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Victor De Pontigny Esq

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FEBRUARY 7, 1876.

WILLIAM CHAPPELL, Esq., F.S.A., IN THE CHAIR.

ON KETTLEDRUMS.

By VICTOR DE PONTIGNY, Esq.

THE earliest musical instruments were most probably those of percussion. Music consists of two parts: rhythm and tone. To produce a tone requires a certain amount of constructive ingenuity; to obtain a variety of tones from one instrument requires considerably more; whereas rhythm may be produced by beating together any solid substances, or even by clapping the hands. By degrees, various as well as improved qualities of rhythmical sound would be discovered; and the stretching of skins over hoops or hollow vessels would soon suggest itself. In the latter case, especially, a musical tone or note would be the result.

Various materials, as wood, pottery, and metal, have been used for making the vessel or body of this kind of instrument. There is in the Indian Museum, at South Kensington, a red earthenware pan, hemispherical, like a modern kettledrum, with a skin stretched over it; and here, as well as elsewhere, there are drums of fantastic shapes, some with one head (or skin) and some with two. Most of these drums have no contrivance for tightening the head. Once stretched by the maker, so it would remain. This was probably of no inconvenience where the pitch or actual note was of no consequence, and therefore did not require changing. Nor would the quality of the sound be subject to deterioration in the warm, dry climates of the East. Very different would it be in this country, where, with all our modern mechanism, drums lose their quality if exposed to the damp. Animal membranes are very good hygrometers; and I could sometimes have told the state of the external atmosphere merely by hearing the flabby tone of the kettle-drums in the Crystal Palace orchestra, when they have accidentally been left uncovered for a day in damp weather. The same occurs with the side drums of a regiment.

I hardly know how to draw the line between tambourines and drums. It may be said the tambourine has only one head and is open at the bottom; but so are some of the tubular drums to be seen in various museums. So also is the gigantic tambourine called the gong-drum in modern orchestras, which is used as a convenient substitute for the bass drum, because it takes less

room, though very inferior in quality of tone. The tambourine is a skin stretched on a narrow hoop, light enough to be carried in one hand, and beaten with the other. There is in the Crystal Palace Museum a modern Egyptian tambourine; and as fashions remain unchanged for ages in the East, it is probable that Miriam's timbrel, 3,000 years ago, is practically identical with the tambourine used nightly by the Christy Minstrels at St. James's Hall.

I have no intention of going *seriatim* through these 3,000 years; but will rather at once come to the subject of the modern kettledrum, the only really musical instrument of the drum family. Very little has been done towards investigating the theory and practice of kettledrum making. It is well understood that the instrument is to be a metallic vessel, like a pitch-kettle or cauldron, covered with a skin or head of vellum, and with sundry screws to vary the tension of the skin, so as to tune it to the required note. These screws work upon an iron ring, round which the skin in a moist state has been securely lapped. But the exact shape and size of the shell seem to be left rather to the fancy of the coppersmith than to the scientific musician. Now the best shape or curvature of the kettle, or shell, as it is called, and indeed the exact function of the shell, are subjects requiring scientific investigation; and my principal object in speaking of drums has been the hope of inducing some of our members to give us an explanation of the true theory of the functions of the shell. For if the theory of the shell can be properly ascertained, it might be easier to decide upon the best shape to be given to it. At present, as I have said, it is a matter of fancy. Either a hemisphere, or a little less than a hemisphere, or one of these forms with a cylindrical addition, are the usual varieties. Sometimes the shell is even semi-oviform, which gives two varieties; for amongst kettledrum makers there are big-endians and little-endians, as in *Laputa*. The head alone gives a good musical sound without any shell at all; witness the drums exhibited by M. Sax, the celebrated brass-instrument maker. But the addition of a shell unquestionably improves the quality of the sound.

The size is a much easier question than the shape; it depends merely on the range of notes required. Now what is that range? A drum may be fairly expected to give, by means of its screws, a fifth or five notes of the diatonic scale, all of good quality; and every orchestra has two drums, one larger than the other. The two combined can therefore be made so as to give a complete octave, one overlapping the other by a whole tone. But which octave is it to be? It appears to be well understood abroad, though ignored by English drummers and drum-makers, that F below the lines to F on the 4th line (bass-clef) is the octave required:

and foreign drums are made of the requisite size to produce this octave. This point may be settled beyond dispute by referring to Beethoven's works. In his 8th and 9th Symphonies he has given to the drums this very octave in F:

I would observe, on the authority of Berlioz, that these are the real notes sounded (the lowest violoncello F and its octave above), and not the octave below that range, as some people think.

