TERESA RAMPAZZI
Selected writings

edited by Paolo Zavagna

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Introduction

Paolo Zavagna

The collection of Teresa Rampazzi's 'papers' reprinted here or published for the first time in this book are testaments to a cultural, social, aesthetic and – why not? – political 'atmosphere' at the end of the Sixties and early Seventies of the past century in Padua, the centre of many new activities.

Teresa Rampazzi's name is linked to the NPS[1] group (Nuove Proposte Sonore), that was present as a collective group and grew out of the experiences of the N[2] group in the field of figurative arts. The co-founder of the NPS was Ennio Chiggio together with Teresa Rampazzi. However, within this group Rampazzi continued her own work. For example, she signed most of the articles published in the magazine «film special» (published between 1968 and 1973) in the cinema and music relations column. In the beginning phase of the Rampazzi's theoretical and musical production, in the electro acoustic field, from the late Fifties and during the Sixties, the collective work of the group is an important element for analysing what they produced together even when signed by only one component of the group.

In addition to all of Rampazzi's published articles – even if they are almost impossible to find – there are also two unpublished articles in this book: *Dalla ricerca alla musica* (1970) is a *summa* of Rampazzi's ideas, especially her activities in the NPS. From all her numerous concert presentations, which sometimes seem like lessons, we chose the *Introduzione ad un audizione di musica elettronica* (1970). Although it's short, it shows Rampazzi's cultural-popularising work through examples of concert programmes.

A problem arise looking for the books quoted by Teresa Rampazzi: it was not possible to reconstruct her private library, really during the years the books were donated and spread. Among her big amount of books a few were kept by her daughter

[1] For Teresa Rampazzi and the NPS group see text [NPS, 1977], [Mollia, 1979], [Vidolin, 1989], [Di Capua, 1993], [Zattra, 1999, 2003a, 2003b], [Durante and Zattra, 2002], [Corba and Delfino, 2007]. Especially text [Durante and Zattra, 2002], that is a revision of the thesis [Zattra, 1999], gives detailed information on the issue. The radio broadcast [Di Capua, 1993] is very interesting – especially for the many witnesses.

[2] About the N group see particularly the monographic book [Mussa, 1976]. See moreover [Argan, 1988], p. 522, [De Vecchi and Cerchiari, 1991], p. 591 and [De Marchis, 1982], p. 613, 615-616.

Francesca; just two of these were used in our research: the *Traité des objects musicaux* by Pierre Schaeffer and *Verso la nuova musica* by Anton Webern.

This is not a critical edition; reference texts are these already published and the transcription is close to original. Obvious misprints were corrected; titles and proper names were uniformed to the current norms. The work on unpublished papers was based on the available typed and on other unpublished collection. All the footnotes, except the N.d.A. ones, are by the editor. The references of the papers by and on Teresa Rampazzi are referred to the literature and criticism listed *infra*.

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- [Zattra, 2003a] Laura Zattra, *Teresa Rampazzi: pioneer of italian electronic music*, Proceedings of CIM, Colloquium on Musical Informatics, XIV, Tempo Reale, Firenze 2003, pp. 11-16.
- [Zattra, 2003b] Laura Zattra, *Teresa Rampazzi e il fascino dei primi suoni elettronici*, in «Konsequenz», X, 8 (2003), p. 23-36.

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– <http://www.teresarampazzi.org.index.htm> [02/08].

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– *Mutazioni di una situazione*, «film special», single number, 1968, p. 34-37.
– *La musica nel ruolo di accessorio*, «film special», 1, May-June 1969, p. 79-80.
– *Tempo e ritmo*, «film special», 2, July-September 1969, p. 65-67.
– *I brandelli dell'informazione*, «film special», 1, January-April 1970, p. 43-46.
– *Musica come servizio*, «film special», 2, May-September 1970, p. 46-48.
– *È tanto difficile da capire?*, «film special», 3, October-December 1970, p. 37-39
– *Ascolto concentrato e ascolto distratto*, «film special», 1, January-April 1971, p. 37-38.
– *Moda e avanguardie musicali*, «film special», 1, 1972, p. 36-37.
– *Nuovi strumenti di indagine sulle verità del mondo sonoro*, «film special», 1, 1973 p. 25-26.
– *Un parametro alla deriva. Un altro in avanzata*, «Quaderni del Conservatorio 'G. Rossini' di Pesaro, Tecnomusica/1», Musical creation and Technology, Pesaro, May 1977, p. 1-17.
– *L'attività nel campo musicale*, in [Pozzetto, 1979], p. 7.
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– *Piccolo discorso con Michela*, in [Mollia, 1979].
– *Il Conservatorio di Padova*, "Musica ed elaboratore elettronico. Verso il laboratorio musicale personale", Proceedings of the FAST summit (Federazione delle Associazioni Scientifiche e Tecniche), Milan, 10th-11th April 1980, out of index.

[1] *Changes of situation**

Except in rare cases, authors and directors haven't taken into account the technical advances in the production of sound. They haven't considered the fact that nowadays we can produce a soundtrack right away with the same film, transposition and editing techniques used in cinema.

The validity of sound can and should correspond to the validity of image.

Easel Music

«Unlucky music», as Leonardo called it[1] because of its transitoriness, finds itself in an embarrassing and paradoxical situation these days. Musicians, the real ones, the ones with universal values for purposes of clarity, bemoan its fate particularly because of this lost transitoriness, of these damned machines and, especially, of that diabolical tape recorder that registers it and reproduces it with obsessive sameness. What has happened to the infinite emotional renewal passed on to the listener by the irreplaceable mediator-performer? All lost. The listener listens to exactly what the composer wanted to say. Make no mistake; the composer is satisfied. It's very risky to put oneself

* Published with two images/pictures – a page from the score of *Ipotesi 2* by the NPS group and a photo of the same – in the journal «film special», single number (1968), p. 34-37. Included with the journal a recording with the following content: side A – *Glissati* at various speeds (1') – filtered white noise (1') – *coloured* noise (1') – filtered impulses (1') – modulated sinusoid (1') – frequence modulation (1'); side B – 3 sound object fragments – Dinamica 1 (available for listening at the journal website). With a similar title – *Musica elettronica: mutazioni di una situazione* – but different content we find a talk from 1967 ([NPS, 1977], pp. 60-62) republished recently in the journal edited by Ennio Chiggio, «Oggetto sonoro» (Edizioni Multimediali del Barbagianni, Padova], September 2002. The issue is entitled *Precessioni* and dedicated to Gelmetti, Grossi, Rampazzi, Zaffiri.

[1] Quoted in a note of Walter Benjamin *L'opera d'arte nell'epoca della sua riproducibilità tecnica*, Einaudi, Turin 1966, p. 54 (or. ed. *Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit*, Suhrkamp, Frankfurt am Main 1955).

in another's hands; rarely can it be advantageous. Now the listener has to get used to being a little less passive and lazy and become a performer himself.

The paradox continues if we think that today, the easel painter, who according to Leonardo had many advantages over the musician, is instead looking desperately to move his paintings and even puts small motors behind them if they don't move on their own! We have to say here that the paradox exists only if we work on two levels: fruition and organisation of the acoustic field.

In reality, even if the temporal dimension is an undeniable constant in music, music also had an easel age. The inflexible rationality of the tonal system presupposed and required contemplative and ritualistic listening. We knew that we left from a certain precise point and that we had to return to that same point no matter how many digressions we took on the way. As Castiglioni observes, it's really strange that «even when s/he knows perfectly well what will happen when listening to tonal music, the listener is still dying for that very thing to happen». And then s/he goes home satisfied. Even music has contributed to her/his social security. Or to her/his narcosis, we say. In fact, the problem of listening, of a new kind of listening, the pressing need to break habits of perception, association, preconceived channels, is becoming increasingly more important to the extent to which we want to renew the type of communication. Those who frequent concert halls are listening in such an automated manner that we're tempted to conclude that they aren't listening to anything anymore. Or rather they're no longer listening to the primary element; that is, the acoustic element. In part the presence of the performer hinders it – «that lack of ease in performance when playing their instruments»[2] – that already bothered that great performer Busoni so much. So we have to return from the musical to the acoustic**.**

Let's say that electronic music can now not only free us from the presence of the performer, but even more importantly, free sound from the codified chain of relations, from the hierarchy of the scale, from the stability of poles of attraction or from the centuries-old functions attributed to the assigned degrees of the scale. The field of acoustic exploration has expanded so much with electronic equipment that the only limits now are those of audibility. We can say generally that we've passed from the Greek tetra-chord to the Medieval hexachord, from octave of the well-tempered system with its hierarchical degrees to the twelve semi-tones, equidistant from each other, of the twelve-tone system, just as we've passed from Gregorian homophony to Renaissance polyphony, then to instrumental music, and now, from mechanical instruments to electronic equipment.

The old system resisted at each passage. Each time it seemed like the end of everything, rather than the beginning of a search for new codifications based necessarily on experimentation. Even if at this point Varèse already feared that «some musical

[2] Ferruccio Busoni, quoted in Fred K. Prieberg, *Musica ex machina*, Einaudi, Turin 1963, p. 32; or. ed. *Musica ex machina. Über das Verhältnis von Musik und Technik*, Ullstein, Berlin-Frankfurt-Wien, 1960. Passage from *Entwurtf einer neuen Ästhetik der Tonkunst*, II ed. Insel, Leipzig 1910 (but 1916); it. transl. *Abbozzo di una nuova estetica della musica*, now in Ferruccio Busoni, *Lo sguardo lieto*, Il Saggiatore, Milan 1977, p. 39-72; we find the Rampazzi quotation at p. 61.

mortician begins embalming electronic music in rules»[3]. Fortunately, we're still a ways away from that.

Now it's no longer a question of scales, intervals, and serial relationships. We've just arrived at what Busoni dreamed of in 1916, «free music that is not enslaved to scales, intervals, rhythm, harmony, but in which sounds spring up, slide forth, turn about like birds in the air, and the changes of height and intensity can unfold delicately and gradually just as in nature»[4]. In this way Busoni extended a hand to our more kindred Varèse over the pseudo-anarchistic experiments of the Futurists. Let's make it clear that we're still rather far from reaching that ideal ease which complete knowledge and mastery of the material presuppose, even if we have the means.

The use of the frequency generator, first used for scientific purposes, and then the increasing use of magnetic tape marked the beginning of electronic music and the gradual waning of traditional instruments. When Werner Meyer-Appler, professor of phonetics at the University of Bonn, presented the first sinusoidal generator in 1954 in Darmstadt, he seemed like a Martian. The generator produced sounds that were as stiff as spaghetti, without timbre, difficult to modulate. Evidently those machines weren't right for making music such as they were at the time, even though they could scientifically break down a whole tone into twelve micro-intervals. While rigorously electronic, those first experiments showed traces of Expressionistic poetics or post-Webernian pointillism**.** We needed to jump over the ditch and think up some other kind of music. Abandon the pentagram.

But even before these experiments, another radical contribution to the de-conditioning of listening had been given by concrete music in France. We'd discovered the musical uses of noise! If for Schoenberg dissonance was none other than expanded consonance, noise was now none other than an expanded, of simply more complex, sound. In the very rational eighteenth century, noise as a product of irrational numerical relationships was banned from music. Percussion instruments were studiously avoided. From then on until Bartók, Stravinsky, and Stockhausen, orchestras were invaded by those instruments in an increasingly noisy way, but always maintained the articulation of musical discourse. Even the noise of the piano lid slamming shut in Maderna's concert for piano and orchestra comes right at the top of a crescendo and fits in with traditional musical logic. Naturally, lids slamming, hammering on resonance iron frames, music stands dragging across the floor, Coca Cola bottles rolling on piano cords, etc. were all the rage in Cage's exhibitions. They were certainly useful

[3] Varèse quoted in Elliott Schwartz and Barney Childs (eds.), *Contemporary Composers on Contemporary Music*, Holt, Rinehart and Winston, New York 1967, p. 20: «They [composers] are also lucky so far in not being hampered by esthetic codification – at least not yet! But I am afraid it will not be long before some musical mortician begins embalming electronic music in rules».

[4] Ferruccio Busoni, quoted in Fred K. Prieberg, *Musica ex machina*, cit., p. 148. In the Italian translation cited, the passage wich comes closest to that quoted by Rampazzi is the following: «…liberiamola [la musica] dai dogmi architettonici, acustici ed estetici; facciamo che sia pura invenzione e sentimento nell'armonia, nella forma e nei timbri […]; non sia altro che la natura rispecchiata nell'anima umana e da lei riflessa; essa è infatti aria che vibra e va più in là dell'aria; altrettanto universale e completa nell'uomo che nello spazio poiché può ripiegarsi su se stessa e scorrere libera senza diminuire d'intensità».

in deconditioning perceptions, but didn't lead to systematic research on the function of noise. Varèse was the first one to tackle the problem when he introduced sirens into the context of the orchestra. As he himself declared, the purpose wasn't to brutally introduce an acoustic event from everyday life (a kind of pop-art ante litteram), but to arrive at that continuous flow of the whole range of sound which is impossible with traditional instruments. Rightfully, Varèse chided the Italian Futurists for slavishly and indiscriminately reproducing naturalistic noise. Pierre Schaeffer and the "de la Recherche" group founded by him in 1943 began the first real theoretical work on the organised use of noise, i.e. of acoustic events produced by concrete objects offering the maximum acoustic spectrum that was not reducible to the pure frequencies of electronic sounds. At the same time as Cage's prepared pianos, Schaeffer took acoustic material from Chopin's concerts for the piano in an intentional way, such that by denaturing and reorganising that same material, it became a concrete source of sound like any other.

We think that the experience of concrete music, despite its not too clear possibilities, given the excessive empiricism which necessarily guides the capturing of acoustic signal that retain their naturalistic source regardless of the most learned manipulation, contributed in the most radical way to research on and renewal of perception. Despite the phenomenological premises of its genesis, concrete music blazed a trail toward listening to the electronic 'acoustic object' understood in its structural autonomy, i.e. the polar opposite of the concrete object.

Precisely because of its relative lack of autonomy, concrete music found its natural application right away in film, television short subjects, and radio comedies. Even Goethe's *Faust* came out with a concrete music version, and then *Space travel*, Kafka's *Castle*, and the *Symphony for a single man* composed by Pierre Schaeffer and Henry[5], adapted for dance with choreography by Béjart. So, concrete music had a descriptive tendency that later only electronic music could surpass completely.

In the beginning the distinction was very confusing and we could say that it still is. Most musicians electronically manipulate concrete or instrumental elements, so we've heard generic talk about electronic music for years without knowing exactly what it is and when it is. In fact, it's a bit difficult to know, at least for us, since electronic music hasn't yet begun or maybe is just being born. We can't ask newborns to lecture or show the way to those who are just coming out into the open.

The private studios that have been opened in the last few years in Italy, in Florence, Turin, and Padua, refuse to call themselves avant-garde in the sense that this term presupposes an advanced phase, yes, but at the end of a process, while we're still at the beginning. Were the experiments of primitive peoples called avant-garde? Therefore, we've presented ourselves in a phase of experimentation and have made a drastic Cartesian decision: to shed all previous opinion and put everything up for discussion again.

In our case to abandon the first phase of electronic music and start again with the simplest of all instruments: one single frequency generator. «You can work for years

[5] Pierre Schaeffer and Pierre Henry, *Symphonie pour un homme seul*, 1949-1950.

with one single generator», states Schaeffer, the Pope of concrete music, who certainly can't be accused of sectarianism.

Artist or electro-technician

Because phases of compromise are what especially hold up evolution and renewal in any field, musicians have approached machines with mistrust. Sure it was hard for an artist to be confused with an electro-technician or at least to have to be dependent on one. In any case, after the advent of generators no one dared play a violin except by denaturing it or looked at a machine and asked himself if he could get a violin out of it. In short, we couldn't lose the advantages or take a chance with too many disadvantages.

