THE INFLUENCE OF SOUND PHENOMENA ON HUMAN CONSCIOUSNESS*

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OUR KNOWLEDGE OF THE EXTERNAL world is conditioned by our possibilities of perception. The phenomenal aspect of things, which we tend to take for their reality, is an effect of the limits of our sense perceptions. Senses more refined than ours would show us worlds of atoms, of light, of energy, where now we think we see tables, buildings, individuals. Subtle beings, whose substance escapes our perception, can exist around us, penetrate us, play with us, act on our thoughts and our senses, without our having the least awareness of it. The number of senses which are theoretically possible cannot be determined. We probably have within us latent senses of which the organs are undeveloped, and which we cannot consciously use, although sometimes a vague and uncontrolled perception may result in some partial knowledge, some otherwise inexplicable "intuition."

For man, the spheres of sensory perception are limited to five —this is not necessarily true for other species. Therefore, we know five aspects of the external world, which do not necessarily coincide exactly.

Hindu philosophers call these spheres "forms of existence" (*bhuta*), a term translated approximately by the term "elements." This is inexact unless we understand it not in the sense of elementary matters, of substances or states of matter of which the universe is formed, but rather take it to mean the subjective elements by means of which we construct, for want of better information, the idea which we have of the external world.

Moreover, the Hindus think that if we can orient the perceptual centers, to which our sense organs are connected, towards the internal, we can escape the limitations of these sense organs and perceive aspects of the sensible world which are deeper and larger and more profound.

The spheres of the five senses are symbolically represented by five aspects of the perceptible world, but these aspects should only be understood as images which help us to understand their hierarchy. These images are earth, water, fire, air, and ether. Earth

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or the state of "cohesion" of things, which corresponds to the sphere of smell, is also perceived by the other senses. We can taste it, touch it, see it, and hear it. Water, or the state of "formation" of things, represents the sphere of taste. We can hear it, see it, touch it, taste it, but never smell it. Fire, or the state of "transformation" of things, represents the sphere of vision. We can hear it, touch it, see it, but never taste it or smell it. Air, or the state of "conception" of things, represents the sphere of touch. We can hear it, touch it, but we cannot see it, taste it or smell it. Finally, ether, or the "vibratory" state of things, represents the sphere of hearing, the most subtle since it escapes all other senses.

It goes without saying that we never perceive the spheres of pure elements, and that all our perceptions apply to the states of "matter" in which one element predominates without the others being completely absent. The fact that in practice we do not perceive external sounds except through vibrations of other elements, is merely a deficiency of our external organs and doesn't change the fact that, even thus limited, hearing remains the only direct perception we have of a pure vibratory state. The other senses produce perceptions of vibratory states which are more and more complex and therefore more difficult to understand and to analyze. The vibrations of sound are the forms of perception closest to the primary state of cosmic manifestation. The vibratory states which give birth to the world cannot be differentiated from thought. Creation is conceived as a mental vibration, which is the thought of the universal being and which composes a world which is nothing but a manifestation of mental energy; a thought which appears as a reality precisely because of the limits of sensory perception of the individual consciousness of living beings. Sound, even in its grossest, most limited form, is not only the vehicle of thought but the image of its intrinsic nature. For this reason through the intermediary of sound, through the Word, the utterance, knowledge is expressed, revelations are made manifest. And by sound also, all thought is conditioned, formed, and fashioned. Sound is the instrument of all development. The effect of sound upon human consciousness is therefore fundamental.

Pure vibration, organized expression and vehicle of thought, is perceived by us in two forms: the musical language and the spoken language. These two forms of language, closely linked with each other, are not arbitrary. Certain sound relations, certain syllabic units, are the vibratory expressions of certain concepts. The more music and language approach these forms of the true language, the more immediate and profound is their effect. When the sound of words or of chords deviates from the form of the true language, their effect becomes weaker and is then perceived only by a mental mechanism which reconstructs, according to

these symbols which have now become arbitrary, the genuine relations which constitute the idea.

If in certain rites we use formulas articulated to correspond to certain cosmic entities, we immediately enter into contact with them. This is why *mantras* or magical formulas are an essential element of all rites.

Similarly, if we set up in music harmonies which represent with sufficient exactness specific sentiments or emotions, we are immediately penetrated with these sentiments or emotions. This is the first role of music. The use of inexact or arbitrary sound formulas is mere play, which is perhaps harmless, but which may be penetrating us with influences which we cannot master, and which may be injurious to our internal equilibrium, and to the harmonious development of our thinking.

The true language, the original language, is syllabic, formed in man of monosyllables corresponding to the different possibilities of articulation. These are: relative pitch (five steps of sound, reduced to three in most languages in use today); the sound shapes of vowels determined by the five places of vocal emissions above and in combination; and the interruptions of sound or consonants, which permit us to attack or to leave the vowels in the five steps of articulation. Certain consonants may combine, the syllables may be nasalized or aspirated. The number of monosyllables forming the vocabulary of the fundamental language is almost indefinite. One *mantra* like STRING, for example, representing the feminine principle, is composed of seven elements of articulation.

