

The Communicative Means of Music and the Ways of Its Reproduction

The Historical and Analytical Aspect

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Abstract—The article is dedicated to the consideration of the communicative music means, their kinds in the context of historical aspect of the ways of music reproduction. The author follows the chronology of the development of communication means – from the non-writing to the electronic and mechanical. In the author's opinion, specifics of the artistic communication means impacts the character of the listening audience, the forming of a psychological type and a social entity in general.

Keywords—communicative means of music; acoustic communication means; visual communication means; a listener; ways of music reproduction

I. INTRODUCTION

In this article the author analyzes human communication means: direct contact between the listener and the performer as well as the non-direct one by means of recording. He also specifies channels of perception and the means of music reproduction.

II. THE MEANS OF COMMUNICATION

The historical analysis of the processes of development, reproduction and functioning of the musical art demonstrates that these processes have always been very dependent upon the means through which the musical ideas are publicized. In this respect the evolution of music faces the theorist as the evolution of the means of communication.

Considering the nature of the musical art one might distinguish two kinds of the communicative means. The first (and the basic one) includes the acoustic means. They use the air as the channel for the transfer of encoded information that may be transmitted both directly from the two sources (directly from the composer or the performer in definite temporal and spatial co-ordinates) or indirectly through the different systems of sound recording and reproduction. In the latter case, the communication might be postponed in time and re-located in space. In this case different transformations of the musical message are also possible - its volume and dynamic, timbre and other variations, overlapping, combining it with other systems of information, etc.

The second kind includes the visual means that are further subdivided in two different types each of which bear

particular information quite different from that which the other represents. The first type includes the means of creating a theatrical environment that enables the music to be perceived as a kind of show, a happening, a certain theatrical performance. Through this visual channel the performers might single out, augment and express the structures that had inherited characteristics of music at the times of the original syncretism - the gestures, the facial expressions, the eurhythmics of the body, the pantomime, etc.

Even the shape of the musical instruments is aimed at aesthetic perfection and should be favourably perceived by the listeners. Or, say, the musicians' clothes that have always possessed some ceremonial significance and sometimes were especially rich and stunning (for instance in the past — at royal courts, in the mansions of nobility, different chapels, etc.). In the XIXth century the concert practice accepted tailcoats for gentlemen and long gowns for ladies. The location of the ensembles, the orchestras and the choirs in the halls is also dedicated, besides the acoustic, to the visual factor as well. The combination of the straight and curved lines is very typical here - the semi-circle with the conductor in the centre, the amphitheatre, etc.

The second type of the visual means of musical communication includes the notation with its graphic recording of the lines along which the sound and pitch develop in the piece, of the rhythmic and other textual components of a musical opus. Originally, notation appeared as an attempt to record the movement of the musician's voice or hand, or rather his expressive gestures, these attempts were manifested in some drawings, markings made over the poetic text, etc. Of course, such 'marks' could not enable the parameters of the musical sound to be precisely recorded.

Later, while the notation was already sufficiently developed, this subdivision of the visual means of communication became a certain additional aesthetic component of the musical integrity. For instance, Tchaikovsky once wrote in a letter to Mme von Meck, 'For me any orchestral score is not only an expectation of the future aural pleasure, it is also quite directly pleasing to the eye' [1, v. 8, 236]. It is not by accident, therefore, that the

authors of modern musical pieces sometimes base their work constructively upon the graphic symbols. Let us now consider the basic means of musical communication in greater detail.

A. Non-recording communication means

It is the most ancient means of transferring musical messages. It has to do with vocal music, as well as with instrumental and vocal-instrument folk music that is often termed as the musical memory of the generations. Its origins date back to the most distant past, but because of the endurance of the aesthetic and performing traditions, music-lovers of today have the opportunity to come in contact with the most ancient instances of musical communication. The other examples of direct musical communication, not related to any kind of pre-recording, is cult music; improvisation and musical meditation.

The means of communication in question are based on the feedback principle. They presuppose the possibility of reiterations and contractions, a certain change in the original idea (the canon, the typical structure) in the course of the communication. In a word, in this particular case, the final form of the message is realized depending on the performer's mood, the listeners' reaction, and the character of the communication is based upon the method of the author's imparting his ideas to the listener. One has to note that this form of communication implies that the music is both the object and the means of that communication.

Of course this whole means of preserving and spreading the musical messages is related to two major problems. First of all, the messages here might undergo considerable transformations when they are transferred from one musician to the other and further to the music-lovers. Second, in the historical aspect, they often disappear without a trace, since generations might not preserve the memory of everything that had been created by the earlier generations.

B. The notation as the new means of communication

The cited problems were partly resolved with the emergence of musical writing that had undergone a long evolution before it took on its present shape. Originally the ancient Greeks used the so-called pictographic method of recording the sounds — their fixation with the help of certain symbolised drawings. In Babylon, as the researchers believe, ideographic (syllable) musical writing was used (the sounds were recorded in cuneiform symbols), then the letter system of recording sounds came to be utilised in ancient Greece.

The latter means, though being more progressive, was characterized by a number of drawbacks. Thus, only the pitch of the sounds could be recorded, not their length. Then neumatic writing and mensural notation appeared, in Russia the so-called hooks were introduced, etc. Only about the turn of the 18th century the modern notation was developed, and it is still used in most countries [see in greater detail {2, 1023– 1026}].

