ARCHIVES OF ACOUSTICS
21, 3, 267–274 (1996)

NOISE AS MUSIC

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It cannot be denied that music and noise have some common features. Since sounds of nature and sounds of acoustic environment are sometimes perceived in an aesthetic mode like music, the fundamental questions arise: *What is music?* and: *Can noise become music?* To answer these questions several problems are briefly discussed. First, music is presented as a communication process where information about the sound structure is transmitted from Sender to Receiver basing on a communication code known to both participants. Recognition of the structure is a source of aesthetic pleasure and involves rich (mostly emotional) connotations. Next, examples are given of contemporary music in which sounds, previously considered as "non musical" play an essential part. Music of Italian Futurists and French "Musique Concrète" are described in more details.

1. Introduction

Music and noise appear as totally contradictory notions, though both concerning sound and its perception by human listeners. Music brings joy and amusement, it gives aesthetic pleasure to listeners, sometimes causes irritation, but in general means something positive, existing to make our life happier. Noise is a word that has two meanings. Its physical meaning concerns vibrations of a random character. Its psychological meaning concerns unwanted, annoying sound. In both meanings, and especially in the second one noise seems to be a contradiction of what we are traditionally inclined to think of as music. A closer look into the problem may change our opinion in that matter.

2. Can noise be music?

The famous American composer of modern music John Cage said in one of his writings: "Music is sounds, sounds around us whether we're in or out of concert halls" [2]. This is a very interesting statement. Certainly very unusual and unacceptab-

le for traditional music lovers, and at the same time most challenging for contemporary composers. Certainly according to such ideas Italian Futurists and French composers of Musique Concrete formulated their artistic programs. However it should be clearly stated that in its general form Cage's statement presented above is not true. There is an intuitive difference between the notions of music and noise. The question arises: *is it at all possible and under what conditions that noise becomes music?* To answer this we must first answer a much more fundamental question. The question that today seems very controversial: *What does the word "music" mean?*

There is generally no doubt that speaking about music we think of art using sound as its material. An indispensable feature of every art is the element of creativity — the creative organization of matter. Another important element is its communicative function. Art is a means of transmission of some kind of information from Sender (a painter, a sculptor, a composer etc.) to Receiver (listeners, viewers, a public). In the domain of music part of the transmission line is usually a performing musician, though his presence is not an obligatory condition for the communication process to exist. For musical communication two elements are absolutely necessary: a creative organization of sound and a communication code known both to the sender and to receiver.

Let us now look at various types of music being produced and to the accompanying perceptual processes. Most typical situation occurs when music composed by a composer is presented to the public at a concert or when it is individually perceived by listeners in front of their home radio or sound reproducing sets. Less typical, though more and more popular form of music communication is listening to experimental music produced by a composer directly on a magnetic tape or on a computer. It should be stressed, however, that even in most typical, "traditional" presentations of music the musical communication process may not even be initiated if the communication code used by the composer is not sufficiently familiar to the listeners. It may be assumed with sufficient degree of probability that to some inhabitants of equatorial jungle who have never had any contact with white man music and were suddenly transferred to the philharmonic hall, the Beethoven's symphony would sound almost exclusively as a terrifying, sensless sequence of noises.

But there are still more difficult problems to explain. Henryk Górecki, the excellent Polish composer, recently particularly well known to the world due to the international success of his Third Symphony, said in one of the interviews that for him the most valuable music is singing of birds. How could we interpret such a statement from a person whose competence in music cannot be denied? What is music in that case? Where is the communication process? Are birds performers of music composed by themselves? And also, who is the sender of "music" perceived by people listening to a melody played by the wind on telephone wires (the ancients thought that it was Eol, god of the wind, who played on the strings of the Eol's harp). And what about the melody of water dripping to a resonating tank? And finally how should we interpret the exaggerated, though fully serious statement of John Cage that noise is music?

