands using the *chirimia* and drums are found in many Indian villages in Mexico. Although the outdoor wind band developed in Asia after Japan severed contact with the outside world in the 9th Century and thus this conical double reed was never introduced, it was brought in much later by the Portuguese who came to trade and also attempted to spread Christianity. For this reason, the Japanese version of the instrument is called *charumera* in imitation of the Portuguese, *charumela*. In Japan this instrument was only used by noodle vendors late at night as they wandered through the streets announcing that they had noodles to sell. Note that this instrument is quite different from the cylindrical double reed pipe, the *hichiriki*, which was in use in Japan for Centuries as part of the ancient court orchestras retained there after being introduced from China and Korea in the 6th and 7th Centuries.

Notes

1) Tellef Kvifte. Instruments and the Electronic Age. Oslo: Solum Forlag. 1989. 187pp.