We had and still have hybrid production, music we can't call instrumental any longer because it's been manipulated electronically in complex ways or electronic since the source of the sound often derives from those same traditional instruments or the two dimensions enter the lists in order to salvage what's worth saving, i.e. the performer's presence, a human presence, the last guarantee that Music is still alive! The issue of labels wouldn't be important if the results didn't make known too often the formal chaos. The most disparate elements are thrown together at least in a seemingly arbitrary way. They're isolated events, almost adrift, that move ahead in time cancelling each other out along the way, without any will to communicate. Usually they support each other by contrast: very short impulses and extended sounds, barely perceptible whispers opposed to lacerating intensity; extreme uncertainty and a total lack of choices lead to a dead-end: structural silence.

The listener is thrown into a state of confusion and discomfort. At best the redundancy of information neutralizes his ability to perceive. «But why upset the ear with enormous jumps of height and intensity that just create a cluttered effect? In this way we can't perceive the slight differences of height the electronic equipment offers. Listening weakens when, in fact, our aim is to help it develop the ability to make the slightest perceptions»[6]. Again this is Schaeffer talking, the most exacting organizer of noise…

Now, following the example of studios in Florence and Turin, four people in Padua came together precisely in order to study these slight variations in height and intensity and verify what the ear perceives. Two musicians, a graphic artist, and an electronic engineer formed a research group and begun with one single generator and a pair of microphones. This was in '65. Little by little the amount of equipment has grown: other generators that can produce automatic glissandos along the entire range, white noise generators, filters for coloured noise, impulse generators that can vary the length and form of frequencies, stereo microphones, mixers, etc. But the working method has remained the same. Woe is the one who gets carried away with the amount of

[6] Pierre Schaeffer, *Traité des objets musicaux*, Seuil, Paris 1966, p. 186: «Bouleversez en effet l'oreille par des écarts énormes de hauteur et d'intensité ou des effets d'accumulation d'objets: les perceptions de faibles différences de hauteur vont s'émousser. Préparez-la à percevoir de façon de plus en plus fine, au cours d'un pianissimo, dans un grand dépouillement d'objets: d'infimes variations lui deviendront alors sensibles».

equipment. It's essentially an analytical method. Instead of accumulating, reducing, and separating, investigate the new application of classical parameters and the eventual discovery of new parameters born of the new material.

Therefore, we've given ourselves very precise research guidelines. We haven't moved on the basis of a language that hasn't come to be yet, but only on the basis of terms and the functions of new terms: organisation of 'acoustic objects'. The new equipment hasn't been considered a greater[7] traditional instrument, a type of super-instrument, but rather the means to create new material without the limits of its mechanical nature, new timbres, «new harmonic splendors obtainible from the use of sub-harmonic combinations now impossible; new dynamics far beyond the present human-powered orchestra; cross rhythms, unrelated to each other, treated simultaneously[8], the role of color or timbre would be completely changed from being incidental, anecdotal, sensual […]. In the moving masses you would be conscious of their transmutations when they pass over different layers, when they penetrate certain opacities, or are dilated in certain rarefactions»[9] and a lot else. This is the way Varèse, a bit lyrically, spoke of it already in 1939.

The reality of our studios is perhaps a bit more difficult but no less exhilarating. To what might seem cold laboratory experiments of interest only to operators rather than listeners, we can rebut that the scientific experiments don't take into account the various stages of research but only the final result which has a practical value, assuming that there ever is a final result. At any rate there are no results of practical value in artistic research and it can happen that some intermediate steps end up being more valid that later ones. Valid in the artistic field which means the greatest information with the maximum economy of means. Again when we say information, we mean strictly acoustic information. It's obvious that we can't reduce everything to acoustics alone or to psychoacoustics alone. The ear is part of the whole person, but its depends on the education of the ear and, therefore, of human beings to move from the most banal, associative, descriptive, emotive listening to listening by which a more rigorous organisation of sound (as in a Bach fugue) can give greater emotion. In fact, we think that a rigorous organisation, free from personal arbiters, is always intelligible.

Cinema and electronic music

In the huge field of still partially unknown electronic music, we can't move around indiscriminately just talking about our own issues. We're dealing with thousands of degrees of height and, frankly, hundreds of intensity levels in which the ear has to get used to distinguishing the smallest differences. In this case, mathematical calculation

[7] In the copy of the journal in the Ennio Chiggio archive «majority» (italian «maggioranza») is replaced by pen in the margin with «increase» (italian «maggiorazione»).

[8] Schwartz and Childs (eds.), *Contemporary Composers on Contemporary Music* cit., p. 201.

[9] *Ivi*, p. 197.

can help even if it can never be decisive. The first steps were cautious but conscious. Experimentalism doesn't mean lack of rules**.**

After all the very nature of the material puts some healthy brakes on the extravagancies of those who would throw themselves into electronic music not like a pioneer, but more like a profiteer.

Until now there have been few applications of electronic music in Italy. Except in rare cases, authors and directors haven't taken into account technical advances in the production of sound They haven't considered that fact nowadays we can produce a soundtrack right away with the same film, transposition and editing techniques used in cinema. The validity of sound can and should correspond to the validity of image. There are films and, especially, short subjects valid on the level of image, but totally betrayed or degraded on the level of music. The reverse rarely occurs. Why do we separate the requirements of the visual from those of sound? And if the latter is lacking, why don't we stimulate it?

The use of electronic music, or better of its more spectacular effects in science fiction films has been up to now ingenuous and mystificatory. We've come to associate electronic music with magico-astral, catastrophic, ahistorical situations. However, electronic music has a precise historical collocation and that is in the present. When it no longer has a subordinate or consumer function, it is able to transcend any functionality to maintain a formal validity and, as such, rise to the artistic level of the cinematic product.

[2] *Music as an accessory**

The relationship between audio and video

The relationship between music and cinema is very complicated and rarely resolved. Music for film is a kind of accessory no one pays much attention to, but if it wasn't used, people would feel that it was needed. There are good soundtracks for bad movies, but more often it's the other way around. In both cases, audio lags behind. The film is produced anyway and when everything is ready there are still some gaps. A musician is called to fill them in: a pinch of drama and ecstatic tenderness added here and there where the director wasn't able to do it himself. For this reason there are kilometres of recording full of effects that are ready to be used; you can buy them by the metre. Of course there are many young people who go to the cinema and are interested in certain technical aspects: beautiful photography, clever editing, perfect rhythm and scene changes, etc. And what about the soundtrack? How many people listen to it and associate it first and foremost with the images? Quick nods from the critics, too. Many soundtracks don't deserve anything more: but would they at least be condemned! Leonard Roseman was asked to teach a course on film track composition at an American university. The composer refused and suggested they contact the Business Administration Department. In this instance, the American responded in kind. Actually, special composition techniques and universal recipes do not exist. Throughout the history of cinema this 'minor' problem has been resolved using 'low level' culture, by simplifying the composition of the musical language of that period, always remaining somewhat behind. (Introducing twelve-tone music ten years after its hey-day). What does it mean to respond to popular tastes after imposing low-quality products through violence and brainwashing? High-quality products are for a specialised elite. The means of spreading such products to the general public have not been created.

* Published in «film special», No. 1 (May-June 1969), p. 79-80. In the Ennio Chiggio archive is preserved a typewritten entitled *Giovani tra audio e video*, similar to the text here transcribed.

Music from melodrama to film

Let's return to soundtracks. Where do they come from? Can we compare them to operatic music? Absolutely not. In the past this problem worked the opposite way. Mozart and Verdi composed for unbelievable, daring stories, but at that time no one paid much attention to the plot; the music was the most important thing. The scene didn't change; the music went on and created new situations that developed independently. The singer-actors repeated the same words in a meaningless way: «let's go, let's go, let's go» and remained put. In film the opposite occurs. Scenes change rapidly; new situations emerge; everything can be told through the images; instead, the music remains the same repeating over and over ad nauseum something that, without the images, would seem meaningless.

However, in the early silent films, something terrible happened: the public panicked because natural sounds were missing. A door would open and close or a train would pass by and you wouldn't hear a thing.

So, they began to use any kind of musical instrument just to fill in that terrible silence. Nowadays shrewd musicians still heighten the public's anxiety in certain types of high-tension scenes by avoiding any musical comment. In the beginning, the era of silent film was happy-go-lucky in a certain way. Everyone went their own way; images sought and often achieved a certain individual independence. The music was itself sort of paradoxically mystified in its independence, at the opposite extreme yet of equal stature as the image.

With the introduction of sound, film music was lowered to the role of the slave of action. Not that there haven't been happy solutions; for example when the film director has also been a composer, such as Charlie Chaplin with his dizzy audio and video rhythms and the pathetic and languishing arias so like his characters' faces. The other example that is even tedious to recall given its notoriety is the Eisenstein-Prokofiev duo. Certainly when a great director and a great composer work together, something good always comes of it. It is an interesting example because it shows that Prokofiev's functional score works well alone and becomes the *Cantata* op. 78[1].

Symphonic elephantiasis

When people discovered that music associated with images had a catalytic effect, the most important American orchestras invaded the film arena in a fit of symphonic elephantiasis. There wasn't a scene left alone. Music everywhere, during storms, dialogues, battles and disasters. The lack of contrast cancelled out any effects. Then came the period of comedies and musical reviews, in which the story lines were only a pretext to give singers a chance to bask in the lime light singing sugary songs. Then

[1] In the typewritten quoted in the previous note the text is followed by this phrase: «(Also today there are as an exception happy couples: among the best known: Fellini Rota – Antonioni Fusco.)».

came the use of jazz or famous soloists like Miles Davis and Nunzio Rotondo, who improvised on air while watching the film, unexpectedly becoming protagonists instead of commentators. Some say these two arts of our time are intrinsically similar. I don't agree with this comparison – jazz is inherently spontaneous while cinema is inherently planned – except for the fact that we are talking about collective phenomena of the greatest mass appeal our time. Sometimes eyes and ears get along pretty well together.

In these last few years, the *Leitmotiv* has been among the many solutions or attempts at solutions, even if it really isn't innovative since Wagner had already tried it.

In the film *Doctor Zivago* the use is spectacular; but other movies repeat a simple tune over and over so that it is impressed in the public's memory to the extent that people will forever associate the tune with the image and think that that and only that is what worked. In this way, the long sought after connection between sound and image is reached through occult persuasion in a very simplistic way.

Speaking of 'this is what worked' it's always a question of subjectivity. Even the most common music maintains a fundamentally abstract character. For example, let's associate an image of skyscrapers to fast gliding sounds. Someone will say the image is dazzling; the sounds are just what we were looking for. But if the same music were used for some skiers racing down a mountain, would it still be dazzling? Or would it not work well just the same suggesting the skiers' thrill? Let's return to Hanslick in his *Il bello musicale* of the last century. The same music was used for Orpheus' lines: *J'ai perdu mon Eurydice – Rien n'égale mon malheur*. The melody moved to tears millions of people. So the lines were changed in: *J'ai trouvé mon Eurydice – Rien n'égale mon bonheur*[2]. The sounds remain unaltered in their essentially musical meaning.

There have been other cases of reversed symbiotic relations. Expressionist films accompanied by twelve-tone music, or something similar: it was extremely dissonant for ears used to the tonal system. The public agreed that 'it worked!'. But when they listened to the music without the images the spectators were confused or rejected it out of hand. So, both video and sound can be powerful and effective means of arriving at new dimensions of perception.

Anachronistic situation

All types of historical analysis are little help in solving today's problems. What was acceptable ten years ago, or even last year, isn't any good today. Visual art has influenced cinema, TV, and even fashion in that it has been vulgarised and commercialised. So what happened to music or rather to soundtrack? Before becoming known

[2] «All'epoca in cui l'aria di Orfeo: / J'ai perdu mon Eurydice, / Rien n'égale mon malheur / commoveva fino alle alle lacrime migliaia di persone (e fra queste uomini come J. J. Rousseau), un contemporaneo di Gluck, Boyé, notò che a quest'aria potevano convenire ugualmente, anzi meglio, le parole di senso opposto: / J'ai trouvé mon Eurydice, / Rien n'égale mon bonheur». Eduard Hanslick, *Il bello musicale*, edited by Luigi Rognoni, Minuziano, Milan 1945, p. 61.

to mass audiences, electronic music is entering by the service entrance and timidly insinuating itself in soundtracks, perhaps even in the wrong moment. Young peoples' ears are rightfully the most sensitive, open and least jaded. But the tight circles of contemporary music festivals certainly haven't helped them. The more refined musical groups, starting from the Beatles to Jimmy Hendrix and including the latest Rhythm and Blues quickly adopt electronic elements, but this doesn't mean they always play electronic music; they probably play it occasionally. That is, they don't use electronic equipment first hand [but they have access to professional][3], electronic equipment that are the envy of a poor phonology research studio…

We need to ask ourselves why those same young people with such critical ears swallow everything when they go to the cinema. They would cry foul if a 'modern' film didn't have girls with mini skirts or boys with a lot of hair; but at the same time, while young people protest in the streets, the polite music of an 18th century string orchestra plays in the background. Obviously, in some cases there's logic to these juxtapositions (that aren't even collages), but more often they seem like completely gratuitous historical confusion. It's like seeing someone dash off in an airplane one moment and in the next climb into a wheel chair. Who knows why! Maybe the director just loves that Beethoven quartet?

Now we don't want to say that electronic music is the answer to everything. In fact this kind of problem will come up again and people will have to find a new solution. The audio will have to correspond precisely to the visual. This correspondence has been achieved in only a few short subjects, documentaries or animated films, but it isn't common knowledge. The mutual cultural lacunae in directors and composers will have to be filled. In fact, those who call themselves directors and composers will need to at least get together to develop programmes for computers, the indispensable protagonists of our time. And they will in time be able to manipulate the terminals with ease. Even if man will always have the final choice (let's maintain this final illusion), we will eventually dominate the sphere of emotional subjectivity that still eludes us.

[3] We find the text between brackets in the typewritten quoted in the first note, making clear the sense of the phrase.

[3] *Time and rhythm**

When someone goes to music school and learns that the longest quantity of sound is a semibreve (naturally this news is passed on as if it were written in stone), s/he is puzzled. How is this possible? We're talking about halves and shorts and it's taken for granted that this is the longest point of reference in time or rather in the division of time. However, then we learn that there was something longer that was still called *brevis*. Finally we get to the *longa* and all at once we think that our medieval musicians couldn't have gone any further unless they dealt with their undoubtedly remarkable breath control. Yet there's something more: the *duplex longa* or the *maxima*. Since we, chronometer in hand, are used to counting seconds, tenths of a second, and hundreds of a second according to the length of electronic sounds, we're now wondering how our perception of time has changed. Listen to an organum by Leonino. Beneath the higher voice's *duplum* that moves with shorter values**,** the *tenor* really seems to be an almost immoveable support. The changes are very slow but deep, turned in on themselves, toward a sound/time interaction whose masterful meaning we are rediscovering. Some years ago during a production of the Living Theatre, when a group of actors formed a circle and out of the darkest silence began to propel the sound of their voices almost as if they were passing their breath from one to the other going beyond limits of sound length for the human voice, it was like a return origins, an overwhelming emotion from the point of view of rhythm if you consider that every rhythmic conventions had disappeared. Do we really know objectively and concretely what was the conventional division of time, i.e. rhythm, used by our relatively ancient ancestral musicians?

