

Drums, Drummers, and Drumming



Jeremy Montagu

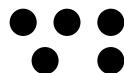
Hataf Segol Publications

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**Hataf Segol
Publications
2020**

Typeset in X_ELa_TE_X by Simon Montagu

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‘DRUM LANGUAGE’

In quotes because although this is the best-known name for the subject, any instrument can be used, including human whistling or other sounds. Another name used was the bush telegraph, especially in earlier times when white explorers, missionaries, and other travellers could not understand how detailed messages travelled so fast and so far across Africa – they could hear the drums, were sure that they were signalling, but did not understand that the drums were talking and how subtle the language was.

Drum language can be used, and understood by those capable of doing so, wherever a language is tonal, i.e. depending on pitch patterns to distinguish between one identical word with another. Even in English we use pitch patterns to indicate emphasis or to enhance comprehension, but we do not normally move an accent away from its normal position. In Chinese and in many African languages, they do indeed do just that, so that the words úpwarts and ùpwards could mean quite different things, and with neutral as well as high and low, three-syllable words can be different again if the language were tritonal rather than bitonal. The convention in transcribing tonal languages is to use the acute accent for high pitch and the grave accent for low pitch, as here.

Of course there are many words that have the same number of syllables (two in the example above) and the same accent pattern, so redundancy is necessary. For example: “The man is coming,

The man who collects taxes is coming, The government man who collects taxes is coming, The government man who collects taxes and takes your money is coming, The government man who collects taxes and takes your money is coming tomorrow”, and so on.

For long range use, slit drums are often used, hollowed logs with a long slot on one side, through which the log had been hollowed. One lip of the slot is thicker than the other and so the pitch differs when struck on one lip from the other. The sound carries well over long distances and can be picked up by those far away and retransmitted even further away. Slit drums are also widely used for signalling in known codes, but can only really talk where there is a tonal language. They are also used for musical purposes in many areas.

Another good long-distance instrument is a horn, often of ivory in Africa (animal horn is cheaper but the sound does not carry quite so well). There, these are side-blown with a finger-hole (more strictly a thumbhole) in the tip. The pointed end of the horn or tusk is cut off and a hole is bored down to meet the end of the natural cavity, or else the tip is cut off at a point where the end of the cavity is revealed. The diameter of the resulting hole is sometimes slightly enlarged, or is even reduced by bushing it with bark or leaf, to affect the pitch – the wider the hole the higher the note produced by opening the hole, the narrower the hole the lower. The fact that this is sometimes done, shows that the difference between the open and closed pitches can be impor-

tant. The distance from the blowing-hole to the open end, or to the thumbhole, does not affect the pitch. A third and even further pitches can be obtained by partly closing the end of the bell with the hand, though that will somewhat degrade the carrying power of the sound.

For local use, in West Africa, Nigeria and Ghana for example, a pressure drum is often used. This is an hourglass drum, as it were a cup at each end of a hollow stalk. There is a skin head on each end, with a multitude of thongs passing to and fro from each head, the thongs usually closer together in Nigeria than in Ghana. Holding the drum between the upper arm and the body, the player can squeeze the thongs into the drum's waist and so tighten the heads and raise the pitch. I remember being at a conference once where there was a musical party one evening. During the music, I was talking to my Nigerian friend Azùbíkye when we heard the drum sound —́—́—́—, and Azùbíkye got up and walked across to the drummer and took over his role.

Also used is an iron double bell, two bells side by side, linked by an iron U-shaped curve from the apex of each in Nigeria, or a smaller iron bell on the back of a larger one in Ghana, all forged in the one piece. These, like the pressure drums, are used for music but also for talking. In Ghana there is a standard pattern in much music, where the bell plays kónkólòkónkónkólò repetitively, and all rhythms and melodic parts revolve around and relate to that pattern.

By no means everybody in these cultures can understand drum language, but in every community there will be some who can. Nor does this use need to be loud; quiet hissing on different pitches in a neighbour's ear can be an all-but secret language. And any instrument capable of producing more than one pitch can be used. Women in compounds in the Hausa area can talk from hut to hut with a long gourd, open at each end, one end stamped on the bare skin of the thigh and the other end shaded with the hand to change the pitch, apparently just a series of quiet plops on different pitches as the air is pushed into the tube.

China also has a tonal language. I am assured that the main part of China makes no musical use of this quality, but I have heard examples of it in the western border areas. There mouthorgans and other instruments can be used to talk. I have a couple of Burmese horns, probably from the Karen people, side-blown via a free-reed like that of a mouthorgan instead of by the lips, with a thumbhole in the tip, and these were used for talking and signalling.

German is also a tonal language, but I have never heard of it being used in this way – maybe it was once in much earlier times?

In parts of Oceania, lovers are said to talk with nose flutes and jews harps, though whether this is drum language or whether it is just playing love songs to which the words are known by both parties, I don't know. Certainly it is said that when the boy plays quietly outside the girl's family hut, she knows what he is saying.

In southern Europe, and not only among the Basques and the Canary Islands where the practice is well-known, and in many other parts of the world, whistling is used to talk, not just to signal, but to reproduce speech. The sound can carry well over a mile from one whistler to another. This is all mouth-whistling – whistles, especially those with a fingerhole can also be used for bitonal languages, but otherwise they are just signal instruments.

What is important is that all these practices are speech and not codes. The ship's boatswain or bo'sun can signal, but each of his pipes (the word used in the Royal Navy for each melodic pattern) has a single meaning – this is a code, not speech, even though each has a meaning. Similarly Morse is a code; each group of long or short sounds produces a letter and those letters can be combined into words, but the sounds themselves add up to a code. Drum language, bush telegraph, is a way of replacing full verbal speech by musical means.

SLIT DRUMS

Slit drums are found all round the central belt of the world, from Africa through Asia, Indonesia, Oceania, and Central America. Because slit drums are made of wood or bamboo, they are biodegradable, and therefore we only have evidence for them from comparatively modern times, and so we cannot tell whether or not they might have been used in antiquity and back into the Stone Ages. Certainly they were used in the near-modern lithic cultures of pre-contact days, and are still used today in many of those areas. It would seem improbable that they were not used in our own prehistoric times, but this can only be speculation. They do not seem ever to have been used in Australia, nor are there any known traces of their use in pre-contact North America, although they were certainly used in Mexico, nor does there seem to be any evidence for them south of the Tropic of Capricorn.

Slit drums, as said above, are usually made of wood, or sometimes bamboo. They vary in size from something that can be held in the palm of the hand to logs two or three metres long and a metre or more wide. They vary widely in shape, though most are longer than they are wide, with a probable majority tubular in shape. Some are rectangular, like a hollowed brick, some globular, some much deeper than they are wide, some triangular with a wide base and a narrow top for the slit. Quite often they are marginally zoomorphic, with a carved head at one end and a tail

at the other, for example in New Guinea with a crocodile head or in Congo with an animal head such as that of an antelope.

They are usually hollowed out through a slit in the upper side, and while the hollow may be no more than the same length and width as the slit, it may be far wider internally than the width of the slit. Acoustically they function as struck Helmholtz resonators, the basis of their pitch being the volume of the hollow, modified by the open area of the slit. The pitch can be further modified by the thickness of the lips of the slit, with one side of the slit giving a higher pitch than the other, or by loading one of the lips at one point by leaving a lump of wood projecting internally – this latter pattern being common in New Guinea.

The realisation that they are giant Helmholtz resonators came from a field report that was brought back by Raymond Clausen from when he was on Malekula in Vanuatu. He watched people making a new standing dance drum in honour of their chief. They were determined to produce the lowest possible pitch, so they cut down the largest tree they could find and dug out the longest possible hollow, with a full-length slit, and were then horrified to find that the pitch was one of the highest – the area of open hole was the largest of any of the other drums, so the pitch was the highest. The proof that the area of open hole controls the pitch is easily demonstrated by striking the drum with a beater in one hand while progressively occluding the open area with the other hand.

Most commonly, slit drums are used for signalling, either rhythmically or, in areas such as Central Africa where languages are tonal, using different pitches to imitate the rhythm and tonality of the spoken language, and so produce verbal speech patterns, as described in more detail in the chapter on Drum Language. They are also often ritual instruments, for example the Chinese *muyu*, known to us as Chinese temple blocks (and as ‘skulls’ in jazz bands). These are the globular ritualised shape of a fish’s head and derive from the earlier pattern of a carved fish with a slit in its back, but are now no more than the fish’s head, with the slit as the fish’s mouth. The fish pattern is used because a fish is thought never to sleep and can thus always be awake as a messenger to the heavens. Also used, in the same Confucian temple rites in both China and Korea, is the *pan*, a rectangular block with a deep narrow slit in the side just below the upper surface of the block; these were also used in jazz bands as Chinese wood blocks. Both forms have migrated into our orchestras as parts of the drummers’ kit – see the chapter on Trap Instruments.

Slit drums are also used for music. The large standing slit drums of Malekula surround the dancing ground, but as well as these, there are smaller slit drums resting horizontally and others small enough for dancers to hold one in the hand and strike while dancing. The Mexican *teponatzli* is also used musically, though this is rather differently made, for it is hollowed from the underside and then closed with a wooden plate, leaving two tongues free on the upperside, one projecting from each end, with

each tongue producing a different pitch. In parts of West Africa there are drums with multiple slits, each a different length and/or width, again to provide different pitches; these have been copied for some of our children's percussion bands. The zoomorphic and triangular slit drums of central Africa are also used musically and for dance.

One form of slit drum seems to be unique to the island of New Ireland, part of the Bismarck Archipelago and thus under the administration of Papua New Guinea. This is the *livika*, a slit drum with three tongues to give four pitches, the fourth produced by the solid end of the block. Unlike any other slit drum, the *livika* is not struck but is rubbed by the player's moistened hands.

Somewhat analogous with slit drums are the tortoise shells of some South American tribes. These are simply the upper and lower shells of the tortoise, and, like the *livika*, they are rubbed by the moistened hands. They seem to be used only as ritual instruments, and, because they are natural objects rather than something artificially hollowed out, they probably should really not be included here.

Small hand-size slit drums of wood or bamboo have been carried in South America, Indonesia, and probably elsewhere, by travellers who do not wish to be endangered if local peoples suspect them of being thieves or spies. They therefore strike the drums to make their passage obvious and innocent, and to signal that they are peaceful travellers.

It can also be difficult to separate wooden animal bells from small-size slit drums. These are widely used around much of the world, since wood is cheaper than metal and in some areas more easily available. They are only differentiated from slit drums by having a clapper suspended inside to strike on the lips. Most are more or less globular in shape, though in Bali the shape in profile is rather like that of a European cocked hat, with a long narrow slit interrupted in the middle of its length by a circular opening in which the clapper can swing. Tubular ones of bamboo, usually with two external clappers, are common in South East Asia. It is arguable that our metal pellet bells might derive from the more globular forms of wooden cattle bells; certainly we do see wooden pellet bells in some areas.

DRUM SHELLS

A drumskin cannot exist without the support of a body, a drum-shell.

Drum shells, the body of a drum with a skin over one or both ends, come in many shapes. Basically these are closed bodies (kettledrums), tubular drums, which cover all the following shapes, include cylindrical drums, conical drums (one end appreciably narrower than the other), biconical, hourglass, barrel, goblets (like a wine glass), and frame drums, conventionally defined as shallower than the diameter though this is ignored when dealing with such things as narrow bass drums.

I have often claimed that the earliest drum was made from an animal that had been cooked in a cauldron, covered by the skin in which the animal had lived, but in fact by far the likeliest is a skin drying on a frame, as described in more detail in the previous chapter. Skins, once cleansed of the fats and tissues adhering to them, are tied with cords to a frame to dry out, and once dry, and therefore under tension, will sound by anyone passing by and striking them, and these surely are already frame drums of a sort. Since cleaning skins for clothing and cooking food are each an element in prehistoric life, we shall never know what came first.

A closed shell such as a cauldron or kettle helps the skin, the drumhead, to produce a defined pitch, and these are found in many areas, often as art musics.

Cylindrical drums are more common around the world, and because many are made from tree trunks, the fact that one end may be somewhat narrower than the other does not change their name. A conical drum is only called that if one end is deliberately narrower than the other. Many are cylindro-conical, cylindrical for part of the depth and then more sharply conical. Biconical are those that are waisted and flare out with straightish sides each side of the waist, in contrast with those waisted drums that are cup-shaped at each end (hourglass drums). The two tend to merge into each other and sometimes either name may apply. Barrel drums contrast with waisted drums for the middle of the drum is wider than the two ends. One thing that complicates these is that the interior of the drum may in fact be waisted, and unless one can remove the heads there is no way to discover this.

The waist is an acoustic feature which acts to clarify the pitch of the drum, and this applies also to goblet drums. Another advantage of the waist is that if the tension cords go from one head to the other, they can be squeezed into the waist and so alter the tension of the heads and thus vary the pitch. Such drums are used in West Africa as ‘talking drums’. They are used in India also as variable pitch instruments, both as struck drums and as pellet drums with cords that swing to strike the heads.

Most drums are circular in section, or more or less so, especially if they are made of natural materials such as hollowed trees or ceramics that have been turned on a wheel. Almost any shape of drumshell is easier made in a circle than a box, and the head

is also more easily fitted to the end of a circular tube. The only rectangular drums commonly seen are frame drums, and these are usually square or occasionally oblong. They are often double-headed and may have rattling elements fitted internally.

Some body shapes are difficult to define such as the Lappland spirit drums, which have an almost closed shell but with enough cut-outs in the body that they cannot really be defined as kettle-drums. Another is the cylindro-conical drum characteristic of Uganda. These have the head braced with innumerable thongs to a small patch of skin over the bottom of the body. Without taking the heads apart it can be difficult to determine whether the bottom of the body is open or closed and therefore whether these are kettledrums or not.

And in Central Africa a number of slightly waisted drums have a hole though the wood in the waist into which a miniature drum is placed over the end of which a thin membrane is fixed to add a buzz to the sound.

Another special form is found in the Himalaya-Tibetan area where two human skulls are fixed together at the tops of the crania to form a type of hourglass drum. The open part of each cranium is covered with a skin, sometimes allegedly human, and the drum is twisted to and fro so that the pellets on the ends of two cords or ribbons can strike the drum heads. These are usually played along with trumpets of human femurs or tibias in Temple rituals.

THE FRAME DRUM

Since skins, as clothing to protect us from the cold, were dried on a frame in the earliest days of hominid development, we might well say that frame drums may have been the earliest of all our skin-headed drums.

