array

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Array

Margaret Schedel and Jennifer Bernard Merkowitz, editors
Jen Wang, designer

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Letter from the President

by Mara Helmuth
May 30, 2008

Dear ICMA members,

I want to thank you and the board of directors for the honor of serving as President of the International Computer Music Association, after holding positions as director for the Americas, newsletter editor and Vice President for Conferences. ICMA is distinguished in the field because of its international scope and its depth in presenting both current music and research. The conferences have provided so many stimulating musical experiences as well as thought-provoking paper sessions, panels and Array discussions. I am happy to contribute in this new role.

Perry Cook, our retiring President as of January, deserves our greatest appreciation. His contributions as President from 2004-2007 resulted in successful conferences each year in Miami, Barcelona, New Orleans (despite Katrina!) and Copenhagen. We hope to see him every year.

Current projects include the extensive revision of the ICMA website. Toine Heuvelmans, Margaret Schedel, Gary Scavone, Chryssie Nanou, and Hans Timmermans, as well as other directors, have been involved with this project.

Another project is the sponsorship of member publication projects. In the fall, before accepting this officer position, I was part of a group of women interested in putting out a DVD of works by lesbian composers. We were excited to work with ICMA as our non-profit sponsor to obtain a grant for publication from Open Meadows. Full funding for the publication of the DVD has since been obtained, and the release by Kristine Burns and Colby Leider at Everglade (http://www.everglade.org/) is expected within a year. This type of sponsorship is beneficial both to the members involved and to the organization, which takes a percentage of the grant income for its sponsorship. Other members with such projects are invited to contact board members regarding non-profit organization sponsorship.

As always, future conference sites are of interest to the organization. If you are considering hosting an ICMC, please contact VP for Conferences Tae Hong Park (park@tulane.edu) and me (mara.helmuth@uc.edu) for the new revised guidelines.

If you have any questions, comments, or ideas about what ICMA should be doing, please contact me, a board member, or the appropriate Vice President for your continent. I hope to see you all at ICMC 2008 Aug. 24-29. We are looking forward to a tremendous conference at the Sonic Arts Research Centre at Queen's University, Belfast.

Sincerely,

Mara Helmuth
ICMA President
Associate Professor, Composition
Director, Center for Computer Music
College-Conservatory of Music,
University of Cincinnati

Letter from the Editors

The Editors of Array are looking for interested persons to write articles and reviews for upcoming issues. The next issue will be coming out in the spring of 2009 and a printed version with an ISDN will be available for purchase. If you would be willing to write something for Array, have feedback about this issue or ideas for future issues, please email us: array.journal@gmail.com. In your email, please give us your name, mailing address, and any particular areas of interest, so that we can send you any appropriate materials. If you have materials you would like reviewed please send to:
Dr. Margaret Schedel
3304 Staller Center
SUNY Stony Brook
Stony Brook, NY 11794-5475
If you write a CD or book review, you will be able to keep your review copy free of charge. We look forward to hearing from you; the success of Array depends on input from its readers.

Thank you,
Jennifer Bernard Merkowitz
Margaret Schedel

ICMC 2007 Keynote Address

Fifty Years of Computer Music: Ideas of the Past Speak to a Future Immersed in Rich Detail

by John Chowning
CCRMA
Department of Music
Stanford University

ABSTRACT

Two early uses of the computer to synthesize and process sound—additive and FM synthesis—led to new thoughts about sound spectra, tuning and pitch. Detached from their traditional association with the timbre of acoustic instruments, spectra become structured and associated with pitch in ways that are unique to the medium of computer music.

With 50 years of rapid technological evolution and increasing knowledge has come an explosion of detail, which can become tractable through imaginative use of the inherent attributes of the medium itself and through visualizations that can make implicit detail explicit.

INTRODUCTION

In 1957, just fifty years ago, Max Mathews introduced a wholly new means of making music. An engineer/scientist at Bell Telephone Laboratories (BTL), Max (with the support of John Pierce, who was director of research) created out of numbers and code the first music to be produced by a digital computer. It is usually the case that a fascination with some aspect of a discipline outside of one's own will quickly conclude with an experiment without elaboration. But in Max's case, it was the beginning of a profoundly deep and consequential adventure. It was an adventure that he modestly invited us all to join through his elegantly conceived programs, engendering tendrils that found their way into far-flung disciplines that continue to grow without end fifty years later.

From the very beginning, Max's use of the computer for making music was expansive. Synthesis, signal processing, analysis, algorithmic composition, psychoacoustics—all were within his scope, and all were expressed and described in great detail in his famous article [4] and the succession of programs MUSIC I-V.[1]

It is in the nature of the computer medium that detail be elevated at times to the forefront of our thinking. Unlike preceding music technologies, both acoustic and analogue, computers require us to manage detail to accomplish even the most basic steps. It is in the detail that we find control of the sonic, theoretical and creative forms. And it is through paying attention to detail that we reveal our scientific/engineering insights or our artistic expression—our own voice.

The first examples of computer-generated music produced by Max Mathews and John Pierce at BTL were rich in ideas, including algorithmic composition, novel tuning, matching tuning systems to complementary spectra, imaginative and compelling graphics and visualizations and, soon afterward, controllers [3]. It is fortunate that these two scientists/engineers—who cultivated a nexus between science and art, and who invited composers and artists like Varèse and Cage to their laboratories to share the possibilities that they saw—were willing to place these nascent musical studies in the public view, confident in the intellectual content of their ideas. Some of their ideas remain as compelling now as they were then and should be "re-viewed" given the enriched domains of application at this 50-year mark.

BREAKTHROUGHS

The richness of the ideas in these early examples was not matched by the quality of the sounds with which they were expressed. Little was known about some important aspects of perception and the acoustics of musical instruments. Max invited two important composers to work at BTL, both of whom made important contributions in this area in addition to creating compositions. They were James Tenney and Jean-Claude Risset.

Preceding Max's famous article by a few months was an article by Tenney that described in exquisite detail the program that Max had created [8]. Tenney had been invited by John Pierce and Max to work at BTL beginning in 1961. He had studied with the visionary Lejaren Hiller at the University of Illinois, so he came prepared in matters of programming and stochastic processes in composition. During his three years at BTL, he made several important contributions. He created compositions using this new medium, and he wrote in great detail about how he had constructed his compositions and what he had learned from Max. Because he was a composer, Tenney's description of Max's MUSIC IV was from a musical viewpoint, and it remains an exemplar of clarity and completeness.[2]

But, important to the points being presented in this paper, Tenney came upon a music-driven question in his compositions using MUSIC IV for which there was no answer. So, with Max's guidance, he did a study regarding the *perception* of attack times [8].

The italicization is to draw attention to two points: first, the fact that from the outset psychoacoustics had been seen by Max as one of the crucial disciplines in the advancement of computer music[3], and second, that musicians have a particular sensitivity to the details of auditory perception.

Risset Uncovers the Microstructure

There is no doubt that the most important breakthrough in the early days of computer music occurred when Jean-Claude Risset and Max Mathews began detailed computer studies in the analysis, synthesis and perception of acoustic instrument tones, which culminated in Risset's *An Introductory Catalogue of Computer Synthesized Sounds* [3]. With this work, the medium of computer music reached a level beyond Max's correct but abstract assertion that computers (coupled with loudspeakers) can produce any perceivable sound. The capability of simulating natural-sounding tones presupposes an understanding of the perceptual relevance of the physical stimuli, only some of which have been "selected" as meaningful by the auditory system.

Risset began his research with a study of trumpet tones [7]. The brass family had eluded attempts at simulation based upon extant acoustic descriptions. In a detailed analysis, Risset discovered that the "signature" of the trumpet tone is the correlation of input force (pressure) and spectral bandwidth. The evolution of the harmonic amplitudes during the attack portion of the tone is rapid, complicated, but with a direction: as the overall intensity of the tone increases, the greater is the relative contribution of the higher harmonics. Risset had made an important discovery relating the auditory system's perception of "naturalness" to selected physical stimuli. This discovery figured prominently in the advancement of FM synthesis.

FM Synthesis—40 Years

It was forty years ago that this author "stumbled" upon FM synthesis [1]. The actual date is not known. Not having a scientific or engineering background, I did not have the habit of keeping dated lab notes, but I did keep notes. There is a record of my having visited BTL on December 18, 1967, when I showed the data that I used in my first trials to Max, Risset and Pierre Ruiz and played them the examples. It was a month or two before, almost certainly late at night, while experimenting with extreme vibrato frequencies and depths that I realized "there is more here than at first meets the ear."

Its discovery was not a purposeful search—that is, stemming from a realization, from looking at the equation, that there might be some interesting experiments to try. Rather, it was altogether a discovery of the "ear."

One must remember that while the theoretical potential for the production of rich dynamic sounds with the computer was great, the knowledge required for realizing this potential was meager. Risset's catalogue was in progress and was little known outside of BTL. Furthermore, the cost in computer time was enormous, limiting the complexity of synthesis algorithms. Deep into the details of digital reverberation at the time, I was keenly aware of this issue. My "ear" was continually scanning for any sound having internal dynamism, coupled oscillators, random vibrato, etc. That I found it within such a computationally efficient algorithm was certainly partly chance, but then I was also certainly prepared for that chance.

The first experiments were each only of a few seconds' duration, because of the tens of minutes' computation time on a time-shared system. But they do show that from the outset, all of the essential features that would eventually be developed and used in musical contexts were noted:

- both harmonic and inharmonic spectra could be produced
- a change in frequency deviation (Δf) produced a change in bandwidth of the spectrum
- the spectrum is conserved through the pitch space with a constant ratio of FM frequencies

As it turned out, these parameters of FM synthesis have a remarkable perceptual relevance.