The value of the notation is, first of all, the fact that it can potentially be read and deciphered both by the performer and the listener, and, therefore serve as a means

of musical communication. But in practice, the notation serves as a means of communication for a limited number of professionals and music lovers — only the people who can read the notes and perform music. Most people, as before, are not familiar with notation, or their familiarity is not sufficient to enable them to perform music independently. They still take music at its face, sound value. The notation has not become so well known to the population as the writing of the verbal, natural language, with which most people are well acquainted.

The listening, aural means of 'consuming' music is an integral part of the musical culture. Besides, music is characterized by a number of genres that are initially supposed to be perceived by the wide public in such a listening manner, not by reading the notes. These are, for instance, the genres of the choir, chamber, symphonic and opera music, that is, the genres which require a considerable number of performers.

One should note here the existing practice of combining the use of the aural and the visual means of musical communication. Thus, there is the well-known tradition that still persists (especially abroad, but earlier in the national listening practice as well) — the tradition to follow the printed score while listening to the piece in concert. In this case the two kinds of the communicative means are obviously combined, and at the same time the two informational flows overlap, connecting the two different spheres of communication. It is true that listening to a piece at a concert hall, the listener receives the musical message directly from the performer (the connection with the composer is indirect, it is conducted through an interpreter, so to speak). And following the development of the intonational process with the help of the printed score the listener, to a degree, might come into a direct contact with the composer through the materialized form of the encoded record of the piece.

The feedback communication - from the listener to the performer — becomes indirect in this particular case, it is manifested in the identification, the checking of the correctness, the precision of the sound (real) message produced by the performer, this comparison is conducted because the listener originally recreates in his mind the text that he has received from the composer in the form of the notation score. Of course, there is a considerable complication of the communicative processes here. But does not this tradition (unfortunately almost outdated today) also testify to a higher level of the form of musical communication in this particular case, to a higher level of the listener's culture? Let us now carry on the discussion of the communicative properties of notation.

The appearance of notation has largely improved and facilitated the communication between the composer and the performer, who are both oriented to the further communication with the listener. Thus the notation might be considered as a sufficiently progressive means of musical communication that functions through the use of the visual channel of perception. Moreover, the fact that a unified system of notation is utilized in most of the countries,

enables the notation itself to be considered an international means of communication.

As a specific communicative means, the notation has a considerable number of advantages in comparison to the scriptless forms of musical communication. First, its development has enabled the musical ideas to be materialized (originally the notation sign could only record the pitch of the sounds, as well as their metric and rhythmical relationships, and the authors graphic remarks that recorded the dynamic, the tempo etc. characteristics appeared later, thus creating the possibility to specify the character and the expressive nuances of the piece).

Second, the note exists beyond the limits of historical time, which implies both the fact that it can be used by the musicians of different epochs and the fact that it may be addressed repeatedly. Thus we have reason to state that the appearance of notation created the basis for a considerable widening of the communicative, the spatial and the temporal fields of music.

Third, the notation has had a great impact upon the composer's professional and artistic thoughts, changing its communicative orientation. Thus, some theorists believe that the absence of the actual interlocutor or counterpart at the moment when the piece is created 'came to imply the prognosis of all the possible arguments from all the opponents that the communicator could imagine. This has lead to a gradual separation of the communicator's mind into the 'I' and 'the other I', to the augmentation of the inner dialogical properties of the thought, to the increase in the reflexive character of the thinking — to a general progress of the mind...' [3, 152; italics by the present author. — A.Y.).

Fourth, the development of the musical writing has assisted the individualization.

Consequently, the presence of a noted text acquired for the composer the status of a certain document that proved his authorship. And being fixed in writing this document spurs the composer to create something unique, different from the pieces by other authors. Thus, the factor of the documentary quality that the piece takes when it is recorded in writing has variously contributed to the development of the musical art, for it has both widened its communicative field and created an opportunity for the author's creativity to be individualized.

Before musical script was introduced, the perception of music by the listeners was mostly based upon the principles of its collective consumption. The noted text has become a communicative means for satisfying the individuals musical needs. And although just a limited number of listeners were able to use the opportunity, this individualization, property in the sphere of music consumption can be related to the emergence of musical notation.

We would also note another important point; The appearance of musical notation first enabled the individual to choose the channel of communication for absorbing the aesthetic ideas. What to learn, perform, what to listen to, became the decision of the performer and the listener, be it

an elite listener or an everyday listener. And when today the factor of social selection in art is discussed, in relation to musical art, the starting point of that selection might be dated back to the appearance of the noted, the written form of musical communication.

But the introduction of musical writing as a means of aesthetic communication has also given rise to a considerable number of problems. Thus, certain theorists believe that the notation has brought about an unnecessary, exaggerated localization, or concentration, of the mind of all the participants of the communicative process (see 1). We should add that in music the substitution of a graphic (abstract) note, that also demanded an act of additional visual and aural decoding, for the live sound that the author/performer had used to contact the listener - such a substitution increased the distance between the author and the listener. (But the above-mentioned utilization of the noted text both by the performer and the listener in the very course of perceiving a musical piece can bring the latter closer to the author, rather than increase the gap between them).

We should note that the substitution of the individual way of perceiving music for the collective one and the related loss of the theatricalized character and the emotional intimacy of the direct contact with the listener led to the situation when some musicians were displeased with the written means of musical communication and insisted upon using the old scriptless ones, since the latter ones still played the leading part in the musical practice of the epoch.