Someone said somewhere that the Greeks' perception of rhythm was based on the measure of the human step; but we know how fast the Greeks thought. Pythagoras did difficult and quick calculations without the use of calculators. There is an example of primitive music (the *Chatur Lal*[1] in which a kind of voice drumming competing with

* First published in «film special», No. 2 (July-Sept. 1969), p. 65-67; recently re-issued in «Oggetto sonoro», edited by Ennio Chiggio, Mar. 2002, p. 31-32, entitled *Lectures 7. Musica elettronica. Fonologia* and dedicated to the NPS group.

[1] The source of this example is the *Solfège de l'objet sonore* by Pierre Schaeffer and Guy Reibel, first published in 1967 (republished by INA-GRM Paris, 1998). In fact Solfeggio n. 11 is «Chatur-Lal commentant le jeu du tabla».

the tabla drumming reaches an extremely fast rhythm, something like what we can get in electronic studios with the *Tempophon*: any speed without changing the pitch frequency.

Now it's too obvious to say that that time is a human convention. As always Stravinsky's observation is very interesting: «The shortest piece of electronic music seems endless; we don't sense time's control»[2]. Exactly. We have destroyed a rhythmic convention; we have been transported by an endless flow of sound; we have lost our points of reference. And we are looking for others with the aid of psychoacoustics; otherwise this evolution will lead us to recognise that an objective point of reference doesn't exist. We'll always be reinventing the world and reinventing time.

After the human step came the horse step (it seems that dactylic metre corresponds to that of a horse galloping), then came the faster rhythms of cars, missiles, and spaceships. It was a headlong rush. Electronic musicians' sense of time is probably the same as astronauts'. They move so quickly they stand still… «they roll around gently in space» just as our sounds, freed from the pentagram prison of bars and measures, have found other coordinates, other orbits, other spaces. Freedom that isn't chaos but a new kind of temporal organisation. That's what it was like (in 1200 – not so long ago) when Francone of Colonia began to harness time in *Ars cantus mensurabilis* and established a value for each sound, the *maximae*, the *longae* etc. This was the beginning of a rhythm that gradually became faster and faster through the centuries. The appearance of shorter note values like the quaver seemed revolutionary. And when Monteverdi used the semiquaver quadruplets for dramatic purposes, people thought he was insane. Going this fast was like the first drivers who went at the breakneck speed of 30 kilometres an hour. The instruments played the quadruplets but evidently everyone was still thinking in vocal terms. The Abbot Artusi declared it was scandalous, but we all know speed isn't an abbot's thing. Since then the speed continually increased and each time it was considered revolutionary. Life itself is probably made of revolutions, or rather anything that seems an established system in the short term, is really a process. According to Julian Huxley «while the mean time of biological evolution remains constant, up to now human evolution has generally accelerated»[3]. The advent of the automobile has certainly exerted some pressure in this way. Recently, not only have new generations had to assimilate changes in ten years rather than seventy-five years, but «every individual has to change ideas and attitudes at least once or twice in a lifetime». Consciously participating in this evolution means truly not submitting passively to profound transformations, but instead organising them and making history.

A musical revolution is taking place. Let's take a look at the general outlines from the point of rhythm. In his later pieces for traditional instruments Stockhausen wrote some rhythmical sequences that are so dizzyingly complex that he couldn't come up with an Ars Mensurabilis to capture it in symbols, resorting in the end in desperation to: «as fast as possible!».

As fast as possible for whom? For humans, of course. Ten years have gone by and all this seems almost pathetic. Nowadays computers can turn out Paganini's *Capriccio*

[2] Igor Stravinsky and Robert Craft, *Conversations with Igor Stravinsky*, Faber and Faber, London 1959.

[4] Sir Julian Sorell Huxley (1887-1975). English biologist and administrator; first general director of the UNESCO (1946-1948); son of Thomas and brother of Aldous.

in a few seconds. We can pick up by ear 96 frequencies a second, just as images appear and disappear before our eyes in fractions of a second.

Let's now look at how musicians reacted to the introduction of machines; it's really very funny. The most famous or rather most popular piece was Honegger's *Pacific 231*, a piece simplistically perceived (and for this reason it was popular) as a train sound; but what the author really wanted to do was capture the sensation of the mathematical acceleration of a beat.

This was during the Futurist period, a 'boom' in dynamism that was followed inevitably by the discovery of noise as a musical form. It was explosive. Machines inspired scores of musicians with their sinister or thrilling potential. There followed an avalanche of pieces with incredible titles. *Bus in Burian*, *In the factory in Stringfield*, *On a transatlantic liner in Cella* and, then, *Airplane Sonata*, *The mine*, *Filling Station* etc. It's pointless to continue. The list is available (though incomplete) in *Musica ex machina* by Prieberg[4]. These people were courageous! But you don't make music with titles and, even without these titles, this is the way of showing how musicians reacted to this technical age: an enormous transformation from the point of view of rhythm and timbre, the elimination of the measures (and later the pentagram itself), the use and predominance of percussion instruments, starting from the newest and most exotic to the traditional, like the piano, now used as a percussion instrument.

There are various ways to react; for example, the naïf, simple that mystifies the music mentioned above. This doesn't make history. In the same way those who walk around in the streets or in factories with a microphone recording the noises of the motorised world or of the deafened working-class won't make history… with all due respect for editing, filtering and various distortions. Then there is a more subtle and penetrating way to capture new time dimensions. Stravinsky never imitated machines but when you deal with him, nothing is simple. Varèse wrote *Jonisation* for percussion instruments alone and aroused consternation: «…like a room full of machines… like an air raid»[5]. People who listen to electronic music (if there are any) make the same comments. How can history repeat itself in such a boring way? What should we think then about Anton Webern's music – so fast it seems caught in ecstatic immobility? Not so much because Webern was able to compose«a novel with a sigh» or because the fourth piece of op. 10 lasts 20 seconds; but because already on the threshold of what we'll call revolution in rhythm, with him we've gone beyond any periodic scheme. We've entered a world of 'musical objects' that «roll around gently in space». Time has become space. For sounds as well as images up has become down and vice-versa. Although he hadn't achieved it, Schoenberg had already posited this. Consider that he still hadn't pondered the elegant revolutions of a pencil out on a walk around spaceship cabin.

[4] We can find the list in Prieberg, *Musica ex machina*, p. 56-57.

[5] *Ivi*, p. 63.

[4] *Scraps of information**

Billions of sound waves invade acoustic space. How many radios, record players, tape recorders are on at this moment all over the world? Could we possibly listen to them all at the same time? Today's musicians could be transported by this mad desire. Not so much to listen everything but to express this monstrous variety, the terrible speed at which we are bombarded with fast visual images and sound waves. There really isn't time for contemplation. Who knows if it's that we run after faster and faster images or that the images are made faster and faster to guarantee that we will react. The way our ears react is mysterious and is certainly still evolving. Sounds change, multiply, and superimpose each other before we are aware that we perceive them. And our awareness of change and variety still finds novelty in the things we experience «for the first time».

The musician's restless hand turns the knobs on the instruments. He's looking for something he doesn't want to find. The latest musical trends just point towards this overturning: proof of victorious surrender.

Please change stations as soon as you hear an orchestra, a speech, or a song begin to take form. Run away! Seek out different broadcasts, but don't reach them. Remain in blurred areas; look for dark areas where hissing sounds and mysterious impulses will reveal the virtual presence of a music that doesn't yet exist. Then, little by little, seek out something you used to love, flashing songs from past centuries… Marenzio, or maybe Verdi, or maybe just the beginning of the second measure of that certain quartet. Who can know? Everything is mixed together again, swallowed up, swept into the endless flow of our acoustic space-time.

Musicians sew together scraps of a fabric s/he never wanted, that life offered up from thousands of sources. We listen to the fastest manipulations and we cross the

* This article, along with an «electronic audiogram» by *Masse 2* of the NPS group in Padua, was published in «film special», No. 1 (Jan.-Apr. 1970), p. 43-46. In the copy of the journal Ennio Chiggio kindly gave me, the following subtitle is written in Rampazzi's hand: *o l'informazione programmata (or programmed information)*. The article was recently republished in «Oggetto sonoro», edited by Ennio Chiggio, Mar. 2002. The issue, entitled *Lectures 7. Musica elettronica. Fonologia*, is devoted to the NPS group.

worn-out boundary between art and life. Recording and listening to several different channels at a time isn't comparable to listening to the different voices in an orchestra. Each loudspeaker becomes an orchestra that is independent and interchangeable. Listening becomes a puzzle; the listener is attracted to something, maybe to the opening of one of Brahms' symphonies and it becomes a chaotic chattering with strains of Chopin in the background. At the same time the listener realises that since the beginning the air was filled with subtle electronic frequencies drowned out by a loud chorus, but not so much as to hide raucous laughter and so on.

Events continue without stopping, without apparent meaning, just like life. It seems that the most disparate acoustic and visual images interweave and overlap. They seem to overwhelm us. In this way sounds are recorded and recorded over. And in the same way new and not so new music has come back into play, no longer as a 'comeback', but as live material torn away from museums, taken from a mummified context and thrown back into something that can't and won't be a context any longer, just a flow of multiplying images. Illusion of life, illusion of art.

Or perhaps a refusal to commit ourselves, the choice to take the easy way out, to create the usual good enough for any ear?

Now let's cut out the illusions and clever tricks. Let's go ahead and juxtapose images. Let's go ahead and record over and over again sounds or acoustic objects; but let's do it in a clear and precise way. Let's not give up trying to bring order out of chaos. We need a plan, with or without the computer. Without a doubt the computer will be the last performer but only a 'performer'. It's hard to understand how the author of the computer-movie *Permutations* can get so excited about this new inhuman author, when it was programmed, even if experimentally, by John Whitney himself (prod. IBM).

Furthermore, Whitney talks about 'counterpoint' or mobile graphic phenomena comparable to polyphonic phenomena.

No, the technique of graphic or sound superimposition doesn't have anything to do with counterpoint. Perhaps Mr. Whitney is a bit confused about the meaning of this term in music. Historically, counterpoint died because the different parts that flowed horizontally according to certain rules became frozen vertically and everything changed. Secondly, because different voices flowed one over another, yes, but in reality they didn't overlap each other. Actually they were temporal forms and couldn't be conceived of as objects. They didn't form networks with a *moiré* effect or fabrics of sound masses, whose major or minor density, could be the focus of the composer-listener's interest. In those days only Gesualdo of Venosa dared to do strange things and some voices in his madrigals go off the field. This is what interests us. But Gesualdo was a passionate prince, an expressionist ahead of his time. The discovery of music as sound is rather recent, even if it was really a re-discovery. At any rate, today's technical means allow us to do much more than just counterpoint. I'm not talking about quality. Unlike Gesualdo, Whitney injects no passion in his graphic moving objects. There are ice ages between the faces distorted by emotional upheaval and these shining and unassailable objects. And instead, no, things happen at the same time, social differences are reflected in these profoundly different concepts of the world: different

conditioning, etc. We even wonder if it's right to give man these uncontaminated images, guided by superior rational mathematical logic, and to expect man to be pure. In other words, to be a hero in societies like ours. But we're overstepping. The overwriting technique was used happily from the beginning of what the Americans used to call 'tape music'. Passing from one track to another, from 2 to 4 to 8 tracks was crazy and fun. Of course, very few people had ten or twenty loudspeakers that could arrange all that stuff piled up. Let's be clear, overwriting doesn't make sense without stereo sound. I mean real stereo.

Xenakis says that music is a combinatory art by definition, «a harmonic art»[1]. There are no three-dimensional limits; music is multidimensional. But without the support of mathematical logic, you can't do anything: «…music has to dominate mathematics, and without that it becomes either mathematics or nothing at all!»[2].

The first overwriting was conceived of in a traditional way; the 'composer' and his creative intuition dominated. S/he imitated life or nature (it's still so today); but nothing was organised. Over Venice's babbling waters maybe someone slapped a revolutionary text. By what logic? Or songs from all over the world were drowned in an electronic ocean on the pretext of embracing the universe. Of course, let's all love each other; that's wonderful. But only I can put this to music. *Meine Musik uber alles!* We are far from any kind of rigour; passion is no longer ruled by logic… «harmonic art». I'm only talking about European countries and not overseas, even if the mathematician-architect-musician Xenakis now lives in America where computers are part of everyday life. In Italy, as long as I know only Grossi does serious research on the computer's potential in the musical field. We have to be careful that this doesn't become dogma because all dogmas, like all faiths, are deplorable: «…mathematics are a hypothesis […] it's a matter of entirely human construction. […] Mathematical logic […] is a working tool […]»[3], says Xenakis. Therefore, let's not reflect a non-exist. Let's propose another order, even utopistic. May our purest objects superimpose themselves in infinite but calculable combinations, move most elegantly in space without time in a calculated way, mark out new rhythms and change continuously before our bewildered eyes and ears; 200 frames a second.

[1] *Iannis Xenakis. The man and his music. A conversation with the composer and a description of his works*, Boosey and Hawkes, London 1967, p. 15: «Music is by definition art of montage, a combinatory art, a 'harmonic' art […]».

[2] *Ibidem.*

[3] *Ibidem.*

[5] *Music as utility**

The problem with music nowadays is how to launch it on the market. This may sound like a provocative statement but is it legitimate to ask «what music?». Obviously there are many different kinds of music. To simplify I'd make a profound distinction between music with words and music without words. This is very important.

For the most general expectations of people who listen to music with words, music without words is meaningless. We can't accuse these people right away of not knowing what to do with music. On the contrary, these pseudo-listeners want music. Maybe they listen to the words more than to the sounds. The words are meaningless, but if accompanied by music they seem less so.

When we present sounds alone to this childish point of view, these ill-equipped listeners feel lost. Some organ within them that wasn't working before has to get to work and try to make some sense of the sounds alone. That's a big jump.

Obviously there's a whole series of stages. Having never really trained their ears, these listeners try getting their eyes to help through images. Everyone's happy if there are at least titles. They happily sail Debussy's *Sea* where things are perfectly clear; he is describing the sea! Beethoven's 'Pastorale' also has its merits; there's the story of the thunderstorm, the image of the stream, the birds, etc. It's much the same for a lot of music consumed in such a pitiful way. In Italy today music is taught (so to speak) in the middle schools and the confusion starts right away when children are asked what they 'see' when they 'listen'. They're even told to paint it!

We have never before been bombarded by as many acoustic sounds as we are today. It's so obvious I'm not going to talk about it. It is a universal scourge. The ancients would say the gods are angry; we suffer all this like catastrophes of Fate. People say that radio sellers might go bankrupt because everybody has a radio already, one or two big radios at home, one in their pocket, and another one that takes the place of a tie or a watch. We should invent some like contact lenses that can be applied directly to

* Published with an illustration by Meggendorfer, wich appeared in «Fliegende Blätter» in 1889, in «film special», No. 2 (May-September 1970), p. 46-48.

ear canals. Then everybody is bringing random sound to the city and country without any plan. On a physiological level these strolling listeners are really potentially pure listeners. In fact, they are not asking themselves what music means like some rash scholars of aesthetics do. Let's say they're free listeners who don't have any problems. We're thinking about this kind of person when we imagine a total acoustic-visual environment. «In our era art is no longer the privilege of a few, but a natural activity of all human beings; that is, a genuine culture depends less on those rare geniuses than on the creative life of the average citizen» (Arnheim).