As mentioned above, Risset's study of trumpet tones had a major influence on my own development of FM synthesis. I first heard about this study on the aforementioned visit to BTL in 1967, during which I showed my first experiments in FM synthesis. Risset explained his analysis and re-synthesis of trumpet tones and played some examples. It was not until 1970, however, that I fully appreciated the importance of his discoveries about trumpet tones.

While working on the FM synthesis of percussive sounds, I noted that in nearly all tones of this class, the amplitude envelope and the envelope controlling the modulation index were very similar if not identical. I also noted that there was as strong a correlation of the perception of "strike force" to the modulation index as there was to intensity. I considered other classes of tones where this might be the case, and I remembered Risset's explanation of the "signature" of trumpet tones, some three years previous. With only a few attempts I was able to create credible brass-like tones by simply coupling a single

function to the amplitude and modulation index envelopes with appropriate scaling. I realized that this correlation of force or effort (strike force, breath and bow pressure velocity, etc.) to the bandwidth and/or high-frequency emphasis of partials can be generalized to all natural sound and that the parameters of FM synthesis provided a straightforward implementation of this important correlation.[4]

Then began a rapid development of FM synthesis[5], and the eventual licensing of the technology by Stanford University to Yamaha. The rest is history.

STRUCTURED SPECTRA AND PITCH SPACE

There are two ways in which additive synthesis and FM synthesis have been used that merit emphasis, because they touch upon issues that are important beyond any particular means of synthesis. John Pierce and Max foresaw one way in the early years: the creation of a non-traditional scale that has a structural link to timbre, where the frequency ratios from the scale are used in the construction of the tone's spectra.[6] Risset, however, used synthesis in a manner not foreseen—a manner imaginative and evocative.

Constructing Spectra in the Pitch Space

The final example in Risset's catalogue stands as a striking advance in computer music, although it is little recognized and little exploited. It is the first instance where pitch is used to express timbre in the same functional manner that pitch expresses melody and harmony—melody-harmony-timbre all within the pitch space. Pitch is composed sequentially as line and simultaneously as harmony, for which there are rich functional theories, but composing timbre as a collection of partials drawn from the pitch space cannot be achieved with acoustic instruments and falls squarely in the domain of computer music.

The sound potential of any instrument is vast, but limited—the partials that make up an instrument's tone can only be partly modified by performance techniques and devices such as mutes. A clarinet and a violin can play the same pitch at the same loudness for the same duration, but they cannot be made to have the same spectrum through time—the frequency and intensity of an instrument's partials are locked within boundaries defined by its and the performer's physical properties.

Risset realized in his timbre studies that by summing numbers of sinusoids (pure tones) where each sinusoid can have its own independent control over intensity and frequency through time, he had unlocked timbre from any physical constraints. He could create tones that cannot exist in the natural world, complex timbres where the partials themselves are a part of the pitch space. He composed a short pitch sequence that is heard first sequentially in time (melody), then simultaneously in time (harmony), and then again simultaneously with exactly the same pitches but now as partials associated with a single sound source, as shown in Figure 1. [2]

Because all of the partials die away in a similar manner, they fuse and are heard as timbre rather than harmony. The timbre is similar to that of a gong, but a gong whose spectrum is imprinted with pitch information, giving the sound an extra-natural structural link to the preceding. Risset's was an altogether new conception, uniquely possible with computers, and beautifully framed in several of his compositions, first in *Mutations* (1969).

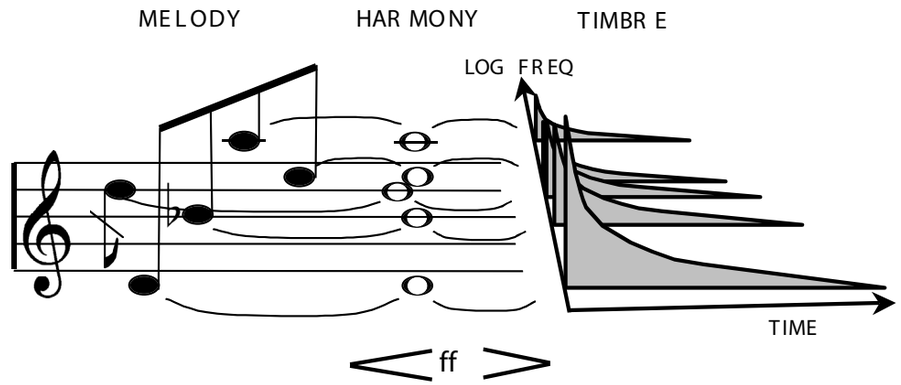

Figure 1. Pitches become the partials of the gong-like tone, linking timbre to the pitch space in a manner uniquely possible with computers. From Jean-Claude Risset's *Mutations* (1969).

Constructing Spectra and the Pitch Space

John Pierce and Max saw early on that using the computer for both control and synthesis could unlock tuning systems from physical constraints, just as Risset had unlocked timbre. Max composed a piece, *The Second Law*, that is entirely made up of noise and entirely free of common understandings of pitch, yet it expresses pitch. In his *Eight-Tone Canon* (1966) [3], Pierce divided the octave into eight equal steps. The even-numbered steps (equal to the multiples of three in a twelve-step division) and odd-numbered steps each form a diminished seventh chord. But what is interesting about this short piece is that Pierce used tones composed of sums of sinusoids

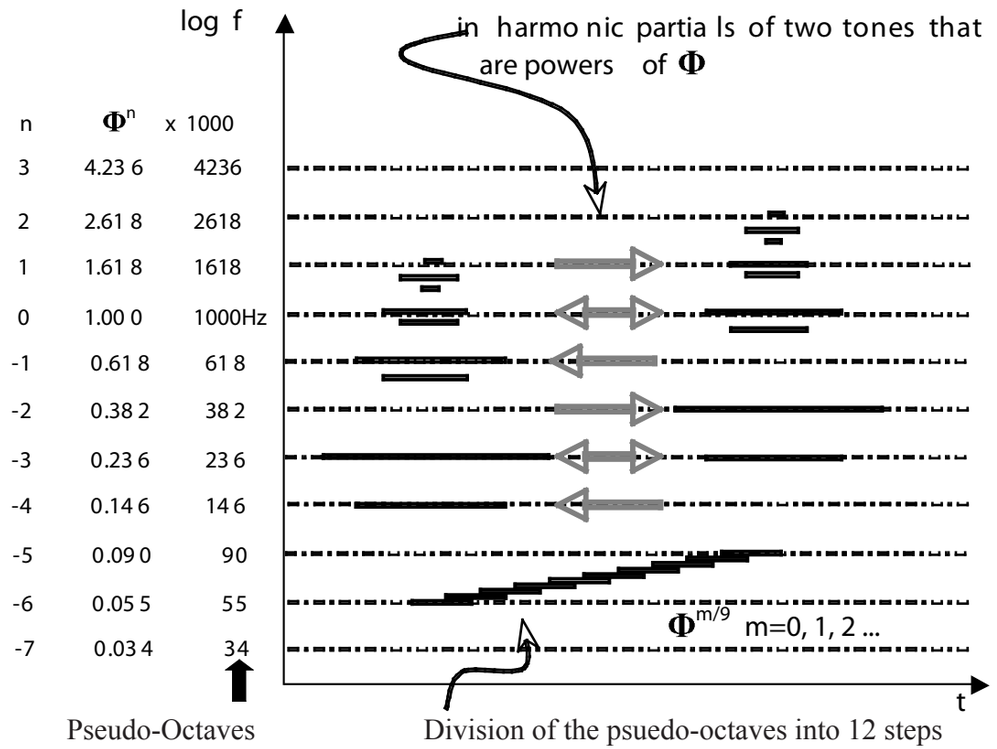

Figure 2. The pitch space in both *Stria* and *Voices* is based upon pseudo-octaves that are powers of the Golden Ratio ϕ, which are further divided into 9 steps. The spectra of tones generated by FM c:m ratios that are also powers of ϕ contain partials that are powers of ϕ, here shown at the interval of a pseudo-octave.

that progress from octave to half-octave to quarter octave with each iteration of the canon. Except for the octave, the spectra are inharmonic, but they are composed of frequencies that are common to the pitch space!

Stria (1977)

While this example is not rich in the sonic sense, it is a compelling and powerful idea that I found especially evocative because of my interest in spectra composed of *ordered* inharmonic partials that could be simply produced by FM synthesis. One class of such spectra that I found particularly interesting is based upon carrier-to-modulator frequency ratios (f_c/f_m) derived from the Golden Ratio or $\phi \approx 1.618$. Remembering Pierce's canon, I conceived a composition in the mid 1970s that is based upon spectra structured in a way that is complementary to the division of the pitch space. The traditional octave is replaced by a pseudo-octave based upon powers of the Golden Ratio (ϕ^n) rather than powers of 2, and the spectra are produced by values of f_c/f_m that are also powers of ϕ as can be seen in Figure 2.

After several years thinking about its theoretical underpinnings, I realized *Stria* in the months from July to October 1977. It was first presented on October 13 at the Centre Pompidou as part of IRCAM's concert series "La Voix des voies," produced by Luciano Berio.

The Fall 2007 issue of the *Computer Music Journal* (31:3) contains a suite of articles about *Stria* that fully explain the circumstances of its composition, the several versions and analyses.[7] The Winter issue of CMJ (31:4) includes a DVD with all of the original materials that were used by the authors in their articles, the original quad sound files, a reconstruction in quad sound files and a visualization of *Stria* from the Princeton Sound Lab.)

