MÜZİK-BİLİM DERGİSİ

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Editoryal / Editorial

Müzik-Bilim Dergisi'nin yeni sayısı, özel bir çerçeveyle okurlarının karşısına çıkıyor. Dergimizin Bahar 2015 sayısı, **Doğu Akdeniz Araştırmalar Merkezi** (DAKAM) ve **İstanbul Teknik Üniversitesi Türk Müziği Devlet Konservatuarı** işbirliğiyle 7-8 Mayıs 2015 tarihleri arasında BİSED Salonu'nda düzenlenen **Musicult'15** sempozyumunda sunulan, dergimizin yayın kurulu tarafından seçilen ve hakemlerimizce değerlendirilen bildirilerin genişletilmiş makale versiyonlarını içeriyor. Böylece Bahar 2015 sayısıyla hem okuyucularımızın İngiltere, Amerika Birleşik Devletleri, İtalya, Cezayir, Yunanistan, İran, Malezya ve diğer pek çok ülkeden toplam 59 katılımcının yer aldığı sempozyumda dikkat çeken konulara ve çeşitli ülkelerin akademisyenlerinin müzikolojiyi kavrayışlarına, farklı müzikolojik yaklaşım ve yöntemlere dair fikir edinebilmesine, hem de akademik dünyalar arasındaki etkileşime aracı olmayı umuyoruz.

Dergimizin yayın hayatına başladığından beri ilke edindiği akademik alanda faaliyet gösteren kurum ve kuruluşlarla işbirliğini artırma çabasının Bahar 2015 sayısıyla ürün haline geldiğini görmek bizler için sevindiricidir. Fakat Manuel Castells'in tabiriyle içinde yaşadığımız "ağ toplumu"nda işbirliği ve etkileşim için karşımızda yeni biçimler ve olanaklar olduğu da görmezden gelinemez. Örneğin literatür taramasının büyük bir kısmını artık çevrimiçi olarak eriştiğimiz veritabanları ve koleksiyonlar üzerinden yürütüyor, akademik üretimi bu veritabanlarına ve koleksiyonlara dahil olan yayınlar aracılığıyla takip ediyoruz. "Ağ"a dahil olmak, ister birey isterse kurum olsun, herkes için artık neredeyse bir zorunluluk. Bizler de dergimizin böylesi platformların içinde yer alması için özellikle gayret gösteriyoruz. Bu doğrultuda *Müzik-Bilim Dergisi*'nin bundan böyle **Répertoire International de Littérature Musicale** (RILM) tarafından hazırlanmakta olan çevrimiçi müzik dergileri koleksiyonunda yer alacağı haberini okuyucularımızla paylaşmaktan mutluluk duyuyoruz. Bizleri destekleyen ve dergimizin niteliğinin yükselmesine büyük katkıda bulunan hakemlerimize bu vesileyle bir kez daha teşekkür ederiz.

Müzik-Bilim Dergisi'nin Bahar 2015 sayısında beş makaleye yer verdik. **Navid Bargrizan**, "Technology, Microtones, and Mediation in Manfred Stahnke's *Orpheus Kristall*" başlıklı makalesinde Alman besteci Manfred Stahnke'nin Siemens Arts Program tarafından desteklenen ve ilk kez 2002'de Münchener Biennale'de sahnelenen operası *Orpheus Kristall*'i konu ediyor. Bargrizan makalesinde operanın baş karakteri Orpheus ve onu çevreleyen dış dünya arasındaki ilişkide internetin dolayımlama rolüne odaklanıyor.

Ángeles Sancho-Velázquez, "Virtuosos, Improvisers, and the Politics of Seriousness in Western Classical Music" başlıklı makalesinde Avrupa müziğinde on dokuzuncu yüzyılda doğaçlamanın terkedilmesini ele alıyor; virtüözler ve

virtüözite kavrayışlarına odaklanarak bu terk edişin ardındaki müzik dışı politik ve sosyal konuları irdeliyor.

"Relation of Music to Cultural Identity in the Colonies of West Greece: the Case of Selinus" başlıklı makalesinde **Angela Bellia,** arkeolojik bulgulardan yola çıkarak müzik etkinliklerini kültürel kimlik bağlamında yorumluyor; Atina ve Sparta'ya odaklanmış Antik Yunan müziği çalışmalarına, Sicilya Adası'ndaki Selinus'a yönelerek alternatif ve bütünselci yorumları kırmaya yönelik bir bakış açısı sunuyor.

Olcay Muslu Gardner, "Endangered Music and Dance Culture and Sustainability: A Case Study in Rural Turkey" başlıklı makalesinde Domaniç'te yürüttüğü alan çalışmasını, UNESCO'nun toplulukların ve kimi durumlarda bireylerin kültürel miras olarak tanımladıkları uygulamaları, temsilleri, anlatımları, bilgi ve becerileri kapsayan "somut olmayan kültürel miras" nitelemesi, kültürel sürdürülebilirlik ve kültür politikaları üzerinden ele alıyor.

Müzik-Bilim Dergisi'nin yayınlanmasını sağlayan MSGSÜ Yayın ve Basın Birimi'ne, Bahar 2015 sayısının hakemlerine, genel yayın yönetmenimize, editörlerimize ve yazarlarımıza içtenlikle teşekkür ederiz.