The future architects and city planners will have to deal with mass acoustic demands. I don't want to give this term a negative meaning. It isn't a given that the acoustic messages that institutions of power – radio, television, etc. – now emit will necessarily always remain so passively tied to the low cultural level of the masses which, by the way, they contribute so much to create. Whether we like it or not, even if those who listen to pop music, the uncultured innocents or those with inferiority complexes – I don't get it anyway – purposely avoid the third radio channel, sometimes they tune in accidentally. As I was saying, fortunately we can't divide human ears into fixed categories (construction workers, weavers, metalworkers), All these people are potentially good listeners. Too bad the programming on the third channel contributes to the already huge confusion by creating these mixed salads of pieces that probably belong to the traditional concert programmes: Sibelius and Bach, Rachmaninov and Stravinsky. These would presume that listeners able to distinguish between a variety of styles. Or 'Great Performers', and they also play anything. Here the most important thing is the interpretation, not the music. I have to make an exception for the Easter week programming. Suddenly the listener of cute, little songs is buried under a mountain of pure, impervious music: a ton of Bach, Pachelbel or Schütz (who knows them?); and Mozart with his *Requiem*, Chopin and his 'Marcia funebre', Beethoven with his 'Patetica'. Just so people will understand that beautiful music can only go together with sad moments!

As you can see, up to this point music offers many choices, and rather than being at the service of the masses, it's more at the service of record producers. When we use the word *utility,* we usually mean something like electricity, gas, garbage collection, etc. Let's not confuse *utility* with the silly songs dished up by supermarkets – another trick used by clever marketing types… The in-house cable radio is the beginning of a service; but it's not very widespread because few can afford it. Nowadays architects are already designing high fidelity systems not only for living rooms but also for bedrooms, even if they're not yet taking into consideration the acoustic environment. Sometimes we should think about the ancient gothic cathedrals, where songs were sung for the masses and with the masses just as in spectacular acoustic environments. Vocal music, the choral masses, had to adapt to those environments just as the *Poéme Electronique* adapted to the Philips pavilion organized by Le Corbusier for the Brusselles Expo in 1958. 400 loud speakers were carefully placed along the hyperbolic and parabolic curves; music played for six months! We can also listen to the *Poéme Electronique* on record (rarely in concert), but its natural setting was that pavilion. It's worth noting that another mathematician-architect-musician, Xenakis, made the calculations.

I think this is one of the first examples of a music-listening occasion that escaped the traditional channels. Another example is the Michelangelo Exhibition in Rome where Vittorio Gelmetti created the music environment.

Now there's the Osaka Expo. It's an aluminium nylon hemisphere with a mirror cupola at 210° (we're talking about the Pepsi-Cola pavilion built in California), The optical changes are incredible and likewise sounds play with perceptions. Sound distortions cancel out distances and space relations. Too complex sound figures disappear, while simple sounds (especially at high frequencies) may transform the cupola into a whispering tunnel. Calculation of the points of reverberation was done on the computer[1]. These are spectacular public or, better, advertising displays. But there are more recent, home-grown examples. In Milan Gae Aulenti designed a home as a collection space. «Devices for providing lighting and sound throughout the residence are hung on the gallery walls. These devices are made up of a sphere containing a speaker, both are adjustable for light and sound»[2].

I don't know what kind of sounds will come out of these speakers (probably contemporary music since it's a contemporary art collection: Noland, Bacon, Nolde, etc), But the important thing is that the sounds can be oriented like the lights, that someone has understood that sound is an event that travels, bounces, circulates around us and we can immerse ourselves in it. Naturally, the ideal would be for each speaker to play different music, different music arranged to be combined and interchanged. We're still within the limits of privilege here. To the degree that we are able to eliminate privilege, all houses and even all cities will have 'sound services' like hot water, electricity, gas, etc. This is what Pietro Grossi, director of the Phonology Studio in Florence, imagines. It's not such music-fiction as it might seem. We'll be able to create multiple sound systems with computers. Everyone will be able to choose light, shadow, and darkness by pushing a button, i.e. sounds, whispers, or silence. We'll soon dismantle traditional concepts of 'broadcasting' music and reach a total functional, fantastical use of music.

[1] «Architectural Design», February 1970 [N.d.A.]

[2] «Domus», January 1970. [N.d.A.]. Gae Aulenti, *Il luogo di una collezione*, «Domus», n. 482 (January 1970), p. 38.

[6] *Is it so difficult to understand?**

Usually this is the question about electronic music. They ask you in a low voice like you'd ask astronauts what they see up there – few have seen it, few have heard it. Once I responded nonchalantly, there's nothing to understand. It's made for ears, just listen. Perfectly edible. Actually no. At the first bite, many, too many palates reject it. Now I've gotten more cautious and careful. If I play them a nice group of well-calculated frequencies that for me are wonderful just as they are, they tell me, what horrible noise! (their ears are saturated with too many signals all piled up). If I play them one frequency, a completely pure sinusoid**,** oscillograph in hand, they say: but that's a whistle! In fact, it isn't modulated and the ear requires an immediate variation, a vital necessity, unless you're a dedicated Zen master or some sort of mystic perched on a ledge. Over time I've come to understand that, in most cases, listening to electronic music is like inviting friends to lie on a bed of nails. You lose friendships.

Things haven't gotten any better with time, although it can happen that, all of a sudden, you meet a guy who tells you how he spends his evenings. He spends them recording grasshoppers and ants, then he plays with the speed, fools around with it for a bit, and discovers that a grasshopper's chirp is made up of 4 impulses every X number of seconds. (The experiment with the ants is still going on). In life, he does something completely different; but I'd say that this is already an acceptable way to listen to what we'd call… Nature's voices. Tomorrow he'll add the creaking of the door or the usual drop falling into the bucket; he'll mix up the signals something completely different from Chopin's 'Drop' or Rimsky-Korsakov's *Flight of the Bumble Bee* with come out. He'll do things that others have already done much better, but without knowing it.

These things are in the air and they're spreading. A tape recorder really should be used like a film camera. But, for many people, it's like a radio, something to listen to in the stupidest kind of inertia. I used to think: we should train the ear. Illusion. It's true that we can't train the ear by giving it eyedroppers full of electronic sounds or noises

* Published, with a 1888 illustration entitled *Summer Symphony* by Beibatein, in «film special», No. 3 (October-December 1970), p. 37-39.

like a dangerous medicine. The patient thinks that once the illness is cured, you can stop the drops, too. And, in fact, he refuses to swallow such unpleasant stuff, when he can find on the market oceans of incredibly pleasant, not at all piercing music to immerse himself in without any difficulty. Let's analyse the situation again. Let's try to understand the opposition, not to sweeten the pill (unfortunately this has been done, nothing more false and worth condemnation than empty praise of electronic music), but to reply centuries later to what Vincenzo Galilei, himself rather perplexed, asked in 1581, «No matter how great the excellence of modern music might be, nowadays we don't hear or see the slightest sign the it could reach the level of ancient music. Therefore, neither its novelty nor its excellence have ever had the power to produce with our modern musicians those beneficial and infinitely comforting effects that ancient music was able to produce. From this we must necessarily deduce that either music or human nature have changed from their original state»[1]. (I don't have the original text at hand and, I hate to say, I'm translating from an English translation!). Why in the world was poor Vincenzo so despairing and where did he put the Monteverdis and the Gabrielis and friends who produce such beneficial effects in us? Let's just hope he didn't yet know what his terrible little boy was preparing for him.

That's right. Let's admit something has changed. But, in general, people still communicate in sentences. They put them together and make discourse or they take them apart, and then we understand that they're doing it on purpose because they've gotten tired of the old way, but they still use sentences.

In music, even the most modern and popular (and we all know what that is), there's a point that we understand to be the beginning, then they say a lot of other things, let's say, perhaps overstating the case, but always arriving at some sort of a conclusion, and we understand that the desire is to come to a conclusion. In electronic music, what I intend by that, there's no trace of a sentence, nor do we understand that anything has begun, if it's about to end, where it wants to go; none of this. At this point, it's the concept of form that has to be erased from people's heads, including Vincenzo Galilei's.

For many it's a form that still starts from the fact that first there's a column and on it rests a beam. At least once upon a time there were no doubts about vertical and horizontal dimensions. Then we discovered that form was something more and different from the sum of the parts that made up the whole. Form is this whole. But now there aren't even elements to add up? Everything is context now. Or better, it's no longer relevant to speak of context.

In electronic music the connexions aren't visible, not because they're hidden, but because they really aren't there, like those plastic materials that can take on any shape. Therefore, training the ear isn't enough. It's too simplistic and crude a solution. As usual, we have to get deeper into the socio-cultural and politico-economic 'surrounding'.

Every year since 1968, I think, John H. Appleton, an amusing guy who directs one of the largest electronic studios in the US, advertises a competition (when will we stop

[1] Vincenzo Galilei, *Dialogo della musica antica e della moderna*, Minuziano, Milan 1947, p. 93.

it with these competitions…) for the best, most recent electronic composition. He says that the judges (horrible term), all experienced electronic composers, are in real difficulty when they have to judge. I don't doubt it.

Instead he says that if they were dealing with the newest composition for orchestra, those same judges wouldn't have any doubts. Here I'd really have to remind him of *In Praise of Doubt* by the elderly Brecht. Fortunately, these judges at least have a few doubts about the criteria to use to understand, first of all, the criteria used by the composer and then to decide if this unfortunate person (I really have to say) «has used the best of his abilities in the manipulation of his material». As you can see, the thing isn't very clear. To clarify it all a bit more for myself, I ordered a record of the winning compositions. Incredible! The composition worthy of the prize according to the judges seemed to me to be an ugly mess completely steeped in twelve-tone instrumental culture. Extremely high technical quality. But is this the only criterion? Besides electronic music nowadays is often reduced to 'electronic effects'. And these are the effects that are given to people by the eyedropper every once in a while. What are they anyway, cutesy little effects. Like things made to order for little children: newborn listeners of electronic sounds. To return to the American, it seems to me that already the starting point is wrong. Once upon a time, patrons commissioned paintings, compositions. And they still do. But this doesn't make sense for electronic music. It's not something to hang in a frame on the wall. Music, too, like everything else, has gone outside the frame. Moreover, if these judges on the jury in Massachusetts say that they have no doubts about how to evaluate new orchestral music because they know its parameters, while they don't know the parameters of electronic music, we'd better be careful because they could be in for some nasty surprises. Some who are familiar with electronic sounds still get confused. For example, listen to the beginning of Ligeti's *Volumina*[2] (easy because it's in the 'Musica Moderna' recordings issued by Fratelli Fabbri). The music is for the organ, but the beginning (of course you can tell it's the beginning) could be, and is, a large bundle of frequencies and coloured noises, a kind of sound explosion, a sudden Niagara Falls that very subtly and skilfully gets gradually more rarefied until it becomes a barely perceptible rivulet in the distance. As you can see, I'm mixing acoustic and visual terminology because references to images are easier and derive from a more widespread culture.

So, in the beginning, nine out of ten people ask if this is electronic music. After, there are very interesting articulations, full of imaginative use of material, but the formal concept seems decidedly instrumental. And so the most alert catch on. After all, this isn't the only piece by Ligeti that tricks us in this way. The last part of the concert for strings[3] or, better still, the piece called *Lontano*[4] does the same thing.

Here there's a quivering of sounds that come into being and die even before becoming well defined, an intense and delicate palpitation. I've seen something similar

[2] György Ligeti, *Volumina* (1961-62) for organ.

[3] Probably *Ramifications* (1968-69) for 12 strings.

[4] György Ligeti, *Lontano* (1967) for orchestra.

happen with the images in the animated film by the young Spanish director, José Sistiaga. And behind those fleeting images, think of it, you couldn't hear any sound!

Therefore, let's conclude that this new concept of form as a global entity that can't be broken up into distinct elements is a particular characteristic of electronic music? The answer is complicated. Concrete music had already pretty much distanced itself from articulated discourses, from the concept 'composition'. With electronic music the material itself keeps you from doing this or should keep you from returning to this concept. (Of course, there could be musicians who use electronic sounds for no particular reason).

So, why do Ligeti, Xenakis and several other excellent musicians treat instrumental music with the same formal concepts that already belong to electronic material? Evidently they are working in the opposite direction. They're using material they know better and, until they go beyond its limits, we should applaud them. But, electronic sounds will necessarily go ahead and they're already much 'farther away'. For example, we can inflate them and make them as large as a house or shrink them to a little ball and put them in our pocket; in short, play with time and space.

A new and different concept of form is no small thing. It implies a different concept of the world, a different way of living, a different society. Nowadays it's not enough to write the non-book, to paint the non-picture. On the contrary, enough of this because it just means believing that it's still possible. Let's not lose hope like Vincenzo Galilei. Perhaps books will disappear; there'll be another way to learn. The new world is already here, the new music, too. What's really missing seems to be a new society. Or maybe that also exists, at least at the proposal level.

We'll listen to these proposals; we'll listen to the music that works for them without worrying about the problem of before or after.

[7] *From Research to Music**

The main points:

1. I'm not *I*, I'm *we* – speech on the group in history, in conception, in utopia.
2. We consider only the sources of sound (every acoustical signal) synthesized by the present-day technological, most advanced means – even the *human voice* – *synthesized* to the instrumental concrete mean.
3. The possibility of technical reproduction of the artist's works has changed the significance of the concept: Art.
4. By new means, new *form*, new *pattern* conception – (Build houses with bricks or with *poliester* (*plastic* stuff) – everything changed.
5. Music as utility.
6. Our research in the field of sound (not music) beginning from *zero*. Acoustical art – as optical art – method of work.
7. Electronic music *is not* an enlarged experience in the field of sound. The shift between *traditional instruments* (and oscillators source) is radical. Electronic sources are the only nowadays sources – (not as Berio, Stockhausen and many others are saying).
8. Finally, this is not the right way to listen to electronic music. Other places, other ways to listen must be found.

The Catholic University of America – From Research to Music

I have to consider seven points, as the seven sounds of the tonal system, even if perhaps it seems strange for a speech on electronic music.

* Conference helded at the Catholic University of America in Washington, D.C., 22nd November 1970, in [NPS, 1977], p. 84-91.

The first point is that I'm not I, but a group. It is not a joke. Seriously, I do not believe, given the nowadays complexity of an electronic equipment, in the individual work. One man alone is not able to face all the work, but this is not the principal reason. The pincipal reason is this: I think that the solitary man struck by the grace of the creative impulse is too old-fashioned and romantic. Nor do I agree with Mr. Zihovieff who has a computerized electronic studio in London and who says that the future of music is in the hands of technician. I say that the future of music is neither in the hand of technician nor in those of the musician. It is in many hands. Nobody is the *Son of the Gods* who rules the world. In a realistic way the work must be interdisciplined. The staff of the Utrecht studio *consists* of a physicist, an audiologist, a perception researcher, a psychologist and (take notice of this final end) a composer. I'm working in my studio (but to say *my* is not proper) that is to say, in our studio with very few musicians but luckily with many mathematicians, electronic engineer, physicists, computer programmers.

Only after two or three years of training, they usually begin to be able to accomplish some project. Therefore, the music you will hear today is not *mine*, it is a production of the group NPS. I'm wrong to say music. I do not want to anticipate something that we perhaps have not achieved. Every work or method of working (there are many methods more or less fitting to the equipment) is always previously discussed, criticized, approved or not approved by everyone. Every component of the group has to help each other during the work in the field he can master better than the other. If we decide to apply the computer programming, everybody has to learn the language required. No one is teacher; no one is pupil; at least in the hierarchical meaning it still has in many schools. Even if only one single person does a work, it is always and only the abbrevation NPS that appears.

The private property of a work of music in such condition has no more right to exist or be maintained. The Cathedral of Chartres was a complex work depending on a multiple collaboration. It is by no means a question of modesty. It is a question of accomplishing our little part in a work that goes beyond our personal limits.

To be more or less talented is not so important as it was in the romantic age. It is true that Bach, Mozart, Stravinsky, Varèse were talented individuals, but they were considering themselves only serious, honest organizers in the field of sounds, timbre, rhythm, etc. etc. They did not pretend to create eternal *Kunstwerke*… *les bonnes artisans*!