A frame drum is, by definition, a drum that is wider in diameter than its depth. Some, like our modern tambourine, have pairs of miniature cymbals, set on axles in holes cut in the frame, to add a jingling sound, but this seems to have come fairly late, perhaps not until European mediæval times when we see such drums in miniatures and church carvings from around the fourteenth century onwards; none of the earlier iconography that we have shows any such jingles. Others, still used in much of Central Asia, have rows of steel discs or rings stapled round the inside of the frame of the drum, to rattle together, and this, because we can never see such details in the iconography, might be very much earlier in date. Others, especially today in North Africa, have one or more strands of gut running below the drum head inside the frame, fixed between the top of the frame and the skin head, and the same applies here – we can never see such a detail. And others are plain, just a skin and a frame, but this is much rarer because most peoples around the world seem to prefer something more lively than the simple reverberation of a drumhead.

It is true, over much of the world, that the frame drum was and is a woman's instrument, in some areas even more so than as a man's. There seem to have been rules and traditions that prevented women from playing other forms of drum, even the kettledrum which, being made from a cauldron in which the women would cook the animal that had lived in the skin that now formed the head of the drum, may have been forbidden to women. Kettledrums, though, have often been status instruments, royal instruments even, so obviously they would have been reserved for men in all male-dominated societies.

But women were free to use the frame drum. One reason, perhaps, is that one of women's duties is to prepare animal skins for use as clothing and some other purposes.

First the animal has to be killed, skinned and flayed, removing traces of flesh, and soaking in water for a day to remove any dirt or blood.

Then there seem to be three main ways of carefully preparing a skin. One is tanning, soaking the skin in a solution of tannin, such as oak bark, urine, dog-shit, and other materials; this is to produce leather. Another is tawing, a different process from tanning, using a solution of potash and alum. This produces a soft white leather, including sheepskins and other animal skins, but also coloured for cricket balls and book bindings. A third is soaking it in a dehairing liquid of rotted or fermented vegetable liquid, including stale beer, and then stretching, skiving, and drying the skin to produce parchment or vellum – the difference be-

tween parchment and vellum seems to be the age and size of the animal, larger and older (eg cows) for parchment, smaller and younger (calves, goats, and sheep) for vellum. A fourth, by far the earliest and simplest, seems to be just drying, soaking, and then suppling, for clothing and other early uses such as tents, though other than stories of Eskimos chewing the skin to supple it, I have not succeeded in finding out how else this is done; Wikipedia is less informative in such details.

For drumheads in our own culture, vellum is considered to be the best, and parchment second best. In much of the rest of the world, just soaking and drying often suffices for drums. Since we are concerned here with frame drums, vellum is the norm worldwide – heavier skins such as antelopes, cattle, etc, often with the hair left on, may be fine for larger stick-beaten drums, but for hand- and finger-playing, parchment and vellum are the answer.

Skins are dried on a frame to stretch them as part of the process in both our third and fourth categories above, and while they are still damp and held in this way, parchment and vellum are skived, using a demilune blade, to scrape them to the desired thickness and evenness – industrially today, machines are used with abrasive belts.

Drumskin will only sound when it is under tension, and once it has dried on its frame, it is naturally under tension, and a casual blow (by a mischievous child?) on such a skin may well have been the origin of all skin-drumming, the realisation that skin will produce a sound. But for all normal drumming, a shell is needed,

whether a cauldron or some other hollow vessel for kettle drums, or a tubular body, open at each end, for many other shapes of drum, or simply a narrow frame for our frame drums.

The simplest is a circle of bent wood or other material that will bend and hold its shape. The skin can be simply stitched round such a ring, as with the Greenland Eskimo drums. The rim of a broken pot has been used for the Nigerian *sákárà*, though better ones are specially made in the shape of a rim; I have examples of each. The commonest is a bent circle of wood, whether with a nailed or glued overlap, or a scarfed joint (each end planed down to avoid any localised thickening of the joint). Nailed or morticed square, triangular, hexagonal and other shapes of frame are also often seen.

Then the head has to be attached. For a single head, the skin is first soaked again. The simplest way of attaching it is to fold it over the frame and turn it up into the interior of the shell, relying on the natural glues in the collagen to hold it in place once it has dried. Alternatively, it can have holes pierced round the edge of the skin, then folded over the outside of the frame, and cords run to and fro through the holes to hold it as tight as possible while it dries. Some drums are left like that, but others, such as our tambourines, are then nailed round the circumference, just below the upper rim of the frame, and then the unwanted part of the skin cut off. Alternatively a narrow wooden ring can be nailed over the skin to hold it. Or the head can be lapped (American, tucked) on

to a flesh-hoop and tension screws fitted with or without a tension-hoop. Other more modern methods are also used today.

Double-headed frame drums are usually triangular or square, sometimes a waisted sub-rectangle, folded over the frame on one side with the other sides stitched together. These are common in Portugal and North Africa, with at least one surviving from ancient Egypt, and others can be seen in Iberian mediæval manuscripts. Circular double-headed drums, for example in Tibet and China, have the heads fixed in much the same ways as our tambourines.

Remember, as said above, that drumheads will only sound when under tension. This has always been a problem with any drum with a fixed head, i.e. without tension cords or screw brackets, etc., such as most frame drums. One common method of adjustment is by damp or heat. If the head is too tight, rubbing it with a damp cloth or swishing a little water round the inside of the frame are the usual ways. If it is too slack, then holding near a fire tightens it, or if no heat source is available, rubbing the head briskly with the hand tightens it by friction, which generates heat. Neither method is practical on the concert platform – delaying a concert performance in the middle of a piece of music by going off the platform to look for water or a fire is unlikely to please a conductor. So a number of makers today have devised hidden methods of adjusting the tension. The use today of plastic heads saves much of this trouble.

Frame drums appear in carvings in ancient Mesopotamian reliefs, painted on many ancient Greek pots, and also in the text of our Bible. We know from the Book of Exodus that after the crossing of the Reed Sea, Miriam and her women took their *tuppim* (the plural of *tof*) and sang in praise of the Lord, and I think that we can guess that they danced as they sang. *Hal'luhu b'tof umahol* is a verse from Psalm 150 – Praise Him on the drum and ? And what? *Mahol* has a meaning of hollow, but was it a hollow piece of reed on which someone could pipe, or was it a ring of people dancing in a circle, that most common form of dance in that part of the world? It could be either, for the *tof*, the drum, goes so frequently with each. Pipe and drum, dance and drum go together like bacon and eggs (perhaps not the best analogy for a psalm of the Bible), so which it was we may never know. At least we have no doubts about the meaning of *tof*, for it is the same word as *duff*, the common Arabic name for the frame drum.

Frame drums are spread all around the world, differing in shapes and in use. Often they are sacred, for example all around the northern Arctic circle, and down into the Americas. Siberian shaman's drums often have an iron frame at the back to strengthen them and to be used as a handle, or sometimes a network of cords; they are struck with a beater of animal skin. Finnish sacred drums, used for divination, are also struck, but with a decoratively carved T-shaped wooden or bone handle; they are marginal among frame drums, for they have a wooden shell that is almost closed at the back, verging towards kettledrums. The Javanese

terbang also comes into that category, again verging towards the kettledrum because of its curved wooden back. Alaskan frame drums are also struck with a beater, often of sealskin, and more usually on the frame than on the head. The Irish bodhran is also struck with a beater, usually double-ended; traditionally they were often made of old sieves, a goatskin head replacing the wire mesh; I asked an Irish friend where he got his heads and he said he took out a shotgun: “They never know how many goats they have”.

Elsewhere frame drums are more often dance instruments, and, as above, often specifically women’s instruments, though men may use them also. In the Greek Dionysian cult, the mænads, the women who followed him into the hills, played their frame drums. The only areas which seem to have no trace of frame drums are Australia and Oceania, though they are common enough in Indonesia, which borders that area; perhaps they arrived there after the emigrations into Oceania.

In China and Tibet they are most often double-headed, the Tibetan ones elaborately painted, and mounted on a pole as a handle, and struck with an S-shaped beater, and in China they are often decorated with painted dragons and other symbols; a ring fixed in each side holds them in a frame. These were commonly used in the early New Orleans jazz bands as Chinese tom-toms, along with Chinese woodblocks and temple blocks (*muyu*) though how they got there I do not know; perhaps as extra stock in Chinese grocery stores?

Decoration is also common in North African double-headed drums, but differently done. Before they are folded over the frame, a hot iron is used on the underside of the skin to raise patterns of lines that are then coloured. I have a triangular example with a *hamsa* pattern on it, the well-known protective figure of a human hand, and a square one with leaf-like patterns. The Portuguese square ones are larger and usually unpatterned, but all have rattling elements, sometimes just a snare internally, but in my Portuguese *adufe* there are also jingles internally.

The Moroccan and Libyan examples of single-headed drums that I have, usually just have a snare under the head but I also have very large Moroccan ones with pairs of cymbals let into the frame. One characteristic of North Africa and the Middle East seems to be that the frame drums are used for dance and what we might call light music, whereas the goblet drum, the *darabukke*, or *dombak*, is used for more serious music.

A Japanese one that I have is built like a heavy window frame and has a very thick head (I think cowhide); it is marked on the back with the name of a famous master-maker, Maruyama San-zaemon.

A modern Israeli example that I was given by a drummer colleague has a hard plastic head with ridges built in to make thumb-rolls easier, and modern pop-groups often use headless tambourines, just jingle-rings that are not frame drums at all, because they are not drums but instead are rattles.

An innovation in Europe of the late eighteenth and early nineteenth centuries was a fashion for ladies' frame drums, the head often nicely painted, somewhat in the style of Angelica Kauffman, and often with pellet bells as well as jingles on the frame, plus decorative ribbons. These usually had both counterhoops and flesh-hoops and tuning brackets. I have not encountered any literature to explain what the ladies used them for, but one does see them dancing and sometimes singing at the same time.

DRUM HEADS

Every skin drum must have either one or two heads, the word we use for the skin. With the two-headed drums, the heads may have more than one function: one is to be struck, or sometimes rubbed or vibrated in other ways; another may be to tension the other head; a third may be to vibrate in sympathy with the other end; a fourth may be to make something else vibrate against it as in our snare drum; and a fifth may be just to close the other end.

The head/s can be made of almost any substance that can vibrate. With toy pellet drums, as in Japan, it may just be paper. With the Dong-Son bronze drums, the head too is bronze. With some of our modern drums the head may be a film of some plastic. But the vast majority are made of an animal skin. Snake skin is quite common, in both New Guinea and Africa for example, fish skin somewhat rarer. Antelopes of all varieties are widely used, and so are camels. Often the skin comes from the animal nearest to hand. The best quality comes from goats and calves, with adult members of the cow family used only where necessary for very large drums.

One essential for a drum skin is that it must be under tension. A slack skin will not vibrate and will produce no sound. This is often, around the world, the reason for our second function of a head above. One of the easiest ways to tension a head is to brace it with thongs to a second head either tightly enough to hold it under

tension or often by applying braces to the thongs to tighten them further. This, too, is why those who suggest that drums must have been one of mankind's earliest instruments are wrong – devising ways to tension heads come late in human history.

Drum skins are hardly ever tanned, but are treated in the same way as is the parchment or vellum used for writing and painting. The skin is soaked to remove most of what adheres to it, and then it is scraped (skived is the technical term) to the required thinness, initially of course by hand on a frame, but nowadays by machines. It was in the early nineteenth century that suitable machines were devised to produce the thin skins that we still use today. This considerably affected the types of sticks that were used. Eighteenth-century and earlier side-drum sticks were much heavier than they are today, for the weight of the stick must match the mass of the skin to get the best sound from it, just as both lighter and heavier beaters are used in different communities all around the world.

With two heads on a drum, vibrating one head will inevitably set up sympathetic vibration in the other head. This is useful because the sound of a drum is often dull, and to brighten the sound a snare, most often one or more strands of gut or other suitable materials, is often fitted over one of the heads. In the European Middle Ages the snare was on the batter head, the struck head. Later, with the advent of the side drum, the snare was moved down to the other head so as keep it out of the way of the beaters. On some drums, especially frame drums, the snare is fitted

between the drumshell and the head as an internal snare. Other types of frame drum have other types of rattling elements built in.

Comparatively few drums are struck on both heads; one of the few examples of this is our marching bass drum.

There are many ways in which drums are sounded. The commonest is by striking the head with a beater, but more subtle effects are achieved by using the fingers. Another way is by rubbing the head, though this is more often done by an agency, such as rubbing a stick or a string attached to or standing on the head. Plucking a string attached to the head changes the instrument from a drum to a resonator, as with some Indian plucked drums which are nowadays defined as chordophones. Another way of reclassifying a drum is by singing into it, as with a kazoo – these are classed as aerophones.

One important aspect which is often neglected is that every drum head is pitched. This is recognised with kettle drums, those with a closed shell such as our timpani and the Indian tabla, and also with goblet drums such as the Iranian donbek and the Arab darrabouka. But every other sort of drum has a pitch, even though less clearly defined, and it is incumbent on every drummer to be aware of this and to adjust the tension either favourably or to avoid a clash with other instruments.

BELLS

There are two basic types of bells: hanging bells (whether from a church tower, etc or dangling from the hand on a handle), and resting bells. Hanging bells have their mouths downwards and resting bells have their mouths upwards.

Hanging bells can either have internal or external clapper/s attached to them, or can be struck with a separate beater, whereas resting bells always have a separate beater that can strike it or rub it.

Both types can be used for numerous purposes: signals, rituals, warnings, locating animals, or playing music, and hanging bells can also be used to work out mathematical permutations. Each can be used singly or in groups.

They can made of many different materials, bamboo, wood, ceramics, glass, and most metals. They can be of many different shapes, tubular (mostly the bamboo ones, though also our orchestral tubular bells), trough, beehive, ‘bell-shape’, and bowls, but the one shape they cannot be is ball-shape with a loose pellet rattling around inside. These ‘pellet bells’ are rattles, not bells despite their common name. They are very useful, keeping babies entertained for hours, adding a pleasing jingle to dancers’ or animals’ movements, warning the birds that the cat is on the prowl, but they are not bells. The definition of a bell is that it is an open-mouthed vessel whose vibrations are strongest at the rim.

Wherever there are sets of bells in towers, both in churches and town halls, on the Continent of Europe, there is preference for playing tunes on the bells, whereas in Britain there is a preference for mathematical permutations of the number of each bell, called change ringing. There is a fundamental difference, too, in the ways that the bells are struck. British church bells are swung by a wheel so that the bell strikes the internal clapper as the wheel turns. With a carillon (a musical set of bells) or Russian or other bell chiming, the clapper has a wire attached to it so that when the wire is pulled, whether by a carillonneur with or without a keyboard, or by a mechanical barrel set with pins, the clapper, usually external, is pulled to chime the bell.

