

II.—ON THE DIFFERENCE OF TIME AND RHYTHM IN MUSIC.

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IF in a psycho-physical laboratory an electric hammer gives a regular succession of equal beats, the attentive observer is able to mentally divide this succession of beats into equal periods of two, three or more beats. While perceiving them he divides them, as the musician would say, into bars; he arranges the beats as if they were given in duple, triple or any time, although the actual beats remain unaltered all the time he observes them. This faculty is called the sense of musical time¹. The beats always represent the same monotonous rhythmical movement, but the observer's mind may assume different attitudes of observation, may change the time division by altering the length of the periods (bars), or uniting another number of beats into one group. The rhythm is in the object, while the time-division is only the form in which our mind perceives the rhythm, the way in which it arranges, systematizes, unites the sensation of several beats into one whole period, into a time-unity. It must also be noted, that this time-sense of the observer, his ability to arrange regular sensations into periods, to perceive them not as single beats but as groups of beats, is an immediate (intuitive) perception, i.e. the observer does not arrive at this form of group-perception through counting the number of beats which make up one group (bar or period), but he immediately perceives the group as such without the medium of counting. The musician has to feel the time intuitively, and his counting it out is only a substitute for feeling it, whenever the time-perception has got lost. Counting is an association of beats with numbers, time-keeping the ability of immediately perceiving beats or sounds in groups, periods or bars.

¹ The French have a peculiar word for it: 'mesure,' as have the Germans: 'Takt.' The English word 'time' is somewhat ambiguous, and hence perhaps the numerous misconceptions of any theory based upon the Time-sense.

One and the same rhythm may be perceived in different time, one and the same time may contain different rhythms. If we ourselves, not the electric hammer, are the performers of the movement, we should very likely alter the accentuation in accordance with the alteration of the time-division, but this would be only a probable not a necessary coincidence; for in spite of an accentuation which is likely to suggest say triple-time, the observer may still follow duple-time in his thought, to such extent can rhythm and time be kept separate from each other. In one word: rhythm is the form of the objective movement, time-sense (*mesure*, *Takt*) the form of the perceiving subjective mind. Time-sense is a faculty corresponding to the power of symmetrical visual perception, which is neither the sensation of sight itself nor the mere sum of all the sensational phenomena, but something in addition to them, i.e. the ability of arranging, dividing, grouping the phenomena into equal sections. So then the time-sense is not a sensation proper as hearing, seeing etc., but a mental work of grouping the sensations, and this takes place not in the senses themselves but in the cortex¹.

If we insist on this merely mental character of time-division in music we shall be able to base on a psychological principle a long existing musical controversy, in which musicians have discussed the question whether a composer is bound by the natural structure of his composition to write it down in a certain time-division (say duple or quadruple time) or whether he is at liberty to fix in writing the length of bars or even the whole time-division according to his individual preference or the practical principle of easy reading. These musicians have asked themselves whether time-division has an outside reality or not, whether it is dictated by the object or by the subject. Mr Lussy, who was in favour of the former view, even went so far as to show that Mendelssohn made a mistake in designating the time of one of his compositions. This very fact, however, seems to me a precise counterproof of Lussy's theory, for if the composer himself can make a "mistake" in this respect the structure of the composition cannot have been subject to any very strict and definite rule. It seems that other writers have agreed on a sort of compromise, and they say that one may always know from the very structure of a composition whether it is in duple or triple time, but liberty is allowed as to the sub-divisions of these two classes as to $\frac{4}{4}$, $\frac{8}{8}$, $\frac{3}{8}$.

¹ Therefore Kant was right in calling time an "Anschauungsform," although wrong in considering it to be "a priori," however this latter term may be interpreted.

$\frac{12}{8}$ etc. None of the writers however thought of referring to the psychological character of the subject and of asking "what is time?" in the musical or in a general psychological sense. Had they done so they would easily have perceived its internal, subjective character. Considering this I should say that the structure of the composition as such does not even tell us whether we have $\frac{2}{4}$ or $\frac{3}{4}$ time before us, e.g. the typical example of $\frac{3}{4}$ time is a waltz, but we can very well perceive it as $\frac{4}{4}$ time without altering the composition in the least if we unite four $\frac{3}{4}$ bars into one $\frac{4}{4}$ bar. An instance of opposite transcription may be noticed in Wagner's *Tannhäuser-Ouverture*. Its second part is written in $\frac{4}{4}$ time and towards the end the theme of the first part (originally written in $\frac{3}{4}$ time) is again repeated. But this time it is written in $\frac{4}{4}$, and yet the object of the theme is the same. I have also seen eminent conductors beat $\frac{3}{4}$ time to this part, although it is written $\frac{4}{4}$. They unite three $\frac{4}{4}$ bars into one $\frac{3}{4}$ bar. This shows that the character of the composition does not compel the composer to *write* a certain time-division, the form of the latter being simply chosen for the practical purpose of easy reading. If we further consider that every regularly worked out composition has an even number of bars, we may transcribe any composition into one of duple bar, if we only unite a period of several bars into one greater bar, which in consequence of the even number of bars must end in duple time. Therefore it is with time as with symmetry; there are not two kinds of symmetry, a twofold and threefold, there is only one, that is represented by evenness, no matter whether the objects which are to be arranged symmetrically are groups of even or uneven numbers, no matter whether the single bars united to a period consist of even or uneven tone-elements. Perhaps an opponent would say: the symmetry of uneven numbers is the triple time. In this case I should ask him to consider that it is not the number of smallest tone-elements that designates the time-division, but a higher and wider formation of tone-groups whose extension lies within the liberties of our perception. I must also add that I am well aware of examples of $\frac{4}{4}$ and $\frac{7}{8}$ time, which under no circumstances could be perceived as duple time, as e.g. in *Tristan and Isolde* (3rd Act, when Tristan sees Isolde's ship coming). But in this instance the composer purposely left aside all considerations of regularity in order to illustrate the dramatic restlessness of the sceng. In such cases the time-division is not a division proper, but is replaced by voluntarily chosen marks to hold the players in concert.