It is generally supposed that kettledrums cannot be too large. I once asked a drummer in a London theatre why he had such an enormous pair, and he said he had bought the largest he could find. Some say that a very large orchestra should have large drums. But I would just ask whether, in a band of several hundred performers, the violoncellos are replaced by double-basses; or whether, instead of each bassoon, you would use Dr. Stone's splendid contra-fagotto? Certainly not; you would double the number of bassoons, as is done at the Opera in Paris, and double or treble that of the kettledrums, as in the Handel Festivals at the Crystal Palace; but excluding, I hope, the monster drums, which only produce a kind of thunder undistinguishable as musical notes, and which might just as well be performed on one bass drum as on two kettledrums.

Another disadvantage of having drums too large, even when they do retain their value as musical notes, is that they may frustrate the intention of the composer. I remember being at a rehearsal of Meyerbeer's "Crociato in Egitto" at the old Opera House in the Haymarket between forty and fifty years ago, when Bochsá was the conductor, and Goodwin, whom we all know as a copyist and librarian, was at the drums. The passage (solo) was this:

Timpani in E?

but Goodwin played it inverted, thus:

which sounded absurd. Bochsá immediately screamed out, 'Goodween! Goodween! I want

'Then, sir, you can't have it,' answered Goodwin. Now, why could not Bochsá have it? Simply because the lesser drum was

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There are also several inventions for tuning by means of one motion. An ingenious musical-instrument maker, the late Cornelius Ward, took out a patent in 1837 for this purpose, the specifications of which may be seen any day at the Patent Office in Southampton Buildings. An endless cord passes over pulleys attached in a few places to the iron ring round which the head is lapped, and thence from the outside to the inside of the drum, where a long horizontal screw, worked by a handle outside, is made to tighten or slacken the cord, and so tune the drum. The tuning is done so rapidly that it is possible to play 'God save the Queen' on a single drum. The tension of the cord, shown by a spring indicator, is read off outside; so that the drum may be tuned by the eye as well as by the ear. For the note depends on the tension of the head, which is shown by that of the cord.* The patent having expired, these drums can be made by anybody that chooses. Potter makes a drum in which curved bars come down outside from the head to the bottom of the shell, where they are tightened or slackened by a screw turned by the performer's foot; or else by turning the whole drum bodily round.

Einbigler, of Frankfort-on-the-Main, has a contrivance consisting of a movable hoop just inside the shell, which can be pressed upwards more or less, so as to vary the tension of the skin. This is worked by a handle outside the shell. I heard these drums last summer in the theatre at Frankfort, and they seemed to answer very well. The price was 400 florins (about £34) for the pair. It is very desirable in any contrivance of this sort to have small screws all round, by which *equality* of tension may be secured. In ordinary drums, if carelessly tuned, we often find that different parts of the circumference present a variety of different notes. And even if the tension is equal, a slight difference of thickness in any part of the head would require a slight correction of tension in order to obtain equality of pitch. It is not to be expected that any membrane can be perfectly homogeneous. Einbigler's drums possess this means of adjustment. But a wide field remains for inventors to improve upon these several plans.

Kettledrums are generally made of copper in this country, and of brass abroad. No particular reason beyond habit is assignable for this difference. As regards the heads, we generally see a thick opaque white skin used, about the colour of ivory. But a thinner and more transparent skin gives a far finer tone, and such should be always used.

Another important point is the choice of the sticks. The old-fashioned ones have a globular knob, about the size of a small orange, and do not bring out the true ringing tone. Those ending in a disc of felt are much better. But the best

* Mr. Ward told me that in the course of his experiments he had found that the note given by a drum under a tension of 37 cwt. was an octave above that given by the same drum with a tension of only 11 cwt.

of all are those having wooden ends in the form of a button, covered with a thin piece of very fine sponge, the stick itself being of whalebone. It is not always easy to get whalebone thick enough or sponge fine enough, and both are always dear: I have therefore devised, and Rudall & Co. have made for me, a substitute in which whalebone is replaced by vulcanite and sponge by felt, but without any interior button. The felt should be either in one or three pieces, otherwise a zone of hardened cement as well as the felt will strike the drum. These two kinds of sticks answer very well, and enable the performer to produce the loudest as well as the softest effects. The heads of all sticks should be of a very moderate size, not exceeding $1\frac{1}{4}$ inch in diameter, so that only a small surface may come into contact with the head of the drum. The quality of the sound is thus clearer and more definite. It is true that a sphere can only touch a plane in one point theoretically; but that refers to a solid sphere and plane, whereas in our case both are of yielding materials.