Voices v. 3 (2007)[8]

Voices for soprano and interactive computer uses the same division of the pitch space and structured spectra as *Stria*. Again, all of the sounds are produced by FM synthesis and all of the spectra are generated from ratios based on ϕ, as noted above (except for a few instances of voice-like tones that use integer ratios). The formal structure of *Voices* is altogether different, however, and requires a larger set of differentiated sounds than did *Stria*.

The important and initial question was how well a soprano, both as a performer and as a "sound," would fit into this "artificial" pitch/spectral space where, first, the scale is unfamiliar to the performer and not related to any of the common modes or tunings, and second, the partials of sung vowel tones are harmonic and do not

share the same spectral distribution. Can one mix a sonic artifact totally dependent upon the computer for its existence with a natural—perhaps the most natural—musical sound, the singing voice?

The music performance problem would seem to be a major hurdle for the soprano. While a single scale step in the 9-step/pseudo-octave division only differs from the traditional semi-tone by 7 cents, the maximum difference in the progression is nearly a quartertone and there are 13 steps in the interval closest to a true octave, as shown in Table 1.

It is my good fortune to have had a soprano[9] at hand with whom I could work during the initial stages of the composition. My hypothesis was that singing in this unusual scale is possible if the structured inharmonic spectra of the accompanying tones are infused with complementary pitch information, since most good performers tune to context. I included in the program (written in Max/MSP) the option for the singer to give herself a cue tone for the current target pitch or the following target pitch. In fact, the option is rarely used, since the singer seems to easily tune to the partials of the structured spectra—to the context, as hypothesized.

n	Voices Scale	Pitch	Cents	Common Scale	n
0	1.000	a		1.000	0
1	1.055	a#(-)	-7	1.059	1
2	1.113	b(-)	-14	1.122	2
3	1.174	c(-)	-22	1.189	3
4	1.238	c#(-)	-29	1.260	4
5	1.306	d(-)	-37	1.335	5
6	1.378	d#(-)	-44	1.414	6
7	1.454	d#(+)	48	1.414	6
8	1.534	e(+)	41	1.498	7
9	1.618	f(+)	34	1.587	8
10	1.707	f#(+)	26	1.682	9
11	1.801	g(+)	19	1.782	10
12	1.900	g#(+)	11	1.888	11
13	2.004	a(+)	4	2.000	12

Table 1. A comparison of the scale used in Voices, $\phi^{n/9}$, with the common tempered scale, $2^{n/12}$, showing the closest scale degree and the difference in cents. The 6th step of the common scale repeats to maintain the proximate Voices step and show that it is the 13th step of the Voices scale that is closest to a true octave.

The other part of the initial question was this: how well would the soprano, having partials in the harmonic series, fit within a context composed of dense (albeit structured) inharmonic partials? The somewhat surprising answer is that the performer and the listener are unaware of any spectral mismatch. Moreover, one senses an overall pitch coherence that is more like a soprano singing with an ensemble of acoustic instruments with harmonic spectra than with idiophones having dense inharmonic spectra (such as gongs and bells). There are several possible reasons that there is no overall perception of "out-of-tuneness" or psychoacoustic dissonance.

While the spectra of low tones in *Voices* are often dense, they are selectively dense, with partials of a single tone spaced at intervals from large to small (in log frequency), as is the case with the harmonic series. In addition, the spectra are composed such that the energy is concentrated around the low order partials (small modulation index). Therefore, whether or not low order partials fall within a critical band is dependent upon the interval of two tones within the pitch space, as is the case with partials in the harmonic series.

Another reason is that the concentration of harmonic energy in typical soprano tones is limited to the low order harmonics, especially the fundamental, which reduces the incidence of strong partials interacting within critical bands.

Finally, there is a third, somewhat speculative reason why there is little psychoacoustic dissonance. Critical band theory is based upon perceptual experiments using stimuli having few variables and highly stable partials, quite unlike the sounds of the natural listening experience. We know that the auditory system responds to partials in a different way when mediating temporal factors such as amplitude envelopes or synchronous micro-modulation (e.g. random or quasi-periodic vibrato) are present.

This internal dynamism brings into play an additional perceptual theory based upon grouping and common fate from the Gestalt laws of perceptual organization. It is a higher-level mechanism (probably not in the cochlea) that causes partials to fuse or cohere where individual partials are difficult or impossible to distinguish, and they become identifiable as a source, known or unknown, and segregable within a collection of sources.

It seems that these temporal features, which are intrinsic to our "out of lab" perceptual experience, may reduce the importance of the interaction of individual partials relative to critical bands, because the interaction becomes transitory and no longer stable.

Dynamic partials not only animate the sounds (harmonic or inharmonic) of which they are a part, but they contribute to the surface allure of the larger sound context, leading the ear through time in a complex of detailed multi-dimensional spaces of timbre, location, loudness and—most importantly regarding dissonance—pitch. The pitch space is loosened from its abstract skeletal form by the internal dynamic detail and accommodates the sound of the soprano, whose fluid expression derives from its own internal dynamism.

During the thirty years since composing *Stria*, I have often wondered whether the integrated spectral tuning and pitch tuning worked because of the particular attributes of the work itself, the manner in which the work slowly unfolds from sparse to dense spectra having enormous acoustic mass, having no other spectral forms than those rooted in the Golden Ratio. Is it a pitch/spectrum construct that is unique to the piece?

My experience with *Voices* suggests that it is not. It could be that these early ideas—Risset's structured spectra, Max's and Pierce's joining of odd tunings with complementary spectra and Max's evolving pitch space in his melodic metamorphoses—can be generally exploited with synthesized sound, with physical models where the "physical" is infinitely malleable, or even sampled sounds, especially with the availability of new stable high-Q filters [6]. A medium is defined by its distinctive attributes, and these ideas are certainly unique to music made with computers.

IMMERSED IN DETAIL MANAGING IT ALL

From the micro-structural detail involved in understanding, creating and processing the sound itself, to the understanding of machine-generated or -processed music for which the description (the equivalent to a score) may lie in the detail of program code (which, even if familiar, is not a springboard to formal visualization), to the vast amount of relevant theoretical, empirical and poetic detail that is available to us through the web, technology provides us with ever more options and consequent detail—we are immersed.

But the evolving technology also provides us with increasing power and new options for managing the detail—links that become vast virtual libraries, rich in content constructed by experts—and new ways to make accessible the complexity of detail when it is transformed into synchronous visual/auditory representations.

Knowledge Webs

I have long been impressed with Julius Smith's *Global JOS Index* and its ever-evolving context on the CCRMA server. Rich in detail and having great scope, it is a resource to which I refer often. For example, whenever asked the difference between frequency and phase modulation, I refer the inquirer to this index. This is a detail that I need to know about, but not all the time and certainly not in the same way that Julius Smith knows about it. In these matters, Julius Smith is an expert whereas I am not, and the answer is better found in a rich but neutral context. It is a detail that may have quite different meaning for the inquirer, inviting investigation of related topics that could lead to unanticipated results.

The Max/MSP-Pd concept of "help files" is a localized but extremely effective web providing interactive sound examples in addition to text descriptions. But this web and the *Global JOS Index* should be linked, and this is precisely what Julius Smith and his colleagues plan to do. His concept of "knowledge webs" includes:

- "backwards learning" (start reading about what you want to know, and click as needed)
- on-line, demand-driven, self-paced education
- complete "ladders" from any research topic down to the advanced high-school level

What an idea! This growing community, of which we are a part, can strive to enhance and tighten the links that connect us and to enable those from whom we have yet to hear.[10]

Visualization

Since the early days, Max and his colleagues have effectively used graphic representation of processes both as a means of composing—signal bandwidth as a function of time or functional control of melodic transformation—and as a means of simplifying complex processes. Indeed, the very form of diagrammatic representation of unit generators and instruments that Max used in his Music I-V programs presaged the object-oriented programs that are now so widely used. It was a representation that made computer music accessible to those of us who were not expert programmers.

Once-difficult concepts, loaded with relevant detail, can now be easily explained in a very short time, thanks to sound-synchronous animation. For example, with two or three animated slides, the relationship between Bessel function coefficients and the amplitudes of the sideband components (partials) when the modulation index is changing as a function of time can be demonstrated and understood to the required level of usefulness in minutes as opposed to

hours. All such demonstrations should be integrated into the "Knowledge Web" and become available to our growing community of users.

Making visible the relevant detail of the music that we compose and listen to is an exciting frontier. The Princeton Sound Lab[11] provided me with a modification of 'sndpeek,' their real-time, multi-mode sound visualization program with which one can display in real-time any pre-recorded music. My request was for a special concert visualization of *Stria*. The modification extends the 3-D spectral display to include the future as well as the past, so that the waterfall display has an illuminated slice in the middle that is the "now line." This representation, somewhere between signal and score, provides the listener with a view of *what is to come*, thus revealing details of *Stria*, e.g. the complex beating and the ambiguity between frequency and pitch, that would be nearly impossible to show in any other visualization and that are only implicit in the score-generating code and the score itself. While there is only twice the information when compared to a typical 3-D waterfall projection, the perceived detail seems much more, as one is able to track details in both the future and the past. There are a number of further refinements planned that will bring this representation even closer to how we perceive. Doug Keislar, who has a long-standing interest in music representation and who has suggested many refinements, points out that this kind of inter-modal reinforcement can be especially appropriate to electroacoustic music, for which there is typically no score.[13]

CONCLUSION

Extending and better understanding the ideas of structured spectra and complementary tuning spaces could lead to *dynamic contextual tuning* where the spectrum and pitch spaces are malleable through time, but always coherent.