It seems that there may be only one answer to all these questions. In every case when listening to sounds of nature people begin to experience the aesthetic pleasure they themselves are both senders and receivers of a musical message. Musical hearing and musical imagination helps them in imposing internal organization upon a flow of incoming acoustic events and recognizing resulting structure in terms of a previously established musical code. Such a creative endeavor may result in a purely aesthetic feeling and bring with it emotional connotations which normally accompany the reception of music. And this is music! The more sonorous, pleasant, not too loud and "friendly" are sounds of the acoustic environment the more likely is their positive musical reception by man's hearing. Therefore the efforts of sound designers and engineers to decrease the negative aspects of noise not only in a sense of its loudness are highly appreciated.

3. "Pleasant" and "unpleasant" sounds of the environment

Within the past decades of engineers' endeavor concerning noise abatement most effort has been put in eliminating sounds too loud and therefore dangerous to hearing. However, for some time there has been a growing interest in some features of auditory sensation other than loudness. Their investigation was carried on with both acoustical and psychological methods.

One of the elements of hearing sensation that clearly influences its pleasant or unpleasant character is the so-called sensory dissonance. Sensory dissonance mean a specific kind of timbre of sound caused by amplitude modulation [10]. In the frequency range of modulation below 20 Hz sensory dissonance appears as separately perceived fluctuations [3]. Between about 20 and 200 Hz it is perceived as roughness and plays an important part in the characteristic of dissonant music chords [1, 4, 13].

It is well known that the phenomenon of consonance and dissonance belongs to the most fundamental features of music. The dissonating sound structures are being used particularly often in modern music. It would be difficult to convince a contemporary composer that "dissonance" means "unpleasantness of timbre", however there is a psychological evidence showing the correlation of this phenomenon with a negative estimation of sound. For some, not fully recognized reasons the transmission of neural pulses from the peripheral hearing organ to the brain exhibits some anomaly resulting as a sort of fatigue effect selectively dependent on the frequency of modulation of the input signal. The modulatin (in most cases due to the acoustic beats) shows the effect of "maximum unpleasantness" at a specific frequency. That specific frequency of modulation for maximum unpleasantness is dependent on frequency of the signal and changes from about ten to about two hundreds [11].

As it was told, sensory dissonance is a phenomenon most important in music. However, its effect in non-musical phenomena may be still more striking. It is also directly related to the negative reception of noise. One can easily imagine scratching

glass surface with a knife, rubbing the blackboard with a piece of chalk, howling of improperly regulated brakes and many other sounds from the acoustic environment. Our reaction ot the above-mentioned startling sounds may be a sign that there are some other factors, besides loudness, which contribute to particularly negative assessment of noise.

A specific factor that plays a part in human reactions to noise, and which can strengthen them, is the spatial distribution of sound stimuli. Some investigations of this effect were reported recently be German authors [8]. The industrial noises recorded with the artificial head were reproduced equally loud in a monophonic and stereophonic sound system. The physiological reaction of listeners was tested with the method of finger-pulse amplitude. The results imply that the listeners experienced a multi-directional incidence of sound as being more of a strain. Still stronger effect was found when the virtual source of sound was moving in space.

There is an interesting, though not fully confirmed hypothesis concerning susceptibility of musicians to damaging effect of loud musical sounds on hearing. Some researchers find that many orchestral musicians being exposed to very high level of sound for decades nevertheless do not exhibit hearing loss to such a degree as people exposed to similarly strong industrial noises. The hypothesis claims that the negative effect of exposition may be to some degree diminished by active involvement of listeners in the perception of incoming signals. The informative content of a signal may contribute to more efficient adaptation of the hearing organ to loud sounds. Unfortunately, this effect, even if really existing is limited in range and not capable of protecting many young people against serious damage of hearing due to listening with excessive level to pop music in concerts and with portable sound-reproducing devices [7].

Interesting investigations of physiological reactions accompanying listening to music and to noise were conducted in early sixties by JANSEN and KLENCH [6]. It was demonstrated that the cardiac output of most subjects was reduced when they were exposed to noise for some minutes. To compare these responses with the effects of exposition to classical music, Allegro and Adagio from 3rd Brandenburg Concerto No 3 in G by J.S. Bach was chosen. This piece of music covers a wide range of frequencies and keeps a relatively constant sound level. Both stimuli were presented with loudness level of 90 phon for a duration of 7 min. There was a clear distinction in the mean change of cardiac output between application of the music and the noise sitmulus. The broadband noise had a stronger influence on blood circulation as compared with Bach concerto. Unfortunately these researches were not continued.