Bells are used with animals wherever herding is practised. This is for a number of reasons, one that a flock will often follow the bell-wearer, often the lead female. Another is that when animals are wandering freely to feed, it is easier to find them when required if they are wearing a bell. Another is that it is pleasant if, when each animal is wearing a bell, they sound nicely in tune – this is especially common in Switzerland. Another is that when animals are used for transport, if they have bells hanging on their harness or the vehicle, it's a pleasant alternative to only hearing the clop of hoofs, the pad of feet, and the creaking of wheels. Such bells are of high antiquity. We see them on Mesopotamian reliefs, attached to horses' harness. We have many small bells surviving from antiquity, through Roman times and allegedly earlier periods. And also the sound of a bell may deter attacks by preda-

tors and, even more important, the sound of a bell will scare away evil spirits, witchcraft, and bad luck. The power of bells to deter evil is so strong that church bells in some areas can be rung to divert thunderstorms.

It seems not to have been until the eighth or ninth centuries that bells large enough for churches were first cast in Europe, initially in Italy, though large bells were far earlier made in the Orient. The earlier European bells were narrow and waisted – examples can be seen in the article on my website *The Oldest Organ In Christendom*. It was not until the end of the thirteenth century or so that the modern shape was seen.

The best bells are cast (the proper term is ‘founded’) in bronze or bell metal and their overtones are naturally inharmonic. It was in the Netherlands, where carillons were particularly popular, that founders developed the skills to grind the interior in specific places to bring the overtones into tune.

In much of Asia animal bells are made of wood, hollowed out from blocks. It was Harry Shorto’s contention that, since with progress (and laziness) large tends to give way to small, such bells derived from slit drums, which are often whole trees hollowed out and struck, though since this would pre-date written records, we can have no evidence for this. But certainly some wooden bell shapes can be very similar to slit drums in miniature. And equally the acoustical behaviour is the same, the pitch being controlled by the volume of the airbody and the area of the aperture. The only real differences are in size and the method of striking, for slit

drums are struck externally by a separate striker, whereas cattle bells have a clapper, normally internal.

In South-East Asia bamboo is a more common material, and here the clappers are usually attached externally, for there may be little space within the bamboo tube for the clapper to swing inside the tube. Certainly our tubular bells are always struck externally, either by a special leather bell-hammer or, for clock chimes, with a metal mechanism.

The normal material for animal bells elsewhere is metal. Brass bells are usually cast, whereas iron bells are forged and folded up from sheet metal. In each case the size usually varies according to the animal on which it is going to be hung – cows are larger and stronger than sheep or goats. At a market I visited in Catalonia, one chose one's bell, specified the animal, and the vendor then fitted a bent-wood collar to suit. The bells he stocked varied from small ones for dogs, larger for sheep and goats, larger still for mules, and largest for cattle. All were folded up from sheet iron in various shapes, and riveted down the sides. Clappers varied from bone, through wood, to iron, again according to size, for the weight of the clapper must suit the mass of the bell.

Such iron bells are known at least from the Iron Age – pre-Roman examples have been found in Britain, and some early saints' bell were of this type, among them St Patrick's which still survives in Ireland, and which is identical with some modern cattle bells in this shape and type.

Over much of Africa a different technique is used. Again the material is sheet iron, but instead of being folded and riveted, two curved sheets are brought together and hammer welded down each side, the white-hot iron being hammered until the metal fuses.

In most cases, whether folded or welded, two holes are punched in the crown and a bent iron rod is passed through the holes and bent over internally to suspend the clapper while leaving a loop externally as a hasp to attach the collar. Often the iron is 'brassed' with a thin coating which is said to improve the sound, on what basis I do not know, but also to inhibit rust.

The African double bells, which are used for talking and for musical purposes are made as above, but one of the two iron sheets is forged so that, in Nigeria for example, there is a curved sheet on each end of a curved bar so that the two bells, one slightly smaller than the other, will lie parallel with each other, each sheet having another curved sheet hammer-welded over it. In Ghana, there is often a small bell hammer-welded on the back of the other larger one, rather as a mother carries a child on her back. Both these are struck with an external beater of wood, horn, or iron.

Resting bells are often ritual instruments. They are used in temples in Japan and vary widely in size from a couple of feet in diameter and depth, to miniatures an inch or two in each aspect, screwed at the apex into a wooden handle for mendicants to carry. The others, the larger ones for six inches or so in each dimension and upwards, normally stand on a ring-shaped cushion.

They are struck by a wooden beater which is covered by a strip of thick leather. In Tibet, and in many esoteric cults today, similar resting bells are rubbed round the circumference area to produce a singing tone in the aid of meditation and prayer.

In India and elsewhere sets of resting bells, often porcelain handleless tea cups, are played as bell chimes, struck with light wooden or bamboo beaters. They may either be intrinsically tuned (such cups do vary in pitch) or can be tuned by the amount of water sitting inside them.

The same technique was used in Europe for the musical glasses, which were either glass bowls or more commonly wine glasses. Benjamin Franklin's glass harmonica, a series of bowls, each nestling into but not touching its next larger neighbour, set in a scalar sequence on to an iron spindle, was more complex, because since they were on their side rather than mouth upwards, their pitch depended on a combination of size and grinding to set them in tune. All these were rubbed by the players' dampened fingers. It has, through the centuries, been alleged that either the continual friction on the fingers or else the whining sound of the glasses themselves tended to drive the players mad.

In many areas substitutes for bells are used, whether for economy or due to religious prejudices or prohibitions. These are usually iron or wooden bars or, in Burma, bronze plates shaped as bell profiles. These are struck on one corner and, as they spin, their sound throbs due to phase effect, with alternately the flat face or the edge of the plate facing the hearer. In China stone slabs were

also used. These are bell plates, bell substitutes, called by other terms, and each with their proper names; they are not bells.

We seldom use real bells in the orchestra, due to their weight and size. Instead we use brass tubes, arranged on a stand in the same layout as a piano keyboard. These are struck with coiled leather hammers, usually with a piece of sole-leather glued over one end to give two different sonorities. The range is limited, for the pitch depends on the length and diameter of the tubes, and also because for the best sound the bell must be struck on the edge of the top. For extra bass notes, improvisation is needed, often using iron drain pipes with the player perched precariously up a ladder. With modern technology, real bells from a neighbouring tower are sometimes patched in electronically, but this something that can very easily go wrong in a live performance.

By far the best bell substitutes that I have ever met are a set of iron plates in the Concertgebouw at Amsterdam. These sound much more like real bells than tubes ever do, but all that I have been able to discover about them is that they were made from the armour-plating of a pre-First War British Battle Cruiser. When a Sheffield iron-master tried to take over the Royal Philharmonic after Beecham's death, I tried to interest him in their reproduction, but to no avail.

HEAVY BRONZE

In the orchestral world we distinguish between gongs and tamtams. Gongs are those which produce a definable pitch; they almost always have a turned back rim at right angles to the face or even more sharply, and they often have a protruding central boss. Tamtams are those which produce a spreading crash which grows louder after being struck; they have a flat face and a slightly curved back rim and modern ones often have one or two Chinese characters painted on the centre of the face.

Tamtams mostly derive from China. Many of the best ones used in the twentieth century in Britain were loot from the palaces in Peking, as Beijing was then called, during the suppression of the Boxer Rising. One, belonging to Jimmy Blades, was that which provided the sound for the J Arthur Rank film trademark, but alas eventually it cracked. The BBC Symphony had another until it was struck with a bell hammer instead of with the proper beater. Tamtams are made in Europe today and come in a variety of sizes, up to more than a metre in diameter.

Gongs mostly derive from South East Asia, from Java, where they are used as punctuating (colotomic) instruments in the gamelan, and from Malaysia and Burma where they have a similar role. Some, usually without a central boss, also come from India. All have a defined pitch which, in India, may be close to a pitch in our chromatic scale, though not always in our equal temperament.

Those from further east and south will be tuned to their own local scales which differ considerably from our own. No pitch in either tuning of the Javanese gamelan is close to any pitch in our scales.

Composers in our music can by no means be relied on when they specify ‘gong’ in a score. However, it is usually fairly obvious whether they mean a tamtam, and particularly when they call for high gong, medium, and low gong, it is clear that they mean gong. How satisfied they are when they hear a clear clash of tuning may be another matter. We can try to ameliorate matters by putting wax and other compounds inside the boss, but this is not always successful, and often we do not bother, for if they just call for high or low without specifying what they mean, why should we take the trouble? High can be anywhere up to the top of the treble stave, and low to below the bass stave; they would not do that for any other instrument, so if all they want is a ping or a bong, that is what they’ll get.

There are exceptions. Puccini called for tuned gongs in *Turandot*, and the Italian makers produced those for him, properly tuned to our scales. Vaughan Williams also asked for them in his *Symphony Antarctica* and when that was first performed it could only be scheduled when *Turandot* was not in the programme at the Royal Opera House, because the Garden had the only set in Britain.

A variety of types come from China, including some that change pitch when struck, either rising or dropping according to how they are made.

Gong chimes are widespread in south-east Asia, the best known being those of the central Javanese gamelan, but in different forms they are also used all over the south-east Asian mainland and in the Philippines. Some are laid out horizontally, like the bonangs of a gamelan, but in Burma they are often set in circular frames, with the player sitting inside the circle, and Thailand in a rising crescent, the two ends up in the air.

Bronze drums were a feature of the Dong Son culture of northern Vietnam from around 1000 BCE onwards. While most have a flat face which can be struck, welded to the top of the sides, some are far more elaborate with whole village and other scenes, all cast by lost wax techniques integrally with the top. A similar instrument, though more often of brass, survived into modern times as an element of currency in the Indonesian island of Alor.

Orchestral and our other cymbals, like gongs, are best made of bronze, an alloy usually of 80% copper and 20% tin with traces of other metals, often called bell metal. And, again like gongs, the best are forged rather than cast. As part of the process they are also turned on a lathe, with what are called tone rings incised on the surface. Cymbals come in all sizes, from those very small ones fitted into slots in the frames of tambourines and jingle-rings or fixed over the fingers and thumbs of dancers, to twenty-inch or more in diameter. I have filled the Albert Hall with sound with my own twenty-inch pre-war K Zildjian cymbal, and once I had to play Tschaikowsky's *Fourth Symphony* with the BBC Symphony's eighteen-inch K Zildjians. After that my wrists were so weak I

found it difficult to drive home! Sixteen-inch is a more usual, and rather easier size for orchestral use. Zildjian (which means cymbal-maker) is the best-known maker and has been since the seventeenth century. Based in Istanbul, the K Zildjians were the standard instruments in my orchestral days, but today the Avedis Zildjian firm is outside Boston, where it moved from Istanbul, and the sound of the instruments is quite different from the old Ks. Whether this is a matter of air, water, or design I do not know, but the difference in sound is unmistakable.

Cymbals were made in Turkey and elsewhere far earlier than the Zildjian firm. They can be seen on Mesopotamian reliefs from antiquity, and they also appear frequently in the Bible. They came into Europe in the thirteenth century, usually about six to eight inches in diameter so far as one can judge from mediæval manuscripts.

Cymbals have been used in China also since antiquity, varying from small cup-shaped instruments to others much the size of our mediæval ones (very useful for our mediæval ensembles). Large, thinner ones were also used in Chinese military ensembles and in funeral and other ceremonies. These differ in the shape of their domes – whereas normal cymbals have a smoothly curved central dome, the large Chinese ones have a trapezoidal profile so that they can be held in the hand by the boss, rather than with straps as we do. These cymbals, often rather smaller in size, ten to twelve inches in diameter, were also much used in early jazz bands as the Chinese crash.

In the Tibetan cultural area medium to large size cymbals are also used and these have much wider domes, covering perhaps half the area of the disc. Also used there are small, thick instruments with a definite pitch and often a built-in vibrato. It was these which inspired composers such as Debussy to ask for tuned cymbals, and sets are now made for orchestral use, fixed on a frame in piano-keyboard lay-out as suspended cymbals to be struck with a metal beater.

Small ones are used in pairs in South-East Asia, particularly in Burma, as time-keepers, one or both of a pair fixed to a wooden base and each struck with another cymbal. They are also used as time keepers in India, especially by dancers, as the kartal, two pairs fixed in slots of a pair of wooden bars, one bar for the thumb and the other for the fingers. Many of these are cheap instruments, simply discs cut from brass sheet, as also are most of those in our tambourines. Brass cymbals have none of the sound quality of bronze ones, nor, to my ear, do some modern alloys with only 8% tin.

Church bells are made of the same bell metal, but these are described in another article in this series.

TRAP INSTRUMENTS

Some instruments are traps for the unwary and some are what we call the traps.

One of the most notorious trap instruments is the triangle. One might think that all that one has to do is to swipe at it, but it's not as easy as that. For one thing, the triangle is hung (we might wish it to be hanged). If it is in a longish loop, it can swing in ways that make it easy to miss it. Normally we hang it in a short enough loop, often from a clip that can go on a music stand, though otherwise from a gallows, but short enough that it can swing very little. The real problem is that for the best sound, as with every other percussion instrument, the beater should only just touch it and spring away again, for with every micro-second that a beater is in contact with an instrument, so by that much the contact with the beater deadens the sound. It is only too easy with the triangle to stop the playing movement a tiny fraction of an inch too soon, especially in piano, and the result is silence. This is something that we have all experienced at one time or another, and this is why we all hate the triangle.

Another trap instrument is the tambourine. It is easy to hit it, and it is easy to shake it, but a very common use is the thumb roll. Here the tambourine is held vertically in one hand, and the thumb of the other hand is rubbed round the edge of the skin. With the thumb dry, this has no effect, so the thumb has to be

moistened so that it will judder on the skin and make the jingles rattle. Too moist and it will slide and too dry it will slide; only with the moisture just right will it judder. If the player has naturally dry skin, the thumb can run out of moisture too quickly, and there is also a limit to how far the thumb can travel round the head before the wrist refuses to turn any further. A short thumb roll is a brilliant effect. A long one is a nightmare.

I have written elsewhere of sleigh bells, and at the risk of repeating myself, playing a rhythm such as that in the 7/8 movement of Holst's Perfect Fool can be very difficult. Sleigh bells are usually fixed on a wire hoop with a handle. Shaking them is easy, but with a tight rhythm, shaking will always produce a rebound, muddying the rhythm with at least one bell ringing out of time. I found the only way to do it was to hold the bells in one hand and strike the back of that hand rhythmically, crotchet, crotchet and three quavers, with the other hand. The result next morning was a bruise on the back of one hand.

A piano stroke on a suspended cymbal can be as dangerous as a triangle stroke, especially if the cymbal is a heavy one, for too gentle an impact can fail to make the cymbal sound, whereas a safe stronger stroke can produce an unwanted forte.