Composers can reveal the background detail of their work, as poetic as it is technical, through the use of graphics and new modes of visualization of compositional structures. With the sound and/or score it becomes a complete record—the meta-composition—and it all becomes part of our "Knowledge Web."

NOTES

1. For a complete account of Max Mathews' work and publications, see http://www.ina.fr/produits/publications/collections/collec_11.fr.html.
2. His early interest and important contributions notwithstanding, Jim Tenney did not continue in computer music, but rather became a distinguished teacher, performer and composer of acoustic music. He died on August 24, 2006.
3. Max wrote in 1963 "At present, the range of computer music is limited principally by cost and by our knowledge of psychoacoustics [4]."
4. The ease with which spectral change could be coupled to effort (key velocity) is one of the reasons for the YAMAHA DX7's remarkable success.
5. The first real-time FM synthesis was programmed on a DEC PDP-15 computer by Barry Truax in 1973, while studying in Utrecht. At Stanford, Bill Schottstaedt developed a particularly powerful form of the algorithm that was used in many compositions for many years.
6. Karlheinz Stockhausen created a similar relationship between pitch and spectrum in his *Studie I* (1953), although with analog technology.
7. "An Analysis of the Compositional Techniques in John Chowning's *Stria*" by Matteo Meneghini; "The assembling of Stria by John Chowning: A philological investigation" by Laura Zattra; "A Reconstruction of *Stria*" by Olivier Baudouin; and "Surface Tensions: Dynamics of *Stria* " by Kevin Dahan.
8. *Voices* was commissioned by GRM in 2004 and first performed (version 1) by Maureen Chowning at the Maison de Radio, Paris, March 12, 2005.
9. Maureen Chowning, for whom *Voices* is written, has had experience singing in alternative tunings, e.g. *Solemn Songs for Evening* by Richard Boulanger, written in the Pierce-Bohlen scale.
10. See http://ccrma.stanford.edu/realsimple/
11. PhD candidates Ge Wang and Ananya Misra, and Perry Cook, Director.
13. 2003 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics October 19-22, 2003, New Paltz, NY.

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[2] Chowning, J. "Composing the Sound Itself," *Portraits Polychrome*, Vol. 142, No. 3592, 553-557, 1963.

[3] Goebel, J. (producer). "The Historical CD of Digital Sound Synthesis." *Computer Music Currents* 13, Schott Wergo, 1995.

[4] Mathews, M. V. "The Digital Computer as a Musical Instrument." *Science*, Vol. 142, No. 3592, 553-557, 1963.

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[6] Mathews, M.V., J. O. Smith, "Methods for synthesizing very high Q parametrically well behaved two pole filters." In *Proceedings of the Stockholm*

Musical Acoustics Conference (SMAC-03), http://www.speech.kth.se/smac03/, Stockholm, Royal Swedish Academy of Music, Aug. 2003. Available online with sound examples at http://ccrma.stanford.edu/~jos/smac03maxjos.

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A Selection of Responses to Gregory Taylor's Letter about Gender and Computer Music from the Winter 2006 Issue

The Listening Room (http://dao.cim3.net/cgi-bin/wiki.pl?Womens_Listening_Room), organized and curated by Pamela Madsen, demonstrates the wide range of women creating electroacoustic music today (2007). This yearly presentation at California State University-Fullerton is inspiring and could change perceptions about women and the composing of electronic music. The Listening Room is designed for non-stop all-day playback in fine concert halls. The production could be presented anywhere in the world with high quality sound systems and is a great step forward in encouraging women to shape a new musical paradigm. The Listening Room certainly inspired me all over again.

--Pauline Oliveros

At FTM-8 (Feminist Theory & Music 8, June 23-26, 2005 in NYC), a letter from Mara Helmuth was distributed to the audience. I find two quotes from that letter to be still very much relevant and important today:

"More often, devaluation of a woman's work is done subtly, by a casual comment implying the insignificance of non-legitimacy, a joke, or a concert ignored."

and

"We all grow up in a biased culture, and all absorb it in different ways. It is up to us to honestly assess how to change it personally within our lives."

--Paula Matthusen

Computer Music exists at the intersection of engineering, mathematics, and music, all of which have been historically male dominated fields with strongly patriarchal models of pedagogy and achievement. Alarmingly, Anita Borg [1] cites a downward trend in the percentage of CS and CE degrees earned by women. Elizabeth Hinkle-Turner [2], while identifying significant achievements of women in music technology, also notes a decrease in women's participation in the field. It is our job as artists and educators to examine the pedagogical tools and curricula rigorously to ensure that talented voices are not being excluded, and that those who enter the field are encouraged to stay [3].

[1] Borg, Anita. "What Draws Woman to and Keeps Woman in Computing?" Women in Science and Engineering: Choices for Success, The Annals of the New York Academy of Sciences, 869 (1999): 102-109.

[2] Hinkle-Turner, Elizabeth. "Women and music technology: pioneers, precedents and issues in the United States." Organised Sound 8:1 (2003): 31-47.

[3] Cuny, Janice and William Aspray. "Recruitment and Retention of Women Graduate Students in Computer Science and Engineering: Results of a Workshop Organized by the Computing Research Association, San Francisco, June 21-22, 2000." Organized by the Computing Research Association. SIGCSE Bulletin, 34:2 (2002):168-174.

--Michael Zbyszynski

Gender and Computer Music: Tracing Change

Mara Helmuth's Array discussions on the state of Women in Computer Music continue to be invaluable. I'm very appreciative to have been asked to contribute to two historical assessments (1998 and 2005). I agree with Greg Taylor's solicited comments that new cultural practices, in particular practices involving intermedia, are being positively impacted by a young generation with fewer gender assumptions than those of the older generations. However, I don't see the change as truly structural. Relatively few women are choosing to apply to academic music composition programs, and few women are focusing on the programming of computer music software. Thus, women as a group are still using techniques, tools and machines developed overwhelmingly by men. Women are still writing art music in male-controlled environments that continue to marginalize women's access to funding and presentation opportunities.

The FTM-8 (Feminist Theory & Music 8, June 23-26, 2005 in NYC) panel was in agreement that we all (including men) lose out from such a situation, but the panel didn't identify exactly in what ways the field itself suffers from its ongoing male-dominated state of affairs. I will speculate here briefly that women tend to have values and thinking styles that may not be identical to those of men. (I am postulating tendencies here, not individual traits; and I'm making no assumptions about whether these are socio-cultural or partly innate.) Diversity is an inestimable plus, whether in biological species preservation or in richness of creative and logical solutions and viewpoints. Who we are, how we see ourselves, and what we want—aspects all reflected in our art and technology—are not things best represented by a mere segment of the population. While racial diversity, too, is lacking in the Computer Music community, gender—as it cuts across all races and ethnicities and represents a very large segment subject to discrimination—remains a uniquely meaningful category on which to cast a periodic retrospective glance.

The following are particular actions that seem to me important to endorse.

1. Reflecting back on Mara's statement in the 'Gender and Computer Music' forum of 1993 that resistance to change is natural, my recent reaction is this: Backlash is expected, but it is essential that we not be apologists for it. The dictates of politically correct behavior form our societal superego at the moment and shouldn't be allowed to slip. I've experienced numerous expressions of chafing at political correctness guidelines over the past six years. Such irritation has seemed to me particularly dismaying to observe in academia. Individuals who in 2005 lack the perspicacity to recognize why political correctness is needed simply affirm how imperative it is that externally imposed guidelines remain in place. Ongoing cultural support for behavior codes may take the form of redressing linguistic biases, or of redressing hiring practices formerly guided by irrelevant visual assessments. Use of screens for orchestral auditions is an example of a remedy for the latter type of occurrence. Politically correct practices may not change the feelings of biased individuals, but they will protect women from numerous forms of oppression, including psychological oppression.

2. My second set of reflections is prompted by comments in earlier Array forums arguing against the ghettoizing of women's music, and contending that increased representation (i.e. jobs) is far more important or appropriate than political awareness-raising activity or affirmative action (e.g. women's concerts) as a means of measuring and/or effecting progress.

My feeling at present is that all such activities, direct and indirect, are intricately and cumulatively interrelated. Further, I see no real reason why producing a women's concert should be interpreted as a patronizing (or matronizing) act. High quality women's concerts will continue to send much-needed messages of validation, access, and inspiration for all women. If and when younger generations move beyond a fundamentally M/F power-relations-framed binary world, then perhaps the need for specifically women's concerts will abate; but the need seems to me certainly defensible at the moment. As Brad Garton noted at the FTM-8 panel discussion, we can only hope for a status quo that is eventually gender transcendent.

Women's concerts need not be seen as a strategy toward counter-hegemony or a reversal of the status quo, but rather as a means to an end, which is the elimination of all gender inequity.

3. A useful ongoing goal: In addition to more women programmers and applicants to graduate composition programs, it would be beneficial to have a greater number of women Tonmeisters, women technical team supervisors, women console supervisors at concerts, and women researchers/technical paper conference presenters. There isn't space here to hypothesize about strategies for achieving such goals. Mary Simoni has written and has been involved in much important work on related issues.

4. My last set of reflections concerns women teaching women. The profound and nuanced importance of women teachers for women seems apparent to me in 2005 in a way that it did not in the past. (One could assert that women teachers for men are also important, too, but for different reasons.) The issue at stake here is not simply to promote the use of role models per se, which harbors its own debate. My point here is only that women teachers are able to comment from a subject position on a host of women's issues—political, pragmatic, or gender-related; sociological or artistic; direct or indirect. A subject position simply translates into unique first-hand empirical evidence and experience.