The evenness of time-groups in music arises from the original organic union of dance and music, so that we may say

it is in the last instance founded on the fact that we possess two legs.

Bearing in mind that musical perception (and with it the essence of the musical mind) consists in the ability of group-perception and that this forms an element of the individual intellect, it will be clear—I think—what I wanted to say when I attributed in my “Primitive Music” the origin of music to the time-sense. I wished to point out the peculiar state of mind necessary to intentionally and consciously produce music as a work of art, to distinguish it from a mere vocal utterance which might be the result of a corporal stimulus of and for the moment. Of course I shall be asked why I insist on this difference and why I do not consider primitive music just as much a reflective utterance as a bird’s song. My answer is because I found that the starting point of music, the peculiar germ which has alone been capable of the enormous development actually accomplished in music, is the *chorus*, with its frame-work—the dance. What the bird sings, what a single individual may exclaim in joy, in anger or in pain, is the reflective outcome of the feeling, of which the momentary corporal condition is a stimulus, and for which it is a vent. Here the matter ends, and there is no necessity for variety and development. But if two or several people sing together, then song is something more than *merely* the outcome of feeling, for they have to keep their performance in accordance with each other, and to accomplish this they have to observe, to group, to arrange the tones; they have to assume the same psychological attitude as the observer of the electric hammer who perceives the regular beats in the form of groups, bars. They could not keep together, if they did not mark periods (groups), for there is no concert possible without bars. What they perform is rhythm, what they *think* is ‘Takt,’ and what they feel is ‘surplus of vigour.’ The necessity for this form of performance arises from the social character of it; it is the necessity along with the ability for acting in concert; and so I might well call the time-sense and with it music itself “*une faculté d’ensemble*.”

Saying this I must add that I do not wish to revive the old theory of distinct faculties, and that where I use the word faculty it is merely for shortness’ sake. The fact of my speaking of group-perception shows that I mean a kind of mental activity not confined to music alone, for a group-perception might be the outcome of any sensation, and need only result in music when it is used to form an expression in tones.

When Aristotle said, *ἄνθρωπος μὲν ζῶν πολιτικόν* he might as well have said *ζῶν μουσικόν*, thus indicating not only his sociability (which he has in common with gregarious

animals), but his ability of acting in regulated concert with others, in unison, in symmetry with them, of making his fellow creatures not only members of a society, but forming all of them into one body, one new organism. A musical ensemble, an orchestra, a chorus, is one organism, one person, just as the state represents (juridically) one person, not only a company of several members. In this sense music may be spoken of as a social function (not to be confounded with society-function).

I might now proceed to a further presentment of my theory by meeting some objections or perhaps misconceptions of my critics. The most frequent remark is to pronounce the time-sense as too complicated and to refer the origin of music to the natural rhythm of our heart-beats. This theory has been before the world since the time of Aristotle. But the reader will now see that I had to resist the temptation to this seemingly natural theory. There is no 'time' in the heart-beats themselves, but only in the mind of the observer, and as in the normal condition we observe the heart very little (if we notice it at all) and the abnormal condition is not the time for observation, we could hardly be led in that way to our idea of time-division, especially as we never feel any *necessity* to observe this mere individual phenomenon in the form of regular bars.

Another view is that of Mr S. Wilks¹, who says that "the rhythmical sense or sense of time insisted on...as the basis of music is the same thing as the muscular sense already spoken of by physiologists as forming an intimate part of the musical faculty." I must object to two points in Mr Wilks' criticism, (1) that sense of rhythm and sense of time are identical. I may well perceive and perform a given rhythm, say in a military signal, without having any time-sense. Some street-cries, many birds' songs, cannot be given in musical bars (time, Takt, mesure), and yet they are rhythmical. (2) I refer to the great difference between time-sense and muscular sense. We may have a proper muscular-sensation it is true, but, in the term time-sense, the word sense is merely metaphorical, for only the further mental process of arrangement of a given sensation into groups, periods or bars, makes up the time-sense. Mr Wilks so much confounds time and muscular sense as to say: "Beating time is in reality the concentration and relaxation of certain muscles." This may be the physiology of beating but not that of time. The intrinsic character of time, however, is not its being beaten, but its being known, it is not the movement of the conductor's arm, but the form of his intellectual perception of music in which his muscular sense

¹ *Medical Magazine*, London, January, 1894, p. 511.

alone helps him nothing. I admit that in the music of primitive times, owing to its connection with bodily movement, it was the muscular impression as much as the auditory, or even more than the auditory, that gave rise to a time-ordered perception. But I can never admit that the perception and the movement (time and rhythm) are identical.