The traps are another matter. These are the effects that jazz and swing bands use or used to use. Some are mounted on a trap tray. This resembles a small table top, mounted with posts and arms on which a variety of instruments can be fixed and suspended, and others can be laid on the tray, waiting to be picked

up when required. The whole tray was fixed with clamps to the top of the bass drum. A swinging arm on each side of the tray can suspend a cymbal, often one a crash and the other a sizzle (a cymbal with holes drilled in it, each hole housing a loose rivet) – this was in the days before the ride cymbal was common. Each post at the back of the tray would hold a Chinese temple block, often called skulls (the proper Chinese name is *muyu*). A Chinese wood block (*pan*), a rectangle of wood with a slot routed out under the upper surface, could be clamped to the front of the tray and a triangle could also be clipped there. A tambourine, a motor horn, a siren, or anything else useful could lie on the tray, as could any different beaters such as a triangle beater, wire brushes, and so on.

Fixed to each side of the bass drum was a tom tom, and floor tom stood beside the bass drum, and in front of the bass drum stood the snare drum on its own stand.

In the early days, before my time around 1950, there were no bass drum pedals, and drummers cultivated the art of double-drumming, maintaining a rhythm on the snare drum with a flick of the stick to the face of the bass drum. A good drummer could even sustain a snare drum roll with rhythmic flicks to the bass drum. Eventually the bass drum pedal appeared, and initially it was a double element, a bass drum beater plus a metal bar which could both strike the bass drum and a cymbal fixed to the rim of the bass drum.

However, always having bass drum and cymbal together was not always desirable, and so players devised a cymbal pedal. When home-made this was a pair of wooden jaws hinged at one end with a bed-spring between them, and a cymbal mounted at the end of each jaw. Then with one jaw on the floor and a foot on the other, the cymbals could be brought together, and they could then alternate with the bass drum.

Eventually the hi-hat stand was invented, two cymbals mounted on the top of a stand so that the upper cymbal could be drawn down on to the lower cymbal with the pedal at the base of the stand. This had the advantage that as well as playing them with the foot, the upper cymbal could also be played with a stick, leading to the introduction of the ride cymbal.

For general purposes, the trap tray must have died out in the 1930s or early forties, though I certainly used one for some things in works like Weill's *Threepenny Opera* in 1956 – playing music from the 1920s and thirties, it is sensible to use the tools of the original period. I never played the original Walton *Façade*, but I think I used one in Stravinsky's *L'Histoire du Soldat*, mainly as somewhere to put things to grab them quickly. When playing that last work for a production he didn't want to do, Jimmy Blades set me up with suitable double-ended beaters and a clamp for a cymbal on the side of the bass drum, with the bass lying horizontally – everything was then within reach.

There is still music around where a single drummer is expected to cope with everything thrown at us, and I can remember

at least one review where the old floor cymbals made a better effect than any hi-hat. And I've played temple blocks in more than one orchestra, and they have to be held steady on something, so I still have the trap tray. In fact I have two, one just a plain tray to put things on, as in *L'Histoire*, and the other still set with all its posts and clamps.

So be wary of the trap instruments, and keep things like traps in store, for we never know what works, what instruments, and what styles of music can get revived.

THE XYLOPHONE FAMILY

This is a term commonly used, but it is nominally imprecise, since ‘xylo’ comes from the Greek word for wood, and many of these are made from other materials. What the term covers is a group of musical instruments consisting of a series of bars (or tubes) arranged in sequence so that they can be played for, usually, musical purposes.

The two things that are essential for good results are that the material used is adequately resonant and that each bar is supported at its nodal points, two ninths of its length from each end; being supported at any other point will prevent proper vibration and will kill the tone. A single suspension hole for hanging bars does not have this effect, though that, too, is better placed at the nodal points.

Wood is the commonest material, but stone has been used since prehistoric times in South East Asia (and elsewhere, including popularly in Britain in the late nineteenth century), as is bamboo, and metal is also widely used there, especially in the gamelan and also in our glockenspiels and vibraphones, etc. We nowadays have a major problem for our orchestral xylophones, for it has always been asserted that Mexican rosewood is the best material, and this is a species of *Dalbergia*, a protected species whose use is prohibited by CITES. Whether pre-existing instruments are going to be banned from export and import like ivory,

seems as yet to be uncertain, but musicians and ensembles need to be wary of this, for it affects oboes and clarinets as well as xylophones and marimbas.

In South-East Asia and parts of Africa, most instruments of this type are usually trough-resonated, with a single hollow below the whole set of bars. This applies to the wooden instruments and also to most of those whose bars are of metal, though in Javanese and Balinese gamelans, a few of the instruments have individual tubular resonators under each bar. Xylophones of bamboo are self-resonated, since the hollow interior of the bamboo acts as a resonator.

The simplest form of the xylophone, found both in Africa and South-East Asia, consists of wooden bars lying across the player's outstretched legs, the number of bars being limited by the length of the legs. In East Africa a common form simply rests on two plant stems, using again the space between the bars and the ground as the resonator. In other areas, however, a xylophone maker will cultivate gourds in successive plantings so that when making a xylophone there will always be a series of gourds, each of the right size to best resonate each bar. Cattle horns of different sizes are also sometimes used.

In Africa a buzz is commonly thought to sweeten the sound of many different types of instrument, and so, with xylophones, a hole is cut in each gourd over which a spider's membrane is placed to buzz in sympathy with the air in the gourd. In Mozambique, where xylophone orchestras are found, a small cup-shaped

segment of gourd is placed over the membrane, all luted together with wax, to improve the sound further.

In our culture, it has, since the early sixteenth century, been generally assumed that the xylophones were derived from contact with Africa, though there is some evidence (Virdung's *Musica Getutscht* of 1511, for example) that they may have been spontaneously invented in Europe, and there was considerable controversy in the 1960s on whether the origin might have been Indonesian, carried thence to Africa. The concept of a row of bars is simple enough to suggest independent invention wherever they are found, though the Central American examples are almost certainly African-derived, constructed from tribal memories by imported African slaves.

The earliest European xylophones were a single row of bars, often laid on hanks of straw and therefore called Strohfiedel or straw fiddle. An eastern European form, probably arising in the seventeenth century or so, was a cheap and easy version of the dulcimer, cheap and easy because bars of wood were a lot cheaper than strings and, once made, did not need to be tuned all the time. These were laid out in the same pattern as the strings of the dulcimer, but as the use of the instrument spread in the late nineteenth and early twentieth centuries, a pattern resembling that of a piano keyboard became more common and is still with us today.

Bars have overtones that are naturally inharmonic. This is comparatively unimportant for the xylophone itself, since the sound is so short in duration that overtones are seldom percep-

tible, but when the bars are wider and thinner, which produces a more sustained sound, and when individually resonated, this can lead to problems unless skilled carving can bring the overtones into tune.

Bars can be tuned in various ways. It can simply be a matter of mass and length, and our European xylophones up to the mid-twentieth century were often just square-section bars arranged in sequence by length. In Africa it had long been found that the thinner the bar, the better the tone, and that shaving the ends of bar would raise the pitch and that hollowing the underside between the nodal points would both flatten the pitch and bring the overtones better into tune. In that way, xylophone bars could all be much the same length, thus leaving the suspension struts more or less parallel.

This knowledge was brought with slavery to Central America, especially Guatemala and Mexico, where it was recognised by the firm of Deagan of Chicago, and adopted for our instruments of this type, radically changing the quality of our instruments, and replacing those with the old square-section bars, and at the same time adopting the piano-keyboard layout that we still use today. The Central American instruments were also individually resonated, though usually with square-section wooden tubes rather than with gourds; Deagan preferred the use of metal tubes, easily available in Chicago, rather than making up square-section tubes. He also adopted their practice of using thinner bars and of improving their sound and tuning by hollowing the undersides.

In the process, he divided the xylophones, with narrower thicker bars, from the marimbas with wider and thinner bars, so producing two instruments with distinct sound qualities. Deagan later added a third format with aluminium bars, tubular resonators, and in the top of each resonator a revolving disc. This was the vibraphone. The discs, called fans, are mounted on a long spindle running the length of the instrument. Initially with a clockwork motor, but later an electric one, the motor made the fans revolve, so opening and closing the tops of the resonator tubes and thus producing a volume vibrato. A disadvantage of the electric motor is that cables stretch across the floor, causing accidents, but a much greater disadvantage of the clockwork motor was that it often ran down in the middle of a piece of music.

While the wooden instrument is certainly the older form, in our music it is arguable that the glockenspiel was used earlier. While today the bars are of steel, earlier instruments often had glass bars and were called harmonicas, for they were in effect struck versions of the rubbed glasses of the same name.

The number of bars in any xylophone, and the number in an octave within the compass of the instrument, will depend on the musical culture of the community. So also will the number of players. Most xylophones are played by a single person, but in East Africa many are played by several people, with one or two players sitting in the centre of the length, often opposite each other, playing the main melodic parts, and with another at each end playing bass and/or treble ostinati.

Individual bars, usually suspended from a frame, are used in many cultures, often as signal instruments. They became common in churches in Ottoman areas, for the use of church bells was normally prohibited there, and therefore a wooden bar or stone slab was used instead.

Note the use of ‘bars’ for all these instruments, rather than ‘keys’. A key opens something, such as the pallet of an organ pipe, which got transferred to harpsichords and pianos. It is not an appropriate name for the bars of a xylophone even when laid out in the shape of a keyboard.

The beaters (or mallets) used are, for the xylophone, wooden, rubber, or hard plastic balls on the ends of flexible shafts, for the marimba and vibraphone similar balls but wrapped with woollen yarn of various thicknesses to produce different tone colours, and for the glockenspiel sometimes small brass beads on shafts, or otherwise similar mallets to those for the xylophone. African beaters were usually some form of natural rubber strands, wrapped into a ball or flattened ovoid.

DRUMMERS

There's not a band, orchestra, and hardly any musical combination other than specialised chamber groups, that doesn't have a drummer. Even when I think of some of the odd combinations I've played in, such as reviews and pantomimes with two pianos and me, or a Brahms *Requiem* with piano, organ, and me, and even a *Messiah* with organ, trumpet, and me, there I was, as a drummer, the one essential extra to the basic keyboard accompaniment. And I'm sure we can all remember things that we've done like those.

A drummer is the key player for every sort of music, all across the world. The didjeridu player is the one everybody sees and listens to, but where would he be without his click-stick playing mate? If he hasn't got one he has to tap his didjeridu with a stick to replace him. Where would the cavalry regiment be without its drum horse and drummer? Or the piper without his tabor?

We may be regarded so often as background (and we're often in the back row), but it's we who give the music its impulse and its rhythm, and it's we who are the bedrock of the band. It may be the bell player in African ensembles that keeps everyone else stable, or the hoe-player in the Caribbean, or the claves in Cuba, but take that 'drummer' away, and everything falls apart.

And yet I remember how we were neglected. Back in my student days you could leave with a diploma on every other instru-

ment, or in teaching, but there was no diploma for the drummer. Timpani and percussion were not taken seriously then, we were just the kitchen department, some little teaching maybe, but more or less we were left to sort out our technique for ourselves, back around 1950, and so it had been up to then.

Today things are very different, we are properly taught everywhere now, and often in our more popular musics the drummer is as famous as the lead singer.

Before that, one of the few works written, just for us, was Varèse's *Ionisation*, an interesting piece but it's not often heard, even today.

Nowadays we have concertos written for us (well we did, too, back in the Baroque and early Classical), and in much modern music it's quite apparent that when musical ideas wear thin, the obvious answer for a composer is to toss in some more percussion. Musically speaking I'm not sure that this is altogether healthy, but there's always something to be said in favour of jobs for the boys, and the girls, for although in my time we saw very few women in our end of the orchestra (Joyce Aldous was unique, the only female timpanist in a major orchestra back then, in the Hallé), nowadays we are all equal.

We do have fun, we drummers. We're the one section of the orchestra that's asked to play anything odd. Is there a cuckoo in the score? Give it to a drummer (I can't even remember which opera it was in, but I can remember standing in the wings blowing it). Or a nightingale – that's a terror instrument because it's

a whistle that contains water, and if it bubbles too much or too long like a real nightingale it can run dry, and then you really are in trouble. Or a saw. Or rattling a set of chains – that was in Schönberg's *Gurrelieder*. Or dropping the chains into a bucket – that's not in the score but it was a traditional input into Litolff's overture *Robespierre*, to denote the fall of the guillotine. Or produce a chromatic scale of conch trumpets for the voice of *Alien* – luckily I'd been a brass player too. Or a tuned set of tea bowls (no, I can't remember what that film was, but Jerry Goldsmith and I toured the Chinese shops in Soho to find them). Nowadays, too, we often have to do all sorts of odd things like dunking gongs into bowls of water and so on. It can make a bit of a mess on the studio floor that someone will have to mop up, but it all adds to the entertainment of the rest of the orchestra, who have to watch our gyrations.

But again, we've all had experiences like that – drummers are used to it and we can cope with anything that we are asked to do.

Another of our advantages over the rest of the musical profession is that we are accustomed to all sorts of music. A lot of players are almost chained to one style of music, whether it's brass bands, symphonic, jazz, pop, or anything else, but drummers roam around, playing in a symphony orchestra one day, a film session or an opera the next, or, as I did once for a couple of weeks, playing in the gipsy band in the basement of a Lyons Corner House restaurant (the leader was a genuine gipsy, with the

number tattooed on her arm as a survivor to prove it), and then in a touring review.

Of course some of us are specialists, the timpanist in any major orchestra, for example, and many of us may be better as a timpanist, or a side drummer, or a xylophone etc player, than we are at some of the other instruments. And some of us, especially in the pop world may be successful in that orbit, but if unable to read music, can have little success elsewhere. I can remember, way back, in the days before any of us could play the cimbalom, when a player from a local Hungarian restaurant was hauled in for a *Háry János*, members of the percussion squad had to cue him in, and then to stop him, for he could not read the music but could busk a part that more or less fitted what Kodály had written. But for most of us, we can deal with anything thrown at us, whether it's timps, tubular bells, a triangle, or a pit drum kit.

We can read a tricky drum part, often at sight; British players are trained in sight-reading; our common system of one rehearsal and concert and our recording and film schedule of recording twenty minutes of music in one three-hour session, have accustomed us to it. There are exceptions of course. I remember one xylophone part when the player said it was impossible, so the composer rattled it off on the piano, and Steve said to him 'Now play it with one finger on each hand', so it was rewritten. But if necessary we can always busk it, and often enough the conductor never notices, and sometimes the composer doesn't either, but the less said about that the better.

One aspect of all this is that we do have to be weight lifters. We accumulate kit. We fill a garage with it – Jimmy Blades filled two garages and an attic. Established orchestras have porters who shift the kit, but we freelance drummers (and most of us freelance even when we play also in an established orchestra or band), have to shift our own kit. We drive it around, often in a van because we may never know what we shall need for a gig, and we lift it from house to van, from van to hall or studio. This was one reason why, back in the old days I mentioned above, that there were fewer women among us. Often they did not have the strength to shift a set of timps or to lower them into a pit or back out again. There used to be a saying in those days, 'If you can't lift them, don't play them.' Women players are tougher today and we can all shift our kit.