Müzik-Bilim Dergisi Yayın Kurulu

Editorial[1]

The Journal of Musicology's new issue meets its audience with a brand new content. The Spring 2015 issue includes proceedings of the **Musicult'15** symposium, a symposium organized with the collaboration of Eastern Mediterranean **Academic Research Center (DAKAM) and Istanbul Technical University Turkish Music State Conservatory** held between 7-8 May 2015 at BISED Hall. All the papers were read and approved by the journal's scientific board. Thus, with our journal's Spring 2015 issue we are willing to offer our readers, the opportunity to discover new musicological approaches and methods, and new musicological understanding of scholars from 59 countries around the world attending the symposium, such as England, USA, Italy, Greece, Iran, Malaysia.

Since its beginning, the main principle of our journal is the idea of collaboration with other academic institutions. And it is our great pleasure to see that this principle is concretely being bought to life with our Spring 2015 issue. In the "network society" that we live in -as Manuel Castells would call it- we cannot deny the new possibilities of cooperation and interaction. For instance, the majority of the source research is made from online databases and collections and we have the opportunity to follow academic writings form publications that are included in these databases. To be part of the "network" is a necessity for individuals and institutions. And we are working in order to appear in these academic platforms. We are happy to announce our readers that, from now on, our Musicology Journal will be part of the collection prepared by **Répertoire International de Littérature Musicale** (RILM). By this occasion, we

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1 Translated by İlke Boran.

would like to thank our referees for supporting us and bringing our publication to a higher level.

The Spring 2015 issue of *the Journal of Musicology* consists of 5 articles. **Navid Bargrizan,** in his paper entitled "Technology, Microtones, and Mediation in Manfred Stahnke's *Orpheus Kristall",* focuses on Manfred Stanke's opera Orpheus Kristall, an opera sponsored by Siemens Arts Program and performed in 2002 at the Munich Biennale. In his paper Bargrizan concentrates on the role of mediation of the Internet within the main character Orpheus and the world that surrounds him.

Ángeles Sancho-Velázquez, in her paper "Virtuosos, Improvisers, and the Politics of Seriousness in Western Classical Music", debates on the abandon of improvisation in the European art music in the 19th century. She aims to analyze the social and political aspects focusing on the conceptions of virtuoso and virtuosity.

In the paper "Relation of Music to Cultural Identity in the Colonies of West Greece: the Case of Selinus", **Angela Bellia** aims to interpret from archeological findings, the musical activities in relation with cultural identity. She proposes a groundbreaking viewpoint in her Ancient Greek music studies focused on Athens and Sparta and gazing at Salinas in Sicily Island.

Olcay Muslu Gardner, in her paper "Endangered Music and Dance Culture and Sustainability: A Case Study in Rural Turkey" approaches her field studies in Domaniç with the perspectives of cultural sustainability, cultural politics and UNESCO's attribution of "abstract cultural heritage".

We would like to thank MSGSU publication department who realises the publication of our journal, the board of the Spring 2015 issue, our chef editor, our editors and our authors.

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The Journal of Musicology Editorial Board

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Technology, Microtones, and Mediation in Manfred Stahnke's *Orpheus Kristall**'**

Manfred Stahnke'nin *Orpheus Kristall*'inde Teknoloji, Mikrotonlar ve Dolayımlama

Navid BARGRİZAN***

Stahnke points out the desires "to make," "to build," but to "build in vain;" since we cannot "win," we "destroy what we have built." As a matter of fact, all these *possible* plots coexist simultaneously, throughout the opera.

Abstract

In his opera *Orpheus Kristall,* Manfred Stahnke presents an autistic Orpheus bewildered by the complexity of his multimedia environment. Extending the borders of the immediate, live music on stage Stahnke integrates an external world by means of the Internet, effectively creating the tension between Orpheus' inner-self and external influences.

I argue that the Internet, as a technological artifact, embodies the role of mediation in *Orpheus Kristall,* clarifying the allegorical relationship between Orpheus and his extended world. I explore the allegorical representation of key contemporary existential issues within *Orpheus Kristall,* represented by Stahnke's innovative use of digital media, microtonality, and mythology.

Keywords: multimedia opera, Internet as a performance medium, microtonality, difference-tone harmony, just intonation

Öz

Orpheus Kristall adlı operasında Manfred Stahnke, multimedya ortamının karmaşasından sıkılmış otistik bir Orpheus sunmaktadır. Stahnke, canlı müziğin doğrudanlığının sınırlarını genişleterek internet ortamının olanaklarını da katmakta, böylece Orpheus'un iç benliği ile dış etkiler arasındaki gerginliği ortaya çıkarmaktadır.

Teknolojik bir obje olarak internetin *Orpheus Kristall*'da dolayımlama rolünü üstlendiğini öne sürerek, Orpheus ve etrafındaki dış dünya arasındaki alegorik etkileşimi açıklamaya çalışıyorum. Bu makale, *Orpheus Kristall*'da Stahnke'nin yenilikçi dijital ortamla dile getirdiği temel çağdaş varoluş meselelerinin alegorik sunumu üzerinde durmaktadır.

Anahtar kelimeler: multimedya opera, performans ortamı olarak internet, mikrotonalite, difference-tone harmony, just intonation

Introduction

Placed in Manfred Stahnke's constructed world, an autistic Orpheus is lost in the complexity of a multimedia opera. Struggling with his own thoughts, Orpheus seeks his lost self-identity amid his immediate world on the stage and its virtual extension represented by the use of the Internet. He reacts to the incoming sounds that emerge from the Internet in an attempt to get to know and locate himself in this media-world. He is trapped within his thoughts until three imaginary Eurydice characters appear on the stage, confronting him and his hallucinations of the most traumatic event in his life: the loss of his Eurydice. As he attempts to face his memories, express his thoughts, and cope with his loss, he constantly endeavors to remember what happened to his Eurydice, throughout the course of the opera.