Second Point

We are considering only the electronic sources of sounds, better to say, acoustical signals. Why? It is now too obvious to describe the limits of the traditional instruments; the instrumental era *has* lived many centuries. It is now finished. Why should it be eternal? Surely, there are still composers who are attempting to get from traditional instruments their most secret last resources; maybe, they achieve something that could be achieved more properly with electronic means. *Some* composer is well intentioned. Some others are simply stubbornly trying to force, to ravish, to treat un-

fairly these marvellous perfect instruments of our past. In this case, I say that I prefer Corelli's violin to Chopin's piano. Give to each his own instrument. And to my age, the electronic instrument! Nothing is changed! The inertia of the evolution has neither changed, nor stopped the evolution. Something interesting is now happening, a kind of 'feedback', of *interchanging* experiences. The discovery of the continuous spectrum of the sound phenomenon has influenced the conception of musical forms. Some composers are using traditional instruments with a new electronic conception; others are using electronic sounds without necessity, becouse their conception of the form is traditional. To mention some names, I'm thinking of Ligeti or Xenakis who are in the first stage, or to Stockhausen and Luigi Nono staying in the latter one. We can say now that the first traditional age of the electronic music is already finished. What we wanted at the beginning was to overcome drastically the dualism mentioned above, to start it anew from Zero, to find something else, to breedge the gap. If Varèse whom I consider one of the most advanced composers of our age, said in 1936 that he wanted to have the right to make the music with any sound he wished to have, if he had already discovered that to the three musical dimensions a fourth or more, were available, as the sound projection in space, or the density of many layers of frequencies, we have the right now to go ahead, we want the right to build the form of the sound, to alter the very wave as it comes to life. There are already machines tat reach this goal. Certainly you know that in the scientific research it is impossibile to explore without transforming. Before reaching the music we had to explore, analyze, separate. The music of the past was a complex indivisible organism. But we can now only stammer: «We want to produce other flowers without killing the plant. It does not matter if at first it seems to some people more like a cactus than a rose»[1] (Varèse).

Third Point

The possibility of technical reproduction of the works of art has changed the meaning of the concept: Art.

In ancient times, art and religion were one. Art was a ritual happening that should be kept apart, far from the profanation of the *daylight*. In the darkness of the shrine and only for a few elected (privileged people) art was accomplished. The more distant from the *uncultured* masses, the more magic and mysterious was the meaning of art.

Now, the possibility of technically reproducing it, has *desecrated* whad was and still is a ritual to which only a few (relatively) can be admitted. All these concerts, all these performances still are keeping this magical atmosphere. And it is not rarely the case that an audience does not care to listen tu music, but only to the skilfulness

[1] Schwartz and Childs (eds.), *Contemporary Composers on Contemporary Music*, cit., p. 201: «No matter how original, how different a composer may seem, he has only grafted a little bit of himself on the old plant. But this he should be allowed to do without being accused of wanting to kill the plant. He only wants to produce a new flower. It does not matter if at first it seems to some people more like a cactus than a rose».

of the performer and the performer is usually convinced that Beethoven or Bach, etc. wrote the music only to give them an occasion for an exhibition. This is a great *distortion*, the tape machine has freed us from the magical 'aura' from the sometimes dangerous necessity of the performer. We can no more remain passive, contemplative listeners, deep in our personal dreams. The mystical distance has disappeared, the tape is very near. We can *stop* and analyze; nothing is even so mysterious. The listener has to become more active, more *conscious*, no longer overwhelmed by emotion. And, first of all, the works of art are at the disposal of everybody.

Fourth Point: Music as utility

It is true that we are at present bombed by acoustical *signals* of every kind. People walk around with radios in their pockets, radios at every corner. The town has become a resounding enviroment without any planning. But be careful – this ambulant audience at this level of acoustical stimulation is actually the purest potential listener – these people, in fact, do not ask the meaning of music as do some incautious scholars of aesthetics. They are, so to speak, a free audience without problems.

«In our times art is no longer a privilege of the few, but a natural activity of any human being – that is to say, a true culture depends less on the rare geniuses than on the creative life of the average citizen» (Arnheim). Something like that was said by your great Dawey. I think now that the city planners of the future will have to deal with the mass acoustical need. How do you think of music as utility? Utility such as electricity, gas, etc. are not to be confused with the music supplied by the supermarkets, which is a sales trick. This is a big problem. Lot people enjoy good music just as he enjoys good architecture, if there is any.

Fifth Point

I said: our research in the field of sound was beginning from zero. I say sound, not music. As the electronic microscope enables the physicist to distinguish the molecular particles of matter, in the same way electronic means enables us to explore and then to central the particle of the sound, his wave form. Before *making* music we had to study the physical, acoustical and psychological affects of this medium, the mathematical laws underlying by every sound precess. «The same impulse that moves the composer also moves the scientific researcher to scientific discovery». I wish to remind to you that Michelangelo before sculpturing studied anatomy, not to mention Leonardo da Vinci, who was charged with infamy for dissecting corpses before he painting them. Nobody doubts that they were artists. Luckily, we may dissect the vibrations in the air – a matter may be less disgusting! In Italy there are many important «Gruppi» of visual researchers. One of these lives in Padua with the abbreviation Gruppo N. That is to say: means nobody. Another Gruppo calls himself ZERO. Our gruppo was less pessimist. We spoke of sound but avoided, of course, speaking of music.

As we are very near to the visual *researcher*, we prefer to speak of acoustical art – as one speaks of visual art instead of pictures. Some of the visual objects of Padova's group are in the Museum of Modern Art in New York! I say it to explain that the analytical method of work of the Gruppo NPS had forerunners.

Sixth Point

Electronic music is not and will not be an *enlarged* experience in the field of sound. There will be always two main points of view: Everything is changing, nothing is changing. The eternal Parmenide and Eraclito, the two faces of the same problem. But in this eternal flowing some passages have to be clear: the one from monophonic to polyphonic music, from vocal to instrumental music, from instrumental to electronic, etc. etc. I do not agree with Luciano Berio, the Italian composer who is teaching in your country. He says: «I do not believe electronic music to be ready for an autonomous life. A kind of fusion has occurred, a giving and receiving; in fact, an enlarged way *of perception*, of 'doing music'». This means that Berio likes the *status quo*. A little change, that is right, but not too much. He speaks as if the autonomousness of the electronic music would depend from the electronic means and not from the men willing or not, to use them. And these means are not enlarging the traditional means. They are completely different, different as the macromolecules are different form the microwaves. What is the meaning of mixing them? To loose the past and the future too? Actually, Berio is aware that commercial reasons are mostly concerned in this matter, that the still surviving great orchestras have more an industrial meaning than a musical one.

Seventh Point

This is not the right way to listen to electronic music. Other places, other streets. For instance, as a gothic cathedral was fitting for perfomance of choral music. But by no means, I want to be here as a performer, that is to say, I do not want to play the ancient part of the priest giving to people the word of God. Schoenberg attempted to democratize the tonal system; electronic music is luckily not yet a system. We have no pole star. We are facing the liberation of sound.

Furthermore, electronic music is not a product of culture, but it will produce culture. In this respect the method of listening must be different. Your actual life is involved, not your parent's life. To discover a new conception of the art of the form, this means to discover or change our way of life, our *Weltanschauung*, but not as a matter of culture. I repeat, as a matter of your human behaviour.

I will say a few words before we listen to the sound. But only by listening you will be able to decide whether a little bit of the research has found its way from analysis to synthesis.

[8] *Attentive listening and distracted listening**

We're in the 'artists' changing room. The atmosphere is tense; emotions are running high; something magical is about to happen.

In the distance the audience is whispering; the musicians have already settled down in the orchestra pit of a famous theatre. Then that special sound, perhaps the most beautiful moment in the entire concert. Everyone tunes their instrument or reviews the most difficult parts of the score on his own.

Everything is there in those bits that will soon be rigidly structured; everyone will have to pay attention to what the others are doing, like an accountant counting beats. And some musicians will remain still for long periods until they have to throw themselves on their kettledrum or bass at the right moment – not a second before or a second after.

Meanwhile the famous, foreign violinist paces nervously, asks how big the audience is, how an Italian audience behaves, and all along that diabolical passage she's never gotten quite right eats away at her inside. For sure no one out there is good enough to notice, but you never know, so she grabs her violin and tries again… But the first bell, the 'silence on the set; action!' has sounded. You can't go back now; you have to go out on the stage. Good God, what a plunge! Like having a strangely calm sea full of traps at your feet. Meanwhile the conductor whispers with artificial merriment, «Spielen Sie gut!» – Play well indeed! At the moment the important thing is to stay afloat.

None of the famous soloists even think for a moment that the audience is about to listen to, let's say, a Schoenberg concerto, and not those little bitches of passages. Sure she's good; they're all good; this is the least we'd expect. A chair might not be perfect, but at the very least we expect to be able to sit on it.

The concert begins; the lights go down; everything invites us to concentrate on listening, even the ancient rituals that will go on in the deepest crypts, in the temples' inner sanctums, far from the sacrilegious light. Sure this isn't black magic any longer;

* Published, with a 1898 illustration by L. Marold, in «film special», No. 1 (Jan.-Apr. 1971), p. 37-38.

but it's still 'cult-like', with a religious aura. The initiates probably outnumber the ancient ones, but they still belong to a certain caste, let's not say class.

We look on amazed at these anachronistic cultivators of religious listening and it seems to us that they're fighting a losing battle. For the usual inexorable market demands, industry is undercutting their monopoly and spreading abroad what were the secret temple rituals by any and every means.

But, let's get back to the concerts, soloists, unforgettable, unrepeatable interpretations, to those celebrations where, even if everyone pretends to not see it, the high priest, the king with the crown on his head, the ladies-in-waiting, the knights, are all still there… Let's imagine that some cheeky guy comes up to the violinist and asks the sensible question, «My dear lady, why do put yourself through such hell?». You're about to play a concert that's been recorded wonderfully many, many times and, with the equipment on offer these days, it can be heard under much better conditions than what they're offering (these kinds of trials have already been carried out). Sure, your interpretation is yours alone. Why don't you record it ten or twenty times until you're completely satisfied, perfect passages, no butterflies, no interruptions, no coughing or sneezing, etc.? After that we'll put wonderful, super-powerful speakers in the right places where everyone can fit, and post a huge placard with your precious name on it. And then if you really can't live without the ecstatic applause, you can come in your beautiful dress, with your violin in hand, and bow gracefully, lifted from the earth to the incorruptible heavenly sphere of art! You can bet on it. That sweet young girl would certainly refuse. She'd rather experience the sweat, the terror, than renounce that «magical aura». In his time, Pirandello already imagined the drama for theatre actors once they became film actors, «with the live action removed 'hic et nunc', sent into exile»[1].

And especially heard in the most irreverent way (here I'm referring to the musicians.) You can walk around the speakers; they don't get offended. Anyway, we're in the middle of a crowd of distracted ignoramuses, so to speak. The nice, little group of attentive connoisseurs doesn't exist anymore. This is the point. «In the age of mechanical reproduction, the work of art has lost its mythical distance from the consumer; it's changed its rapport with the masses, given that a vast audience can enjoy it simultaneously»[2]. Walter Benjamin said this already in 1936. How many rearguard actions we still have to carry out!

Certain intellectuals like Aldous Huxley[3] complain that the consumption of works of art happens so quickly that it outstrips the 'creator's' ability to produce; and so the level is low. But this is the usual autocratic way of posing the problem.

Of course we can't expect film audiences to look at films the same way they would contemplate, let's say, Fra Angelico's paintings!

[1] Luigi Pirandello quoted in Walter Benjamin, *L'opera d'arte nell'epoca della sua riproducibilità tecnica*, Einaudi, Turin 1966, p. 32; or. ed. *Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit*, Suhrkamp, Frankfurt am Main 1955.

[2] The phrase quoted by Rampazzi is a synthesis of various places of the work of Benjamin cited *supra*.

[3] Benjamin, *L'opera d'arte nell'epoca della sua riproducibilità tecnica*, cit., pp. 53-54.

Art has had its different functions in every age; but it has always stimulated unconscious needs in the masses. It has been observed that architecture has never been damaged by the fact that it can be enjoyed simultaneously and distractedly by a vast audience. Only now in our age we can say this for music in such a generalised way. Those crowds of devout listeners of Bach's cantatas probably didn't behave any differently in their Gothic churches than our film audiences… In this way, let's contrast concentration with distraction, transport with indignation. At first glance it could seem that the masses behave in a reprehensible way before a work of art. But let's not get too scandalised. We know for sure that children are aware of a lot of things. (A middle school class was asked, «Who is Beethoven?» and all of the children broke out into a chorus of the Fifth Symphony). Here's another example of careless listening: the t.v. news broadcasts shocking images of the earthquake in Tuscania (the one from a few months ago) along with, by chance or by design, a sweet, little ditty immediately perceived by some viewer as «What a nice little tune!».

Understand that I'm not saying works of art have to be so immersed in life as to be confused with it (life is already so complex that there's not reason to add more confusion.)

Simply, 'no' to the sacred meaning of works of art, or better to how they are consumed, which doesn't mean 'yes' to their market value.

[9] *Musical fashions and avant-gardes**

We're talking about athletic types. With the difference that real live runners always have a finish line to reach, while these musical marathoners never have a well-defined finish line. If they think they've reached it and stop, it's all over. They shrink up right away and disappear in a flash. So, they're condemned to run forever. I don't know how they can do it these days with the fast advances in computers. If we could give them some friendly advice, we shouldn't tell them to stop. We should tell them not to run. I have no idea what things were like once upon a time, or what criteria were used to define avant-gardes. But since up until Beethoven music «was always only contemporary», as I've already noted, we can imagine that avant-gardes weren't recognised or that everything was an avant-garde. For example, I don't think that in 1320 when Filippo da Vitry wrote his treatise entitled *Ars Nova*, he considered himself part of an avant-garde, as we understand that term today. His originality consisted in introducing many 'imperfections' into Medieval perfection, in introducing *binary* rhythms greatly offending the holy *Trinity*. In reality, he had only sanctioned what certain anonymous rouges had already been practicing, as shown by the *Roman de Fauvel*, the first collection of ancient or 'very new' compositions of a satirical and politically involved nature that has come down to us! Since then and ever since the «Arte Nuova» has been always found on every street corner. Here I should make a confession: for example, a little group starts and devotes itself to the study of electronic music and hands down the judgement «let's start over!» and names itself "Nuove Proposte Sonore" (new proposals in sound). The term proposal is timidly discrete, but 'new' is decidedly presumptuous. The group refused to call itself avant-garde right away, making excuses, saying that it was just beginning to talk, that it was still looking for the right words, and who knows when it would arrive at making sentences. While avant-gardes, like runners, are absolutely sure of making the most beautiful and novel declarations. At any rate, it's clear that that adjective is dangers and can easily have a boomerang effect.