It is also necessary to remark that the notation cannot record all the aesthetic intentions of the composer, neither can it reflect some of the aspects of the live process of musical reproduction. That is why it is reasonable to consider it a means that provides a partially adequate communication between the author and the composer and the listener. Consequently, a considerable proportion of the communicative links is still provided thanks to the established norms and traditions of performing and text decoding.

So it is natural that there exist three kinds of the graphic presentation of music: the complete (in relation to the possibilities of precise recording), contracted (the ciphered bass, the setting of only the contour of the melody for 'diminution' in the baroque epoch, etc.), and the directing representation (the graphic reflection of the sound and pitch movement without differentiating the tones, with the precise marking of the temporal fragments of sound, in seconds, in this or that texture and other means of the modern visual and graphic representation that often excludes the notation lines, the keys and the measure are not defined, etc.).

Besides, the standard notation is designed to record the music in the European tradition and that makes it quite unsuitable for preserving the music of other cultures. Say, the Armenian music is characterized by the so-called 'non-octave' harmonies, where the octave sound does not correspond to the European counterpart (it is higher by almost 1/8 of a tone), plus, the pitch is reduced while going down. In the Arabian music this accounts for the fact that

every half tone (and even quarter-tone) has its own designation. Consequently, the Armenian and Arabian music recorded in the European system of notation and performed on strings precisely according to the European traditions, in fact, turns out to have little in common with the original.

Historically all that has led to the opposition between the advocates of the established and the alternative means of musical communication. At the same time, N.A. Khrenov, for instance, believes that the appearance of the new means of aesthetic communication is a natural, not an accidental phenomenon. A new means emergence 'as the resolution of a pressing need to overcome this or that conflict in the culture's development. Thus the notation resolved the conflicts that sprung up from the predominance of the spatial and territorial forms of communication which led to the appearance of the public as ... a new kind of community, new in principle' [4, 28; italics by the present author. — A.Y.].

The cited author then makes a very important remark that the new means of communication do not lead to the elimination of the earlier established types of communication — they are only included into a different, a wider communicative structure. The critical attitude towards them is explained by the fact that 'every new means of communication involves new segments of the public into the appropriate culture, the segments had not been included into the aesthetic experience formed by the previous methods of communication. Thus these new segments disfigure the relationship between the, so to speak, constant 'elitist' audience and the accidental, the mass audience' [4, 28–29; all the italics by the present author. — A.Y.].

We should add that the conflict here arises not only (and not as much) between the society segments that are, or are not, involved into the aesthetic culture. The means of communication are fully included into the processes of the development of the communicative forms, the evaluation criteria, the traditions, tastes, requirements, etc. This is why a certain balance of interests is established in the musical culture. And every new means destroys the established balance and the accepted traditions, thus bringing its own problems into the culture. These problems, in their turn, create the precedents for conflict. Besides, the struggle here also has to do with the right of the composer to present his own ideas to the society and to extend the field covered by his communicative links. In this case the communicative means also become the instrument of the struggle.

At the same time, the appearance of the new communicative means is a positive factor for it is exactly those means that oppose the conservative tendencies in the development of the musical communication, and consequently, of the musical art as a whole.

C. The polygraphic means of musical communication

A new stage in the development of the means of musical communication started with the introduction of the polygraphic copying of the musical scores. The invention by the Italian Ulrich Khan who first printed the choral score to

the Roman Mass produced a major influence upon the development of the processes of musical communication and the musical culture in general.

Within the context of the general tendencies that were brought about by the musical writing, the printed notation created favourable conditions for the territorial, spatial and temporal barriers of music to be overcome, and that led to a new situation in the historical development of the musical communication. The scores printed since the end of the 15th century still carry out their communicative mission since they let the same musical pieces sound in the different corners of the world. We should also note that the church scores published at the end of the 18th century by the talented Russian notation printer S. Byshkovsky [see 5, 1047] are still used as canonical by the Russian Orthodox church.

The possibility of wide copying of the musical score enabled a standard form of notation to be eventually formed. It was the factor that was the major one in unifying people's musical interests, in consolidating the aesthetic perception of the different nations into a certain cultural unity. There is still another reason to consider the notation a unique means of human communication - it does not demand the translation of the imparted information into any other language. And while the linguists failed in making any artificial language a successful means of international communication, the development of such a common communicative means in the European music started as far back as five centuries ago.

The polygraphic copying of the musical scores brought about many other important consequences. It was the first occasion in the history of musical art that the communicative means was oriented not towards the collective consumption of music, but rather to the individual one, presupposing a possible lag in time too. The copying of the scores for sale enabled the author to directly address his individual listener. Thus, with the introduction of the printed score an inner differentiation begins in the listeners' masses, and certain listeners take on individual traits that are important for the communication as a whole. Not just the forms of the musical communication are being changed, but its stimuli as well. So, if before the introduction of the printed score the composer's 'supply' had defined the listeners' demand, with the printed score, the listeners' demand came to define the composer's supply.

The radical changes in the system of musical communication led to the changes in the practice of the listeners' 'interests' formation. Formerly, the practice was largely based upon the fact that the musical elite — that forced its tastes, preferences and traditions upon the general listener whose interests were often underestimated. The new system, on the contrary, enabled the general public to participate in the evaluation of the composer's creativity. Plus, this very circumstance provided for a greater legal and economic independence of the author.