Orpheus Kristall, Stahnke's German opera in two media for stage and remote musicians, resulted from a cooperative project initiated by the Munich Biennale for Contemporary Opera 2002 and the Siemens Art Program. The purpose of the collaboration was to explore the theme of *Oper als virtuelle Realität* (Opera as virtual reality).[1] In this pioneering work, the Hamburg-based composer extends the boundaries of the live music on stage through integration of a vast external world via the Internet as an integral part of the performance medium. He also uses a finely-tuned system of fifty-three tones to octave, his own concept of *Differenztonharmonik* (Difference-Tone Harmony), and extensive micro-glissandi to characterize Orpheus's inner-battle within his extended, technological world. In fact, Stahnke's innovative approach to integrating digital media in the performance and his extensive, multifaceted microtonal construction is the foundation for the entire opera.

While Stahnke has authored articles disclosing the sophisticated compositional procedures in his works, here I analyze them as much as they relate to the use of technological and microtonal structures in this opera. Concentrating on the opera's technological aspect, I argue that the Internet, as a technological artifact, embodies the role of mediation in *Orpheus Kristall* to clarify the allegorical relationship between Orpheus and his extended world.

In the opera Orpheus uses the Internet as an object to relate to the large, confusing world. Using objects as mediator between an individual and the external world is not new to humans, and technology-philosopher Peter-Paul Verbeek has expounded upon this notion of "mediation":

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[1] In this paper, all translations are mine.

I articulate an approach to technological artifacts in human existence. The key concept of this approach is "mediation".... When technological artifacts are looked at in terms of meditation -how they mediate the relation between humans and their world, amongst human beings, and between humans and technology itself- technologies can no longer be pigeonholed simply as either neutral or determining. (Verbeek, 2005, p. 11)

In other words, based on the concept of mediation, technology is able to shape the nature of the human-world relationship. Here, Verbeek looks at technology as a possible form of mediation for human beings to be confronted with reality. In Orpheus Kristall, the allegorical relation of Orpheus to his extended world symbolizes the reflections of Orpheus's memories of Eurydice and her catastrophic death. The external world is realized in the performance by the remote musician's sound coming to the stage through the Internet, filtered by control boards and amplified by speakers. Integrating the "medium" of Internet to clarify the aforementioned relationships and extending the borders of the live stage-music represents a notable technological issue in Orpheus Kristall, as I shall demonstrate.

This paper will also address the allegorical representation of key contemporary existential issues within *Orpheus Kristall,* namely the correlation between Orpheus' inner-battle, and the non-fixed, fluid world of microtones in Stahnke's microtonal system. Orpheus' endeavor to overcome the cold "Kristall" (crystal) of his corrupted, non-functioning inner-world by grasping onto the external world's Internet-sounds, I further argue, is analogous to the composer's desire to break through the limited scope of equal temperament, as well as his attempt to expand the narrow reach of the immediate stage. *Orpheus Kristall* is a successful example of a multimedia art piece that draws upon mythology in order to address issues related to cultural and personal identity, while shedding light on the subtle amalgamation of mythology, technology, and microtonality.

The World of Stahnke's Orpheus

For this operatic collaboration, Stahnke, the librettist Simone Homem de Mello, the director Bettina Wackernagel, and the dramaturge Peter Staatsmann, agreed upon a different conception of the Orpheus myth, even though Orpheus has been the subject of several artistic projects throughout history. The question is: what would be their contribution to the *Orpheus* myth? Stahnke's own answer is related to the plot: "This opera does not tell a story. The story is rather pushed far behind; only an echo of the story remains to be heard."[2] (Stahnke, 2002, p. 196)

Stahnke considers, however, at least two distinct, *possible* storylines. First, the classic story of Orpheus: Orpheus descends to the underworld of Hades to retrieve his beloved Eurydice; he fails, and eventually collapses. Second, a

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2 *[Trotzdem ist diese "Oper" kein Ding, das eine Geschichte erzählt. Die Geschichte ist eher so tief eingesickert, dass nur ihr Echo zu hören bleibt.]*

transformation of the Orpheus myth: he escapes from the underworld, but Eurydice seduces him when she realizes that she would no longer be able to have contact with Orpheus (Bargrizan, 2012, pp. 106-110).

In Stahnke's version of the myth, however, the notion of "nature" is even more important than in the original story. In my interviews with Stahnke, he addressed the following relationships of the original Orpheus myth, as well as his own rendered version, to the concept of nature:

> Orpheus is a magician who reaches out to stones, animals, and plants, through his music. He has power over the cosmos, upon the humans. It is at once "Animism", considering nature as the spirit of everything and everyone, but also "Shamanism" which is an ancient culture and still exists partially in Siberia, Korea, or Japan. In other words, Orpheus is a Greek version of the old Shamans.[3] (Bargrizan, 2012, pp. 107-108)

In Stahnke's opera, Orpheus rules a world that he created -a world that extends beyond the borders of the stage. The composer adds some other islands across the world to Orpheus's territory of the opera hall. These islands are connected to the main stage through the Internet; from New York and Berkeley, to Amsterdam. Within this new world, the autistic Orpheus suffers from his memories of falling in love with Eurydice, wining her, and eventually losing her. "He even may have murdered her," says Stahnke; this possibility leads to another component of the opera. Stahnke points out the desires "to make," "to build," but to "build in vain;" since we cannot "win," we "destroy what we have built."[4] (Bargrizan, 2012, p. 108) As a matter of fact, all these *possible* plots coexist simultaneously, throughout the opera.