Accumulation of kit, and knowing how to shift it and to play it all, is a universal today. As I've said over and over again, we play everything and anything, and no band or orchestra can do without us.

THE PIPE AND TABOR IS ALIVE AND WELL IN THE BASQUE COUNTRY

Back in 1997, I was invited by Sabin Bikandi Belandia, the town piper of Bilbao, to speak at a conference of Txuntxuneroak, the Basque for taborers, in Pamplona. This, I think, was chiefly because of my tabor pipe article in *Galpin Society Journal* 50 of that same year, and therefore what I said at the conference was based on that material.

Sabin greeted me at the airport in Bilbao with a long and elaborate pipe tune, a traditional welcoming melody, he told me, but causing all the other arriving passengers some considerable surprise, and covering me with much embarrassment! He had invited me to stay with him for the night before the conference and to stay on for a few days afterwards, at his home in Galdakao, a small town which today is more or less absorbed as a suburb of Bilbao and is now fully industrialised and with large blocks of flats. Nevertheless, much of it is only a stone's throw from the open countryside, one of the great advantages of so mountainous (and beautiful) a landscape, for there is less inducement to build on a one-in-five slope than on flatter ground.

We drove to Pamplona for the conference. While I and Jean Baudoin from Gascony were the only people from other countries, there were other 'foreigners' on the programme, Marcus

Frengani Martins, who is a Basque but who is now working in Bamberg, who presented much interesting iconographic and historical material, three or four Catalans who were speaking on the flabiol; they were very pleased with my idea that the flabiol may have been the earliest form of the tabor pipe. This a pipe with holes for all the fingers of one hand, three holes in front and two at the back, one for the thumb and the other for the back of the little finger. (Apart from that, I assume that any of you interested enough to be reading this have also read my GSJ paper and therefore that I do not need to rehash it here) There were several speakers from Extremadura, Salamanca and Zamora who were talking about their shawm, the gaita, one of them, Alberto Jambrina Leal, also with much interesting iconographic and historical material. Jean Baudoin was speaking about his flabuta or flauta and the tamborin or string drum which is used instead of the tabor in Gascony and Navarre, as well as the Basque country, of which he had several different types with different tunings and I think different string materials – certainly the sound was quite different between them, and both his flabuta and his tamborin were also somewhat different from the chiflo and salterio from Aragón which Alvaro de la Torre spoke about and played. The string drum, which has a different name in every province, is a long, narrow box with from four to six long, thick strings tuned to the tonic and dominant of the pipe, and which are struck with a quite thick wooden beater across all the strings. It often has a series of metal hoops, one over each string at the upper end, that act

as brays. One of the fascinating things about the whole conference was the differences, sometimes subtle and sometimes very considerable, between the different tabor pipes and the different tabors, and the different shawms which we saw and heard.

The main participants were all Basques, from the different provinces of Euskadi (the Basque name for that territory), with their txistu, which is the world's only fully chromatic tabor pipe. This chromaticism is achieved by a support ring for the ring finger, so freeing the side of the little finger to cover the distal end to more or less flatten the pitch. Since all the papers were in Castilian (the language spoken all over Spain and thus understood by both Catalans and Basques as well as the Spanish), except for Jean Baudoin's, who spoke in French, and mine which was in English, I was lost a good deal of the time, save where there was musical or iconographic illustration. It was very clear, though, from what I could follow, that the txistu, flauta, gaita, etc, are the subject today of serious and comprehensive study, historical, ethnomusicological, and scientific and acoustic (one paper was illustrated with sonographs), as well as being very strongly in use, right across the Basque country and northern Spain as far south as the Baleares, across into Portugal and up into southern France, just as I knew the flabiol to be throughout Catalunya.

While I was the guest of the txistulari as a whole, my participation was due to Sabin Bikandi, with whom I'd had previous contact. His duties as the town piper of Bilbao were not as onerous as those of the city waits or the Stadtpfeifer of earlier times

and places. He did not have to play from the town hall balcony every hour, for example, nor to walk the streets at night, keeping the citizens awake to show that he and the watchmen are also awake and on guard, but he was on call, with three colleagues (one of whom was ill in hospital when I was there so that I only heard and was able to record the three of them instead of all four) for all civic ceremonies and occasions. On average he played two or three times a week, and of course he wore a traditional costume when he did so. Nor was he alone in this; there are many pipers throughout the Basque provinces playing for all sorts of occasions, formal and informal, civic and personal (weddings and so on), dances, and processions, both as amateurs and, like Sabin, as professionals, though many of the latter are part-time, rather than full-time like Sabin.

The society of txistulari, or pipers, (they publish an excellent journal called *Txistulari*) was formed seventy years ago, and on our way back to Galdakao from Pamplona, Sabin took me to their anniversary meeting, which was held where they had founded the society, on the top of a mountain, in what is now a conservation area and nature reserve called Arrate. This was a very impressive occasion with a hundred or so pipers, plus dancers and a few side drummers. They are, incidentally, nowadays usually called pipers (txistulari), though this is a fairly recent practice – in the old days, as in the English tradition, where Thomas Slye was referred to as Will Kemp's taborer when he morrised from London to Norwich, they were always called tamborileros (Castilian) or txunxuneroak

(Basque) (txuntxun is the Basque name for the string drum), and it was noteworthy that the conference in Pamplona was called under the old title of Txuntxuneroak. When playing in large groups, as they were at Arrate, they often play only the pipe, leaving the rhythm to the side drummers. They play in four parts, txistu 1, txistu 2 (with or without tabors), and silbote, accompanied by the side drummer. The silbote (the player of which was the one who was missing from the Bilbao town-piping group when I heard them) is a longer pipe, a bit longer than a tenor recorder, but still with three holes. Because of its length, the player cannot reach the end with his (or often today, her) little finger, and therefore both hands are used, one on the three fingerholes and the other to close the open end for chromatics etc. The silbote player, therefore, never plays a tabor as well. I mentioned 'or her' just now. Traditionally, of course, taboring was an exclusively male thing, but nowadays women are accepted, especially among the larger amateur groups, though not I think for such posts as Sabin's.

After a long church service, during which I was able to gossip with a number of players (some spoke English and a number spoke French as well as Basque), some of whom had been at the conference in Pamplona, and also with one of the side drummers who is also a percussionist in the local symphony orchestra. After an outdoor concert, processions, and dancing, there was an even longer, and pretty bibulous, lunch at which, through the kindness of that side drummer who lent me his drum and sticks, I was permitted to join in the playing and the fact that the 'professor from

Oxford' was taking a part in the proceedings was well-received, and several people whom we later met had already heard of me as the drumming professor!

Sabin took me to meet various txistu and tamboril makers and also a shawm maker. There is a good deal of important and innovative work going on with these instruments, using new techniques, new designs, and new materials, as well as the long-standing traditional methods. One maker, Gancedo at Amurrio, who makes instruments in African blackwood and coca-bola, is also working in new plastics, for the sake of increased stability, making up his own plastic in order to maintain full control of the uniformity and the quality of the material. He has introduced devices to control the precise angle of the airstream through the mouthpiece and to where it meets the labium, with grub-screws and an allen key. While he also makes some alboka (the double hornpipe with single reeds) and cowhorns, and even serpent and french horn mouthpieces in the same plastic, his main work is with the txistu in all sizes, from a piccolo, the same size as the txirula, the smaller Basque tabor pipe, through the tenor silbote to an experimental metal bass, about the same length as a bass recorder and with a dogleg in the tube similar to that of the bass recorder made today by a number of the modern industrial makers, with a key that pivots a plate across to close the open end.

The shawm maker, Jose Manuel Agirre of Tolosa, is also using a resin plastic, producing the local dulzaina, an excellent instrument akin to the Navarrese gaita, but using, as the Navar-

rese do also (Navarre is over the border in the French Basque country), a reed closer to that of the bassoon than the original; both are made from *Arundo donax*, but the scrape of the modern reed is very different from that of the older pattern. I bought one of his dulzainas, which he made up from stock parts while I watched, assembling together the plastic body, the metal trims, the staple and the reed. I have encountered similar changes on the Valèncian dulçaina, where one that I bought from Michael Morrow more than thirty years ago has reeds with a fairly unformed scrape, whereas one that I got a couple of years back in València also has a rather bassoon-like scrape. In València the name of the instrument is spelled with a c-cedilla, but here in Tolosa with a zed instead, but neither is in any respect dulcet in sound, and they are each just as loud as any other shawm. I had not needed to buy a txistu or txirula, because I had bought examples of those in Barcelona several years earlier, along with an alboka.

This maker, Agirre, is also using innovative techniques in the production of drum shells of all sorts, which he produces to a greater extent than he does shawms. Normally goat skin is used for the heads. His tambourines (pandero), like those throughout the area, have jingles which are stamped out as crinkled discs. The tabor for the txistu has a single gut snare, the tabor used for the dulzaina has two strands, the side drum has four strands. These are of gut for the txistulari but occasionally they are made from guitar wire-covered E strings for use with the dulzaina, when also brass shells are sometimes used. He makes all his tabors

and drums to diameters that are standard in the pop world today, though these are still close enough to the traditional diameters, so that he can use plastic heads when required – much more useful for outdoor work when the weather can be bad.

Tabor technique is impressive indeed, far more elaborate than anything that Thoinot Arbeau ever suggested. For one thing, the drum hangs from the crook of the left arm so that the batter head hangs down as the lower head, facing obliquely downwards. For another, as a result, the players are striking the tabor upwards, instead of downwards as we do in England, requiring a very supple wrist technique. The snare today, incidentally, presumably following side-drum practice, is never on the batter head as it is in all mediæval iconography, but always on what would be the snare head on the side drum. It looks, judging from an old instrument in the Bilbao Museo Vasco, as though this change came at least a hundred years ago, and perhaps even longer ago. Players use flams, drags, and other multiple beating techniques, using their fingers or very relaxed wrists for the multiple strokes, whereas a side drummer depends on the bounce on an upward-facing head to help him reiterate. I have to say, though, that this may vary more than I first thought, for while all the players that I heard used these elaborate beatings, one CD which Sabin gave me, of players from Gipuzkoa, sounds as though it could have come straight out of Arbeau's *Orchésographie*, and the photo on the cover of the booklet shows a snare on the batter head, as well as a pipe quite different from the normal txistu. I have not yet worked out

the text of the booklet (which is in Basque, of course), but it is possible that this is a deliberate archaizing.

Many makers are interested in the older traditions, so that my slide of Frances Palmer's illustration from *Early Music* of the Mary Rose pipes attracted much interest, as did the Bate Collection drawings of the two nineteenth-century tabor pipes there (unfortunately, a slide of Bill Waterhouse's earlier English pipe did not arrive in time to be included), as well of course as the iconographic material in my and other papers. The main interest, though, is in the modern use, the modern design, its acoustics, how it can be further improved, and so on. While we in Britain and in other countries are mainly producing somewhat hypothetical Praetorius, Mersenne, Arbeau, and Will Kemp pipes, as well as wholly imaginary plastic and metal instruments, they are producing txistu, gaita, txirula, and all the other pipes, and judging from the range they achieve (two and a half to three octaves) and the quality of the sounds that they produce, I think that we have a good deal to learn from them.

Certainly they have there a living tradition that, however much it may have changed from the sixteenth century, is still in direct descent and in direct contact with the mediæval practice, and there is, I think, a good deal to be said for our pipe makers to establish firm contact with them. The txistulari were hoping to establish an international pipe and tabor society, though I have not heard whether they have done so, and I hope that when and if they do so, our makers and players will join them. I hoped then,

too, that we might have been able to arrange a Bate or FoMRHI pipe and tabor day when Sabin was next in this country. Regrettably, I never got round to organising that; I had of course by then retired from the Bate, and my successor was never really keen on arranging such weekends.

I should also record my very grateful thanks to Sabin for the number of pipes, shawms, alboka, and a tabor that he has given me in return for the very small academic help that I have been able to give him, as well of course for his hospitality and the opportunity to attend that conference.

Meanwhile, the pipe and tabor, in all its varieties and ramifications, is alive and well and living in Euskadi.

DRUMMING

People think that drummers just hit things, but we do far more than that. Any sounds that are needed, that the other members of the orchestra or band are too respectable to produce, come our way. So, yes we hit things, we shake them, rub them, pluck them, and scrape them, but we also often blow them, whistles, hooters, motor horns. And we often play more types of music than most other musicians, a pantomime one week, a symphony concert next day, a cabaret or a dance band the day after, with a film session in between.

What we hit are divided into two great groups of instruments, the skin drums and the hard instruments, in technical terms the Membranophones and the Idiophones.

And our basic function, above all others, is to provide the rhythmic drive to the music, something that we have to practice every day. Rhythm is something that many other musicians are a bit sloppy about. I have heard great players playing quintuplets (five semiquavers to a crotchet for example) as two plus a triplet, but we have to try to steady them with a strict five even beats – what happens if we can't steady them? Well, if they're more famous than us, we have to give way (I did), but we do have to try. Which reminds me, if we are counting rest bars in five in a bar, a useful trick is to count 6,2,3,4,5,6,2,3,4,5, and so on – it avoids any risk of 1,2,3,4,5,-,1,2,3,4,5-. We do count more rests than

anyone else, and using the thumb and fingers helps; at least then you know which number out of five you're on. So does a slight movement of head or hand round the section as each rehearsal letter or number passes by. Malcolm Sargent used mnemonics: 'This is such easy music'; 'This is very difficult' for different 7/8s, and so on.

Keeping rhythm precise isn't easy. I taught (and practised) four crotchets and eight quavers, gradually speeding up (for non-British, crotchets are quarter notes, quavers are eighth notes, semi-quavers sixteenths, etc), and every time your beaters get into a tangle, slow down, and speed up again. Again and again. Then four crotchets and twelve triplets, doing the same. Start with the other hand each time – otherwise you'll wind up being able to do it with a right-hand start and unable with a left-hand start and that'll be a killer on timpani. Do you remember the sound of a train on the tracks before the days of the welded rail?

Dum – t dum ----- Dum – t dum -----

If you fill in the gaps with continuous notes, it's a nine-note rhythm leading with each hand in turn and the accented 'dum' is on alternate hands, too. It's a really hard one to practice and well worth doing it. It was taught me by a pupil of mine, Ray Cooper, now a famous drummer. But all three of these are good practice material.

So of course is the traditional dadamama for the side drummer (and the early music timpanist), two strokes with each hand, partly bounce, partly push, starting at a walking pace and getting ever faster until it's as fast, and as even, as rain on a tin roof. It takes years to get a good side-drum roll, especially on an old-fashioned field drum with gut snares, which we need in some orchestral works (*Till Eulenspiegel*, for one). There's no short cut for that one, just lots and lots of practice, but then this true of playing any instrument, though it's more boring than practising a piano concerto or even five-finger exercises where you do hear different pitches.