While in 1998 I would have concurred with what seems to be the prevailing consensus even now—that equally effective role models for women come in any gender—I find myself believing that there are unique forms of support and ways of relating that only women teachers can offer women students. My appreciation for Diane Thome's artistic, academic and personal guidance for me as a graduate student in the 1990s at the University of Washington has only increased over time. Again, if and when younger generations move beyond a fundamentally M/F power-relations-framed binary world, then perhaps the potential value of women teachers for women will be less significant. Keep in mind that this has been an issue commented upon in Array only because so few women graduate students in computer music composition have had female teachers in the field.

Thanks to the ICMA (particular individuals, male and female, and to the organization as an evolving body) for its ongoing commitment to Tracing Change and promoting gender equity.

--Elizabeth Hoffman

The same day that Meg Schedel asked me to write a few comments for this discussion, I received my class list for the composition class I was teaching that fall at Portland State University. As I scanned the list of students' names, I noticed a conspicuous absence of women—not unusual, of course, but a symptom of what we are up against. For me, it is an affirmation that I must be proactive as a teacher to ensure that more women are given opportunities in the creative arts.

Two years ago, I was able to make a small change in the enrollment patterns at Colgate University. In the fall, I taught a full class of men the basics of digital audio and Max/MSP. Bothered by the lack of women in the class, I let word get around that I was interested in women signing up for the next semester's class. By spring, there were suddenly five women in the class! These women constituted about a third of the students that semester. The experience taught me that small efforts to alter the local landscape can go a long way towards change for the better.

Of course, real change in the inequities of our discipline cannot be accomplished through women's work alone. For this reason, I welcome the inclusion of men's voices into the dialogue. Gregory Taylor's comments are both provocative and optimistic. By suggesting new trends in the field which may help us fight or bypass systems and genres which do not treat men and women as equals, he moves the discussion away from analyzing problems and toward envisioning solutions.

If you dig far enough into these suggestions, you will find that it is the systems themselves—the patriarchal scaffolding that was largely in place before most of us began to participate in the field—that can largely be blamed for continued inequities. By targeting various "systems," he displaces the unconstructive question of whom to blame. Instead of accepting blame, we can accept responsibility and help to dismantle the scaffolding of oppression. Instead of merely changing ourselves, we can change the way we participate in oppressive systems.

For example, I am a participant as an instructor in the "system" of academia. Like most of my colleagues, I am able to identify the various gender issues within the system. Unlike many of my colleagues, I have decided not to stand by passively, believing that because I am not responsible for the issues, there is nothing I can do to effect change. It only takes a bit of imagination to find a few meaningful actions that might very well make a difference (recruiting women to take a class in digital audio is just one small example).

As both Greg and Meg mentioned, the role of mentoring is crucial. Women are raised as social creatures, and it may very well be more important for a young woman in the

field to have the support of her teachers and colleagues. In addition, as we have seen with racial inequities in academia, a bit of creative affirmative action can help. Why not offer a special scholarship each year to a woman in the field? Or ensure that a search committee for a new position interviews at least one woman? Or include pioneers such as Pauline Oliveros, Bebe Barron, and Laurie Speigel in our discussions of the history of electronic music?

These suggestions, of course, come from within my own "system." If you find yourself working in a different system, you may have a different list of actions to pursue. Gregory Taylor's list suggests a few. My hope is that each one of us will commit to doing something. Then, bit by bit, byte by byte, we may reap the fruits of our efforts.

--Bonnie Miksch

An Interview with Tzvi Avni
by Bob Gluck

Tzvi Avni is one of the preeminent composers in the history of Israel. He was born in Germany in 1927 and immigrated to Israel in 1935. He studied composition with the major Israeli composers of the previous generation and subsequently visited the United States in 1963-1964. While in the United States, Avni studied at the Tanglewood Music Center with Aaron Copland and Lukas Foss, and at the Columbia-Princeton Electronic Music Center in New York City. Upon his return to Israel, Avni taught at the Jerusalem Academy For Music and Dance, where he opened an electronic music studio in 1971. It became the second such studio in Israel. Tzvi Avni has won many of the major artist awards in Israel, including the coveted Prime Minister's Prize (1998) and the Israel Prize (2001). This interview draws from a September 14, 2006 telephone conversation, which builds upon previous email correspondence on August 8, 2005. Tzvi Avni was at his home in Jerusalem and Bob Gluck was in Albany, New York.

BG: What brought you to the United States?

TA: I came to the United States at the end of 1962 with my wife Pnina. I didn't really know what I was going to do there. I only knew that New York was an important center of new ideas and that it offered a wide variety of activities that might be of interest to me. I did know that I wanted to find a way to learn about what was going on in the world. After World War II, the Israeli War of Independence and the difficult economic situation in the years that followed, we in Israel were cut off from the rest of the world. In the early 1960s, Israelis of my generation were eager to seek ways to find out about the world.

BG: How did you learn about the Columbia-Princeton Electronic Music Center?

TA: Once I arrived in New York, somebody arranged a meeting with Edgard Varèse for me. He asked me, "What can I do for you?" He listened to a few tapes of my work and said, "It's very good. You are a composer. Do you want to learn my tricks? Go find your own tricks! Go to Columbia University." Varèse then spoke with Luening, who met with me, listened to a few of my compositions, and spoke with Ussachevsky. Ussachevsky enrolled me in the course of study at the Columbia-Princeton Electronic Music Center.

BG: With whom did you study at Columbia-Princeton?

TA: Vladimir Ussachevsky was our teacher. We didn't see much of Otto Luening. Mario Davidovsky was already quite a dominant figure and already a veteran. The technical instruction, though, was done by Andres Lewin-Richter. The students that year (1963-1964) included Walter Carlos, Ilhan Mimaroglu, Charles Wuorinen and Harvey Sollberger. We met once or twice a week for a couple of hours. We would analyze pieces and speak about them. Then Davidovsky and Lewin-Richter would teach us the how-tos. Individual work was with Lewin-Richter. Later, at the end of my time at Columbia-Princeton, when I was finishing my work *Vocalise*, they gave me the keys and I would stay on my own all night long.

BG: What recollections do you have about Vladimir Ussachevsky?

TA: Vladimir Ussachevsky was a very kind and nice person. He was of course one of the pioneers in the field, and when I was with him, he was already summing up his life's work. He was much more into concrete sounds than electronic sources, even though he was the one who developed the RCA synthesizer lab. He was a founder of the basic language using splicing and other tape techniques. He was also a more conservative musician than the students, such as Mario Davidovsky and Charles Wuorinen, who were very much into serialism and other approaches.

BG: What did you learn from Mario Davidovsky?

TA: Mario Davidovsky is a very bright person and a gifted musician, one with very definite opinions about what is right and wrong in music. Structure and accuracy are very important for him. Not a fan of loops, he thought very carefully about sounds and how they were worked out and placed in a piece.

BG: What other recollections do you have about Columbia-Princeton?

TA: It was a time of trial and error and everybody was looking for new ideas and techniques in order to find a language for themselves. I remember playing my *Vocalise* to Walter (later Wendy) Carlos, who was highly enthusiastic about the piece. Altogether, I worked in the studio for a year and a half. Babbitt was already working with the Mark I Synthesizer and we were invited once to see that instrument. It was as big as a room. It seemed to us like the eighth wonder of the world because we were used to do everything manually by splicing, mixing, filtering, and so on, but this wasn't necessary with the Mark I.

BG: What was it like for you to be in New York City?

TA: This was a fascinating period for me. Karlheinz Stockhausen and Pierre Boulez were there. Everyone came to the Hunter College concert series. It was a dramatic time in the whole world. When I was at Tanglewood during the Summer of 1963, right before I came to Columbia-Princeton, Aaron Copland said to me, "When you get back to Israel, it will take you a while to return to yourself from the confusion of your time here."

BG: Did you visit other places while in the United States?

TA: During that year, I also spent a month working with Myron Schaeffer at the University of Toronto, on a scholarship from the Canada-Israel Foundation. This was two or three years before he died. He had the multi-track machine that Hugh Le Caine had built. You could choose any loop you wanted for the mixer, and it had a keyboard. When I returned to Columbia-Princeton, I told them about it. Mario Davidovsky said that that if it had a keyboard, it wasn't for him.

BG: Did you have contact later with any of the people you met at Columbia-Princeton?

TA: The only people with whom I met many years after the course was Mario Davidovsky, who visited Israel a few times, and, once, Ilhan Mimaroglu, who seemed very frustrated with music.

BG: Tell me about your electronic work *Vocalise*, which you composed at Columbia-Princeton.

TA: I remember hearing the sounds of the subway and this gave me the idea for the first sound in Vocalise. This was the period following President Kennedy's assassination—quite a tense time in the world, a time of international concern. I think that the general atmosphere goes into everything people do, quite aside from compositional technique, such as splicing and mixing.

BG: What about the formal structure?

TA: *Vocalise* is principally a sonata. It has two themes: the voice and the electronic sounds. After they are introduced, they go through a series of variations, and at the end, there is a brief reprise. I didn't speak of the work as a sonata at the time because it was too conventional a category. But times change. In the development—the middle section—the material gets very tense. All of the sounds build up and reach a climax, almost like an explosion. I didn't mean to imitate the sounds of an explosion, but I wanted a build up of something that was very tense. I had recently read George Orwell's novel 1984, and was thinking about some of the forces and trends that were affecting modern society negatively.