Crystals and Building Internet-Opera

In this opera, *Kristall* is a metaphor for nature, for Orpheus's corrupted world. Stahnke borrowed this term from the Austrian physicist, Erwin Schrödinger's concept of "aperiodic crystal" from his influential book *What Is Life?* (1944). In this seminal text, in an era before the biological structure of the human-DNA was fully exposed, Schrödinger proposes the concept of "aperiodic crystal" as the molecular material carrier of life. He juxtaposes this concept, which stands for the rather complicated and non-repetitive structure of a gene, and the rigid and plain structure of the natural "periodic crystals" as it was already understood in the physics (Schrödinger, 1944, p. 5 and pp. 60-61). In his words:

> An Organism's astonishing gift of concentrating a "stream of order" on itself and thus escaping the decay into atomic chaos -of "drinking orderliness" from a suitable environment- seems to be connected with the presence of the "aperiodic solids", the chromosome molecules, which doubtless represent the highest degree of well-ordered atomic association we know of -much higher than the ordinary periodic crystal-

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3 [*Orpheus ist ein Zauberer, er ist mit den Steinen, mit den Pflanzen, mit den Tieren verbunden. Er hat Macht über das Universum, über die Menschen. Eigentlich ist das Animismus, die Natur als die Seele des Ganzen zu betrachten, oder Schamanismus, der immer noch in Sibirien, Korea oder Japan existiert, das ist eine uralte Kultur. Orpheus ist sozusagen eine griechische Version der alten Schamanen.*]
4 [*Er hat sie vielleicht auch gemordet, das ist eine mögliche Komponente in unserer Oper. Das hat uns die Texterin nahe gebracht: Das Bauen, aber das Umsonstbauen, weil ich die Welt nicht gewinnen kann, deshalb zerstöre ich sie.*]

in virtue of the individual role every atom and every radical is playing here. (Schrödinger, 1944, p. 77)

Inspired by Schrödinger's thesis, for Stahnke, the complicated, rigorous structure of "periodic crystals" is a metaphor of his intricate, microtonal system, comprising fifty-three tones to octave.[5] He employs this scale exclusively for the improvisation of the remote-musicians. In this regard, Stahnke mentions:

> How are we able to deal with an Internet opera that includes building crystals (tone systems) and Internet? Tone systems are analogous to crystals. But in this omnivorous Europe, the crystal is already very old (our great-grandfather: the twelve-tone equal temperament).[6] (Stahnke, 2001, p. 27)

Stahnke employs his specific just-intoned tone system, including the partials up to the twenty-first harmonic in the harmonic series. His system consists of fifty-three equal intervals, which linearly would build a scale of one-eighth tones. In other words, using intervals imbedded in the harmonic series, he creates an approximate elaboration of equal temperament, extending the realm of twelve tones to fifty-three tones to octave. About the relationship of this scale to the ancient musical cultures and its characteristics, Stahnke mentions:

> That is an old *Bonsaquet* and Baroque system. Even the ancient Chinese people knew that building up a scale of fifty-three natural fifths, practically results in the octave.... Using fifty-three tones to octave opens the door to a lexicon of perverse and useful intervals. There, we are suspiciously close to world of "noises".[7] (Stahnke, 2001, p. 27)

Here, we see how Stahnke's tonal concept has its roots in the ancient world as well as in the nature, representing the world of Orpheus and the world of the natural, un-tempered tones; questioning our dominating, equal-tempered tonal world.

The second significant microtonal element in the opera is the slow, long micro-glissandi, where we can experience a diverse and constantly-morphing microtonal world (see Examples 1.1, 1.2, and 1.3). This is an effect that Stahnke often applies in his compositions. In *Orpheus Kristall,* the extensive use of micro-glissandi is related to the constantly mutating thoughts of the autistic Orpheus. Stahnke relates the extensive use of micro-glissandi to the story-line (if there is such thing as story-line, in this opera) as follows:

> There is the threshold of form-recognition in the constantly-mutating meloharmonic[8] image as a consequence of micro-glissandi and pulse-

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5 As opposed to his metaphorical use of the concept of "aperiodic crystal," informing his system of Difference-Tone Harmony, which I will explain in the next pages.
6 [*Wie ist so ein Ding „Internetoper" zwischen Kristallbauen und Internet-Laufenlassen zu planen? 'Tonsysteme, gehören zu Kristallen, aber in diesem allesfressenden Europa sind die Kristalle gealtert (unser Urgroßvater 'Zwölfton-Temperierung)*].
7 [*Das ist ein altes System. Bonsaquet, Barok. Sogar die alten Chinesen wussten, dass nach 53 reinen Quinten übereinander praktisch die Oktave erreicht ist. 53 temperierte Schritte pro Oktave ergeben linear zirka Achteltönen.... Mit 53 Tönen öffnet sich ein Lexikon des Perversen und Nützlichen, wir sind dem rauschen verdächtig nah.*]
8 For explanation of the concept of "meloharmony," see page 20.