Kettledrums should be placed in a slanting position towards the performer, as the blow then falls easier to the hand than when they stand horizontally. They should never be struck in the centre, but at a point distant about one-fourth of the diameter from the circumference. The bass drum, which is a large cylinder with two heads, must on the contrary be struck in the centre of one of the heads. The stick ends in a soft round knob. The side drum is of similar shape, only very much smaller, and is struck in the centre by two sticks, made entirely of hard wood, ending in a small knob. Across the lower skin are several pieces of catgut, called snares, which rap against it at every stroke, and merely produce rhythmical noise without tone. The kettledrum roll is produced very differently from that on the side drum. In the former each stick gives a single stroke alternately, but on the side drum each gives alternately *two* strokes, commonly called 'daddy-mammy.' This latter is very difficult to acquire, and must be learned at an early age.

The kettledrum roll is not so difficult, but still everybody is not able to do it. It is quite a fallacy to suppose that any fool will do to put at the drums. I have seen a yeomanry corps march into a town, headed by its very tolerable band; but a youth was put on horseback to beat the drums, who had not the remotest idea that it could signify which drum he struck; so he flourished about, right and left, in the most picturesque manner he could, as often beating the right note as the wrong one. And at a professional concert in a fashionable town near London, with an excellent orchestra, a boy was set to play the drums who could not even be made to beat a triplet in time. A kettle-drummer ought to be an excellent musician as regards time, both when playing as when counting some 50 or 100 bars' rest; and also able to feel exactly what his part is contributing to the effect of the whole score. The late Mr. Hogarth says that a single stroke

may determine the character of a whole movement, and the slightest hesitation, or the misapprehension of the requisite degree of force, may ruin the design of the composer. Even the late Mr. Jenkinson, the chief drummer of his day (the predecessor of Chipp), once came in a bar too soon in a chorus of 'Joshua,' and was so mortified that he inflicted summary punishment on himself by beating his own head with his sticks. Fétis says that there is a notable difference between drummers that have been taught in the same school, and that a certain tact is required which cannot be analysed, but is nevertheless essential and real. Another difficulty is that of tuning the drums, as it requires some experience to appreciate the exact note sounded. To illustrate this, allow me to ask, how many of the able musicians in this room would undertake to tune the last four or five strings in the bass of their pianos?

The old practice of writing drum parts invariably in the key of C, like trumpets and horns, is very inconvenient. For instance, if the composer writes

the C becomes a G, and the G a D; and as the G is too high to be got out of the smaller drum, it must be taken an octave lower on the larger, and the real notes will be

inverting the passage and confusing the performer. If the same passage is for Timpani in F, there are two possible ways of executing it, viz. :

and if for Timpani in B♭, also two ways :

The composer should therefore indicate which of the two ways he wants, by writing the real notes. (It will be remembered that the united range of the two drums is from F to F, one octave.) When three drums are used together, as in Spohr's *Historical Symphony*, no other method of writing would be intelligible. The same with Mendelssohn's *Capriccio in B minor*, where the drums are in D and E, a most ingenious contrivance, whereby they are available, without any change, in the key of B minor as well as in that of D major.

Drums are heavy and inconvenient to move about, especially

in travelling ; but by taking off the head of the larger, and screwing the lesser firmly inside of it, and putting on the head again, the bulk, at least, may be diminished.

If I thought copyists and engravers could hear me, I would entreat them to discontinue spelling *timpani* with a *y*. The word is Italian, and the letter *y* does not exist in that language.

I would just mention another instrument of percussion—the triangle; the shape and size of which, in this country, seem to be left to the blacksmith's taste. But I have here a very good one of French manufacture, such as is used at the opera in Paris. It is an isosceles triangle, of which the height is 7 inches, and the base $6\frac{1}{2}$. The beater is tapered, so as to produce loud or soft tones, according to the part used. This instrument suits all keys, for it gives out many subordinate tones (not harmonics) besides the fundamental one, and thus produces an indefinite clang like cymbals.