The attention Mr Wilks calls to the muscular sense is certainly of great importance, and is, so to speak, the physiological form of the ethnological fact that primitive music is firmly associated with bodily movement (dance, gesture and action). But it has to be said further: that the muscular sense is not directly and in itself the cause of enjoyment in music, but becomes the cause not only of enjoyment but of high mental edification when forming the basis of a cortical process which consists in arranging a certain number of sensations in time-periods, and perceiving them as whole united groups. Through this mental process the otherwise mere sensuous enjoyment rises to the higher rank of artistic value, while without it the musical performance would have to be placed on the same level with gymnastics or, as in the savage world, with beating and fighting, and this difference in rank certainly exists even for primitive men. Such considerations lead us to the seemingly paradoxical result that the muscular sense has far more importance in the original development of music than the sense of hearing. This view changes at once the whole attitude of an inquiry into the psychological cause of music. It is not the sense of hearing alone which is to be examined, but when the physiology and psychology of music are in question, the subject for inquiry should be the cortical process. The first stimulus is the muscular sense, and the sense of hearing only comes into action later as an additional help in getting a greater number and superior quality of sensational impressions which through their qualitative difference and greater substantial richness might facilitate the course of the cortical process. "Making music" means in the primitive world performing, not listening. In the most primitive concert an audience does not exist, all being performers. A long time is needed before the sense of hearing can take a part of equal importance with the common action based on the muscular sense, and yet again a long time before it becomes the more and ultimately only important sense. The whole structure of primitive music shows this: an unsettled melody, an uncertain and constantly varying intonation, a perpetual fluctuation of pitch; and contrasting this with the strict and ever prevailing rhythm, with the precision and marvellously exact movements of numberless performers—we see where the chief point lies.

The musician is not necessarily one who hears best but he in whom originally the muscular sensation (later on chiefly the acoustic sensation) most frequently results in cortical processes (of group-perception); the painter need not be he who sees best but one in whom sensations of sight result in the most frequent and intense cortical processes, the sculptor he whose tactile sensations most frequently result in cortical processes etc., etc. But in any case I should lay special stress upon the action of the brain and the peculiar form in which this action manifests itself to our consciousness.

Another mistake in explaining the origin of music is to deny any difference between bird's song and men's music, as has been done for instance in a review in the *Boston Leader*¹, where it is said "that birds have a time-sense, as anyone who listens to their songs must admit." I do not admit it, and many observers of the bird's song (whom I have quoted in my book) state the impossibility of writing these songs down in regular bars: i.e. they betray no time-sense. The reviewer evidently thinks of time in the sense of 'tempo' (quickness), not in that of 'Takt.' Rhythm is no doubt "the basis of all motion"—as the reviewer says—but 'Takt,' 'mesure,' 'time' is only the intellectual form of our perception of the motion; the bird's song has rhythm, but the bird no 'Takt,' no 'mesure.' But if my critic nevertheless still holds that the bird has a time-sense, and maintains that bird's song is on that account exactly the same as primitive man's music I will illustrate the striking difference even in a mere external quality, and ask: *Has anyone ever heard any animals sing in concert?* i.e. not only at the same time or responding to each other in immediate succession, but in accordance with each other, in unison? No, and herein lies the difference, this is the point that distinguishes a merely vocal utterance from music. True music requires a degree of observation, an intention and a participation of the intellect, and not *only* a momentary vocal reflex of feeling; it requires the form of time-ordered perception which is lacking in the animal and so strongly pronounced in the choral dance-music of primitive men. An individual vocal reflex arises and vanishes with the stimulus of the moment, while singing in concert requires a definite purpose, a definite arrangement of utterances, which are to be intentionally worked out, practised and preserved in memory. In this settled condition song would in time become monotonous, ineffective, and therefore calls for variety. Variety in face of tradition means progress, development, and thus choral music alone affords the only possible

¹ January, 1894.

starting point of our art; in its intrinsic character lies the germ of music. In the dances of men and animals we can observe a difference similar to that in music. Men dance in a unison and with a *symmetry*, which are wanting in animals' dances, and this deficiency is due to a mental cause which betrays—if I am not mistaken—the most serious difference between men's and animals' intelligence on record.

One can follow the importance of this distinguishing characteristic even in modern music. It is possible to be deceived as to the musical ability of a performer who performs alone, and who may make up by mechanical practice what is wanting in talent, but let him play in an '*ensemble*,' let him accompany the simplest song, and you will at once see what his music is like. This example again points to the chief psychical element of music which once more may be characterised as an *art d'ensemble*.