There is a certain kind of musical avant-garde that sees itself in the concept: avant-garde = private property! The jump is a bit risky, that's for sure. We should return to the connexions. Either we admit that music (and art in general) is a whole that evolves

* Published, with a 1896 illustration by E. Sclittgin, in «film special», No. 1 (1971), p. 36-37.

in time, that each composer thinks of his/her historical period as something to which individual modifications can be made, or the composer gets up and says: «Stop everyone! I found it. No one's said it before. This stuff is mine!» In my opinion, the first category includes those who are generous and strong; the second those who are 'stingy' and weak. This isn't a moralistic judgment. We can see the consequences of these two positions on the evolution of musical language, even if it's easy to say right away that the second position won't have any consequence. Let's take two names from the distant and not so distant past: Bach and Stravinsky. At the time, their running companions eliminated themselves on their own. Now we vaguely remember their names or they've disappeared entirely. On the other hand, the present ones have well known names and called themselves avant-garde. And there are many of these. They change fast precisely because they die out before their descendents can bury them. So they have to be replaced quickly. How could we live without avant-gardes? These young people who bring in a breath of fresh air everyday! The old folks, on the other hand… That old dotard Bach always stubbornly insisting on his massive contrapuntal structures, seemingly unaware of the Enlightenment, and the fact that his sons, especially Phillip Emanuel, openly called him 'old fogey', like we'd say 'matusa' or 'passe pas l'hiver'. The real pioneers, the musical avant-garde (there really was one) was Bach's sons who wrote sonatas for that wonderful new machine, the 'fortepiano', and put into practice the homophonous style, the graceful rococo that the old gentleman certainly considered frivolous. Meanwhile, however, the old gentleman has survived intact more than two hundred winters. There are also curious examples in history of avant-gardes that weren't aware of being avant-gardes. I'm thinking of the great Gesualdo, «prince and murderer». He insisted on writing polyphonic madrigals when the Florentine Camerata had already discovered that it was absolutely lovely to write for a single voice because that's what the Greeks did. Gesualdo didn't care about the Greeks when he began strange experiments with unrelated harmonic blocks and so skipping over the Florentine Camerata, too. A real man of the future. Now let's take the case of a living composer of the generation after Stravinsky. (It's too easy to talk just about past composers). Let's talk about Bruno Maderna. He's always seemed indifferent to sudden discoveries and maybe never asked himself if he was a member of an avant-garde or not. He's always been interested in *all* kinds of music. Maderna was certainly one of the first to compose electronic music, but since what he has had to say has always been the most important things for him, the means by which he said it could vary. They just had to be appropriate to that one essential aim: to compose music. A comparison between his *Serenata* for traditional instruments and his Serenata for electronic equipment is illuminating. The accusation that his has been and still is a lyrical artist and, therefore, politically unengaged is truly strange. The one who said we can't sing in difficult times ends up singing, too. By this I mean creating art specifically in order to be effective. In his concert for flute and magnetic tape, just as in *Hyperion*, the last word seems to rest with the traditional instruments, not so much as traditional instruments, but as an affirmation of the values human beings can't live without, as the refusal of humans who do not want to be captured by technology, but use it to affirm themselves yet again as human beings. I have to confess that I, too, used to take him for a nostalgic conservative, when in fact we're talking about commitment if we're all in agreement that music should be judged by ears rather than by ideologies.

If we listen now to Bruno Maderna's recent *Quadrivium*, we realise that he has always worked at deepening a central idea, like all true creators (let's stop feeling embarrassed by this term). Even if his language is incredibly updated, he never seems to be touched by the fashions, tricks, sleights-of-hand of the avant-garde types. He's never needed to destroy in order «to start over again from the beginning». He's just proceeded and is proceeding along a bit of path, and we'll know only much later if his path is the main path. In fact, there are precious (not affected) things in his music that will become richer in the future like all authentic things. But we can't wait any longer to say without a shadow of a doubt that Stravinsky opened a main path in the history of music. In addition, he is one of those who belong to the category of the strong and generous, of those who aren't afraid to lose themselves by reaching down into the roots of the past and who manage to embrace such a wide breadth of history that past, present, and future combine in one single personality, and this personality is so rich that he can afford to appear completely impersonal. Stravinsky's provocative and reactionary comments are well known. I think he used them like tests. And waited to see who'd fall for them. In fact, there were two ways to not take him seriously: to simply say «but he's got to be kidding» and go on thinking «he's pretending to not want to be revolutionary, but watch out because he really is» or to say «I even warned you he's a raging conservative and now he says it himself notwithstanding all those scandalous hosannas to Gounod and Chajkovsky». Truly one of the most stupefying examples of an avant-garde that refuses to be called one precisely because it is one! In the few years since his death, Stravinsky, who had said, «I was made a revolutionary despite myself», «Je serai bien embarrassé de vous citer dans l'histoire de l'art un seul fait qui puisse etre qualifié de révolutionnaire. Qui dit révolution dit chaos provisoire. L'art est le contraire du chaos…»[1] and many other unequivocal declarations, which put him on the side of order, is getting bigger and becoming still more novel. At the age of 89 the venerable old man declared to someone who timidly interviewed him, «you all come to see me out of curiosity like we'd go look at a stone that's still warm long after the sun set». His usual ironic detachment. And now that stone is burning: it's become our collective conscious.

Given that this issue is dedicated to fashions from different points, let's touch on a final and rather singular one. There's a proverb, the origin of which escapes me at the moment, «He who follows fashion, doesn't follow Jesus!». Amazing! How should we interpret this? Certain proverbs shouldn't be taken lightly. So, let's admit that for Jesus we mean God and for God we mean a universal law which, in this case, seems to favour immobility. I admit it's dangerous to overstep like this, but I don't think I'm really overstepping that much if – moving to music – I say that, in fact, the concept of music doesn't change much. The various ways of making music, of giving it form, change.

Therefore, we could conclude that he who follows too closely the changeableness of this 'giving form', risks losing that subtly indefinable concept that has been called «the harmony of the spheres», «the essence of the world that reason cannot comprehend» and so on. In short, Music.

[1] *Poetique musicale* – Stravinsky [N.d.A.].

[10] *New research tools for the truth of the sound world**

Problematic and recovered parameters

First of all let's speak about the synthesizer, which has a quite sonorous name; it seems that it is something important, related to complex, a little bit devilish mechanisms; not at all; now we all call it with its lovely middlename: «our Synti». It is a musical instrument which is becoming exactly what the small upright piano was for the good family girls in the beloved '800… both in its big size and it the small one, both as a scientific tool and as a musical instrument (there are no differences) it remains a not so serious device, but it is built in a very clever way. Of course the small size is the most spread and in some sense the most interesting: let's think about a black briefcase, extremely decorous; it is full of circuits so little that they can substitute all the big devices in the ancient studios, and more. There is a matrix with 16 holes in abscissa and 16 holes in ordinate in which you can plug tiny but robust pin which join together several circuits; the number of combinations is almost endless; it is like playing naval battle but that is more predictable. Here, to plug in a pin can spur a sound storm with great surprise both of the listener and of the player. One time, a musician which loved not so much electronic music, evily said that the whole electronic musician's job consists in inserting things in holes… (let's think that one time there were cables, thousand of cables, behind pins; the poor musician got entangled and in the most desperate cases he was completely prisoner and paralized). Today, as I said, everything is simplified: someone goes around with his satanic briefcase and plunges in whatever place to make electronic music or something similar. One time, at Termini station, a porter unintentionally stroke my briefcase with his hand-car and was shocked by my excessive reaction; he could not know that he might have broken some transistors! But it seems that the synthesizer is very solid unless you hammer it. The upright piano got

* This article, together with two images (*a musical joke* published in «Fliegende Blätter» 1891 and the reproduction of a Russelots system for speech recording taken from *Das Neue Universum* in 1892), was published in «film special», No. 1 (January-April 1973), p. 25-26.

untuned (and then they were so pathetic); this Synti has no problem – it suffers only hot temperatures – do not forget it in your car under the summer sun; it really hurts.

What can be done with thie Synti and where it comes from: first of all it was born in America in its big size, Mr. Moog built it in 1964; recently it has been provided with a memory, so becoming more similar to the computer; it costs of course several millions but its performances are so complex that nobody can manage all af them, maybe only its builder! There is always the difficulty of plugging the pins into the holes: they are many and there are many cables too which, although different in colour, will jail the poor composer-performer with many wrappings. Luckily there is also the Mini Moog in which the connections can be obtained through switches. If traditional instruments and concerts performed with them in front of a precise kind of society corresponded to this one, which we could call middle-class, we could say that the Synthesizers exactly correspond to the neocapitalistic society which starts to welcome electronic music but wants it to be identical (at least for performance) to the old familiar music: so here are the concerts of «live» electronic music. The small Synti are the most suitable for this purpose: they are alive because it is still possible to see the performers-authors working hard to push buttons, to put pins into holes, to turn on and off mysterious lights, and furthermore these synthesizers are provided with common keyboards which can have (or not) different functions from the traditional ones. It is not possible to aks a public, conditioned by history to listen to a sound signal and to see in the same time its source, to concentrate themselves only with ears in an empty place in which the loudspeakers can also be hidden. The proper way to meet this public is still to call him into a concert room, to hear a sort of electronic cultivated and worldy music: he will accept without fear a plenty of imperceptible whispers or loud rumbles and, fearing to appear as a conservative, will swallow up any noise. I do not want to say that in electronic music those signals, that once we called noises, are not important, but that also these can and must be organized in a precise way, which will not be possible in an improvisation. We could avoid the obstacle by programming these little or big monsters, recording on tape and playing the music with common loudspeakers, and at the same time playing the same piece in a live or pretending to swich on and off buttons... there is also upside down honesty. What is sure is that these new instruments have sanctioned a fact which is passing under silence: the loss of that parameter which we call «pitch», that is the notes of traditional music or the frequencies in the early electronic music. We worked always with numbers and with relationships between more or less complex numbers; but in modern synthesizers the frequency-meters do not exist almost anymore; they are obsolete; musicians do not work with single sounds or joining several clear frequencies together, but with sound masses in which zones are pointed out only from a macroscopical side. In place of the classical pitch there is today a new parameter: the mass or density. Already in the last instrumental production clouds of sounds very short and very close to each other can be heard, and the perception of single elements has disappeared: the effect is global and the variations are related to the more or less density. The outcomes from the musical, ideological and scientific side have still to be verified and organized; perspectives are extremely rich. For now synthesizers offer us only a simplification of these possibilities; as I said, at certain levels, it is only a naval battle in which it is difficult to decide if the players win or loose; the only certainty is that the industry of small synthesizers will win for sure.

[11] *Introduction to an electronic music audition**

You can't put a cathedral in a living room or in a concert hall. The dimensions are too different. Forcing this kind of operation brings out contradictions; in the end it makes them explode. It's clear that the destinies of living rooms and concert halls are obviously predictable.

Therefore, a living room needs a living room and a cathedral needs a cathedral. Things have to make sense. Every architecture calls for its own music and every music calls for its own architecture. Of course, there are also urban events; Gabrieli's quadraphonic stereophony and, even older, those of kings, who greeted their noble consorts with sumptuous choruses of 300 silver trumpets arranged at the gates of the city along with others of proportionate number bursting at the entrance to the palace. It was said, «the entire city was transformed into a resonating space».

So look at how miserable we've become and what wretched fare we offer our bourgeois ears. Only the wind in the forests or the wind whirling down alleyways, over oceans or the terrible wind whipped up by riots can give us sound events greater than those of our domestic spaces and that our domestic spaces rightfully reject in horror.

So, no electronic music is tolerable in places where it doesn't belong, apart from the values it does or doesn't promote. All the same I've been asked this and I've accepted, certainly not with any hope of resolving the underlying contradiction I remain convinced of, but in the hope of making it explode. It's clear that whatever I do, there wouldn't be anyway I could hide it. It's obvious in the light of day when things don't fit together.

* Unpublished work, 1973. Along with this piece in the programme, the following was included: «Centro d'arte degli Studenti dell'Università / AMICI DELLA MUSICA – PADOVA / SOCIETÀ DEI CONCERTI 'BARTOLOMEO CRISTOFORI' / Tuesday, February 12 – 8:45 p.m. on the dot / ELECTRONIC MUSIC AUDITION / presented by Teresa Rampazzi / of the NPS group / Sala dei Giganti al Liviano / 586th Concert of the Centro d'Arte». The programme for the evening, held in Padua in 1973: «Luciano Berio, *Mutazioni* / Bruno Maderna, *Serenata III* / Karlheinz Stockhausen, *I Studio* / Enore Zaffiri, *Progetto XI* / NPS, *Filtro I* / Eugenio Rudnik, *Dixi* // Luis de Pablo, *Soledad entorrompida* / Joel Chadabe, *Drifting* / Gustav Ciamaga, *Inventions* / Werner Kagi, *Hidrophony I* / G.M. Koenig, *Function Green* / NPS, *Computer 1800* / Pietro Grossi, *Polifonia* / *Sei canoni dall'Offerta Musicale*».

Let's get to the history. It's obvious that even though everything today is electronic, the term, when associated with music, inspires perplexity and rejection in those who see Art threatened by technological contamination and a similarly dangerous 'mythologisation' by those who look at technology as enough of a guarantee for values that continually elude complete rationalisation.

So, before entering into our consciousness electronic music has to be demythologised and brought back into the realm of analysable historical processes.

We don't have time to do it. Consider it enough that you've been forewarned.

On purpose I've divided listening into: traditional electronic music and today what is called 'new music', which will probably become classic to the degree that the search for new forms then becomes established forms. A further warning for non-specialists: despite its centuries of history, Gregorian music is still called generically Gregorian music. Distance in time has flattened out its evolutionary stages. The same goes for electronic music. Its features seem blurred given its closeness in time. Everyone thinks electronic music is: Stockhausen's *Gesang*, the sound track of *Clockwork Orange*… some of the strange effects on *Carosello*[1]. I'll try to use schematic, rough categories, but in confused times schematism, let's even say sectarianism is the only alternative. Let me explain. I call electronic music only music produced on electronic devices. For the moment I won't make any value judgements about the results. If anything I'll make them about work procedures, about coherence or lack thereof in the use of materials. «What is man if he isn't even honest?». And let me add, what is music if it isn't even logical? But let's not go overboard.

[1] Advertising clips on Italian television.

[12] *One parameter adrift, another on the horizon**

The first is called or was called 'pitch' the second we started to call density or mass from Varèse on (with various meanings for the term). It would seem superfluous to say right away that we shouldn't confuse density with intensity; but it's better to say it. The piano has nothing to do with the number of signals (but once upon a time it was difficult to make them out). In strictly correct acoustical terms, the width of a wave is independent from the form of the wave.

In the past something happened to suggest a use for this new parameter and, lo and behold, we find it in the great age of choral polyphony. Forget the fact that today we reject any return to polyphony for love of the concept of the 'masses'. This rejection has to do with form rather than parameters.

In a mass by Josquin Despres in which the behaviour of each individual voice is highly differentiated, complex, though coordinated, what matters for the ear is not so much the individual behaviour but the overall effect. Since the human voice is the most complex acoustical event in the field of harmonic spectrum, it's clear that the combination of many voices and different paths also creates mass perceptions even if this isn't the intention.

We might imagine that a greater or lesser sound 'density' was also highlighted in the Gregorian responsories or in the 'concerti grossi' of our Baroque, with their 'tutti' and 'solo' or concertino in contrast with one another. However, this wasn't intended. Our listening has changed towards past works. Perhaps we revolve in a circle, but we never come back to the same place! It seems that certain individualistic and collective concepts alternate even in the history of music. For Russell Descartes gave birth to modern subjectivity «whose fundamental certainty is the existence of the external world».

If we really want to get ourselves in trouble by philosophising about music, an accompanied melody in music is the most eloquent expression of the individualistic concept. In a melody each sound has its own precise pitch (or we thought this was the case) and its own rigidly coordinated function as regards succession of sounds (that is, we never had any doubt about the temporal parameter for before and after). In reality those individuals, that is, the musical notes as some still call them today, were enormous

* «Quaderni del Conservatorio 'G. Rossini', TECNOMUSICA/1», *Musical creation and technology,* Pesaro, May 1977 (edited by "Laboratorio Sperimentale per la Musica Elettronica". Responsible of the TECNOMUSICA series: Walter Branchi), p. 1-17.

sound molecules with a train of satellites that reached up to ultra sounds. But we didn't know this or rather we didn't take this into account. They were arranged there like individuals of different importance: some tyrannised others and, in the end, only one was to come out on top according to the rules of any well-organised society. Then those molecules broke up and we discovered little, elementary particles named after natural numbers. These numbers, which corresponded exactly to each periodic frequency, became our new pitches, but they were so isolated that they didn't tell us anything. So, in search of their relationships. But time flies. Not only have we already thrown doubt on those clear, minimal frequencies and their sinusoidal, square or triangular form, but also specific schemes of traditional, mathematical relationships aren't useful any longer. And so we started to talk about 'groups', 'zones', or 'galaxies'. If we look in detail, a phonic event appears so complex, even though it might be analysed, that a musician can easily feel ill at ease. S/he can't ignore the scientific data and has used them to derive other principles in composition. Of course, the acoustic experts come along and ask exactly what our ear can perceive, while the musicians are already way ahead and describe that they can make the ear hear by resorting to violence. This is the only way to discover new principles in composition that go beyond what we already know in the same way that we've gone beyond Euclidian geometry, even if we can't exactly define what geometry certain curves belong to. Humans always experiment; then the theorisers come along.