Another important factor has to be mentioned. The development of printed notation spurred the development of the visual channel of the musical perception. The

appropriate theory (and practice) has not yet given this phenomenon any particular attention since that means of the musical communication can only be used by professional musicians and a limited number of music-lovers who can, with the help of the so-called inner hearing, 'reproduce', or rather, imagine the way the piece sounds.

But bearing in mind that the visual form of aesthetic communication in the other arts is becoming more and more rampant and established, we cannot rule out the possibility that in the near future the musical art would more intensively use the different synthetic forms of the musicians' communication that would include the visual communicative means as the additional ones that spur the perception and the imagination of the integral sound picture of music.

The new electronic means of notation printing and copying have greatly simplified the previously labour-intensive and complicated processes, reducing the time required for the score publication, i.e. the time needed for musical pieces to be transferred through the communicative channels between the author, the performer, the listener and the musicologist-critic.

The critic now gets the opportunity to come ahead of the interpreter's and the consumer's activity, partly taking their responsibilities of preliminary evaluation and selection upon himself. The change in the situation leads to the possibility that his positive role in managing the processes of musical communication in a society is likely to be increased. This circumstance may also pose the question of the necessity of the new orientations in training the professional musicologists and critics.

The speed of the technical progress gives rise to the hope that the further development of the polygraphic means would facilitate a more rapid and effective publicizing of musical pieces which in its turn will lead to a more active musical communication and to the widening of the spheres of serious music consumption. Although it has already been mentioned that the script and graphic means of musical communication also materialize the aesthetic idea and its tonal (encoded) form, they only realize it in the shape of some graphic presentation. To actually hear the music one should also decipher this record of the musical information. But this 'operation' is sufficiently complicated and is only familiar to a very limited number of listeners. The statistics has it that only 6% of the Russian population are sufficiently notation-literate. Therefore, without diminishing the importance of graphic means of musical communication one should note that the new audio-visual means enable a free materialization of the already deciphered and reproduced musical message while still letting it be accessible to a wide circle of listeners. That is the percentage of the whole number of school age children that annually attends music schools. But if one bears in mind that out of this percentage 30 to 40% quit the studies without mastering the basics of musical culture, including notation reading, the resulting percentage will be perceptibly lower. Besides, the difficulties in the sound deciphering of musical scores are also related to the imperfect techniques of teaching score

reading. It is not accidental, that the appropriate schools in France have introduced a special subject called *dechiffage*.

It is also noteworthy that since the printed notation was introduced the epoch began when the technical means became to be increasingly used for the publicizing of musical ideas. And if at the initial stage their role was limited to the score printing, in the XIXth, and especially the XXth centuries the various technical means are more and more widely used as the means of musical communication.

D. The electronic and mechanical means of communication

The new era in the development of the means of communication dawned when the devices for sound recording were invented. The first experiments with recording sound were conducted in 1807 by the English physicist Thomas Young, but the subsequent sound reproduction was not successful. In 1876 the American inventor T.A. Edison created the first phonograph. And although the original machines were full of imperfections they were to really revolutionize the means of musical communication. They were the first appliances to fulfil the task of recording the sound of a musical piece in the course of a live concert performance.

Such a record became 'a sound document' of an epoch. It enabled the once made performance to be numerously reproduced, 'to freeze the beautiful moment', it helped the solution of the problem of the reliable musical communication both in time and in space, presented an opportunity of recording the particular performer's interpretation of a given piece.

But the obvious fact is quite simple - the phonographic records were unique - they could not be copied. A new record had to be made for each particular copy. That is why the records preserved the individual version of a performance and could not, in fact, be regarded as copies. Still, the phonograph use opened a new venue for the acoustic communication, it became a wider, multiple (not singular) channel of communication directed from the performer to the listener and presenting the latter with the opportunity to compare variants of performance.

At the end of the XIXth century the disc phonographs were introduced — the means to copy an individual performance. So the quality of the communicative channel had changed, the channel had narrowed, but its throughput capabilities had increased immensely, as well as the quality of the record itself. The rare phonograph rolls produced were superseded by thousands, and then millions, of disc copies.

At the same time the individual opportunities for record copying remained scarce, and the equipment complicated, huge and unwieldy. The introduction of the tape recording widened the communicative channel from the performer to the listener. Besides an opportunity arose to record a piece independently not from a TV or radio broadcast only, but directly at the concert. Moreover, another channel of musical communication first became independent — the one from listener to a listener. The possibility arose to copy any records from one another for personal use (in this respect the

channel had been previously limited by the exchange of the records).

Then an opportunity arose to conduct a 'partial' transmission of a musical piece for a particular practical purpose. This is the way the records of the accompaniment to romances, instrumental pieces and concertos appeared (the so-called 'minus 1 records'). This enabled the performers, trainee performers in particular, and members of the general public to recreate at home or in the classroom the complete conditions of the creative process. One has to note here, though, that the standardized character of the transmitted information is in this case greatly increased: the precisely fixed accompaniment strictly programs the student or the enthusiastic music-lover setting him once and for all basic interpretation parameters (those of tempo and rhythm, in particular), largely depriving him of the creative freedom that is so traditional and important for a performer.

The next revolutionary stage in the multiplication of the communicative channels of music began when the visual images came to be recorded on tape. It was a natural development of the sound cinematography. This latter art recorded the major events and phenomena of the musical art only sporadically, though the musical numbers often became an integral component of a particular motion picture. Still the specifically musical films, the video records of concerts, opera performances, etc. were quite different.