To sum up, these are the points I wish to insist upon:—1st. That no drum should exceed 30 inches in diameter, and that the range of the two drums together should be from F to F. 2nd. That the transparent thin vellum heads should be used instead of the thick opaque ones. 3rd. That sticks with small knobs of sponge or felt should be adopted.

If the Association sees fit to support my views, the uncertainty in the make of these instruments would cease, and their effect become generally improved. In conclusion, I would repeat the hope that some one will undertake to explain to us, theoretically, the way in which the shell of a kettledrum modifies and improves the tone of the head. Experiments are also wanted to determine the best shape for the shell. Such investigations are perfectly legitimate objects of our Association, and we fortunately possess many members highly competent to carry them out.

DISCUSSION.

Dr. STONE said the subject was one of great importance, to which he had given some attention, and perhaps it was one which had not hitherto received sufficient notice. He wrote to Mr. de Pontigny, asking him what was the literature on the subject, and received as reply, that it was a blank; which he found to be the case. The subject was an exceedingly difficult one, incompetent to be met by mathematical investigation. Here and there a proximate formula might be found; but without going into abstruse points, he would like to mention one or two matters, and before doing so would say that he thought Mr. de Pontigny had done good service by bringing the subject forward. Everybody would agree, he thought, that the function of drums of all kinds was to accentuate certain noting, or to reinforce the bass tone of the orchestra. Besides this, there was their melodic use, and there

were many specimens of this in Beethoven. The case of Bochsa was that there were only two drums present, and thus the first had to be inverted for that which belonged to the third. What was wanted was a third drum in the interval, to be written without transposition. In the case of the melodic instrument, the time-keeping was done by the side-drums, which kept up a sort of terrible noise, made more *crassant* by adding a piece of catgut, and by a bass gong and drums of various kinds, which uttered a sort of boom. The drum, as a melodic instrument, he thought, should be on a sixteen-feet tone. He had a very old hobby on that subject: he considered himself the apostle of the sixteen-feet tone—the thirty-two feet tone, if possible. It would be agreed, he thought, that when they got a fine tone in the sixteen-feet octave, it supported everything, and seemed to give a foundation which hardly anything else was competent to give. In the double basses and trombones you might take half in the sixteen-feet octave, and half in the eight-feet; but no doubt drums ought to be of size enough to bring out a good sixteen-feet note. His own experience was that in our large orchestras, like the Sacred Harmonic, the Crystal Palace and the Handel Festival, the drums did speak a sixteen-feet note. If so the drums sounded in unison, and were not playing an octave above. There should be, he thought, a great predominance of the sixteen-feet tone, the eight and twelve coming in to give the name and the character to the note. Then, as to mechanical construction, we were intensely behind. They were playing the music of the future with the drum of the past. Owing to the unfortunate mechanism, the drummer had to go round ticking, and making a nasty noise, which ought to be exorcised and driven out of the musical world as soon as possible. Mr. Cornelius Ward's plan was very good, except that in about one evening in three it broke down. There was a German plan which he believed was much the same as Potter's, and also a plan by which there was a lever under the drum. The drum was very difficult to tune; it required great experience, and a certain knack had to be acquired. Perhaps the drum, from its very compound note, was even more difficult than other bass notes; he thought a good deal might be done towards getting an accurate note, by attending to the construction of the kettle, which seemed to be made rather by a rule of thumb. He had had a good many experiments made, and was now continuing them, the result of which he hoped to communicate to the Association on some future day. He believed the hemispherical shape answered very well, and also the cylindrical shape. Why they should not make the kettle a regular shape, and tune the kettle so as to consonate with the membrane, he did not know. The difficulty in appreciating what the drum was doing, arose from the fact that it was doing two things at one time. The membrane was doing one thing, and the kettle another. There was a difficulty in tuning the kettledrum, because it was somewhat unwieldy; and he would suggest, as you could tune a

cavity, by opening that which connected the cavity with the air, that there might be a closable cavity, and thus a drum could be made to vocalise as the lips of a speaker vocalised. There should be some standard of pitch, by which the drummer should be guided, and it should not be left merely to the ear. He believed a good deal might be done if the drummer had beside him a set of reeds corresponding with the possible note to which the drum should be tuned. If the drummer had a simple octave of reeds, he could take a reed, compare the note, and be able to tune his drum accurately.

Mr. DE PONTIGNY thought the idea of being able to open the cavity would yield good fruit, and hoped some one would go minutely into the functions of the shell, because he believed there was much to be done.