The effect of these syllables upon our inner being is considerable if they are frequently repeated. They let penetrate into us, little by little, the principle that they represent, and consequently retransform our personality. The practice of *mantra* repetition is one of the major exercises in yoga.

The musical language presents divisions parallel and complementary to those of spoken language. It represents a more abstract form of language, in which we perceive the sound manifestation of numerical relationships, corresponding to ideas or sentiments. Music, therefore, plays an important role in the knowledge and perception we can have of the mechanisms of thought and of sensation, since it permits us to realize directly that thought and sensation are probably mathematical operations. In fact we only perceive relations between luminous frequencies, auditory or other, but we perceive them as if there were distinct elements which we call colors, substances, forms or chords. It is through music that we receive the most direct statements. These sound relations evoke sentiments in us, ideas, but we can, to a certain extent, abstract their psychological or mental effect, and we can consider them themselves in the abstract.

There exist, therefore, two types of musical theories and analyses. Those which start from the psychological effect of intervals and of rhythms, according to the sentiment which it provokes in us; and those which start from their purely physical relation, their numerical relation, and their harmony phenomena. In the first case, we would speak of sad or gay chords, exalting, depressing, tender or cruel, harmonies; in the other case, of consonance or dissonance, harmony, equilibrium, of form, etc. These two approaches lead to different musical systems. The first makes of music an instrument of psychological action, capable of modifying our internal equilibrium. The other tends to make an abstract art, an architecture of sound, which may have high aesthetic or evocative value, but in which the psychological action is weak and without lasting value.

The principal system conceived as a means of psychological action capable of bringing important modifications in our internal equilibrium, our sentiments, our ideas, is constituted by music which we may call modal, in the sense we give to this word when we talk about Greek, Persian, or Hindu music. This system is based upon the fact, easily verifiable, that certain very definite sound relations are perceived by us as having a certain emotional color. At first, this perception may be very vague, especially if our musical habits intervene with all sorts of purely mental artistic conventions. But it is undeniable that this perception exists. Intervals we classify at first roughly, into gay or sad, active or passive, soft or hard, calm or restless, etc. It is only through repeated and systematic use of very precise intervals that we will begin to distinguish the psychological effect of intervals, which may be very close to each other, but which have in the long run a definite and distinct action upon our sensibility, creating in us the most diverse "states of the soul."

In modal music one establishes first a base, a point of reference absolutely fixed, represented by a continuing or a frequently repeated sound, which is called the Tonic. All the intervals of a mode are established with reference to this Tonic. After this one looks in the scale of sound frequencies for certain perceptible points which form with the Tonic easily analyzable relationships. These points will be the notes of the mode. We will see that these perceptible points are quite numerous and have very distinct effects upon our perception. Depending on the desired effect, the relative pitch of the notes of the modes should therefore be adjusted. These adjustments may be established little by little through experience, but they may also be analyzed in such a way that they can be defined arithmetically, and reproduced mechanically at will.

In a musical performance, melodic or harmonic forms are developed by moving from one point to another on the scale

chosen for the mode. Since the Tonic is fixed, the same note will always correspond to the same sound, the same sound frequencies will evoke the same relations, and hence, the same sentiment. This consistency is very important for the action to be effective. It is then that the psychological action begins. No matter what music it is, we can recognize, more or less vaguely, the emotional color of an interval, but in modal music this interval, always represented by the same frequency, the same sound, is constantly repeated. We thus become more and more sensitive to it. Like the drop of water of the Chinese torture, this sound always hits the same point of our auditory system. We become conscious of its precision, of its color, of its meaning, in an extraordinary way, and after a certain time, we are emotionally conditioned by the sound complex which the different notes of the mode represent. The idea, generally accepted in the Orient, but also supported by Plato and Aristotle, that certain modes incite virtue and others debauchery, is not at all imaginary. To convince oneself of this it is sufficient to see even today the audience of an Indian or Persian concert being shaped by the performer, assuming more and more the same expression, the same face, moving together as if hypnotized by the musician, who carries them away in the direction in which he throws himself, toward a very intense emotional state, in which he himself is completely immersed.

We can see that slight differences between intervals, which in other systems may appear negligible, play a considerable role in those musical forms whose aim it is to act systematically on the psyche, and not to construct vague structures which, following convention, we regard as aesthetic, but which completely lack any marked psychological effect. One can, moreover, determine certain laws of frequency relationships which act most strongly on our sensibility, and classify them according to categories in which

• NOTE: The relations between musical sounds are determined by ratios between their frequencies. Thus, an octave represents a double frequency, a fifth corresponds to a ratio of 2 to 3, etc. These ratios between sound-frequencies are perceived directly, just as we perceive a square or a triangle, provided the numbers involved in the ratios do not go beyond the number 6 (limit of non-verbal counting) and the simple multiples of the first four prime numbers.

According to the prime numbers used in the structure of intervals, different basic scales can be built which have distinct psycho-semantic contents, i.e., create different emotional reactions.