That's also a point for us – we do *not* want to hear different pitches in dadamama. We do *not* want to hear dada louder than mama, nor do we want to hear the first da or ma louder than the second da or ma. So watch out always that one hand isn't stronger than the other, or that the stroke and the bounce aren't the same strength, or that one stick isn't heavier or lower pitched than the other. Side drum sticks do have a pitch, just like xylophone bars, a slight pitch, sure, but with good ears (which we need anyway) a difference can sometimes be heard. Watch out for that when buying sticks, just as one must always roll them on the counter to check that they aren't warped – if the bead on the end wags up and down as they roll, reject them.

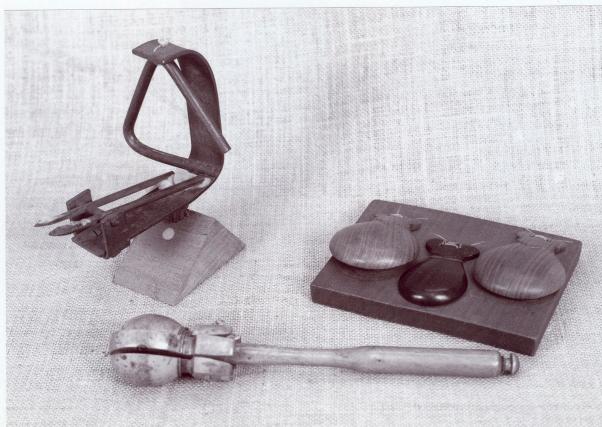
Never believe that some instruments are pitched (timpani, xylophones, etc) and some are not. All instruments have a slight but perceptible pitch. And sometimes they clash with the harmony.

That's why we carry at least two triangles in a full kit, and the same with wood blocks and so on.

Coming back to rhythms, dotted crotchet and quaver (and its more diminutive equivalents) are more difficult than people think and quite easily drift towards triplets. Norman Del Mar said 'Count the small notes: 1••4 to keep it precise'. When I was teaching I wrote out cards with eight semiquavers and wrote rhythm notes above them: quaver and two semi, dotted quaver and a semi, crotchet and four semi, whatever else I could think of, and taught pupils always to count the small notes while playing the notes above. It works.

We have to accumulate kit; we never know what may be needed for the next gig. It's useful, too, to be able to make things, whether it's as simple as a double-ended beater for when there's no time to put one down and pick up the other, or as tricky as a stand to get two instruments together, or even to make a new instrument – metal maraccas for instance (lavatory cistern balls, unsolder the screw end, drop in some hex nuts, solder it up again, and screw in a bolt as a handle). Or a tubular bell for a specified pitch (brass tube, a soldered cap on one end, a hacksaw, and a tuner). I made a machine triangle: a gallows with a triangle (13-inch silver steel bent up in the flame of the gas ring on the kitchen stove) suspended from a short nylon loop, with below a U-bent strip of steel crossed by an axle carrying two 6-inch carriage bolts with their ends flattened to make finger-plates (gas ring again and hammered on a thick iron plate as an anvil), all

bolted together with the bolt projecting down to go into the top of a cymbal stand. A felt pad on the gallows to stop the beaters clicking, and it can be played by two fingers or with even less time available to put down sticks and pick up a beater, with the sticks themselves with cork glued to the finger plates. [see photo]



A similar gadget is useful for castanets. It's impossible to get the real castanet sound without doing it properly on the thumbs, but the castanets on a handle come close and so does the machine castanet. This is pair of shells tied down hard to a board so that again they can be played with fingers or even with beaters.

This all arises from two causes: one the reluctance of managers, even in the best orchestras, to pay for an extra player for just a few notes, and the other is the pit drummer, whether in the

theatre where space and numbers are limited and also in all sorts of situations where a single percussionist (often timpani & percussionist) is the normal number. We have to do our best with only two arms, and sometimes two feet.

It's useful, too, to have some junk instruments for when the composer asks us to hit things with something that can damage them, such as hitting a cymbal fortissimo with an iron rod, or hitting timpani with side drum sticks (better to cheat on that and use proper wood sticks), or a gong with a tubular bell-hammer (doing that once in the BBC Symphony, Alfie Duke killed a superb gong that had been looted from the Summer Palace in Peking). Never throw away a damaged instrument – it may prevent a better instrument being broken to satisfy a composer's daft whim.

It's useful, too, to have some mechanic's skills, tapping a thread on a rod, drilling a small hole at the end of a cymbal crack to stop it extending, the odd soldering job. Small garages can be helpful, too, with more elaborate welding and brazing.

It's amazing just how much kit can be got into the reach of one player with the application of some skills and a lot of ingenuity.

It's important, too, to look after our kit, especially because we cannot leave the playing area, whatever it may be, with our instruments like fiddlers and wind players do. I'm always surprised how cellists and bass players leave their instruments on the floor to be kicked by any clumsy oaf. Every skin drum should have a cover, and that cover should always be put on every time we leave the area. Drums, and other percussion kit, fascinate

people, even other players; they'll tap drums as they pass (one violinist tapped one of my timps with his bow as he passed – he won't do it again after I aimed at his fiddle with my timp stick). There's a musician's convention that one never touches somebody else's instrument without permission – it doesn't seem to apply to our kit! So cover the drums. A hardboard lid, with the underside lined with cloth or foam, is often enough (of course proper boxes should be used for transport), though 5-ply wood is better, but a simple lid will stop most things being touched, tapped, dropped on, etc. We have to take a chance when we're playing of course. In a pit I've had ice cream dropped on a timp head, toffees tossed at the drums by bored kids, all while playing, and managements don't like members of the audience being sworn at, and told to curb their bloody kids, by a drummer – paying customers have to be kept sweet, they say.

A small portable tool kit is often a useful auxiliary. It's surprising how often we're expected to play local instruments (pianists suffer from this, too). Especially in pits, even opera houses, timps can be there and refuse to be moved – this can apply especially to older pedal drums that need four men to move them. A well-sealed oil bottle, a grease pot, an adjustable spanner, a duster, and a couple of screw-drivers can help get crappy drums working properly, or at least adequately. The BBC used to keep horrible pairs of timps in studios and refused to pay transport costs to allow me to bring my own, but I pointed out that they

wouldn't expect violinists to play any old box instead of their own fiddles, and eventually I persuaded them to change that policy.

We do have to invent sounds, too. Especially in film studios a 'different' sound is often required. The composer will often have a sound in his head and somehow we have to recognise it and then try to improvise it. Lowering a gong into water while it is vibrating; friction balls on a cymbal or drumhead; a thievish spider trying to steal a diamond; John the Baptist's head falling to the ground; whales grieving; a jingling johnny; a devil's fiddle; the voice of Alien. All these I have had to improvise.

Times have changed since my student days when there were diplomas for every instrument except timps and percussion. I used to get called in then (and paid) to amateur orchestras when there was something tricky on the programme because the timpanist (or side drummer) was the conductor's girl friend – anyone can hit a drum, can't they? Nowadays we are as recognised as any other musicians.

But we do still have to be able to play anything that can be hit, shaken, rubbed, plucked, scraped or blown whenever required, and to have all the kit to do it with.

LAPPING TIMPANI HEADS

Many timpanists today use plastic heads. These have a number of advantages, principally that they are impervious to changes in temperature and humidity and therefore retain their tension and thus their pitch despite the blasts of cold air that halls love to swirl across a concert platform or the rainstorms that commonly bedevil performance areas that lack climate control. Back in the old days, before plastic became available, I can remember having a bucket of water and a sponge beside me during a television programme and having to swab the heads in every rest to keep the pitch down below a soprano range. This was when television cameras depended on very powerful lighting which gave off tropical levels of heat. And another occasion when I was placed beside a broken window while it was raining outside and I was trying to maintain a high F on a drum that preferred not to stay so high. Plastic heads also have the advantage that they come ready-welded on to their flesh hoops, so that they do not need to be lapped.

The disadvantage of plastic heads is that their tone quality is much poorer than that of calf skin or best-quality goat, such as is still used in Vienna. The resonance period of plastic is shorter, and this is preferred by the recording and broadcast engineers who, because they are only too often the paymasters, have much control over what we should use. Also, the conductors, who tend

to have cloth ears so far as timpani and percussion are concerned, have become more accustomed to hearing recording playbacks than to the sound of the timpani further back in the hall from their rostrum, so they also prefer the use of plastic heads. And so the tonal disadvantages of plastic heads has for both of them become an advantage.

Nevertheless, some of the best players still keep to calf or goat. These skins are the same as the vellum or parchment that was used in the Middle Ages for manuscripts and today for testimonials and, in Britain, for Acts of Parliament. They are skived, nowadays by machines, to the desired thickness and evenness, after being soaked in suitable agents to remove fats and hairs, a process quite distinct from tanning for leather.

It is now quite difficult to find good quality vellum in sizes suitable for timpani, which need to be at least four inches wider than the diameter of the drum shell. In the old days, once they knew me, I used to be allowed to go up the stairs to the workshop of H. Band in Brentford (alas, they vanished some years ago) and to shuffle through the piles of heads, checking that the line of the backbone was diametric across the head, that there were no lines of white spots across the head, showing where the animal had met a barbed-wire fence, and checking the thickness and smoothness of the head between finger and thumb. If there were discrepancies in those last two respects I could ask for another run through the machine.

The need for the extra four inches diameter is to provide a one-inch collar for the skin to go down the side of the shell (see below for this) and enough skin to lap round the flesh hoop, for which one and a half times the circumference of the flesh hoop is required. So first measure the flesh hoop, and if it's thick, then more than four inches will be required, and if it's thin, perhaps less. For safety, always go for more rather than less – trimming excess is always easy, adding extra is impossible, and heads are expensive.

Most of us prefer the backbone, which can be seen as a line across the head, to be diametric, because we think that if it is off-centre, one side of the head might then be more flexible than the other side and thus produce a wobble in the sound – how true this is, I have no idea.

The white spots from barbed wire are best avoided because they might be points of weakness – ‘Tear on the dotted line’.

Smoothness is certainly important for quality and any hard spots should always be avoided; a skin should feel flexible and supple in the hand.

Variation in thickness is real trouble, but judging the thickness between finger and thumb is perfectly adequate for this – there is no need for micrometers. For thickness in general, this is a matter of what drums are being lapped. For early music we need thicker heads, and for standard symphony orchestras we need thinner. Until one is fairly experienced, probably the best

way to judge is to feel the thickness of the old head that we are replacing.

As for the look of the skin, some of us like it clear, some like it cloudy, but I suspect that this depends on the colour of the animal's hair, and whether black and white Holsteins or brown Channel Island calves give better results I have no idea at all.

Harry Taylor, a leading timpanist of the 1930s, was shocked to hear that I did not lap my own heads – 'You younger generation...' and so on. Lapping is the English term for this process; Americans call it tucking; I'm afraid that I don't know the term in other languages, but the process is simply the method of fixing a skin on to a hoop that will fit over a drumshell so that the tension, and thus the pitch, can easily be adjusted. We were on tour then in Germany with the Royal Philharmonic under Pierre Monteux – this must have been in the late 1950s or maybe early '60s. So Harry sat me down, bless him, under a tree outside a Bierhall in Munich, each of us with a litre of their best product, and Harry described exactly how one laps a head, and I've done it ever since.

Having got one's head as above, or today if necessary by mail order and with no hesitation in sending back anything inadequate, the first necessity is cleaning the rim of the drumshell and burnishing out any nicks or roughnesses. Harry recommended rubbing the rim with a block of paraffin wax or a candle stub to make sure the head would move smoothly – that is why the rim needed cleaning, to remove any old wax and with it any dirt that clung to it. Today there are probably better compounds available than

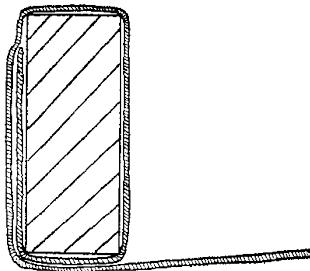
wax. Also clean off the flesh hoop, which for hand-tuned drums is usually wood, making sure there are no rust spots if the hoop had been nailed together at the overlap, and for pedal drums, where the flesh hoops are usually steel, again removing any rust. The same should be done with the counter hoops, the upper ring that carries the rings for the tuning screws. Pedal drums usually have an L-shaped counter hoop, normally chromium-plated, and these are no problem, but hand-tuned drums usually have a plain iron hoop, normally black-painted or black iron, and these have to be treated carefully because they have an up and a down side. The rings for the tuning screws are always closer to the down edge. Because the rings on the hoop and the brackets for the screws on the drumshell are not spaced to engineering tolerance, one bracket and one ring are usually marked with a filed notch – these must match up when putting it all back together, because if they are not matched, one or more rings and brackets will not be vertically aligned – equally, if the counter hoop is put on upside down, the same trouble will arise. Finally, in all these details, older drums may have hand-turned screws and sockets, and so it can be important, when taking the screws out of the sockets to remove the old heads, to put the screw back in the bracket to make sure that each one goes into the right socket.

One then infuriates one's wife (I am writing as then a married man) by co-opting the kitchen table and two or three soup plates, and the bathtub. Fill the bath (halfway is usually enough) with cold water and put the head in to soak for half an hour or so; a

thick skin for early music may need up to an hour. It must be cold water – hot or even warm water will shrivel up the skin. Spread several layers of towel or paper over the table – preferably not newspaper unless one wants to read old news as one plays. Lay the flesh hoop on the table and place the soup plates in the centre of the ring in a pile of two or three, bottoms up. This is to provide a collar to go down the side of the drum shell – too much will foul the tops of the tuning brackets, and too little will leave the head resting on top of the shell like a lid, preventing any latitude for tuning.

There are two ways of lapping, normal and reversed. Reversed is usual for pedal drums and on the Continent of Europe, especially Germany, for hand-tuned. English hand-tuned are usually normal lap. Every head has a smooth side and a rougher side, and we play on the smooth side – it is safest to mark (right on the edge where it won't show) which is which, *before* putting it in the bath, because it's less easy to tell when the skin is wet. For normal lap, lay the playing side down; for reverse lap lay the rough side down, in each case under the flesh hoop. Check that there is at least two inches beyond the hoop and that the soup plates are central, and trim off any excess amount of skin – a wooden block with a hole for a wax pencil makes a good marker to run a two-inch ring round the outside of the flesh hoop. I used the kitchen scissors (more annoyance) to trim the skin.