4. Revolution in the way of thinking about sounds that may create music

Among the first artists who openly acknowledged the beauty of the common sounds of a big city was the famous architect of "Art Nouveau" August Endell. He wrote "It is so strange: the croaking of ravens, the winds blowing, the sea foaming

seems poetical, seems grand and noble. But the noises of the town don't even seem to be worthy of attention, and yet they alone form a remarkable world which must make the town appear a richly structured being, even to a blind man. You only have to listen and hear the voices of the town. The lightly rolling hackney carriages, the heavy pounding of the post coaches, the clip-clop of hooves on the asphalt, the swift, sharp staccato of the trotters, the dragging steps of the hackney carriage horses, each has its peculiar character, more finely graded than we are able to express in words... How jolly the rolling wheels sound, how strange when they suddenly die away as the carriage turns into a side road. How penetrating the echoing steps of lonely pedestrians sound. How fleeting, how soft almost dainty the steps of many people in narrow streets sound, wher a carriage rarely appears, as can often be heard in Schloßstraße in Dresden. How passionately muffled is the pushing and shuffling of the waiting crowd. How varied are the voices of the cars, their roar as they approach, the cry of the horn, and then roaring, sounding metallic, now coarsely pounding, now finely with a clear beat... One can roam through the town for hours, listening to its loud and soft voices, feeling its strange, interwinded life in the silence of lonely places and the roar of its busy streets. Words fail me to describe the appeal of all these things." [12]:3.

Similar view, but in a more radical form appeared in a group of young Italian artists, calling themselves Futurists. They were painters, sculptures and musicians. Their approach is well shown in the picture of Umberto Boccioni painted in 1911, entitled "The street enters the house". It presents a woman looking from a balcony window out over the town. Irregular spirals in the picture symbolize noises that rise from streets of the town and penetrate the calm interior of a bourgois house.

In 1913 Carlo Carra published his manifesto "La pittura dei suoni, rumori, odori" (the painting of sound, noises, and smells) explaining how lines, surfaces, and colors may design the architecture of a musical composition. Soon, however, a much more radical declaration appears concerning the modern view on substance of music: Luigi Russolo announces his famous manifesto on the art of noises. The noise, the non-musical sound is announced here as a fundamental material for musical composition. It becomes the essence of the new music which produces completely new world of sound. Rumbles, hisses, booms, crackles and buzzes become musical material substituting the so-far dominating harmonic sounds and tonal harmonies. Traditional orchestra is banned from concert halls and replaced with the world of machines and mechanical sound-producing devices, the world of common-world sounds designed according to musical imagination of the young artists. We read in the Manifesto: "We Futurists have deeply loved and enjoyed the harmonics of the great masters. For many years Beethoven and Wagner shook our nerves and hearts. Now we are satiated and we find far more enjoyment in mentally combining the noise of trams, backfiring motors, carriages and bawling crowds than re-hearing, for example the Eroica or the Pastoral". [12]: 4.

Russolo did not limit himself to theoretical declaration. He designed and constructed many instruments for the new music. These „Russolphones" were divided in 6 groups constituting a futuristic orchestra [5]. There were:

1. Rumbles, Roars, Explosions, Crashes, Thuds, Booms
2. Whistles, Hisses, Snorts
3. Whispers, Murmurs, Mutters, Rumbles, Gurgles
4. Creaks, Rustles, Buzzes, Crackles, Scrapes
5. Percussive noises obtained from metal, wood, skin, stone, etc.
6. Voices of animals and men: Shouts, Screams, Howls, Laughs etc.

Russolo's insturments, mostly made of wood and metal, were a proof of the mental revolution that took place in the artists' minds. It concerned the new way of thinking about the material of music. This revolution developped fully only some years later, when the technology of sound recording was used by the composers of musique concrète.