The wide popularity of the video records has enabled the visual and acoustic information to be recorded with high fidelity, as well as to be copied and exchanged for personal use with the other listeners and viewers. But the limited lifetime of the very magnetic tape poses now the problem of preserving the records and spurs the necessity of looking for new technical solutions (laser discs, etc.).

The appearance of the various electronic means of music recording has contributed to the solution of some problems that had previously hindered the development of the communicative processes. One of the most significant of the new advantages is the possibility of the art 'delivery' right to the consumer's 'doorstep'. The degree of the popular involvement into the processes of musical communication has consequently risen a great deal. The widening of the 'consumer base' of the serious art has also been accompanied by its greater orientation towards the individual and a greater technical perfection of its presentation. The new opportunity to perceive music in one's micro-space (through headphones) separately from the others has contributed to the intimate character of the listening. All that has led to a further differentiation among the listening audiences.

The new technical means of musical communication have led to significant changes in the spheres of the composer and the performer. New opportunities arose in managing the dynamics of the sound, its timbre, and that has influenced the whole development of musical thought. Thus, while recording to a disc or tape, the sound editor may attain the tonal gradations that are quite unthinkable during a direct concert performance. This way the sound of a flute

may be made stronger than that of, say, a trumpet, or even the whole orchestra.

The effectiveness with which the volume, frequency, space, time, timbre and other characteristics of the musical sound can be managed has led to the possibility to attain such sound that is improbable in a live performing process. A whole new branch of musical 'production' appeared, the branch that involves professional musicians that operate the modern means of sound recording and are specialized in creating these 'artificial' kinds of musical products. A specific listening audience is being parallel formed — the one that prefers records to the live sound.

Some other orientations of the composer and the performer have changed too. Some theorists believe that when the (open) transmission channel of the external communication or recording is turned on the present-day performer slightly changes the performance form taking into consideration his idea of the invisible but usually vast audience that might hear the broadcast outside the concert hall at their TVs, radios, tape or disc players.

It is this very potential audience, involved by the new media into the direct contact with the composer and the performer, that creates the previously unprecedented popularity for the latter. Today 'not the concert performance itself is most important, it only accounts for a small percentage of the income and publicity, but the records and broadcasts, the number of copies, the advertising and distribution', stress V. Borev and A. Kovalenko [3, 232; italics by the present author. — A.Y.].

The competition for the media coverage has largely spurred the composers to search for new expressive means, and the performers to master new programmes, new heights of the aesthetic expressiveness and interpretation quality.

As far as the synthesis of music with other arts goes, the musicians of today possess much wider opportunities for managing the listener's perception, its quality and depth. Thus the sequence of visual images in a music video may even direct the very process of the listener's associative thinking.

All the above considerations enable the limits of the traditional theoretical musicology to be extended. Its interest may be spread onto a deeper analysis of the processes of the existence of music in the world of today, thus assisting in the intensification of the very processes of musical communication.

Nevertheless, all the modern technical media fail to recreate the unique atmosphere of the collective 'co-presence' at a live musical performance, they do not provide for the psychologically important effect of 'catching' the fluids of the whole musical event, of sharing the listening enthusiasm, they fail to create the opportunity of rising to the high energy level that stimulates the most productive processing of the musical information.

Everything that was said here about the possibilities of the human perception development leads us to the conclusion that one of the next steps in recording the live

process of music presentation would be contained in trying to recreate the spatial component of the video image, to reproduce the most important 'presence effect', the unique psychological atmosphere, the invisible currents that connect the performers and the listeners, as if electrifying the whole audience. But even if all that could be technically reproduced the very feeling of perceiving it all second-hand would most likely prevent the listener from being immersed in this very specific condition of the natural and unique happening that provides for the most creatively effective and direct contact with the performer, the contact that is besides taking place in full view of all the other listeners.

The future development of the sound recording could bring about a completely new and interesting kind of communication from the performer to the listener, the kind that is impossible at a concert in principle. It is a computer combination of the several variants of performance into a certain wider unity - that is, the creation of a certain invariant field of performance (and, consequently, of the piece itself). This could enable a direct selection of this or that variant and its comparison with the other ones (as a whole, and in detail) to create a certain 'synthetic' invariant in accordance with the aesthetic taste of the listener. The result could possibly become, in the future, a new specific kind of the 'multi-variant' work of musical art.

Let us now get back to the analysis of the changed situation with the processes of musical communication that emerged as the result of the introduction of the sound recording, and try to see what problems new communication media have brought about.

First, the sound recording has seriously harmed the elitist musical culture. Formerly the appropriate elite was really in possession of the means of music publicizing, thus the whole related technology was also oriented towards the elite. With the introduction of the new, the technically perfect communicative means the traditional means of forming the musical environment became inadequate to the degree, to which the new means filled the communicative space.

The analysts have different opinions as to the reasons behind everything that had happened in that respect. Some believe that the musicians were not prepared to accept the new conditions of the music's social being and therefore proved unable to direct its consumption in an appropriate direction. The others think that the new technical media of musical communication and the possibilities for their spreading from the very beginning turned out to be in unprofessional hands. Still others point out the mistakes of the social elite that for a long time disregarded the problem of satisfying the other, the different needs that existed among the general public. That is why the 20th century, especially the recent decades, became the time when a new and very significant sound environment came into existence, the environment that is dominated by the entertainment kinds and genres of music.