> fluctuations -as if Hades is the world of "formlessness", and as if "form"
> comes from an inaccessible, different world.[9] (Stahnke, 2002, p. 196)

In other words, the vague microtones which are located between the fixed half and whole tones as opposed to the familiar tones of the equal tempered twelve-tone scale, inform "formlessness vs. form".

The scale consisting of fifty-three tones to octave used by the remote-musicians and micro-glissandi used by the stage-orchestra are therefore the most essential elements in the tonal construction of this opera. Alongside juxtaposition of the stage and Internet-music, these tonal elements create contrast between the notions of "formlessness" and "form." Orpheus desperately desires to reach his now-dead, formless Eurydice. Hence, he travels to the Hades, where the distinction between form and formlessness is not as clear. He nearly regains his Eurydice, but he loses her again, and therefore loses himself as well. This dichotomy between form and formlessness is conceived throughout the work by means of a contrast between the realm of half and whole tones and the domain of microtones, all of which is amplified by the improvisatory world of Internet-sounds, in contrast to the stage-produced sounds. To realize the dichotomy of form and formlessness in the music, Stahnke expands the world of fixed half and whole tones to a world of endless tones, where the tone is an unfixed phenomenon. By allegorical adoption of a multi-layered microtonal structure, Stahnke breaks the barrier of the equal temperament that had characterized our somewhat limited world of the tempered fixed tones.

As an allegory to Schrödinger's concept of "aperiodic Crystals," Stahnke's concept of "Difference-Tone Harmony" which is the underpinning of opera's harmonic structure, is equally significant:

> If this enormous apparatus, the Internet, with its uncontrollable character has to be integrated on the stage, as a counterbalance, a precisely-built "crystal" should also be present on the stage. My difference-tone harmony could become a comprehensive meloharmonic concept for the entire opera.[10](Stahnke, 2001, p. 27)

Meloharmony is a term coined by Stahnke in his article "Hybrid Thinking in Meloharmony," published on his official website.[11] Stahnke explains this notion as follows:

> Meloharmony is a word that I came up with to denote the interrelationship of vertical and horizontal pitch organization within an open microtonal field. By definition, this field is open to every aspect of pitch organization; interval relationships may exist within this field regard-

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9 [*Es gibt die Schwelle des Gestalterkennens in einem stets mutierenden meloharmonischen Bild infolge von Mikroglissandi, Pulsschwankungen -als wäre der "Hades" der Ort der Gestaltlosigkeit und als käme Gestalthaftes aus einer anderen -unerreichbaren- Welt.*]
10 [*Wenn schon dieser riesige Apparat des Internet mit seinem unsteuerbaren Spielcharakter in die Oper einbrechen soll, müsste als starkes Gegengewicht ein sehr präzise gebautes "Kristall" auf die reale Opernbühne gestellt werden. Meine Differenztonharmonik könnte zu einem umfassenden meloharmonischen Konzept für die Oper werden.*]
11 http://www.manfred-stahnke.de/stahnke-english.html.

less of whether or not they are also related to older forms of melodic-harmonic relationships. The only restriction lies in the avoidance of addressing "anonymous" fields, where neither horizontal nor vertical pitch relationships play a distinct role. (Stahnke, 2014, p. 1)

Example 1.1: Manfred Stahnke, *Orpheus Kristall,* Act I, Measures 84-89. Micro-glissandi in the strings, microtonal deviations, and the difference-tone chords; the fundamental tones are stated below the staff. Reproduced with the permission of the Stahnke-Verlag.

Example 1.2: Manfred Stahnke, *Orpheus Kristall,* Act I, Measures 90-95. Micro-glissandi in the strings, microtonal deviations, and the difference-tone chords; the fundamental tones are stated below the staff. Reproduced with the permission of the Stahnke-Verlag.

Example 1.3: Manfred Stahnke, *Orpheus Kristall,* Act I, Measures 96-100. Micro-glissandi in the strings, microtonal deviations, and the difference-tone chords; the fundamental tones are stated below the staff. Reproduced with the permission of the Stahnke-Verlag.

In earlier pieces such as his fourth string quartet, titled *Schrödingers Kristall,* inspired by Schrödinger's concept, Stahnke applies his system of Difference-Tone Harmony, extensively. In *Orpheus Kristall,* Stahnke's meloharmonic construction also rests upon Difference-Tone Harmony. This concept refers to what happens naturally in our ears when we hear any interval. As soon as we hear an interval, its summation-tone *(Summationston)* emerges as overtones, and its quadratic as well as its cubic difference-tones *(Differenztöne)* emerge as undertones. While these are naturally occurring phenomena, we, however, are only able to perceive these in specific acoustic conditions accompanied by enough amplification, correct intonation, and the lack of vibrato.

Taking any ratio (f2/f1) from the overtone-series (f2 has a higher frequency than f1), the quadratic difference-tone of this ratio is f2 minus f1 (f2-f1). For example, as illustrated in Figure 1.1, based on C2 as fundamental, its eleventh overtone (f2) is F#5 -49 cents, or the natural tritone (11/8), which is about a quarter-tone (50 cents) smaller than equal tempered tritone. On the other hand, its seventh overtone (f1) is Bb4 -31 cents, or the natural minor seventh (7/4), which is about one-sixth tone (33 cents) smaller than the equal tempered minor seventh. According to the formula f2-f1, the quadratic difference-tone of these two frequencies sounding harmonically is 11-7=4, the fourth partial which is C4. The summation-tone of these two frequencies (f1+f2) is 7+11=18, in this case the eighteenth partial, which is D6.