5. Musique-concrète — the music of noises

In 1923 Artur Honegger composed his famous "Pacific 231", a musical piece that paid tribute to modern technology. The composition represented, with orchestral means, the power and speed of the great intercontinental traction engine. It also revealed the artist's sympathy to the world of machines and his solidarity with the composers who used artistic transformation of the ambient sounds in their musical works. Honegger must have been surprised, when exactly quarter of a century later someone made a similar attempt, this time however, not bothering with making an orchestra sound like a railway engine, but simply going to the railway station, recording all posssible noises of a train, and making a musical composition out of them. The man who did this was head of the Studio d'Essay of the French radio, sound producer, writer, and composer Pierre Schaeffer, and the title of the composition was "Étude aux Chemins de Fer" [9].

Pierre Schaeffer was always fascinated with avant-guarde music. He wanted to explore the expressive possibilities of sound effects used in various radio and TV programs and to compose music using sounds of the acoustic environment. He tried to compose using recorded "l'objects sonores" (sound objects) and called the result "musique concrète" (concrete music). The word "concrete" reminded that unlike in traditional music, the object of musical art was here not only an idea described in notes, but a physically produced, concrete object, recorded and ready to be demonstrated to the public.

On October 5, 1948 Paris Broadcasting Service produced a radio concert called "Concert de bruits", ("Concert of Noises"). It consisted of "Étude aux Tourniquets" made out of recorded percussive sounds, "Étude aux Casseroles" made out of sounds recorded in a kitchen and "Étude aux Chemins de Fer". Sound objects gathered to produce this last Étude were quite numerous. There were starting sounds of the engine, rattling of the wheels, bumps of the buffers, sounds of moving trains and so on. Though having gathered such an unconventional material the composer wanted to organize it according to traditional musical rules. Structural analysis showed there

a strict musical construction with many elements of polyphony. There was an interesting rhythmic counterpoint, accelerando and crescendo, solo of the engine and tutti of the cars. However, to the artist's despair for someone hearing the piece for the first time only one thing was sure: Here is a train in motion.

This was the first experience and first disappointment of the composer of concrete music. Ambient sounds, when easily recognized, carry with them the whole story of their non-musical past which dominates over the musical construction. In spite of the author's intention that his compositions should impress the listener exclusively with abstract auditory elements the public could not free themselves from perceiving the anecdotic level of sound. Thus the important work to be done with the recorded sound material was to transform it into a non-recognizable form. This was not an easy task regarding the early stage of development of sound technology.

One of the most important examples of concrete music was Symphonie pour un Homme Seul (Symphony for man solo). Its main idea was to show the opposition of the human voice and the sounds of the environment. The main instrument here were voices of men, women, and children artificially changed in such a way that the articulatory information was lost, though typical intonation and timbre remained. Human sounds consisted of words, shouts, screams, groans, sighs, laughs, singing, murmuring, breathing etc. Sounds of the environment were knocking at the door, footsteps, ambient noises, and transformed sounds of various musical instruments. The symphony was first prepared as a sort of an avant-guarde radio play. In subsequent versions all the verbal comments were removed and finally "symphonie" was presented as a piece of concrete music. The authors were Pierre Schaeffer and a young composer, former student of Olivier Messiaen's, Pierre Henry.

"Symphonie pour un homme seul" had a strict musical form. It consisted of 10 parts ("sequences") called: Prosepopée I, Partita, Valse, Erotica, Scherzo, Prosepopée II, Eroica, Apostrophe, Cadence, and Strette. However, in spite of the author's declared intentions the anecdotic contents of the material was clearly seen in many parts of the piece. The symphony had many presentations in public concerts and on the radio. It became one of the best known pieces of concrete music and in 1955 was presented in form of a ballet by M. Bejart and J. Laurant. Perhaps its literary content contributed partly to its popularity.

The success of early compositions of concrete music attracted many new composers who after 1950 joined the group and tried the new technique. Among them were Pierre Boulez, Oliver Messiaen, Andre Jolivet and several other leading French artists. At the time technical possibilities of Studio d'Essay were already much more advanced due to the development of magnetic sound recording ("Etude aux Chemins de Fer" and "Symphonic" were produced without any taperecorder, with the use of gramophone-record technique only). Musique concrete strongly influenced the composing style of whole generations of composers in the years to come. It changed their way of thinking about the relations between music and noise.

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