Xenakis is still asking how much musicians are influenced by the kinetic theory of gasses or Poisson's laws, etc. Without a doubt musicians are very attuned to nature and its laws regarding the «sense of hearing» to return to Goethe-Webern's golden definition[1] (the historicized laws naturally); but I don't think scientific discoveries have ever directly influenced musical concepts. Rather we could speak of a global concept of the world that, above all, includes politics. In one of his articles that appeared as an introduction to the *Sociology of Music*, Adorno speaks of «productive musical forces that can sometimes cause the conditions of production to explode, sometimes cause them to be smashed». Elsewhere he speaks of music that can be both a social fact and a form in itself free from immediate social pressure. As you can see we can't approach the question in simple, alternative terms.

Let's return to concrete proof. I think that Varèse (no surprise a friend of scientists like Oppenheimer[2]) who already from 1925 to 1930 dreamed of manipulating masses of sound–noises, could have easily not known anything about Poisson's law, but he contributed to shaking up the pitch parameter even without arriving at a complete identification of sound-noise. Just as scientific discoveries are never the work of an isolated individual but the consequence of previous discoveries or potentiality, so it is for those in music. The conclusion is then that all of those who pass for «precursors are, in reality, 'of their time'» as Charbonnier[3] has rightly observed. The others are

[1] Anton Webern, *Verso la nuova musica. Lettere a Hildegard Jone e Josef Humplik*, Bompiani, Milan 1963; or. ed. *Der Weg zur Neuen Musik*, Universal, Wien 1960.

[2] Robert Oppenheimer, american physicist, 1904-1967.

[3] In George Charbonnier, *Entretiens avec Edgar Varèse. Suivis d'une étude de son œuvre par Harry Halbreich, Belfond*, Paris 1970, we can find, the following phrase by Edgar Varèse: «Il n'y a pas d'œuvre moderne ou ancienne, mais seulement celle qui vit actuellement» (p. 107).

none other than late-arrivals. Here it's fun to compare the titles of works by Varèse and Xenakis.

On their own they're indicative of a different world: *Density*, *Jonisation*, *Integrales*[4], etc. by the former; by the latter *ST 4* (based on a probability program), *Polytope* (spatial distribution), *Terretektorh* (or *Sonotron* small particle accelerator), *Analogical A, B*[5], where sounds are chosen statistically in arbitrary areas of intense frequency and density. The areas change according a string of events (Markov's process). As you can see, Varèse was interested in general scientific concepts, while Xenakis looks for strict connections between scientific laws and musical concepts. These are observations, not value judgments. After all, what values?

No doubt you'll be surprised to hear talk of «musical discoveries»; however, the principle of sound masses statistically distributed is a new synthetic principle musically speaking. The sound-noise equivalence derives from this. The use of noise in concrete music had not yet dealt systematically with the organisation of new parameters. Now where are those of us who have had our eyes fixed for years on the frequency meter and the second counter checking numbers instead of 'sets' and 'galaxies'? The evolution from an established order to a new type of order always involves a moment of apparent disorder. Revolutions are never painless. It happened that certain relationships became difficult; they became more rigid when we wanted them to be fluid without slipping out of our hands. Sound as a discrete pitch got lost in the mass. The solution certainly wasn't to find a new organisation in the relationships, but rather to just let it go and instead organise the masses themselves in relation to their density. This required necessarily another kind of temporal organisation. We all know you can't touch certain key points without damaging the entire structure. Considered as a mass phenomenon today, a sound event gives way to a kind of contemporaneity of events that defy time. Even if completely real, mathematical objects, numbers are eternal and outside time just as for Pythagoras, while our mental constructs of before and after have been problematised. In this way we have lost, or rather abandoned the individual pitches of sound events; we've abandoned the deterministic scansion of time, the Platonic definition of rhythm as «temporal order». Taking up the ancient Pythagorean argument, Xenakis speaks of «algebraic structures outside of time»[6] and of possible mental mutations linked to this parameter or of finding musically new logical relationships between temporal and spatial durations.

People will say all this is a real mass of contradictions. We don't distinguish sound from noise any longer, no consequentiality between one event and another, and now we are trying to defy the flow of time, to jump ahead of it, to overturn it, even to

[4] *Density 21.5* for flute (1936); *Ionisation* for percussion ensemble (1930-31); *Intégrales* for 2 piccolos, oboe, clarinet in B flat, horn, trumpet in D, trumpet in C, tenor trombone, bass trombone, contrabass trombone, percussion (1924-25).

[5] *ST/4 (ST/4, 1-080262)* for string quartet (1956-62); there are two different performance with lights and sounds entitled *Polytope*: *Polytope de Montréal* (1967) and *Polytope de Cluny* (1972); *Terretektorh* for orchestra (88 players) (1965-66); *Analogique A et B* for string and magnetic tape (1959).

[6] In Iannis Xenakis, *Musiques formelles*, «la Revue Musicale», double numéro spécial 253 et 254, Éditions Richard-Masse, Paris 1963, we find a paragraph devoted to the «structures hors-temps».

arrive before leaving. We certainly haven't arrived at 'language' in the sense of Bach or Mozart, but the physical mathematical premises for getting there exist. The most important thing is to not get scared, not stop midway with one foot out and one in, taking advantage a bit of the confusion. The average and not so average listeners feel deceived way down deep, but don't dare admit it. They swallow the products even if they cause a bit of indigestion, but they pretend it doesn't matter. What can you do about it; avant-gardes are like this, they'll pass…

Please be patient; let me return again for a moment to the question of time before going into its relationship to density. The fact that the supporting role of rhythmic scansion can't be eliminated at the elementary level (songs, pop music, etc.) is proof that freedom from the bonds of periodically divided time is a necessity for evolved musicians. Perhaps this is the umbilical cord that can't be cut without causing serious damage to the listener at an infantile level.

Schoenberg called it «emancipation from dissonance». Let's go a bit further and call it «emancipation from rhythm» which is a more subtle way of travelling both in time and space using the equations that mathematics already offers us. Stravinsky considered all sound objects at the same time in all their sections regardless of their temporal order, but always retained the notion of the web so that the path drawn from point X to point Y always made angles and straight lines. On the other hand, Webern assumed these various paths to be obvious and took into consideration points as isolated poles, immobile and self-sufficient universes. Now, us. We're trying to structure objects in a circular motion according to curvatures, which is another way of trying to move out of time. The obvious conclusion that music is a temporal art form has a double meaning, so this means that time is not «an obvious feature of music; that rather it is a problem for music». The age-old aim of secular, entertainment music to distract from prolonged tedium demonstrates this. This aim survives in the relationship to time in autonomous music**.** That relationship is tied to time as well as addressed antithetically against it. If time is the medium that in its fluid nature seems to oppose any attempt at 'thingness', then the temporality of music is the very thing that causes it to condense into something more lasting and autonomous, into an object, into a thing. The term *form* refers «the temporal articulation of the music to the ideal possibility of its ability to spatialise itself»[7]… This is what Adorno thinks. Therefore we have *form* in the organisation – and synthesis – of events rather than in their sequentiality-hearing light; seeing sound, a fascinating equation which our creator seems to have already thought of when he decided in the beginning maybe he had only symmetries, mirror-image forms in mind. But when he wanted to turn the plan inside out, or the plan didn't work out perfectly; or he applied some imagination and created slight variations so that only a few people would catch on, deep down he was really thinking of a formal unity, a space-time convergence. So it happened that the left foot is bigger than the right foot, one eye sees more than the other, same for ears as for hands with the result that we always have to choose which

[7] Theodor W. Adorno, *Über einige Relationen zwischen Musik und Malerei*, in *Festschrift für Daniel-Henry Kahnweiler*, Gerd Hatje, Stuttgart 1966; italian transl. *Su alcune relazioni tra musica e pittura*, in *Immagini dialettiche. Scritti musicali 1955-65*, edited by Gianmario Borio, Einaudi, Turin 2004, pp. 301-314. I would like to thank Gianmario Borio for the information.

one is most useful. It's probably an issue of one cerebral hemisphere's being occupied overseeing events in another so it doesn't have time to oversee itself. This is fortunate because certain little infractions have helped avoid a mechanical repetition of the two parts. Otherwise we would be boring to ourselves, so to speak, just as we find boring perfect symmetries that don't exist in *forms* worthy of that name.

Therefore, concerning music I would advise listening to mirror forms, Bach's as well as Schoenberg's. None of us should fool ourselves into thinking that we've understood the right-hand plan because the left-hand plan could be different, apart from the fact that right and left might have no meaning at all. Furthermore, musicians have often applied very complex mirrors, reversals of reversals, etc. to the point that we couldn't figure out any longer if we were dealing with a model to mirror or a mirror to model. The Mozart's and Beethoven's sonata-forms should also be listened to in their entirety because, even if they can be divided in two and we know beforehand that if we follow a path from A to B, we'll necessarily have return from B to A, this return path will take us up delightful little byways, just like some improvised shortcuts that seem to be necessary on damaged roads. In short, it's one thing to go from tonic to dominant where everything might proceed smoothly. It's another thing to return from dominant to tonic where there might be hitches and difficulties in finding the precise point again. Naturally these are all difficulties we create for ourselves so we don't get bored, just like our creator did. So we have to conclude that precisely because we are imperfect, we are forms and are in search of forms.

I apologise for this apparent digression from the search for our new parameter that was just appearing on the horizon, but every once in a while we need deviations. In this case, to have anticipated a discourse on form without having exhausted the one on formalising parameters means precisely not adhering to a sequence that is too rigid. Now let's try to historicise this entire issue. We said that we've lost a parameter. It seems, though, that we never lose anything. At least Adorno prefers to speak of «oblivion» rather than loss, «history has resolved itself to a universal elaboration of all the elements that would hardly be abandoned again»[8].

In fact, if today we speak of blocks rather than lines (anyone would be ashamed of writing a melody!), let it be known that we aren't just talking about this, but about a profounder convergence of all dimensions. Already there's a difference between Varèse's and Stockhausen's masses and Xenakis' density. And between these and Koenig's rotating forms there's yet another difference. Finally and definitively, with Koenig we enter into what has been called improperly up until today «electronic music».

Density throughout history

We started way back in time – from the Gregorian responsories, the discovery of polyphony, etc. We find one of the first examples of 'acoustic mass' in Perotino in the 12th century. In Perotino the flow of signals is interrupted only in a constant way by the duration of human breath that is sustained anyway by the Gregorian *tenor* part

[8] *Ibidem.*

played on the organ. The polyphonic interaction between organ and voices is perhaps comparable to what Xenakis achieves between electronic and instrumental signals.

Perotino persists almost ferociously in freeing himself from the mystical a-temporality of Gregorian flow to fix a spatial-temporal verticality completely immersed in the present. Here the interaction of the frequency intervals modifies only when vowels change (and this involves timbre as well as rhythm). The variations appear out of focus because of a kind of perspective distance. All this within a stillness that no longer has anything of the ecstatic and whose revolutionary character has not diminished after eight centuries of history. But what do eight centuries matter? Perotino and Xenakis sound equally contemporary to our ears. In the latter we find examples in which the static nature of the context does no more than encompass and conceal an atomised articulation in both the frequencies and the rhythm (but can we still use this term for a parameter that gives a completely changed temporal dimension?). Xenakis pursues the density parameter with equal intensity and a subtlety that only its closeness in time (unlike Perotino) makes perception difficult. Nothing happens; but then perhaps everything happens. The sequence isn't perceptible. Let's say that, in these two examples, what is actively communicated is achieved by subtraction rather than addition with the following difference. With Xenakis the entire history of the articulation of the material is wilfully denied, whereas with Perotino this same articulation hadn't yet begun and the early signs appear very daring attempts at its affirmation. It's as if something not yet achieved and something we withdrew from gave each other a hand and supported each other by simply remaining indifferent to history rather than relying on historical cycles. Of course nothing returns on itself by the exact same path (being over here or over there evidently are the same thing and, at the same time, are not the same thing). As usual, our electronic ears, or rather, our electronic listening seizes from the past what suits it best, imagines the changes, and provokes them. It seems clear that with each change human beings establish laws by challenging nature. We create monsters that will eventually be accepted as 'beauty!'. At any rate, the act of studying a phenomenon modifies that very phenomenon in both art and science. The point at which 'to know' also means 'to find' has to be established each time. Lucky Picasso who didn't search but found. We aren't finding but are searching. Maybe this is the fundamental difference between the supreme position of the individualist artist immediately preceding us… and we should have listened to similar statements from Bach.

We return to masses just as we can make out their presence in 14th century Flemish polyphonic music and in the electronic music of the moment in the Utrecht studio. Geographical distances are still important. In a country where light if feeble, the sky overcast, and everything emotional is internalised, the brain immerses itself in complex, obscure speculation. The phonic result seems hard and angular to our Latin ears. This is especially true of the first Flemish composers Obrecht and Ockegem, and less of Josquin Despres, who was long familiar with the sunny clarity of our skies. In the horizontal flow of voices, the masses were articulated in various ways and were often sustained by the organ or trumpets – a kind of constant pedestal in time and width on which these masses rested without creating noticeable alterations in the relationships of quantities of signals. After centuries of schematic methodology applied to rhythm

and frequencies, this compact mass where articulation is still static, a kind of synthesis of Heraclitus and Parmenides is what matters for us today. The cadenced stops haven't been established yet; the single cells elide in context even if they are differentiated; we can't isolate the thematic excerpt without affecting the structural integrity of the whole. As if to say that individual human destinies exist but it's human destiny that counts or dead people exist but not death and so on.

In more concrete terms, that very theme against which Schoenberg's twelve-tone system will fight and, what fascinates us the most, the absence of any a priori expressive intent do not exist in all of the Flemish polyphony of 14th century. With Monteverdi individual paths start to emerge from the polyphonic mass and gradually assert themselves. The human drama comes to the fore and accompanied melody, the revolution of 'modern style', is born with Monteverdi's death. From Monteverdi to Verdi the road will be long.

On the other hand, with Gesualdo Da Venosa we come back paradoxically to a concept of blocks similar to Perotino's. There are historical figures that create the premises that history doesn't pick up on. It appears that their task is to destroy rather than build. We can say this today about Cage. They are positive figures apart from the steady stream of people who live off destroying when there's nothing more to destroy and there are those have already started to build. However, Gesualdo is very interesting for us because his acoustic space is so dense that you get a suffocating feeling from it, an absence of space. There aren't any holes in Gesualdo's madrigals and the result is always the same: where there's no space, there's no time. The religious dimension of Gesualdo's last works is proof of this.

Continuing through history, where can we find the density parameter affirmed perhaps rather than sought out? There are Bach's preludes in the *Well-tempered Clavier* (obviously the alternating polyphony in the fugues couldn't be fixed in such compact blocks) in which a constant 'densification' occurs around a nucleus that almost excludes articulations of any kind: tight modulations, unchanging intensities and timbres. Everything appears immobile around a fluid mobility. Bach allowed himself very little slack in order to construct objects that turn around on themselves like celestial bodies. In the end, he wasn't so far from the use of the 'sequencer' as it's practiced today in Utrecht; an application that is so popular as already to have become almost an abuse.