BG: What were the lasting influences of your studies in electronic music?

TA: I think that my experience with electronic music changed much about my approach to musical thinking, and it remains with me even today. I became involved in more abstract ways of thinking about sound, not only as a component of harmony or melody, but as something with its own meaning. And of course, my mind became changed about noise, its qualities and possibilities. While we in Israel were influenced by impressionism, I learned about a new way of approaching texture in New York and I encountered new, less linear ways of looking at development. My earlier works were generally in Classical forms, such as rondo and sonata. What I learned about electronic music influenced my later works, and not just those with electronics.

BG: You mentioned Aaron Copland's comments about what it might be like to return to Israel. What was your experience like?

TA: Indeed, after returning home from Columbia, it took maybe two or three years to adjust. The work that I completed a year later, *Meditations on a Drama* for chamber orchestra, was the product of collecting myself and assimilating the new ways of musical thinking that I learned at Columbia. You'll find in it some influences from electronic music. I began to explore more open forms and I was much freer and more abstract in my formal thinking. This work was a big first step towards a more amalgamated approach for me.

BG: What electronic music works did you compose after Columbia-Princeton?

TA: I composed *Collage* for voice, flute, percussion and tape (1967) three years after returning from New York. *Lyric Episodes* for oboe and tape (1972) was composed originally for a ballet. It was included on a Folkways recording of electronic music from Israel in 1981. I composed *Synchromotrask* for female voice, tape and a door in 1976, *A Monk Observes a Skull* for mezzo-soprano, cello and tape in 1981, and *Five Variations for Mr. K.* for percussion and tape followed in 1982. I think of *Vocalise, Collage, Lyric Episodes* and *Five Variations for Mr. K.* as the most important of these works.

BG: What was the influence of Columbia-Princeton on how you taught electronic music?

TA: When it came time for me to put together a studio at the Jerusalem Academy, the model in my mind was Columbia-Princeton. I gave a weekly lecture with examples from works, which we would analyze. We would listen to music of different types. We also had a technician who worked with the students. It was the most logical approach to take: to work with the students more theoretically and then give them a chance to try and create a piece. They had to do this at the end of each course.

Every student at the Academy had to take the electronic music course. This became the policy when I was the head of the theory and composition department. Some were less enthusiastic than others, but students created all sorts of pieces, some of them even funny. I believe that students should have the experience of composing all types of music, including twelve-tone, and gain some degree of understanding.

Bob Gluck is a composer and historical writer. He is on the faculty of the University at Albany, where he directs the Electronic Music Studio. Gluck serves as Associate Director of the Electronic Music Foundation. For more information about Tzvi Avni and electronic music in Israel, refer to Gluck's "Fifty years of electronic music in Israel," *Organised Sound* 10(2), Cambridge University Press, 2005 and "Electronic Music in Israel," EMF Institute, 2005. On the web at http://www.emfinstitute.emf.org/cgi-bin/ireading_search.pl?keywords=articlesmaterials.

ICMC 2005 Reviews

ESMuC Barcelona, Spain

Tuesday, 6 September 2005, Noon Concert (ESMuC Concert Hall)
by Felipe Otondo

The first tape piece of this concert, Iron *Emerald* by Andrew Czink, was developed spatially in an interesting way in terms of the use of the timbres employed in the piece, which fit well in the wide room where the concert took place. Unfortunately, the piece evolved in a very predictable and simplistic way towards a very predictable climax.

The second tape piece of the concert, *Sleep Driver* by Martin Stig Andersen, showed a clever use of long transitions of very steady sounds in a sort of meditative way. The audience seemed to like the gentle character of the piece and its calm pace. Unfortunately, the sound projection of the piece was not at the level of the quality of the sound material, because it created a very steady and fixed spatialisation.

The next piece, *Litania* for saxophone, guitar and tape by João Pedro Oliveira, was probably the best piece of the concert. The composer made an effective use of the synthesized tape sounds, creating diverse types of interactions with the natural sounds of the instruments, contrasting their sound most of the time, and blending them in timbre and space at certain moments during the piece. The performance of the players (Sergi Rovira, saxophone and Carles Guisado, guitar) lacked a bit of naturalness, and at moments it became clear that the performers were just waiting for cues to play their part. There was no vivid sense of integration of the tape and the instruments.

The fourth piece of the concert was the tape piece *L'uomo* by Massimo Fragalà. This piece, based on texts as well as diverse sonorities and theatrical approaches of the voice, resembled pieces by Nono and Berio of the sixties and seventies. The piece worked quite well, creating dramatic and hilarious situations where the text worked as a framework and a sort of vehicle for dramatic voice gestures. This was a simple piece structurally, but it was very effective in its use of the material.

The fifth piece of the concert was the tape piece *A romance of rust* by Antonio Ferreira. This acousmatic piece explored different types of timbral nuances of sound following constant evolutions in the transformations of sound. The piece showed an interesting combination of tonal sounds with other more granular sonorities.

The last piece of the concert was Javier Garavaglia's *Ableitungen des Konzepts der Wiederholung (for Ala)* for viola and computer, played by the composer himself. The piece, clearly based on the idea of repetition of a sequence performed by the instrument, showed to be very poor in its form, creating a development based on an eternal loop that went on and on. The relation between the sound of the instrument and the sound transformed through loudspeakers was never very clear. In brief, it was a very long and simplistic piece that seemed to be a rehearsal by a performer triggering sounds from a computer rather than a creative work where performer and computer really interact with each other. Unfortunately, this is a very common practice nowadays.

Wednesday, 7 September 2005, Noon Concert
by Sile O'Modhrain

This lunchtime concert featured a well-balanced program of works. Pieces for tape interleaved with pieces for acoustic instrument and/or live electronics. As for most of this year's concerts, the performers were, for the most part, local student ensembles.

Vivencias - Beatriz Ferreyra - Tape
Vivencias was commissioned for Musiques & Recherches in Belgium in 2001. In Spanish, the word means experiences that contribute to the personality of the whole being. Sonically, events emerge from a context of filtered noise, making explicit as they do so the fine distinction between tightly filtered noise bands and pitches.

Signals - Michael Klingbeil
Contrast String Quartet (Jordi Claret, Claudia Farrés, Elias Porter, Noemí Rubio), Michael Davidov, piano and MIDI keyboard
This piece for string quartet and piano/keyboard explores the boundaries between sustained clusters of tones and the clustered overtones of a piano pitch drawn out through the use of electronic effects. The musicians, a local student string quartet, handled the music with great care and maturity of approach.

in-s-cape II - Aikaterini Tzedaki - Tape
As stated by the composer, the aim of this composition is the sonic realization of a journey through imaginary soundscapes. An imaginary soundscape is a type of inner soundscape (in-scape).

Ajunennuline - Shawn Pinchbeck - Tape
This piece derives its material from a collection of found sounds with textural properties that are surprising in their relatedness—drills, cats growling, dogs barking and corks popping. The title Ajulennuline is a word that the composer made up, but derives from the Estonian

word "linnulennuline" or "bird's-eye view." Literally, it translates as "brain flying like a bird," and is intended to capture the act of the mind drifting from one thought to another. In this case, the thoughts are related through the sonic environment they provoke.

Stream - Arne Eigenfeldt - Computer and data glove
Stream is an exploration of different meanings of the title: moving water, moving people, moving data. It is a journey in which the listener inhabits the stream in its changing meanings, observing the sonic environment through which the stream passes as both sources of sound and their reflections on the surfaces of imaginary objects. As the piece progresses, the meaning of 'stream' becomes more abstract, and the sound environment becomes more complex.

Psalm 06 - Douglas Scott - Tape
Psalm 06 is a portrait in sound of the sixth penitential psalm from the Old Testament. The source material for the entire piece is the text of the psalm, recited in both English and Latin by Denise
Gill. Its overlapping sections mirror the division of the text into ten two-line stanzas. However, this is not a setting of the text in a traditional sense. The accompanying material is derived from the vocal material using a granular synthesis approach, and the result is a texture where the division between vocal material and accompanying texture is extremely fluid.

Fluctuations - Seung Hye Kim - Flute and live electronics
Finally, *Fluctuations* explores the sonic world on the borders of pitched and unpitched flute tones.

Thursday, 8 September 2005, afternoon concert
by John ffitch

What I privately thought of as the evening concert took place in the large concert hall. The comfort of the seats contrasted with the uncomfortable bright blue backscreen behind the performers, which made looking at the performance a little of a trial.

The concert opened with *Séparé et invisible* by Yasuhiro Takenaka. The composer stated in the booklet that "the work describes the relationship between the saxophone part and the electronic part in accordance with that between the two worlds," but I did not read this until after the concert. It is a tribute to the work that my initial reaction was to appreciate the juxtaposition of the two streams; the sounds worked well together and managed that difficult task of unifying the physical and electronic within the same sound world. I was less convinced by the second section, and at times there seemed a resort to trite solutions, but this did not detract from the overall effect. I thought that at about 15 minutes it was perhaps too long. My notes comment on the ending: there appeared to be an extraneous voice, out of character with the previous sounds, but this could have been outside the auditorium.

The second work was for guitar and tape, *Sol y sombra...L'espace des spectres, a* joint creation by Francis Dhomont and the performer Arturo Parra. This work also contrasted the tape component with a traditional Spanish guitar sound, although the tape sounds were created from samples of the same guitarist. In the concert, the relationship between these strands was not clear, and I was not convinced that they belonged together. I also failed to understand the structure of the piece and so was disappointed overall. I could of course appreciate that the playing was of a very high standard.

