The human key

The reason for measuring the human key centres on the use of acoustics in human communication.
When the voice expresses a thought via words, there is an important component, which is that of the expression given to that word in its context. We can express different concepts with the same words by lengthening the vowels or changing the tone of voice.
Modulation of the word is therefore not a mere aesthetic expression. It is part of the actual message that the voice wants to communicate.

In order to be expressive, a musical instrument must develop the third sound, or Tartini sound. This phenomenon is produced by the comparison of two simultaneous sounds in instruments built by the rulebook. Such instruments are able to supply every note with its relative spontaneous harmonic sound. This results in the expression "like a human voice".

This makes us think that if a musical instrument, in order to be "human" and therefore expressive, must develop an effect produced by the comparison of two notes, the human voice must be produced in part by the confrontation of two frequencies. We have understood from the studies of Helmholtz resonators that part of the sound of the human voice is produced by resonance in the cavities of the human body, i.e. the chest and cranial cavities. It is due to these circumstances that the idea came about to measure the resonance of the human cavities to identify the fundamental notes which define the key, i.e. the range of sounds with which the specific person interacts, with the conviction that the relation between emotive expression of music, the voice and human thoughts are in the third sound.

We know that the emission of the human voice is by air. There are, however, also these "sound" components of the voice, caused only by resonance, i.e. simultaneously stimulated by the apparatus of the voice and produced in the chest and cranial cavities. This mechanism is similar to string instruments, when two notes are played contemporarily. This resonance in the human voice develops that sonority which completes the uniqueness of the key of a common harmony with other individuals. Within this harmony it is possible to obtain full sonority with which we express the intrinsic emotive meaning of our thoughts. Without this harmony, the meaning would be lost. A typical example is when someone else recites our thoughts with their own instrument, adds and takes away the emotional ingredient that identifies the original thought.
Therefore via the same mechanism, which generates the third sound in the musical instruments, it is possible to establish that the fundamental tonal matrix of every specific voice lies in the constant relationship of resonance between the chest and skull.

The obtained results of the specific measurements highlight that the interval of frequency between the two cavities is always a major or minor third, but always a third. The chest cavity frequency is always the lowest, whilst the interval between the relaxed chest and the chest with the open diaphragm is a fifth. In that case, the lowest frequency occurs when the chest is relaxed.

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In the light of these results, it is possible to establish the exact order of the notes that form the triad of sounds and therefore establish the precise tone, placing the chord in the following order:

- the tonic is obtained from the resonance of the chest in its natural position;
- the third interval comes from the cranial cavity;
- the fifth interval is acquired from the resonance of the chest with an open diaphragm.

Obviously the chest-cranial cavity is not only influenced by the vocal apparatus but also by external frequencies. These frequencies act as receivers for the listening and decoding of harmonies and dissonances. They influence the comprehension of what we are listening to with the same rules used to modulate the words with which we express verbal concepts. These verbal concepts are similar to the rules of harmony studied in musical composition.

Technically we can therefore suppose that:

- a singer favours some frequencies, rather than others because he possesses a tuned instrument in a key which facilitates the resonance of a precise range of sounds, but not all of them;
- the choice of harmonically consonant sounds is the basis for the acoustic success of vocal and instrumental groups, independent of the technical capacity;
- during musical improvisation, we are attracted to some notes rather than others, because the memory conserves the emotion experienced with those notes to which we are magnetically attracted;
- a composer is emotionally able to yield more in some keys rather than others;
- the choice of keys is fundamental during music therapy or phonic-hearing re-education;
- etc. etc…….

We can equally suppose that the relationship between two spoken voices is subject to harmonies and discords, which influence the liking or disliking long before the rational understanding of the verbal concepts expressed. This condition prepares us to listen in a similar way to when we listen to a song. The more we are tuned into the harmony and the instrument used, the more the "music" becomes pleasant, before even hearing the melody.

In conclusion the new concept relative to the sound production of the voice is that the resonance of the cranial-chest cavities supply the human voice with a background sound, which identifies the single person. This completes the necessary instrument to emotionally express one's thoughts and to understand the human language. By measuring the key of the human voice, we are moreover able to rationalise the use of this sublime instrument, through which it is possible to express the spirit of our thoughts and emotions.

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