A typical example of these differences appears in the major third. The major third can be "Pythagorean," i.e., built on multiples of 3/2. It is then a part of the cycle of fifths used in tuning instruments (C G D A E). But the major third can also be "harmonic," that is, built on the ratio 5/2. The interval between these two major thirds is called "comma diesis." It corresponds to 81/80 or 21.5 cents (100 cents make a

certain prime numbers seem to play a major role. Music becomes then a very powerful psychotherapeutic method, and we will observe conversely that musical systems in which the interval is imprecise, badly defined or calculated on erroneous bases, may create strange nervous disorders, and in any case atrophy our sensitivity to sound stimuli, with easily observable physical, psychological, and physiological results. On the other hand, musical reëducation using the repetition of precise intervals has an effect with appreciable medical applications. Moreover, this effect is not peculiar to man. Experiments which have been made with plants and animals have apparently yielded very interesting results.

The precision of the interval is essential for its efficacy. This can be recognized today through technical means which greatly facilitate experimentation. It is only when the musician becomes completely involved and taken by the sentiment of the mode, that he can develop sufficient precision at the end of a certain amount of playing. This explains the interminable preludes of the Indo-Iranian music. The musician plays at the outset with a very approximate precision. It is only little by little when he is seized by the sentiment of the mode that his play becomes precise, in a way that seems incredible if one has not yet had the experience. The audience, which, until now, only listened vaguely, was agitated, talked, appears all of a sudden to be subjugated, magnetized, by a sort of magic ability of sounds. According to measurements which I was able to make, the intervals are exact to a hundredth of a comma.* Measures made in monthly intervals gave absolutely identical results. We will understand the importance of this precision if we consider, for example, that the so-called Pythagorean third, obtained by the cycle of fifths, and corresponding, therefore, to a frequency ration of $3^4/2^6$ or 81/64 is an active interval, brilliant, enterprising, glorious, intrepid, exalting; whereas the

semi-tone). The artificial "tempered" major third of the piano scale is about halfway between the two "natural" thirds.

There is another comma spoken of in technical literature. It is the "Pythagorean comma" which represents the difference between an octave and the 12th of twelve successive fifths. This comma corresponds to $3^{12}/2^{19}$ or 23.5 cents. The Pythagorean comma, however, is beyond the limits of our mechanisms of analytical perception and has no reality in music, while the comma diesis is an essential part of the mental mechanism through which we analyze, classify and interpret musical sounds, and is therefore the only logical basis for the establishment of musical scales and of a musical vocabulary. The equally tempered scale is obtained by dividing the octave (2/1) into twelve equal parts. The frequency of each half tone is $\sqrt[12]{2}$ in relation to the previous one. We have no mental mechanism to identify such a numerical entity. We therefore always interpret the tempered half tone as a slightly out of tune form of the nearest natural interval.

so-called harmonic major third corresponding to a frequency ratio of $5/2^2$ or 5/4 is a tender interval, affectionate, peaceful, calming, passive, relaxing. The difference between these two intervals is only one comma, a difference which may seem almost negligible to us. If we then use the theoretical interval of the so-called tempered major third, corresponding to a frequency ratio of $4/\sqrt{2}$, which is intermediate between the other two, it can only have a very vague effect, or even create a sort of fluctuation, a nervous disturbance, as we try unconsciously to identify it with one or the other of the two real intervals which surround it. The tempered intervals will moreover always remain very approximate because we apparently do not have an audio-mental apparatus which would permit us to analyze multiples of $\sqrt[12]{2}$. To make the inexactitude and the painful effect of the so-called tempered intervals bearable one has to mask them with the aid of sound clouds, obtained by adding to the sounds the fundamental multiples very close one to another: (the three strings of the piano, the double reed stops of the harmonium, etc.) or by the means of string vibratos. These procedures weaken the emotional color of the intervals to such a degree that one encounters today musicians and musicologists who deny that musical intervals have by themselves any other than a purely conventional meaning. Thus, we attribute to the Minor mode a more melancholy character than to the Major mode—as limited as this character may be—because we hear the former used more in funeral services and the latter more for marriages. It goes without saying that it is sufficient for any one to hear an instrument only once which gives precise intervals to realize the expressive reality of the intervals established according to certain very definite arithmetical relations. Moreover, we find again the same intervals in all kinds of music in the instrumentalist as well as in the singer, when the performer feels genuine emotion.

We can see, therefore, that the mechanism of auditory perception and of the analytic mental perception which corresponds to it, permits sounds to act through repetition upon our internal personality, to transform our sensibility, our way of thinking, the state of our soul, and even our moral character. This is true of music, where arithmetic (or rather, harmonic) frequency ratios, based on the combinations of certain specific numbers, which our mental mechanism permits us to recognize and to analyze, produce considerable effects on our psycho-physiological condition. This is also true, although less directly, for language, where the repetition of certain syllables corresponding to specific ideas, produces a mental conditioning utilized as one of the fundamental methods of yoga.

Translated by Paul Huebner and Ralph Metzner