Clandestine Parts by Paulina Sundin was the high point of the concert for me. A tape work that started with a slow, thoughtful passage clearly established the sound world, and when this later changed to a fast section the unity continued, maintaining interest while continuing to have something to say. The sounds were all well crafted; this is definitely a work I would like to hear again.

There then followed two works that used the saxophonist Xelo Giner. Stefan Klaverdal's *Prayer of a King* for alto saxophone and computer was a gentle piece, with the saxophone dominant, being enhanced by computer processing. Perhaps the hall was too large for this work, which would have been better in a chamber music setting. Its gentle sounds were too much for my neighbour, who slept through it.

Un caracol manchado by Alfonso Garcia de la Torre was the other piece for saxophone and electronics. I had problems perceiving where the electronic component was for much of the opening section, and while there were a number of nice moments, I was left with a feeling of missing the unity of the whole work. Seeking clarification in the program booklet, I found that the notes were in Spanish, a language I do not know, and so I remain uncertain what was intended.

The concert ended with Panayiotis Kokoras's *Shatter Cone.* The work for violin and tape, played by Jordi Claret, explored the way in which the violin's sounds are created, and the program notes suggest that the tape sounds originate from the violin. The processing was such that sounds were quite distant from the live instrument; there were uses made of string-like glissandi in the tape part, but I lost the thread rather too soon. The piece ended with what I took as a joke, with a burp after the violin had ended.

Throughout the concert, Xelo Giner played the saxophones with great versatility and conviction.

A review of this concert would be incomplete without mentioning an aspect of all the 19:30 concerts: there was no interval and minimal gaps between the pieces. Preparing for the next work by checking the title or program notes was not possible unless one had brought a torch. My notes on some of these pieces were written in total darkness and so hard to read. In ICMC 2003 the conference pen incorporated a light, and I wished I had that with me to record more fully my impressions.

ICMC 2006 Reviews

Tulane University
New Orleans, Louisiana, USA

Concert V: Tuesday, 7 November 1:30pm, McAllister Auditorium

by Jon Appleton and Daniel Shapira

Path to the Serene - Yuriko Kojima
Japanese composer Yuriko Kojima's chamber work for the Azure Ensemble was beautifully performed. It was a lovely, gentle, colorful, post-Debussy work without any significant appearance of computer-generated sound or modification of the flute, violin, cello, harp or piano.

Balacoire #15 - Jeremy Baguyos
Goelle Leandre's vocal techniques are the source of Jeremy Baguyos's Balacoire #15. An arresting and highly original work, it suggests life in a surrealistic bird sanctuary. Sometimes the music alternated between the effective use of silence and highly humorous organic sounds. Perhaps the looping audio was excessive, even if the repetition was intentional.

Fragmentary Seven - Haruka Hirayama
A rising star of Japanese computer music is Harika Hirayama. Her works have been recognized in competitions and by inclusion in recent ICMC concerts. Her virtuoso double bass solo was superbly performed. The inharmonic string-like attacks were striking and sometimes even grotesque. Noticeable in many works like this one performed at the conference was the return of feedback techniques updated through granular synthesis.

Das Bleierne Klavier - Hans Tutschku
Composer and pianist Tutschku's 11-minute work seemed to last an eternity. Filled with the tired gestured of the European avant-garde, this second-rate import featured the most simplistic delay and processing modifications of the strident piano timbres. Harvard University, Tutschku's home, has proved itself again to be an ultra-conservative bastion of "modernism." Many in the audience were angered by being subjected to this drudgery.

Seven Lonely Rivers - Kristi McGarity
A rising star of the American computer music scene is oboist-composer Kristi McGarity. Her work for oboe and tape was a wandering, impressionistic, modal melody over a tonic pad with contrasting sections of wildlife sounds. Verging on new-age ambiance, it occasionally breaks out in unexpected and adventurous ways.

les jeux sont faits - Tommaso Perego
Violinist Viktoria Horti of the Onix

Ensemble (of Mexico) brilliantly performed Italian composer Tommaso Perego's les jeux sont faits. In one steady gesture, from near silence to a violent climax, this piece meticulously explores one high-pitched dyad. This is extended by computer-generated filigree. Explosive interjections ultimately dominate the progress of this work.

Concert VII:Wednesday, 8 November 11:00am, Dixon Hall
by Adam Jenkins

DUST – for tape - Hans Timmermans (Netherlands) 10:28

This piece started with short crisp popping sounds. These were used as grains to create a mountain of sound which washed over the audience. Raindrops joined in and soon clips of a female speaking did too. The sound of her voice was cut short, but it was long enough to recognize it as a woman's voice. Robust low frequencies rumbled into the landscape, creating a warm foundation while the crisp popping sounds continued. Deep wisps of wind blew louder and louder, as well as what seemed like a wave of water crashing onto the shore. The sound of wind and water merged and symbiotically form a vicious storm. A synthesized choral pad sustained near the end of the piece. It ended the same way it began. The popping degenerated from an enveloping wall of sound to sparse droplets.
For me, the piece was very effective in leading the mind to see, hear, and feel the power of dust. Dust on its own is small, scant, and almost insignificant. However, when dust is thought of as dirt, you can imagine how a mass of dirt, dust, or grains can create undeniable density. It is like a sandstorm, a swarm of bees, or a flood of water molecules. I truly enjoyed the soundscape.

Dreamtime – for didgeridoo and digital playback – Eric Honour (USA) 8:42

This piece starts with solo didgeridoo. Popping sounds enter as well as what sounds like sped up voices. Deep sonic waves which feel like angry winds rumble in. At this point the didgeridoo player has dropped out and the digital playback is the only instrument. The deep waves create the feeling of a chasm. The quick vocal chatter continues and builds to a whooshing sound. This whooshing escalates and then collapses on itself to silence. Fiery ruffles emerge and the didgeridoo joins in as well. We then hear a percussive beat, a primitive keyboard synth patch, what sounds like a large barking pit bull, and quick chipmunk chatter. This swells and everything exits except the didgeridoo and the synth pad. The sound of a beating heart comes in for a few seconds. Eventually, the didgeridoo exits and new sounds enter creating an uneasy feeling – angry, lamented, painful. If there was a sound which represents the pain of being ripped and torn apart, this would be that sound. To me, it would represent the anguish of being put back together after having your entire body disassembled like a jigsaw puzzle – as painful as being torn apart. The piece ends with just the didgeridoo – calm, peaceful, whole.

Overlooked – for video – Edrex Fontanilla (USA) 8:52

The description of Overlooked states, "The work attempts to explore ideas of being, structure, and stability through ambiguity between the use of analogue and digital processes." The video starts with darkness. Slowly, from the bottom right hand corner, a white fuzzy light begins to emerge. There are soft rumbling and tumbling sounds. The rest of the screen slowly illuminates, exposing a blurred black image of what looks like tree branches swaying from gusts of wind. Sounds of wind increase the sensation that we, the audience, are looking at tree branches. However, the image is distorted and leaves the mind to wonder what we are looking at. The image is not in color—it is simply black and pale yellow. It is a little brighter in the center of the screen and that leads the audience to assume it is the sun shining through the branches. The wind and branch movements continue for a while, giving the audience a meditative feeling. This is caused by looking and hearing the single almost indistinguishable concept—the blowing limbs of a tree. A little later, there is more movement with the leaves, and a darker image seems to be seen, though the image is still fuzzy. The sound of crows cawing leads us to think the image is a bird stopping for a rest. The sound of wind bleeds to sounds of waves on a beach and then back to sounds of wind. This increases the meditative feeling of stability through ambiguity. The piece ends with a visual and auditory fade to black and silence.

Microcosmos – for tape – Chih-Fang Huang 5:05

This piece is built from many different sound samples derived from direct and indirect synthesis techniques. The best way I can describe this piece is simply by stating what the ears would communicate to the conscious mind. Most of these sounds only play for a short while: a loud piercing blast; a banjo; horns trumpeting; a variety of different instruments; laughter; the plunking of an eastern stringed instrument; the hum of soft wind and a variety of instruments that inhabit the same space; a high "ding" and then the low "dong" of a bell; soft wind, almost like white noise; a low stringed instrument that sounds like moaning; more and more sounds join to create a sonic tapestry. All the timbres and sonic qualities of each instrument make an appearance and then are taken away.

The piece does indeed create vast layers of sonic microcosms.

Et Iterum Venturus Est – for real-time Csound5 – Arthur Hunkins (USA) 4:30
This piece is sonically simple. For this reason, it is also very relaxed and meditative. It begins with a quiet low hum which rises gradually and steadily. A second note starts, then a third, and then a fourth. All of these notes take their time to enter. A single note is held and its intensity builds and becomes louder. A low note rumbles in and takes over. Its pitch rises slowly over a few minutes. The higher pitch then becomes more prominent. After a few minutes, the high pitch diminishes in volume as if it were fading farther and farther away. The note begins as low and majestic and it ends as quiet and faint. The sustain of these notes lends us to focus completely on the music and the piece itself, but it mostly occupies our ears enough so that we can be with the foundation of our own minds—which is one of the things that meditation attempts to accomplish.