Who has something to say if we skip from Bach to Mahler to Varèse to ourselves? Then maybe we'll return to the Greeks or to the Gregorians? For example, there's a special density in the Adagio in Mahler's 10th, achieved by bands of frequencies in the middle zones and in the very acute ones of the strings that for the first time almost reach the ultrasonic. Furthermore, there are repeated variations in density from the initial one by a single instrument to total, spreading one that covers, or seems to cover, the entire chromatic space, at least all of the space available at the time. I'm not saying here that we can talk about density in the quantitative sense severed from the intensity parameter and timbre. But we're close. After all, as we've already said, is it really possible to isolate a parameter completely?

Varèse dreamed of doing just this consciously. At the age of 14 he hit on his «musical aesthetics while reading a study on the Zambesi River, a major African river, which

spoke of the variety of currents and their different speeds»[9] (Ouellette). This is purely anecdotal. Varèse did dream of working with materials that didn't exist yet.

When he was able to do it his operation on the density of masses that flow one into the other retained an expressive function, not in the sense of banal sentimentality but rather in the sense of enchantment. Therefore, the fact that he called a piece for flute *Density*[10], referring, it seems, to the density of the platinum used to make the instrument, was just an exterior suggestion, certainly not an effort to compete with the density acoustic levels. There is a fragmentation of acoustic cells in Varèse, which derives from Stravinsky. It differs in their connection, which almost becomes overlapping. What results is a continuum that we could already call density. However, there's still a major boundary to cross: how to structure these masses in acoustic objects. That is to say, how to move from spontaneity to organisation. Or in other words, how to move from the as yet generic term 'acoustic mass' to controlled blocks in space and time. This is a major problem that only the latest discoveries in mathematics can help us with. It was relatively easy for Weber to create a relation between the two parameters: height and rhythm. His mathematics was still on the deterministic order. Now that we've lost both height and rhythm all we can do is jump on the tiger and accept the reality of a permanent revolution. We have set theory, voltage control, and finally, what appear to be the last protagonists: computers.

Perhaps the Flemish are still ahead today. Here a high-level team rather than a single individual is trying to systematise and generalise a language. But, like I was saying, in an age when everything's up for discussion as soon as it begins to stabilise and engineers sometimes offer musicians technical models that musicians themselves aren't ready to pick up on, it might seem a vain hope to find a linguistic system as stabilised as the tonal one. In the future the conclusions. Today the public's ears generally reject certain music or remain frightened as if they were being presented with some abnormal phenomena, a kind of abnormal creatures. In reality, today like yesterday music isn't looking for a public, it's creating one. It has to make inroads into mental structures that seem to be tied to impracticable biological laws. We know little about acoustics and even less about the physiology of the human ear, but what more we learn will help musicians substantially. Their work will probably go ahead or coincide with discoveries in other fields. The ability of the human ear to distinguish simultaneously the horizontal and the vertical is still limited. Schoenberg already knew this. Now we talk about universes rotating on axis that remain Cartesian only in name: parallels that meet, vectorial spaces… It would seem here that formal mathematics were applicable mechanically and externally to music, but this isn't the case. Music makes use of mathematics like a means, like a logical support, but it will never remain only abstract mental speculation. It will never give up 'its body', its wonderful physical phenomenon of *sound*.

[9] There is no close inverted commas in the original. In Fernand Ouellette, *Edgar Varèse*, Seghers, Paris 1966, p. 20: «A l'âge de quatorze ans, le jeune musicien eut l'intuition de son esthétique musicale et de sa vocation de compositeur, d' 'organisateur' de sons. En lisant une étude sur le Zambèze, grand fleuve africain où il était question de la variété des courants et de leurs vitesses différentes…».

[10] See note 4.

[13] *Changes in formal conception in the passage from analogical to digital means**

It seems premature to talk about formal changes when studios have been concerned more with the development of technological means than with the results musicians could achieve with them. In addition, software technology is changing and diversifying so quickly that it is hard for a composer to pass from one studio to another without having to face language difficulties. On the other hand, the term musician has taken on a very different meaning nowadays. A race car driver can't drive a car anymore without knowing how it is made; in short, a musician can't tell a technician how to carry out his ideas. A composer now has to study computer language just as he studied counterpoint and harmony in the past.

As I was saying, my point could seem premature and out of date at the same time, if we consider that today we can not only load the computer with data to make the sound, but also load the whole structure and structure sequence so that we can create the whole project. Furthermore, as everybody probably knows, there is a machine in Edinburgh that automatically creates programmes, and even control programmes.

But as for my personal experience, I've been involved in electronic music, or rather composition with electronic means, since the time M. Chion called the Super Nova explosion, meaning a bright beginning, then a rapid decline, and finally it burns itself out. After the advent of these new sound instruments, musicians who had used them so enthusiastically soon abandoned them and went back to their orchestras, even though they were themselves changed by the initial impact. Only in recent years, with the formation of a new galaxy (Computer Music) – not exactly a second explosion – we can understand what in the past had seemed impossible: the non-participation of musicians […][1] about 25 years of rigorous, isolated research, on the one hand, and of great confusion in terminology and practice, on the other hand: electro-acoustic music, tape music, mixed music, etc.

Exactly 10 years ago during the 1st International Congress of Electronic Music in Florence organized by Professor Pietro Grossi I hoped for a change from research

* The article was published in G. De Poli (ed.), *Atti del III Colloquio di Informatica Musicale*, University of Padua, 2-3 April, 1979, pp. 44-49.

[1] There is no an entire line of text in the original.

to message; now, after a first contact with the Computer, I'd like to try a more advanced approach: from message to form. Music has always expressed messages with every possible means, but the idea of form has always been modified according to the transformation of the material or rather, the means that could offer us that material. At the beginning everything seemed unpredictable and the number of possibilities infinite. As Boulez said, we were on the border of a fertile land: there was no point of reference, a uniform universe, an overturning of all parameters, the creation of sound itself instead of the choice of materials; the only criterion or absolutely new element in music: the idea of continuum. So a long period of research and evolution of these technical instruments was necessary so that we could evolve from grammar to communicable discourse. The sounds produced by the first generators were poor and inflexible; even the use of voltage control couldn't modify in any radical way the situation of electronic music.

At the time (1965-70) we were in the sound object phase (I'm not talking about Pierre Schaeffer's sound objects): these sound objects were, at least for my group, just acoustically perceptible events, structured in a limited way by a combinatory calculation. These objects could be compared to a cage made of wires represented by the sound events. Clearly, our ears were considered neutral and impassive receivers. The term 'communication' was substituted with 'sound information', but at what level? Simply using qualified techniques at the level of realisation**.** So music was reduced to an acoustic product and the product was neutral for both the producer and the listener.

When synthesizers started to be used, even the smallest research studios operated at a scientific level. Let me read a short satire I wrote in 1976 on synthesizers, big and small (this is obviously a light-hearted intermezzo). Computers can control synthesizers, of course, so I think we should just work directly with computers.

Here we are at the formulation of the first languages written in Stanford around 1969, which allowed musicians to get closer to the huge monster and interact with it. It stimulated musical thoughts, while at the same time they reined themselves in knowing they had to give the computer precise and exhaustive data. Today it's hard to find a musician or even an electronic music student who would go back and use analogical means after tasting even a little bit of what digital means can offer. And this even knowing how slowly the computer responds when it isn't used in real time. I think real time is a necessary condition for a composer to create a real dialogue with a computer.

As far as I'm concerned the change from analogical to digital means had the strange effect of taking me back to the happy period of my first experiences, when all you needed were a few generators, a band pass filter, a frequency metre, and 2 tape recorders to get bundles or bands of frequency that could at least control height and duration if not timbre. It was this long and dark era of research that kept us from getting discouraged before the infinite capabilities of the new means, which were really so limited that they discouraged – as I've already said – a whole generation of musicians.

Now we've returned to a completely other level, to the safer field of research and early musical production. It shouldn't surprise us then that timbre, till today the most problematic and elusive parameter, has been the main object of research and experimentation. Risset's studies are now famous. Gray's analyses had helped us to penetrate

the mystery of the timbres of traditional instruments. Successive experiments can be compared to what happens in experiments in nuclear physics when by adding or taking away elementary particles you create new elements. By modifying the partials of a sound, we can give them a different order and number to arrive at a new, more and more predictable, and characterised timbre.

After two years of experimentation in this direction, the idea of composing a piece with a limited number of sounds of different timbres came naturally. Actually, a series of sounds with different timbres still can't really be called a composition. So here the problem of the form, neglected till now or not considered a problem at all, comes to the fore. The historical evolution of formal transformation, or rather the discovery of form vis-à-vis the new instruments, has always been slow. For this reason, every time we've composed the *Canzona da sonar* over and over. Today the instrumental tradition still comes to bear in the use of computers. It's no longer a question of desecrating past models but of questioning everything all over again. In this I think Varèse had the most foresight in a period when computers weren't used yet in music. The concept of continuum and use of the enormous computer memory can help us conceive of a flow of sound in constant transformation; an evolutionary process that contains within the elements of its evolution like the growth of a plant**.** That this process could last 300 years or 3 minutes changes nothing in its inherent negation of every dialectical counter-position.

In order to arrive at a continuum involving every parameter, including space, the human brain will never be enough without the help of computers. Probably the results will go beyond human predictions. Not for this do I agree with Cage when he says: where man hasn't predicted certain results, then it is the machine that has created them. I don't want to get into this kind of discussion; we'd end up talking about cosmology.

We can see that computers are no longer huge monsters that a few elect can approach. Computers are increasingly miniaturised and affordable. Programmes are getting simpler so that it is easy to predict the general use of what shouldn't be called a new tool, but a factory of new tools. Any composer can request and get the exact tools he needs from the computer to put his idea into practise and these will be different each time. This was my first approach with the computer; but we now know that this was only the first step**.** We can request not only the material but also the automatic structuring of that same material.

In conclusion, I think that since recording on tape, the most innovative event in music has been computer-generated composition. It is no chance that this innovation has already had a kind of official approval as never before - the fact that last summer Unesco organised two-week open workshops in all the studios around the world is of great importance.

The Synthesizer

We are told that man was made in the image of his creator. Poor us. Certainly that creator hadn't studied programming. He mixed all the data and loaded it haphazardly. I don't know why the universe hasn't turned upside down.

The computer at least tells you to stop and politely calls you an idiot.

Instead, the universe pretends to work. It's the same thing with the synthesizer; it looks like a machine, but when you touch it, it reacts emotionally like a nut case. In fact, now we try not to touch it.

There are controls, but the controlled don't give a damn.

You don't know where the *range* starts and where it finishes. Let's not even talk about pitch because you can barely distinguish the bass from the high notes. The timbre is a sort of mix; so you manage to follow the rhythm for a few seconds but if you even dream of brushing the usual controls, they start to go crazy. On the other hand, the *sequencer* is stubborn to the point of sadism. Of course, you can change but then it keeps on changing and never ends.

The only place this machine, or rather this pile of machines, works is randomly. This is its domain and it's the boss. It's eliminated its creator and forced him to watch powerlessly the catastrophe of logic.

May 1976

[14] *The conservatory of Padua**

A few words of personal history

I've had an almost exclusively musical education. Even if I thought I had given up music from 1965 to 1973 for acoustic research and knowledge of the then new, analogical instruments – aided by a group of electronic engineering students, mathematicians, and physicists – our first tentative forays into a totally virgin field always had the secret aim to conquer new territory in music without being captured entirely by the technology.

From 1973-75 the Conservatory of Padua signed an agreement with the University Computer Centre. The door was opened to the computer. The choice between programming and making music was before us again. Given my generation, I had few doubts. I managed a bit of Music IV or Music V, just enough to be able to move towards music while still remaining in the middle of that despicable gap between art and science. I was lucky to abandon punched cards early on and move on to real time, thanks to the engineer Tisato who developed the ICMS (Interactive Computer Music System) program for the video terminal.

I restarted a period of experimentation on Chawning's FM, carrying forward at the same time experiments that could by then be called musical compositions, and always aimed at this. As such, this was never pure research. I rather cynically took advantage of programming done by others for what I needed, suggesting at most those subroutines that were lacking for what I wanted to do. I adhered and adhere still to Farlino's well known definition: «Being a proportional science and having the sound number as a subject, music comes to be in part mathematical, in part natural». This «in part natural» means that science and art never coincide; otherwise engineers would be musicians, as Xenakis said.

I have to confess that if once upon a time I hoped that this gap between science and music or art would be overcome, now I'm happy in the conviction, confirmed by his-

* In *Musica ed elaboratore elettronico. Verso il laboratorio musicale*, Atti del convegno FAST (Federazione delle Associazioni Scientifiche e Tecniche), Milan, 10-11 aprile 1980.

tory, that it's impenetrable. Even if through informatics we find ourselves before results unpredictable for and unattainable by humans, this won't bring us to new formal concepts in keeping with the evolution of the universe and ourselves as living organisms.

The situation at my conservatory. Deficiency in informatics

Another point I would like to touch on is the decline in artistic production subject to the rigid algorithms, which are suitable for economic and scientific use. So, as Adorno already warned, music has been reduced to *merchandise* in the most advanced and extensive sense; so much so that all the ability of the *musician*, I say *musician*, has consisted in avoiding rigidity and the sacredness of the machine.

Difficulty for the musician, therefore, in finding machines that the logic of the marketplace couldn't produce for him, since informatics isn't so much a scientific discipline as a super industry. Musicians are becoming a new market niche; we'll all have mini personal computers in the house to entrust with our private digital fantasies! So, we're talking about an unfair struggle *against* automation that, carried to the extreme, will be the death of art, i.e. *Art* as *Invention*. (This kind of mortification has already started with the control of voltage applied to analogical instruments, accompanied by a rejection of the repetition of uniform rather than random cycles).

So the resistance on the part of the Conservatory, which had already allowed the study of electronics to enter its citadel, is understandable; but it hadn't predicted that the computer and, therefore informatics, would pour out of this Trojan horse. We agree that the old institutions should be destroyed, but we can't destroy the Conservatory and music, too. 'Throw out the baby with the bathwater!'.

Now, the difference in making music today lies in the fact that the old machines, i.e. traditional instruments, were designed for making music. (Industrial uses came later here, too). The new machines weren't born to make music, but rather as the umpteenth means of capitalistic power in all fields. This is why, right away, an entire generation of musicians distanced itself, and then why musicians who were interested were forced into pure research. In fact, in this field informatics has already borne and promises to bear a rich harvest that will probably lead to new musical concepts and so to new forms. But the concept of *form* alone is not refutable. Informatics supported by mathematical logic can give a structure of musical structures sequentially. But the *form* of a work of art, I repeat, is *comparable* only to a living organism. A product is rationalised if there was there was something to rationalise before. Can we postulate that engineers will endow machines with an automated consciousness? It would be a contradiction in terms.

Now let's understand that I don't want to sound like the old European who wants to save humanistic values, but like a person of her times who intends to use all the technological means available to rationalise the unconscious art derives from, like Josquin Despres or Bach rationalised their unconscious, or conscious view of the world, with the technical means of counterpoint. But above all I speak as a person who doesn't want to 'fetishise' these instruments and denounce the danger of centralised and uncontrolled use of these instruments both the umpteenth form of oppression of

humans by humans and, finally, a total mortification in the arts, too, at least for as long as humans remain humans.

When humans yield the field to the new civilisation of robots or automatons, then we'll be talking about something else and maybe then, freed from emotions and the unconscious, we might, we might move one step forward towards the civilisation we haven't yet reached.