Second, the development of the recording and copying equipment has significantly increased the distance between the composer and the listener. The distance first emerged

when the performer came to stand in the way of their communication. But the performer still provided a live connection between the participants of the process. The new technical means have greatly narrowed this communicative channel. That is why the problem of the listener's remoteness is now an equal worry to the performer and the composer.

Thirdly, music has entered into the communicative interrelationship.

A. Khrenov believes that the analysis of the problems of musical communication leads to the conclusion 'that while dependent on the established social and cultural relationships, the communicative means actively influence the culture. In particular, they may increase or decrease the importance of the factors that constitute the sociological characteristics of the audience - the social, class and other factors. Supporting or breaking the continuity in the functioning of the cultural organism, any communicative means may enrich it with the elements from other cultures. In this respect, the history of communication manifests the movement towards the planetary dimension in history...' [4, 31].

And since the means of communication may positively or negatively influence the formation of the psychological type of a particular personality and a social community, their specific character, as the author of the cited work justly believes, may actively influence the general character of the perceiving audience [see 4, 32- 33]. The psychological type of the personality thus absorb the characteristics of the new communicative means used by a certain social group in the course of a definite period of time. These means contribute greatly to the formation of the socio-cultural groups that believe the earlier established and traditional means of communication to be conservative.

III. THE FORMS OF COMMUNICATION

Let us now consider the other components of the system of musical communication. We would discuss the forms of interaction of the participants of the communicative process with the musical piece, the different means of music reproduction and channels of its perception.

In the course of the historical development of the means of musical communication, the forms of interaction with the musical piece progressed too. There are five basic forms established to date.

The first one is the live interaction that is conducted between all the participants of the communicative process (the composer, the performer, the listener and music-lover, and today, the musicologist/critic). The second form is the transmission of the musical piece through the media links. In this case the listener, normally, has no opportunity to freely participate in the process creatively, neither is he given a choice in picking the particular music to listen to. The third form is the contact with the musical piece by individually listening to its audio record or watching it performed on videotape. The particular characteristic of this form is contained in the possibility to realise one's musical preferences.

TABLE 1. THE TABLE OF THE POTENTIAL CAPABILITIES AND PARAMETERS OF THE AURAL SOUND PERCEPTION

The pitch	The threshold of low sound perception	The threshold of high sound perception	The threshold of minimal change distinction	The number of distinguished gradations
	≈ 16 Hertz the sound <i>C</i> of the <u>subcounteroctave</u> (C_2)	$\approx 16,000$ Hertz the sound <i>B</i> of the sixth octave (h^6)	4-5 cents (1 cent = 1/100 of a tone)	$\approx 1,200$
The volume	The minimal threshold	The maximum threshold (the pain limit)	The threshold of distinction	The number of different gradations
	1 dB	110 dB	1 dB	$\approx 100^1$
The length	The threshold of short sound registration	The threshold of the attention waning while perceiving long sounds	The threshold of distinction	The number of perceived gradations per second
	0.06 sec ²	6-10 ³	46 quanta ⁴ (0.046 - 0.092 seconds)	≈ 22

TABLE 2. THE TABLE OF THE SOUND CHANGES MOST WIDELY USED IN THE PRACTICE OF THE ACADEMIC MUSICAL GENRES

The pitch	The lower threshold	The upper threshold	The threshold of distinction used in the European music	The total number of the used sound gradations
	The sound <i>A</i> of the <u>subcounteroctave</u> (A_2)	The sound <i>C</i> of the fifth octave (C^5)	1/2 of a tone	99
The volume	The minimal threshold	The maximal threshold	The relative threshold of distinction	The total number of the used gradations
	<i>ppp</i> (less frequently <i>ppp ppp</i>)	<i>fff</i> (less frequently <i>ffff</i>)	The full unit of measurement (with the exception of <i>mp</i> and <i>mf</i> that denote the change of the dynamics by half a unit)	~ 12
The length	The minimal length	The maximum length	The threshold of distinction	The maximum frequency of the instrumentalist finger stroke per second
	(1/64)	The full note (up to the 16 th century, the longest note - 'the maxim' \equiv)	A little over 0.46 seconds	~ 22

The fourth form is the individual (or group) performance of the piece following the score (or without the score when the piece is memorised). Finally, there is the fifth form - the individual 'reading' of the score of the piece without the instruments (based on the activity of the sound notions and imagination resulting from decoding the notation score).

We have to note here that it is only the first form that provides for the full perception of the musical piece in all its integrity. It is not by chance that B. V. Asafyev always stressed that music is only born in the course of direct performance before the listener (6, 357 et al). Indeed, this is the only case when the actual communicative act takes place, when both the aural and visual perception is active. The other forms may contribute to the first one, extend it in a way, deepen some of the impressions, but they cannot replace the first form. Let us now try and consider the role that the means of music reproduction play in the communicative system under study.

Within the theory of musical communication, it makes sense to distinguish the four means of realising the live musical communication. The first one is the natural means that uses the most natural instrument - the human voice. It is used in performance by a vocalist, a vocal ensemble, a choir, while reproducing melodies at solfeggio classes, etc.

The second one is the quasi-natural means. It is contained in reproducing the sound by means of an instrument established in this particular culture (in Europe this would be a harpsichord, a piano, organ or violin, etc.; in Russia - the guitar, harmonica, bayan or balalaika, etc.). The third means is contained in the performer's reproduction of the sound form of the piece with the help of some appliances (both mechanical and electronic). It is the use of, say, an electric guitar, a synthesiser, etc. Then, there is the fourth, combined means that includes elements of all the above. This has to do with a situation when the vocalist uses sound magnifying equipment, or when a performer utilises some pre-recorded elements, etc.