- The numbers above the notes indicate the numbers of the partials.

- The numbers below the notes combined with the accidentals indicate the cent-deviations form the equal temperament.

- Q. D. T. stands for quadratic diffrence-tone.
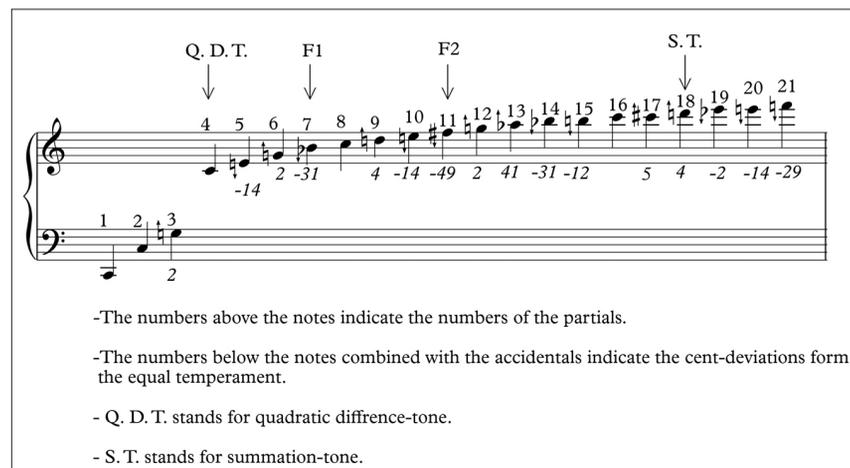
- S. T. stands for summation-tone.

Figure 1.1: Overtone series of the fundamental tone C2, up to the twenty-first overtone. This figure indicates the quadratic difference-tone and the summation-tone of the ratio f2/f1.

A bit more complicated and not as well-known is the phenomena of cubic difference-tone (2*f1-f2), which actually is not just one tone, but usually a cascade of difference-tones consisting of the undertones of any ratio based on a specific fundamental. Take, for example, the ratio 11/10 (tenth partial is E5 based on the fundamental C2), the first cubic difference-tone is 2*10-11=9, which is D5 -4 cents. Then if we take D5 as f2, the next cubic difference-tone in the cascade will be 2*9-10=8, which is C5. If we keep on calculating according to the same formula, the rest of the cubic difference-tone will be: 2*8-9=7, 2*7-8=6, 2*6-7=5, 2*5-6=4, 2*4-5=3, 2*3-4=2, 2*2-3=1. Here, see Figure 1.2, we observe that all the undertones of the ratio 11/10 build a cascade of cubic difference-tones (the ninth, eighth, seventh, sixth, fifth, fourth, third, and the second partials, as well as the fundamental tone itself).
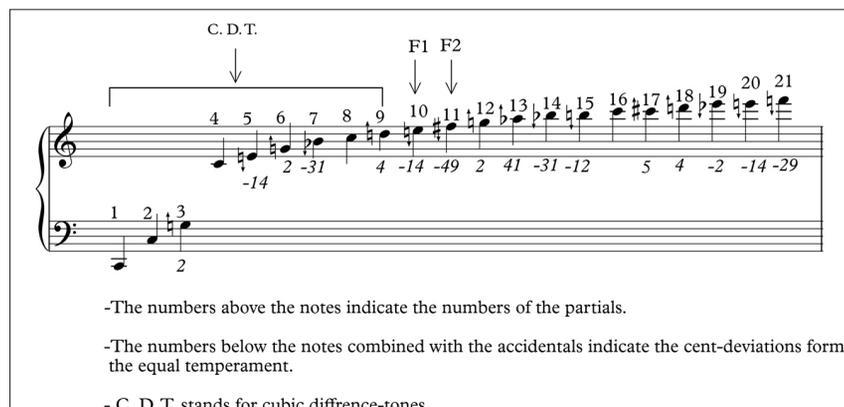
Figure 1.2: Overtone series of the fundamental tone C2, up to the twenty-first overtone. This figure indicates the cubic difference-tones of the ratio f2/f1.

Extending the scope of his microtonal system, throughout *Orpheus Kristall,* Stahnke uses this natural phenomenon and builds just-intoned chords based on both sorts of the difference-tones, constructing the harmonic structure of the opera. In other words, his harmonic system makes us perceive consciously what we most often, unconsciously hear.

Stahnke projects in *Orpheus Kristall,* however, a holistic world of sound and image that belong together. In order to accomplish that, a few months before the performance, the collaborators developed an interactive platform for visual interaction in Internet. In the course of the time, images were shaped through the Internet platform and used later in the stage visual effects. Parallel to the tone system as shaped by the composer, these images were crystalizing. Here, we can see another connection between the notion of *Kristall* and the technological element of Internet in this opera. At the beginning of the first scene, Orpheus is playing with his computer keyboard; he is trying to contact the remote musicians. While Orpheus recalls his fatal memories of Eurydice, the improvisatory, incoming Internet-sounds, in contrast to- and in combination with the strict notated difference-tone harmonies, get projected upon Orpheus on the stage; the aforementioned dualities begin to emerge.