Then, either with a proper lapping tool (these have a flat side to the handle so that one can get right down on the head) or with



the handle of a dessert or soup spoon (ahem!), bowl up for the same reason as the lapping tool's flat handle, start to tuck the skin underneath the hoop and up over the outside of the hoop and down under the skin and up the outside to make sure it grips (see the drawing for this; this shows a normal lap with the playing side down). Do this at one point and then diametrically opposite. If the first tuck tries to come undone as one does the second, a clothes peg over it will hold it (yet more annoyance). Then again at 90 degrees and diametrically again, and so on round the ring, always keeping the tension as even as possible. Any variation of tension will lead to wobbling pitches. When all the head has been lapped, check all round that there are no skin edges visible within the circle of the hoop, tucking each of them in under the hoop (there always are some). Leave the head for half an hour or so to set, and then place it on the shell, playing side up of course.

If not using paraffin wax (or a candle) on the shell, rub some french chalk (or baby powder) round the underside of the head just inside the hoop. With an iron counter hoop, put strips of paper over the flesh hoop to avoid any rust spots, which could weaken the head and look bad. Place the counter hoop over the flesh hoop, making sure that the counter hoop is the right way up and that everything is level and even, and put the tuning handles back through the holes, having dipped the end of each screw into grease or vaseline for lubrication. As above, if the drum is an old one, the screws may have been hand-made so make sure that which screw belongs to which hole. And if the counter hoop has a filed notch to match a bracket on the shell, make sure that they match up.

Turn the screws, diametrically again, down just enough to bring the two hoops together. Make sure that everything is even and that the hoops are not further down the shell at any one point, and then, every hour or so, apply a little more tension, always at diametric points, north-south, east-west, and so on as the head dries out over a period of twelve hours or more. Once the head is dry, remove the paper strips.

While all this covers most points, there is an additional problem with some early drums. These usually had a single hoop, combining flesh and counter hoops into one, with the rings for the screws coming through the head. For this one needs a scalpel and a good deal of prayer. The lap is always reverse, with the playing side up. Every step is as above, but wherever the lapping

involves a tuning-screw ring, a slit has to be cut in the head, as small as possible but just big enough for the ring to go through it. Where prayer comes in, is placing the slit so that once lapped, the tension will be equal. It really is a nightmare. There is also the fear that the slit may extend, though because one is using a thicker skin there is the hope that it will be strong enough to hold together. And there is also the problem that because the tuning ring extends from the hoop, it becomes difficult to lap the head right up round the hoop. However, some early drums had rings that screwed into the hoop – if lucky enough to meet one of those, unscrew all the rings, but keeping each by its hole because the threads of the screw and the tap in the hoop do need to fit, lap the head in the normal way, and then just pierce the head above each hole and screw the ring back through the hole. A red-hot iron may be safer than a scalpel for this, since burning through the skin provides a hard collar which can inhibit further splits.

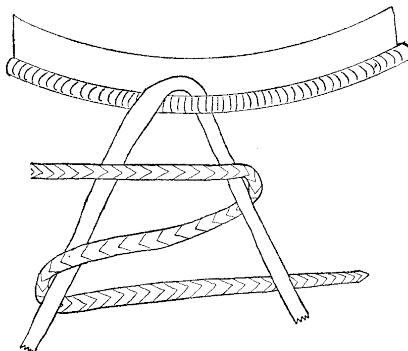
As just noted, early drums had thicker heads than today – machine skiving came into use around the beginning of the nineteenth century and this meant that the old wooden-headed, or wood and leather sticks rattled on the new thinner heads, and so sponge and/or felt-headed sticks were adopted. A wooden or ivory disk gives a very clear and precise sound on early drums, and also allows the player to use double-beats (as on the side drum) for a great many passages in the works of Beethoven for example, avoiding the necessity for cross-handing in passages such as the finale of the *Eighth Symphony*. Double-beating was often also

used for rolls. None of this was possible when thinner skins and soft-headed sticks came in. We shall return to beaters in a fellow article.

Drum skins do dry out, especially in our modern climate of central heating, and their sound deteriorates. Lewis (Titch) Pocock, Beecham's timpanist in the Royal Philharmonic, recommended the use of top-quality toilet soap, such as Lux. Never ever use lanolin, nor lanolin based soaps – I did once, and it was disastrous and it ruined two good heads and a pair of sticks. Stearite comes from cows, lanolin comes from sheep, heads are usually from the cow family, not from sheep, so keep things in the family. Use a damp sponge and when the head is moistened, rub it with the soap, rubbing it in with the fingers all over the head. This will also clean the skin, so have a cloth there, too, to wipe off the dirt as it goes. Go on rubbing the soap in until the head starts to feel supple again, and then wipe off any excess soap. Leave it to dry just as one does after lapping, but provided the head has only been damped, rather than soaked, this should only take a few hours. This can be done in emergency with the heads on the drum, but obviously it's better with the heads off so that both sides can be treated. There are two problems with that, though: one is that the head will take much longer to dry out, and the other is that one should never remove a head unless prepared to take it off the hoop and relap it, for once off the drum, it never really settles back, due to all the small inequalities of the rim that have been imprinted on to the underside of the drumhead.

Most of this naturally applies to all the drums that we normally use in the orchestra, side drums, tenor drums, and bass drums, though plastic is today much more common for these, especially side drums. With bracket and screw tension, proceed as above. Rope-tensioned drums need more attention.

Check that the ties for the tug-ears are all in good condition (the ties are usually cut-offs from drumheads). Check that the rope is all in good condition; if it needs to be replaced, measure the length of the old rope to find how much will be needed for replacement – more than you would believe possible! And for safety make sure you have a yard or two more than the old rope – as with drumskins, you can cut off any surplus but you cannot add to any deficiency. If you have the skill, make an eye splice in one end of the new rope to give a neater final knotting off. Once the heads are sufficiently set to go back on the shell, replace the counterhoops and start threading the rope through the holes in the hoop, starting from the lower head so that final tie off will be on that edge of the shell. One strand through the other hoop, down through the tug-ear, up through the hoop and back through the tug-ear, and so on round the drum. Some people prefer to pull the tug-ears up and some, the majority, to pull them down, so work accordingly. With something like a Long Drum (an eighteenth-century bass drum) or a deep tabor, there will probably be tug-ears at each end. Keep all the rope slack so as not to disturb the drum heads. When all is done, do a temporary tie off and then gradually take up the slack, bit by bit, making sure that the



heads are still sitting evenly on the shell. Once the rope feels the equivalent of finger-tight on brackets, then one can gradually allow the heads to be tensioned. Finally when all is dry, tighten the ropes with the tug-ears. Rope always stretches so it will need to be taken up round the drum again, and quite possibly again, before you can do the final tie off. That is usually done by winding the tail end of the rope round the drum, putting it through the bottom of each V in an S-shape: through the far side, back over the near side, under both sides of the V, and forward again to pull each V over itself, as in the drawing. And finally coil the end of the tail round the last of the Vs.

MAKING TIMPANI STICKS

Historically, from the late sixteenth century onwards, timpani sticks have had ball or more commonly disk heads, usually of wood and sometimes of ivory. These give a clear, precise sound on the thick drumheads that were used in those days. Some disks had edges that were quite narrow but most were a quarter of an inch up to half to an inch wide, proportionately with the diameter of the drums themselves. As and when the thinner, machine-skived heads became available in the early nineteenth century, these sticks caused a harsh rattle and had to be replaced with softer materials, such as felt and sea-sponge.

What came between is little known. Some seem to have been leather, again disks similar to heel leather, some leather-covered wood, and some with coverings such as cloth or chamois. It is likely that players used their ears to select the sounds they wanted, and this must also have depended on the sizes of the drums, which gradually increased in diameter and shape through the Baroque and Classical periods. What little evidence that we have depends on the very few surviving sticks and the drums themselves, many of which in both cases are essentially undatable. We have some evidence from the music, for as the range of pitches written in the music increased, there must also have been a commensurate alteration of drum diameters. A low F needs a wider diameter than an A or a G.

The first firm evidence that we have comes from the mid-nineteenth century, when Berlioz asked for *baguettes d'éponge* in contrast with the older wooden sticks. Which species of Mediterranean under-sea sponge these came from is unknown; it must have been something firmer than those used as bath sponges, but whether it was something that would keep its own shape when glued to the end of a stick or whether it was encased in a cloth bag, we do not know.

So far as I am concerned, my own knowledge of nineteenth-century sticks derives from the old ones that were still around in the late 1940s. These were disks made up of layers of thin cloth or felt compressed into a disk on a wooden core by a pair of small wooden disks, glued on to the end of a thin malacca cane. Others were again with a wooden core but this time covered by a layer of felt glued over the core. The flexibility of the cane handle gave one very little feel of control.

Newer sticks were coming on to the market by then, with rigid cane or wooden handles with a head of cork and a covering of piano-damper felt. These had a hard but reasonable sound. Others were a solid disk of felt, somewhat firmer than damper-felt, constrained by a metal disk and screwed into the end of the stick. I was not happy with the sound of either.

The timpanist of that time with the finest tone quality was James Bradshaw, timpanist of the Philharmonia and the greatest I ever heard or saw. He could play a pianissimo roll with a full arc of the sticks, and produced a wonderful sound. I asked him what

he used for the heads of his sticks, because I found the cork heads that my teacher, Jimmy Blades, recommended were far too hard. Balsa wood, he said, and two layers of felt, and that was about all he said, so I was left to myself to experiment.

I found the best way to drill the balsa to go over the end of the stick was with a chemist's cork borer – drill bits didn't work on the soft wood. And always across the grain, never along the grain for that made the wood break up in use into slivers. Balsa can be bought in bars from model shops and then cut or sawn and sanded to shape. Bradshaw recommended half-inch piano-damper felt, which one can buy from piano-mechanism suppliers. Cut the shape needed with shears, tin snips, or tailor's large scissors; split it into two halves, and then split it again. The result will be two pieces with one hard surface and one soft surface (good enough for one's pupils or for some of one's own uses) and two pieces with two soft surfaces, which are the ones to use because air will be caught between the fuzziness of the soft surfaces and improve the sound. Sew each piece over the balsa, one sewn on top of the other. Since one usually makes more than one pair of sticks at a time, start with two pieces of different size; if only making one pair, then trim one of final pieces enough smaller to allow one to fit over the other. These, I emphasise, are for modern skin heads. I dislike the sound of plastic drumheads and so I never tried to make sticks that would suit them.

Initially I used bamboo shafts since that was all that was available; I mistrusted the dowel rods that were available at that time

– indeed I am not sure that they were easily available; there were no DIY shops in those days, only timber yards. The problem with bamboo is that its size is not consistent, which made it difficult to decide which cork borer to use for each head. While on holiday in Copenhagen, I saw that the timpanist in the orchestra in Tivoli Gardens was using what appeared to be metal sticks, so I went behind in an interval and asked him about them. Duralumin, he said. Aluminium tubing (aluminum in American) was then easy to get, so I adopted that. All a constant diameter, and they had a good feel and good control. And I found that there were small black rubber ferrules to go on the feet of iron-frame furniture the same size and these were ideal for the other end of the stick. They had the advantage that when working in a pit one could flip the stick over and use those ferrules on a side drum when there was no time to change beaters.

A set of beaters, each pair of a different size, will cover most contingencies. And of course one also has other pairs for special uses.

We all have our own preferences. I like a cylindrical head rather than a spherical one, so I make them accordingly, from quarter inch to two inches long (that last pretty well only for Tschaikowsky). The sizes that I use most often are the one inch and the inch and a half. One each of a set of different sizes and types is illustrated in my book *Timpani & Percussion* on p.150. A wood stick for ‘Mars’ or Berlioz is on the left, and two different wood

sticks for Early Music are on the right. The second felt-headed stick from the left is my most usual.

The wooden sticks for Mars etc are balls that I got a woodyard to turn for me and fix on wooden shafts, but equally good are wooden plumbers' bobs on my usual ally shafts. There is no limit to the number of effects that one needs and I have made heads of all sorts for different occasions: rubber balls, bath plugs, heavy rubber tubing; plastic disks; wooden disks; practically no limit.

What I prefer for Early Music drums is a single-piece wooden beater with a disk end, and I bought a pair that were based on an original from Tony Bingham. I've also used a pair with a narrower disk end that were made and given by a colleague. And when I got my double drums from Jimmy Blades, I turned a pair myself from two mahogany chair legs that were the right size and weight to suit them. With these early sticks on thick skins one gets a good clear sound and one can double beat as one does on a side drum which is useful for all those pairs of semiquavers that turn up so often in Baroque and Classical music. This also avoids a lot of cross-hand work such as the Finale of Beethoven's *Eighth*, and double or even multiple beating was also used for rolls in that period.

WRONG GEAR

Composers have a bad habit of trying to wreck our instruments by telling us to use the wrong sort of gear. Elgar, for example, asks for an iron bar on a cymbal – well, not on my cymbal, mate. I'll hit his cymbal as hard as he likes with whatever he likes, but not on mine. That's not quite true of course – we do all keep the odd crap cymbal to cope with this sort of thing, just as violinists keep a crap bow for *Il Signor Bruschino* and other works when they have to tap the strings with the back of the stick and ruin the varnish on the bow. And we do know how to use a wooden stick on a cymbal without cracking it when we have to do so, but again we don't do it on one of our better cymbals.

And we don't want to use side drum sticks on our timpani, either, though composers often ask for it. We know that the small bead of a side drum stick will scar a timp head and so we try to ignore what the composer said and we use a proper timpani wood stick with a ball or disc head. On the other hand we don't mind using a couple of coins for a pianissimo effect in a timpani roll, especially of course if the composer will give us the coins out of his own pocket. Back in the days when the *Enigma Variations* was new, a couple of half-crowns (five shillings in old money) would have provided a very good meal for the whole percussion squad.

Nor do we like to scrape a good tamtam with a triangle beater, as Stravinsky asks us to do in *Sacre*, because we don't want to

scratch the surface of a good instrument, but here again most of us have an old poor-quality gong that can be allowed to suffer. Nor is it a good idea, as I've also written elsewhere in this book, to whack a tamtam with a bell hammer.

Talking of bell hammers, I've been asked to use carpenter's hammers on tubular bells, and not only did that make a nasty noise but it also dented the tubes – luckily they were the BBC's tubes and not mine.

Equally we use bass drum rollers when composers ask for timpani sticks on a bass drum because we know that the small head of a timpani stick will fail to stimulate a head as wide as that of a bass drum, and again we use special cymbal rollers rather than timp sticks on a suspended cymbal. Both these are to produce a better sound on an instrument, rather than to avoid harming it, but both do also reflect the ignorance of composers on how our instruments work.

But trouble does come when the composer is there, standing over us, and we have to talk them out of it. Most of them are reasonable and realise that we're doing our best to help them without damaging our kit. I mentioned above the legends of half crowns on the timpani in the *Enigma Variations*. Half crowns have pretty well vanished today, but I've still got a couple, and some old pennies from pre-decimal days and they work as well – just don't use the side drum sticks and if you've not got suitable coins, use the butt ends of the timp sticks – they're safer.