The analysis of the regularities of human perception is very important in this respect. Such analysis, meant to clear up the problems of the communicative means used in a given musical piece was undertaken by V. V. Medushevsky (see 7).

For the theory of musical communication, it is important to make the distinction between the two kinds of channels of musical perception. Thus, the sensory channel is related to the direct perception of the musical form by the hearing organs, that is by the 'living' human ear. The technical channel* is the channel of 'the artificial ear', the channel that is actualised in recording on a tape, some kind of disc, etc. The musical form in this case is first 'received' by a microphone or some other technical appliance, not the listener.

Let us consider in greater detail the peculiarities of the sensory channel of musical communication. At first, we deem it important to discuss the capabilities of the human ear since the acoustic material of the musical form and its structure are directly dependent upon the physiological capabilities of the organs of perception. Recalling the well

known saying by Ch. Montesquieu {8} on the dependence of the construction of a work of art upon the peculiarities of our perception we could say the following: had the construction of our ear permitted us to perceive the subtler dynamics of the sound, its pitch characteristics, had our attention span given us a chance to preserve in the short-term memory the whole complex of the musical expressive means - the music that we now listen to with great pleasure would have probably failed to impress us. Consequently some other kinds of music would have arisen - the music that could give us a deeper and subtler pleasure.

It is known that the human perceptive organs are capable of registering the sounds (the hearing sensitivity), the concentration of human attention lets the sounds to be kept in memory and differentiated by various parameters (the analytical abilities) and integrated into different meaningful complexes. Utilising the traditional measurements of the sound pitch, volume and length, two tables may be drawn. One of them reflects the natural capabilities of man, the other - the boundaries within which the capabilities are utilised in the musical practice "Table. 1" and "Table. 2".

Of course, the cited tables leave out certain capacities of the human sound analyser - the capacities that considerably enhance the hearing ability. As for instance, the ability to produce combinational tones, to perceive the ultra-low sounds by their harmonic characteristics (the overtones and the formants), to connect the timbre and the pitch components, as well as the synaesthetic ability (the 'colour' hearing, etc.).

At the same time, the comparison between the cited tables proves that the human is able to perceive sounds of a much wider range than that is used in actual musical practice. The tables demonstrate that the volume, the dynamic and the pitch characteristics of the human hearing well surpass the level that is actually used. In a word, the musical content still fails to relate to the whole potential of human musical perception.

The psychologists and physiologists account for this paradox by the naturally programmed excess of the human abilities, physical and otherwise. The example that is usually cited in this respect is the fact that the human short-term and long-term memory is experimentally proven to be able to store a much greater amount of information than is actively used by a man in the course of his lifetime. However, for us the consideration of the channels that deal with perceiving purely material, physical information is quite essential. And then again, why is the whole range of short sound perception capabilities completely utilised, whereas the tabled data demonstrate many other capabilities of the human ear that still remain only potential? Here we encounter the two interrelated phenomena that need some explanation.

Within the theory of musical communication, it is worthwhile to bear in mind that the capabilities of human perception and the regularities in accordance to which the very art develops are closely interrelated. And the basic factor that sustains their balance is the optimal level of original content within the musical form. The original content is here understood as those pitch, volume and

dynamic sound characteristics that are perceptible but rarely used in musical practice.

Of course, the notion of originality could be interpreted in a much wider sense, while it should be basically related to the aesthetically significant, the spiritually charged aspect of the musical means. But for our purposes we might be forced to limit the treatment of this notion somewhat and consider it just from the viewpoint of the physical characteristics of the sound. Besides, this approach may be justified by the fact that the present-day science does not have an effective set of methods to correlate the brain activity with the work of the physical receptors. Thus, we will concentrate upon the physical 'content' of the sound that can be analysed in a more precise manner.

As the initial step, we would like to note that from the viewpoint of its physical (acoustic) characteristics, a musical piece 'fashions itself' in accordance with the human perceptive ability. In case the amount of the original information exceeds a certain limit, the attention is focused on a different object, characterised by a greater degree of integrity and familiarity. And the original information is then neglected. Of course, listening to music does not mean listening to one sound after another, as if 'following' closely their succession. The previously absorbed sound combinations, the sound structure 'stereotypes' (M. G. Aranovsky) play a significant part in the adequate perception of music. The recognition of such 'stereotypes' optimises the perception, it also enables the attention to be focused upon the original information, whereas the stereotypes themselves are, as it were, gently pushed aside, while time is found for absorbing the original information. Then the mind analyses the new information in accordance with the existing regularities of the stereotyped system, 'defines the place' of the new information within the system, thus absorbing the very information. L.A. Mazel, as it has already been said, called such structures "original intonation-genre complexes", proving on multiple examples that they, being historical, were fixed in the listener's performance, are the fundamental basis of the language of European music of the last centuries. {9}

The analysis of the work of the composers of the 16th - 20th centuries proves that the use of the sound material progressed together with the perceptive capabilities. Thus, the madrigals and villanelle by Orlando Lasso generally utilise the range of three octaves, and the used pitch characteristics of the sound are quite average, whereas Liszt already needed a range of over six octaves. The 19th century romanticists revolutionised the usage of the physical characteristics of the sound in practically all of its parameters. The modern experimental music, in its turn, uses, as a matter of fact, the full range of the sound pitch that the human ear is capable of perceiving. A similar situation characterises the sphere of the volume dynamics usage.