Stahnke deliberately uses unlimited meloharmonic possibilities, which his microtonal conceptions grant him, throughout the opera. He relates the microtonal world of difference-tones to the Orpheus story, using a triple Eurydice character which could be interpreted as both Eurydice and the tree-headed dog, Cerberus, as follows:

> A triple Eurydice is generated as the composed difference-tone shadows of Orpheus' voice. The woman, from the world of shadows, pulls the man (escaping love) underneath. Orpheus appears as a double of the triple Eurydice; as her projection. The sung tones are actually the projection of a modified sound space: each sung tone is instrumentally projected in a difference-tone space, which unfolds in a strict and obsessive tone system.[12] (Stahnke, 2001, p. 30)

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[12] *[Eine dreifache Eurydice erzeugt sich als komponierten Differenztonschatten der Orpheusstimme. Die Frau, hier durchaus kein Wesen aus der Schattenwelt, zieht den (vor der Liebe Fliehenden) Mann herab. Orpheus erscheint wie ein Doppel der Dreifach-Eurydice, wie Ihre Projektion. Überhaupt sind die gesungenen Töne Projektionen eines vorgeformten Klangraums: Jeder gesungene Ton wird instrumental in ein differenztongeschehen eingebettet, ergibt sich so aus einer strengen Ordnung, aus einer Obsession.]*

In *Orpheus Kristall,* the musical instruments often realize the difference-tones of the voices to build complex, microtonally-tuned chords (see Example 2).

Example 2: Manfred Stahnke, *Orpheus Kristall,* scene V, measures 123-128. Difference-tone chords; the fundamental tones are stated below the staff. Reproduced with the permission of the Stahnke-Verlag.

In addition to the natural intervals, the complex unordinary intervals play for Stahnke's *Orpheus Kristall* also a significant role. What happens if we move from the natural fourth (4/3) to a slightly distorted fourth of 4.1/3? Then we will have extremely exotic difference-tones. As a matter of fact, using micro-glissandi we can experience a diverse world of these strange tones in-between the just-intoned tones. The natural intervals, the distorted intervals, and their complicated difference-tones, are the underpinnings of the harmony in *Orpheus Kristall,* which of course, draws upon mathematical calculations. Viewing this microtonal conception as an idea to be realized in the performance, the singers also have several microtones to sing. In order to intone these intervals as precisely as possible, Stahnke and the conductor practiced for a long time with the singers, using the exact computer versions of the microtones. In addition, the microtonal voice parts are frequently accompanied by instrumental background to have a reference frequency. According to Stahnke: "Without the instruments as references for the vocalists, it would be very hypothetical to realize these micro-intervals in the voice."[13] (Bargrizan, 2012, p. 110) Here, one of the important reasons for the persistence of the composer to revive the predominance of the "natural" tones in *Orpheus Kristall,* which sound to our ears ironically "unnatural" and "strange," and to base his whole meloharmonic construction upon this just intonation, is the presence of the element of "nature" in the whole Orpheus myth, which, as explained, is of a particular relevance in the conception of the opera.

A duality arises from the conflict of the indefinite, improvisatory world of Internet sounds, and the definite, intricately built microtonal system of this opera. In fact, duality is a constant present notion throughout the opera: duality of the ancient myth and the modern, technological world; duality of our solid universe (or multiverse) and the underworld (Hades); duality of the world of fixed-tones and the realm of non-fixed, fine-tuned tones.

Internet and Mediation in *Orpheus Kristall*

With this opera, Stahnke comments on the foundation of our existence in an enormous complicated exterior. In the present time, using various possibilities of digital media, our existence is strictly tied to the outer-world. In *Orpheus Kristall,* Orpheus's existence is represented not merely by the small stage where the performance takes place, but also by an external world made available through the Internet musicians' sounds. The incoming sounds, reflected in the hall, leave Orpheus to deal with his memories, as they leave us to question our existence through the opera's content. The opera seeks to break the barrier between interior and exteriors realm -to overcome the old *Kristall* of equal temperament, and the boundary of the immediate stage.

Breaking the barrier between the exteriors is the Internet's role in this production, an allegorical mediation between technology, the opera, and its message. From one standpoint, *Orpheus Kristall* could be interpreted as the aesthetic product of the artists involved in the project and the technological possibili-

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13 [*Wir sind immer von den Gesangstönen, die von Instrumental-Tönen getragen sind, ausgegangen. Also es gibt niemals den reinen Gesang ohne den Hintergrund der Instrumente. So haben wir auch mit Computer geübt, damit die Sänger hören, wie die Mikrotöne klingen und sich anpassen können. Sonst wäre das sehr hypothetisch.*]

ties that the use of the Internet granted the project. In other words, a specific mythological and microtonal structure conceptualized by the composer, librettist, director, and the dramaturge on one side, and the technological structure of the Internet on the other. Here, the Internet mediates the projection of the autistic Orpheus's thoughts (voice), attempting to come to terms with his memories. The remote musicians react to his thoughts and improvise. Their reflections flow back to the stage through the media of Internet, and Orpheus, now confronted with them, keeps trying; and that is how this interaction begins to exist.

This opera features *quintet.net,* a real-time Internet performance environment which allows remote musicians to participate in the performance. The multimedia composer, George Hajdu, at the Academy for Music and Theater Hamburg developed this concept, which Stahnke applies in the opera. In 2002, the Internet was not fast enough to transport sounds. Thus, the sound engineers converted the live Orpheus character and the percussion sounds from Munich through a pitch-tracker device, in real-time. They transported these sounds with MIDI-data, using the Internet, to give the information to the remote solo musicians or ensembles in Amsterdam, Berkeley, and New York. These remote musicians heard the modified sounds while watching the stage's image through real video streaming. Accordingly, they reacted to the stage-music and improvised upon it. The composer and the engineers, using mix consoles could take one or more of these new incoming MIDI-data, modified them through a pitch-tracker, samples, or electronic sounds, and played them in the hall. At some points, the incoming internet-sounds were intriguingly filtered up to their thirty-third overtone, filling the hall with a wide range of natural tones (see Examples 3.1 and 3.2). Sometimes, they even filtered the Orpheus voice through the incoming Internet-sounds. Therefore, the audience heard his voice in a kind of strange, blurred, deformed manner.