Then of course there are the composers who think we're an octopus. There's a short passage in *Sacre du Printemps* where there are five timpani notes going at once for the two timpanists; usually the bass drummer reaches over and lends a hand. I remember once at a Prom being asked to play claves and maracas, not simultaneously but in quick succession. Maracas while holding claves are easy, but claves while holding maracas are damn near impossible without letting the maracas sound.

Worse are the managers of opera and ballet companies. They'll have temps and three or four percussionists in the pit at home, and then send out a touring company with just a timpanist or temps and one percussion and expect all the same music to be played. Festival Ballet used to tour temps and one percussion and whenever I had to put in a bit of percussion as well as temps I got doubling money, so more or less fair enough, but with the Royal Ballet I was on my own. When we got back to the Garden I asked for doubling for all I'd tried to do – 'What's that?' they said, so I refused to go out with them again. Our Musicians' Union in Britain is fairly tough on this – if any player is asked to play more than one instrument (other than obvious bits of our gear within a section), he or she is paid half as much again of the session fee. However, it didn't seem worth reporting the Opera House to the Union, so the easiest alternative was just to walk away.

Coming back to the wrong gear, it can often be our own bits and pieces that are not what we wanted for a specific gig. One reason for this is the fault of managers and bookers, or fixers as

we call them. We can so often be booked for a session or a concert without being told what's on the programme or details of it, and then when we arrive we find we've not got the right gear. I remember once being called for a concert, and when I asked what, I was told 'just bring a couple of timps'. On the stand was a weird edition of the Bizet *Symphony* with changes of pitch in almost every bar. And there I was with two hand-tuned timps.

Other times I could be forced to use the BBC's studio timps (I've written about my later success over that elsewhere here), and there was the Reger *Mozart Variations*, with forte low Es. No way could a BBC 27-inch temp get down there, and eventually I managed to persuade them to lend me the Symphony's hand-tuned 30-inch.

Another of our problems is not knowing what an instrument is. In the Villa Lobos *Emperor Jones Ballet*, I had to ask the conductor what two of the instruments were – I didn't speak either the Brazilian version nor mainland Portuguese. One of the answers I've mentioned elsewhere, was metal maracas, which was easy enough to make up from a neighbouring ironmonger, and I can't remember what the other one was. Another time, when I was a beginner, was what was *Sporen*, which, when translated, was spurs. Where the hell on the Isle of Wight could you get a pair of rattling spurs? An ironmonger was the answer again, a pair of hinges and some iron washers. But there's a lot of scores with a lot of funny names in them, and if you only meet the part on the bandstand, or in the pit, you're in trouble.

Another problem is space. No management ever believes you when you tell them how much space a set of four timps is going to take up. Go out on tour and the pit's too narrow to take them all, if you're lucky enough to have a pit. If it's a theatre, where we're playing on the flat with just a barrier between us and the audience, the management won't take out another row of seats to make enough room – it's bums on seats that pays the rent and that pay us. So often I've had to play a four-timp part on three drums, and at least once trying to do it on just two pedals. And then worse, you may find there are some timps sitting there already and they can't be moved (I've often met that on tour abroad), or not without a crane and they can't get a crane into the theatre with the rehearsal starting in half an hour. I've met hand-timps, tram-handles, even once timps that you had to rotate by hand to tune them, and when there's no room for your own drums, you have to do the best you can with what's there.

Other times it's a matter of trying to make sure we've got the right kit between us for a gig. If you're playing a work for two side drums, *Gazza Ladra* or *Bolero*, for example, you really need a contrast between the two drums, often the lighter first and the second later or vice versa, certainly the lighter first for *Bolero* where you start *ppp*. Same of course with tuned gongs for a lot of composers' crap ideas for high, medium, and low gongs. We each have to scrabble among our kit to find ones that'll match up and make a decent sound and not too far away from normal tuning.

That's our job, to do the best that we can for a composer who doesn't know how to write for the kitchen department, and when it goes wrong it's usually us, not the composer, who get the blame.

RHYTHM IN EARLY MUSIC DANCE

Most of the early music we play is religious, secular motets, or dance music, from the thirteenth century onwards, and even the first two of these may need rhythmic accompaniment, as dance music invariably does. What do we do and with what do we do it?

Pipe and tabor are the traditional instruments for dance, as also is the tabor alone. The next most frequently seen percussion instruments are the nakers, a pair of small kettledrums slung from the belt in front of the body. Why were they paired, or more seriously what was the difference between the two? Christopher Page translated one of the few descriptions, *obtusus* and *peracutus*, as high and low, but the two drums are always shown as the same diameter and, where visible, the same depth, which, while it remains possible, it does make that translation improbable. No nakers survive (nor do any other mediæval percussion instruments – we depend entirely on iconography), but I have a pair of allegedly Egyptian naqqereh (from which the nakers derived in earlier times), and one of those has an air hole at the apex of the bowl and the other does not. This suggests to me that *obtusus* might mean dull and *peracutus* clear, suggesting a difference in tone colour rather than in pitch. But there is no clear evidence for either interpretation, and perhaps it was just that with small drums it is easier to play with one beater on each drum – certainly

the nakers were the only mediæval drums that are always played with two beaters – the tabor is always shown played one-handed even when it is played without a pipe.

The other percussion instruments shown in the manuscripts are handbells, a row of bells often with note names drawn on them, the triangle, and a small pair of cymbals. None of these are suitable, at least in our ears, to repetitive rhythmic use.

And one other point to make in preliminary, is that there seems to be much less certainty among scholars regarding which rhythmic mode is required than melodic mode. One often hears the same piece in 2/4, 6/8, or even other time signatures. I do not have the knowledge to determine that question – I play in whichever mode I am asked to play.

But what rhythms should I play in that mode? Here we have no evidence at all until Thoinot Arbeau published his dance treatise *Orchésographie* in Langres in 1588 (Warning: None of the translations are wholly accurate; best to use the facsimile edition, and a facsimile is also available online as a pdf).

But we do have evidence from much later dance music, even into our own time. Leaving aside all forms of jazz, pop, rock, etc, in which dancers do their own thing, in all the more formal dance formats, from Rameau's *tambourin* down to rumbas and congas today, the accompaniment to the tunes always indicates which foot is which, and the same is true of march music, which Arbeau also discusses in much detail. Think of a waltz: um-cha-cha, um-cha-cha, all the way through (pity the violas and second

fiddles), with a little twiddle at the corners, i.e. every eight bars or so.

Before jazz arrived, around the beginning of the twentieth century, we in Europe were pretty flat-footed, and we needed this cue. I am sure that we needed it in the Middle Ages and that we still do today.

In march music, Arbeau insists that there is a plain stroke for the left foot, plus as much elaboration as the player likes on the right foot, and he insists that this goes on, right through the whole march. In the two dance songs that he writes out in full, the same applies. Either  or  throughout, even at the corners.

And I believe very strongly that this applies to all mediæval dance music, and also to the renaissance dances, galliards and so on. We did this in *Musica Reservata*, throughout all our performances, recordings, and broadcasts (most of which can still be heard through the British Library Sound Archives), from thirteenth-century dances onwards, and with the long *istampitas*, *basse danses*, and all the other dance pieces, also in some motets, and even in some religious musics.

To my ears, much of the jazzy rhythms we so often hear today, often drawn from North African sources, or from Spanish flamenco, etc, is false. We northern Europeans, from France, Germany, and England (from which much of the music we play derived) do not, and did not, become influenced by the Arabs, as the Spanish did. Maybe *Kalenda Maya* can be jazzed, but not an *estampie*, not a *basse danse*. And nor a waltz.

Keep it simple, keep the rhythm tight (but human, not like a click track), and help the dancer know which foot should be which. That's the whole secret of playing dance music.

And one useful tip: if you're recording and the melody player breaks down, keep the rhythm going, let him/her recover and join in, and then they'll get a good tape edit. We found that was the only way to get a clean join, so sometimes I'd have to play on for twenty minutes or more to get a five-minute piece into the can. It worked, whereas with a stop and restart we could never get a good join.

IMPROVISATIONS FOR PERCUSSIONISTS

I became a timpanist and percussion player in 1950. I was dragooned into it because I wanted to get into first orchestra at the Guildhall School of Music and Drama. My main studies then were conducting and french horn. They already had enough horns in first orchestra but there was a dearth of percussion – in those days it wasn't treated as a serious subject, you were almost expected just to be able to hit something and pick it up as you went along. So they told me that playing percussion would be so good for my rhythm as a conductor, *wouldn't* it. We were going to be playing for the first orchestral acoustic test in the then-unfinished Festival Hall in six weeks time and somebody had to play the side drum – *Caprice Espagnol* was on the programme. So, of course in those days, was the National Anthem. So I had six weeks to learn to produce a side drum roll! One result was that I was the first person to play under a conductor in that hall (not counting the oboist who gave an A), because I rolled up *The Queen*, which began the concert. The second was a disaster because I couldn't hear Len Friedman, our leader (the acoustics were appalling, even after the hall opened properly one could seldom hear any of one's colleagues) , when the roll had to go pianissimo for the violin solo in the *Caprice* it kept stopping because I couldn't roll any softer – it was a pretty grotty roll in any case after just six weeks.

So, this was 1950, only four years after the war, and none of the gadgets we have now existed in those days.

All our instruments were pre-war at the Guildhall. The only side drum was a poor-quality lad's brigade type, and that, with a pair of mediocre sticks (all there was in the shops in those days) and a stand, was the first thing I had to buy so that I could practise and then have something better than the Guildhall's side drum, for the *Caprice*. Nobody then made good timpani sticks, but that was less my worry since I was only occasionally allowed to play timpani. Our teacher had been a good player once but was now elderly and by no means up to date, so I went outside and got better lessons with Charlie Donaldson of the London Symphony Orchestra, who taught me both hands down, good for a beginner, though it could limit further opportunities, so I practised both ways.

Later I got to know Jimmy Blades and went to him for lessons, and that is how I began to learn how to improvise and so improve my kit. Jimmy had been trained as a boy as an engineer, and he made many of his own gadgets that made life easier. He taught me a lot, and some of this I've mentioned elsewhere, like being able to cut a thread on a rod, or when he showed me how to make a tubular bell for my first pantomime (you can't do a *Cinderella* without a bell). Jimmy made many of his own instruments, especially those for Britten's operas and canticles, for Ben had an idea in his ear of sounds that he wanted such as the famous shuffle through sand (a tube with shot inside that slid from one side to

another), and then asking for a difference between left and right foot (a conical gourd so that the sound was different when the shot struck either end). So I learned from him to make my own gadgets, two of which are illustrated in another chapter here.

But much of this sort of improvisation I've mentioned in other chapters in this book. What I want to discuss now is improvisation in the music, especially in the Baroque.

Just what do you do in the Sanctus of the *B minor Mass*? Everyone else is playing and singing triplets, and you've a quaver and four demisemis (one eighth and four thirty-seconds, for foreigners), which adds up to two quavers. Either you play a crotchet and four demisemis (one quarter and four thirty-seconds), or else you play what's coming up in the Hosanna, a quaver and four semis (one eighth and four sixteenths). You can't play what's written (it doesn't even match what the oboes have, a dotted quaver and a semiquaver, which they're going to play as triplets anyway, one crotchet and one quaver), so you have to improvise, and choose between one or the other unless the conductor insists on the other one.

What are you going to do at the very end of the Dona, a double breve? Just one whack while everyone else holds the note, or a roll? Personally I prefer the whack and hope the hall is resonant enough to hold it for me, as it often is in a church. (And parenthetically in the Sanctus I prefer the crotchet and four demisemis – it drives the music on).

But what about *Messiah* and a lot of other works of that sort, the *Music for the Royal Fireworks*, for example. Handel is known to have used two pairs of ordinary drums and a pair of double drums in that work and in performances of *Messiah*, and surely all three timpanists didn't play exactly the same. In one movement of the *Fireworks* he even wrote 'side drums roll (*wirbel* – I like to think of it as warble) here', without any written music, leaving it up the player to decide what to do. You often find the trumpets playing a quaver and two semis whereas you've got a couple of quavers in the timpani part – do you do what's written or do you follow the trumpets? We are the bass of the trumpet squad, and to my mind it's up to us to support them and do what they do and break that second quaver.

More seriously, what about the final bars? So often it's just two semibreves (whole notes), one in each of the last two bars. Well, in *Messiah*, Mozart gives us the answer, because he arranged it for his own time when players were no longer expected to do it for themselves. He breaks up the penultimate bar into a rhythm, and this is of course what players always did in the Baroque period. There's examples of what one should do in Altenburg (*Versuch einer Anleitung zur heroisch-musikalischen Trompeter- und Paukerkunst* (*An Essay on the Introduction to Heroic and Musical Trumpeters' and Kettledrummers' Art*) (Halle, 1795), and more in Speer (*Grundrichtiger Unterricht der musikalischen Kunst*, 1687 and 1697), and doubtless there are other sources. Altenburg is available in translation, but I'm not

sure about Speer – however we can at least read the musical examples in his book.

What is important is that the timpanist in those days was a showman. There he is, in so many illustrations of the period (for which see many of them in Edmund Bowles's great book on *The Timpani*), high in the orchestra, waving his arms and sticks in the air. In Britain you can still see him doing this, but mounted on a horse, leading the band of the Household Cavalry and those of some other regiments.

Going back to the earliest Baroque or late Renaissance, what do you suppose we should do in some of the Battle pieces? There's no written music, and we have to improvise it. Or in the big Praetorius choral works? These have some written music, but often just long notes which surely we have to break into patterns. There's no timpani part in the opening Toccata of Monteverdi's *L'Orfeo*, for example, just the five trumpet parts, the lowest of which is just a string of long notes on the tonic. Were there drums there in Mantua? We don't know and they aren't included in the list of instruments, but today we quite often hear them. There's no real reason why we should not provide rhythms of tonic and dominant, especially when we consider that the Toccata is to be played three times.

Going back even further, into Shakespeare's time, there are many references to tucketts and sennetts (English for toccatas and sonatas), many of which do survive for three or four trumpets, the lowest, especially in the four-part ones, just on tonic and

dominant. Surely that line is for us, and if we are asked to provide incidental music for Shakespear's and his contemporaries' plays, we can enjoy ourselves with busking it – it's pretty clear that Shakspere expected us to do so.

In the music of this Baroque period and in that of the late Renaissance, it is up to us to embellish the music where there are long notes, especially in final cadences, with good taste of course, and to be seen to be doing so – letting our sticks fly up after a good note (but don't let go of a stick!), provided we don't detract from the appearance of the rest of the band.