The process of widening the musical palette is characterised by the progress from the average values towards the polar extremities. The tendency is towards mastering and absorbing the original information, wherein

each sound, close to the ultimate limits of perception, eventually becomes absorbed by the mind, familiar to it.

We have to note here that the temporal characteristics of the sound cannot fit into the general scheme of the development of the sound properties. In this particular case the process evolved through mastering the smaller units. This might, on the one hand, be accounted for by the fact that the rhythm of the human environment has long been getting faster, and on the other hand, by the tendencies of human cognition that increasingly focused its attention upon the microcosm and that led to gaining a better understanding of the shorter and shorter time spells.

In general, one might note that a deeper consideration of the infinite sound universe and all of its aspects, the effective use of all the possibilities of the human hearing and thinking capacity in relation to music is one of the inevitable realities of the cultural progress. But the point here is rather in a more thorough inner differentiation of each aspect of the hearing potential, not in reaching the purely sensory limits.

Therefore, considering the characteristics of the sound and pitch differentiation, one has to bear in mind the human ability to perceive not only the 48-sound pitch, but the 24-sound pitch as well. It is known that the Arabic and the Indian music utilise intervals close to 1/8 of a tone. This leads to the hypothesis that the future development of music would be primarily related to using the systems that possess a more minute pitch differentiation, not based upon the half-tone only. The number of timbre gradations also grows, the significant zone of cluster and the noise component use widens, etc. Definitely, this way of development does not abolish the earlier tendencies towards mastering the marginal limits of sound perception.

Moreover, there is a tendency today towards a more intensive use of the marginal limits of the pitch range, the tendency that leads to modernisation or creation of the new (electronic) instruments. We also witness today 'the widening of the temporal boundaries within which the musical pieces sound' (B. V. Asafyev) {6}. An 18th century instrumental concerto by Vivaldi sounds for 10 minutes, a concerto created today normally sounds for up to 45-50 minutes. Here's another limit of the use of short-term memory, attention and will that has been reached.

The theoretical publications have widely discussed the shortcomings of the traditional notation. So, we would not consider the issue in detail. We would only note here that no doubt exists as for the fact that the system of notation, the system of recording a musical piece, including, of course, its volume dynamics, would undergo considerable changes (there is even a special UNESCO resolution to that end). This new system would most likely encompass the capabilities of the new instruments, as well as the achievements of the non-European cultures in widening the dynamic and the timbre palette of the musical sound. One might also suppose that the subsequent evolution of the expressive means of music would be related to the instrumental progress of the academic genres within which the search for the means to express new content, as more aesthetically expressive structures continues.

The same goes for the temporal characteristics of the sound. And whereas the modern instruments have nearly mastered the short sounds that the human ear is capable of perceiving, in the case of the so called 'long' sounds a great potential still exists. The fact that, say, the 10-second perception of a long, monotonous, non-musical sound leads to a sharp weakening of attention should not prevent such a strong expressive means from being used in a wider manner in the future. One might presume that the long and extra-long sounds may in the future become more rampant as the 'instrument' that could help to focus the attention upon the subtler and deeper processes of the human spiritual life, of the human interaction with the world.

It is likely that the attempts - started by Scriabin, among others, almost a century ago - to use various synaesthetic means (connecting different sensory spheres), primarily, the powers of the hearing and sight analysers in order to create a certain synthetic art of 'light-and-colour'.

The theatrical aspect - the gesture, the eurhythmics, the pantomimic - are not at all alien to the art of music, particularly, in the performer's case. We should also note the importance of the conductor's expressive gesture, the whole aspect of his behaviour on stage, for the adequate perception of music.

All the above leads to the conclusion that the sceptical outlook of a number of Western scholars of culture (A. Moles, M. Kassler, V. Fuchs) upon the future of the academic musical genres is slightly overdone. The tendency towards a deeper mastering and understanding of physical material of music, as well as the non-musical expressive means, together with the unceasing progress of the musical thought and perception, as well as the widening use of music in the various fields of human activity (healthcare, education, manufacturing, sports, etc.), as a means of positive influence, - all that allows one to adopt an optimistic attitude towards the future progress of the modern academic genres of musical art.

At the same time, a deeper consideration of the emerging tendencies, as well as of the differentiation of the world of sound with the help of new technologies brings about the realisation that the prospects of the musical art development are not at all that bright and simple. One should bear in mind that in musical art, those tendencies have led, in spite of the truly noble intentions of the best part of the society, to an unchecked expansion of the entertainment kinds of music which both deform and exaggerate the hedonistic function of music and lead, as is proven by the related studies, that a deeper psycho-physiologic negative impact may occur.

Therefore, the problems of the content and the development of the forms of musical life, the problems that are closely related to the structure and the means of functioning of the system of social musical communication, the means of music reproduction and channels of its perception, with the tendencies of managing the musical communication in the best interests of the ecology of the society's spiritual culture - this whole set of problems is currently considered very acute in many countries of the present-day world.

IV. CONCLUSION

The variety of means of music communication allows us to observe a considerable number of ways of the performer to reach the listener. Thus, musical life can be enriched by many performance means, such as live orchestra performance, solo singing or a recorded concert.

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