Emphasizing the aesthetic significance of incorporating the digital media in a contemporary artwork, Stahnke's use of the Internet as a media in his opera gives credence to the importance of collective creativity and digital participation. In fact, using Internet as a participatory platform to integrate the collective creative imagination has been a recurring subject in the twenty-first century. In the context of Internet art projects such as Crowdsourced art, Iona Literat highlights the importance of collective creativity and digital participation as follows: "With the rise of the Internet, artists interested in collaborative or participatory art found an ideal platform to reach an infinitely wider and more diverse pool of potential contributors." (Literat, 2012, p. 2972) However, there is a simple difference between Stahnke's concept of Internet-opera and digital, participatory projects such as Crowdsourced art: Stahnke's concept is in one sense participatory because it involves remote musicians to participate in shaping the Orpheus' musical world. Although it does not integrate the creativity of audiences in the hall or in remote locations, it makes a complicated exchange between the stage and the remote musicians possible. Furthermore, through its innovative, pioneering approach to tonal systems, digital media, and myth, it successfully mediates its existential message to the audience.

Example 3.1: Manfred Stahnke, *Orpheus Kristall,* incoming Internet-Sounds, in *Poème Internet* of the Act I, measures 6-10. Reproduced with the permission of the Stahnke-Verlag.

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Example 3.2: Manfred Stahnke, *Orpheus Kristall,* incoming Internet-Sounds, in *Poème Internet,* measures 11-16. Reproduced with the permission of the Stahnke-Verlag.
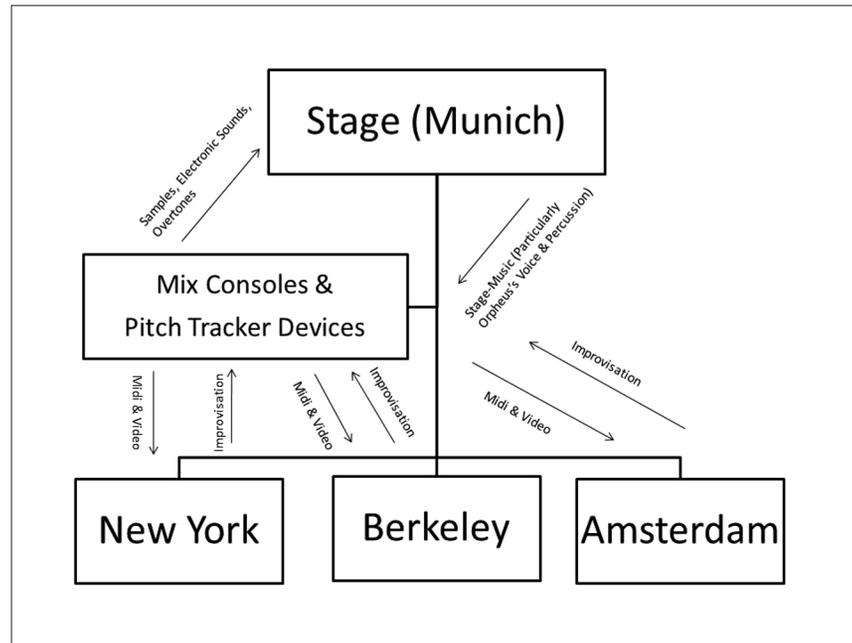
Figure 2: The Function of Internet in Manfred Stahnke's *Orpheus Kristall.*

Technology and The Essence of The Opera

In his 1954 essay "the Question Concerning Technology"[14] Martin Heidegger explains the relationship between art and technology in the art-technology world, as follows:

> Because the essence of technology is nothing technological, essential reflection upon technology and decisive confrontation with it must happen in a realm that is, on the one hand, akin to the essence of technology, on the other, fundamentally different from it. Such a realm is art.... Yet the more we ponder about the essence of technology, the more mysterious the essence of art becomes. The closer we come to the danger, the more brightly do the ways into the saving power begin to shine and the more questioning we become, for questioning is the piety of thought. (Kaplan, 2009, p. 24)

Here, Heidegger considers art as a mode for essential reflections on techno-logy. In other words, he proposes the medium of technology as a means to question the essence of art, and at the same time, art as a means to ques-tion the essence of technology. The aim of my research was to investigate the essence of technology in the context of this contemporary opera, and at the same time, to ponder the essence of this artwork by means of analyzing its technological aspects. According to Stahnke's multi-dimensional approach to the art, in *Orpheus Kristall,* he creates a new concept of opera by integrating the following elements: exotic intervallic and harmonic concepts; improvisation; exotic, African percussion instruments; and the Internet; all the while basing this construction on an elaborated version of the Orpheus' myth, which con-

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14 Published 1954, originally in German, under the title "Die Frage nach der Technik." It was translated to English 1977.

tains psychological as well as existential connotations. Accordingly, he appoints an essential role for technology in the context of his opera. This conventionally mythological, but modernly microtonal and technological opera is a relevant example of a multi-dimensional twenty-first-century artwork.

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