The Gongs of Tiny Incerts – for tape – Jeffrey Stolet (USA) 9:05

Like Microcosmos, The Gongs of Tiny Incerts is best described by stating what was heard and felt: A crash of cymbals; what sounds like many wind chimes rustling and howling wind; screeching bats; the mood is dark and damp; a boomerang whooshing by; crisp popping; fast chattering voices; the sound of glass slowly cracking; the ringing of an old alarm clock bell circles the audience; a hit on a damp metal drum; more metal hits which sound like the clanking of metal machines working in a large echoing factory with cement floors, ceilings, and walls; the alarm clock bell which seems more like a fire alarm bell continuing to ring; machines rhythmically hammering and wind howling again; wooden blocks clunking, falling, and tumbling down. As a whole, this piece created a feeling of a metal machine factory dripping with water. It was cold, damp, and expansive.

lines – for video – Stephanie Loveless (Canada) 9:30

This piece has a series of video images that are all connected by the concept of lines. The first video is like the beginning of a film reel as shown through an old movie projector. It is scratchy and there is a vertical pale blue line in the center of the screen. The colors and tone are pale and worn. It feels like watching the beginning of an old home movie before the days of DVDs or VCRs. A piano phrase accompanies this video and continues throughout the entire piece. The next video is train tracks in what seems like an industrial area. These straight tracks stretching to the horizon are another depiction of lines. The image is not stationary. The camera person is walking forward, giving a sense of movement. There is then also the view of telephone wires on which two birds are perched. These images are in inversed black and white, like photo negatives. The music mirrors this inversion by playing the piano phrase backwards as well as forwards. The next video is of an older roller coaster, one whose support beams are layered and made of metal and wood. The beams create a grid of lines. The next video is of a carnival ride called a swing. Wikipedia describes these rides as the following: "The swings are types of amusement rides that have seats attached below a metal structure. Each seat is suspended by metal chains. The swing ride will spin around the center axis of the ride, and travel at a moderate speed." The metal chains hoisting the seat again reinforce the image of lines. As the ride spins, there is the sound of children chattering. The video of the blue line from the film reel reemerges, reminding us of the older faded medium that this video is representing. The music continues with low piano notes played in reverse. The music is quite minimalistic and has a somber tone reminiscent of Radiohead. The piece ends with a fade to white, which makes sense; since a variety of images were inverted, the end is not a fade to black, but a fade to white.

Editor's note: There are two reviews for Concert VIII. However, since they represent two unique perspectives on the concert, we have decided to publish both.

ConcertVIII:Wednesday, 8November 1:30pm, McAllister Auditorium
by Christopher Bailey

Concert VIII of the ICMC featured mostly works for some sort of live performer with computer music.

William Kleinsasser's *Protean Profile*'s large time scale (the work was 20' in duration) caught me a bit off guard at first (I had barely glanced at the program). Not expecting its extended length, I found that there were a large number of moments where I thought "wow, that's a beautiful ending…" only to have the work start up again. That's often a source of frustration for a listener, but upon reflection afterwards, if I had known what I was in for, I think I would have loved the piece for the very fact of it being a "collection of beautiful endings." Kleinsasser has a beautiful sense of pitch choice, modernist in heritage, but gorgeous and romantic in ultimate effect.

LongTrainRunning by Sinichiro Toyoda was an odd little sonic snipshion. I found myself listening into its swaths of mostly low-end noise, recordings of ambience in subway stations and so on; occasionally picking out pattering footsteps, a crash of this or that, and so on. Another exploration of noisiness was found in dirty grooves by Iain Armstrong, which, to my ear, focused on a dialogue (or perhaps a parent-child relationship) between LP

scratch noise, radio static, and other audio detritus, and what sounded to me like harmonies synthesized via sharply filtered noise (though according to the composer's program notes, they were from a clockwork music box).

Victor Lazzarini's *Timelines 1a* was a curious experience. Although the guitar writing was skillful, and there were some moments of effective combination between the laptop processing and the acoustic guitar sound, the guitar was often dwarfed by the purposefully brash and often distorted processing. At the opening of the piece, the processing was loud and distorted for a lengthy chunk of time, causing a neighboring audience member and I to wonder whether there were problems with the performance patch. In a way, this kind of ambiguity made the piece more interesting, but I still have no idea whether this was intentional or not.

Both Jen Wang's *Spaces Between* and Sam Pluta's *noise + mobile* were effective works for instrument(s) and tape, but there the similarities ended. Wang's work was relatively quiet, subtle and coloristic, carefully weaving the mostly diatonic, sensitively arranged pitch and timbral material between the live and recorded sounds. In contrast, Pluta pitted Cecil Taylor-inspired mayhem in the piano part with Autechre-inspired derangement in the tape part. For the first half of the work, the only common thread between them was the intensity of energy. For the last part of the piece, the two came together, with the piano riffing more quietly over sensuous electronica-esque harmonies.

Finally, Christopher Dobrian's *Mannam (Encounter)* for daegum and computer and Jason Bolte's *Forgotten Dream*s for double bass and computer were gorgeous, sensuous works, and both received superb, expressive performances. Mannam's electronic sounds entered in a very subtle manner, growing and morphing atop and around the live daegum. *Forgotten Dreams* was a darker work. Some poetic fragments that occurred to me during this piece: "… dark trigger for noisy blasts, a scream in an industrial hell…"

Concert VIII: Wednesday, 8 November 1:30pm, McAllister Auditorium
by Spencer Stuart Topel

An important theme during ICMC 2006 was the employment of ancient or non-western instruments with electronics. This was an integral component of the conference, as there were fantastic guest artists from the Korean Traditional Ensemble participating in various performances. It was exciting to see how many pieces either incorporated these instruments or samples of these instruments into their tape part or as a component of live manipulation. The results were pleasantly effective, with an often-ethereal blend of something that could be perceived as both electronic and exotic.

A highlight of Concert VIII was the first piece on the program: *Spaces Between* by Jen Wang. This trio plus tape featured an "east meets west" quality, and from the dramatic unearthly pizzicato opening this was immediately apparent. The music seemed to have an unsettling tension between members of Onix Ensemble and the electronic backdrop, while at times returning to a carefully wrought repose. At certain moments one could perceive an exotic flavor in the electronic tape part, yet Wang playfully avoided any direct reference to one particular idiom. This was an effective play on expectations that lasted the entire piece. At times the music seemed traditional, but it was not a drawback. Rather, the juxtaposition between ancient and electronic contributed to the east-west dichotomy that the composer describes in the program note as an inspiration for the composition.

Christopher Dobrian's piece *Mannam (Encounter)* tapped into folk instrument-plus-electronic motif with interesting uses of a Korean instrument called a daegum coupled with real-time processing. The approach to the electronics was organic and worked to highlight aspects of the instrument's timbral characteristics. It was a very successful approach.

Timelines 1a by Victor Lazzarini (Ireland) had a folk-like quality as well, but of a Spanish flavor. Lazzarini offered an extended work for guitar and an electronic mixture of what sounded like tape elements and live processing (though I suppose most of it could have gone either way). The music was driving and at times turbulent. The timbre of the electronics often seemed born from the guitar itself and this was effective. The performance was given by Javier Olondo, a talented and technically gifted guitar player.

A piece that paid respect to a different tradition was a laptop improvisation aptly entitled *LongTrainRunning* by Shinichiro Toyoda (a nice reference to train inspired pieces). The music didn't stray far from the metaphor, but the composer balanced this potential vice by sprinkling sonic curiosities within the texture that would come and go in interesting ways. This was one of the works on the program that seemed a bit long, but I should point out that it was improvisation, and that I have a special fondness for train pieces.

dirty grooves, the "lone" tape piece on the program by Iain Armstrong, provided an interesting foil to the other works. Like the title suggests, this piece was raucous and jovial. I especially liked the expressiveness of the samples, as they were strong in

character and were well matched. This is definitely one of the pieces in the festival that I felt could have benefited from a different venue, simply because the scale of the work suggested a more intimate atmosphere. In addition, the lights were rarely, if ever, lowered for electronics-only compositions, which would have helped the reception of tape pieces, at least for me.

Of the eight pieces on the program, two involved the piano timbre explicitly. The first was a mammoth (by ICMC standards) twenty-minute work by William Kleinsasser entitled *Protean Profile* for amplified pianos and computer, performed by duo runedako. Technically, it seemed that the amplification detracted from the performance, while at times the pianos seemed to overwhelm any sense of the electronic background. (Having had a piece on an earlier concert in McAllister, I could definitely relate to technical problems.) Even so, the feeling of the piece did come across. In many ways this piece paid the greatest homage to some of the classic piano plus tape pieces by Milton Babbitt and Mario Davidovsky.

The other piece involving piano was Samuel Pluta's *noise + mobile* featuring pianist Teresa McCollough. Unlike Protean Profile, this piece could have benefited from better sound reinforcement of the piano, since at times the electronics would overtake the piano even in places when the piano was playing loudly. The musical material composed seemed idiomatic to play and the expressive and charged nature of the writing lent itself well to the electronic backdrop.

Another standout in the program was Jason Bolte's *Forgotten Dreams*, with a great performance by double bassist Jeremy Baguyos. This work has a lively interaction between the solo double bass and laptop, and these two components are handled expertly. At times the mood was psychedelic and vibrant, which seems to agree with the composer's note that the piece is inspired by "abruptly waking from a dream." Forgotten Dreams appeared at the end of the program, which was a suitable choice considering the pyrotechnics in the music.

Overall, the program encapsulated much of the music heard during ICMC 2006, especially since there were so many interactive pieces presented during the festival. I am curious to see if the ancient/non-western instrument motif that was heard so much during the week will continue in coming years. For me, I found the wedding of technology and traditional, the ancient and the very new extremely appealing, and I look forward to seeing work of composers engaging in these kind of projects in the future. I think I am going to go start a piece for sheng and electronics right now.

Shutting out sound: the ICMC unplugging
Late-night Concert Two
Wednesday, 8 November 9:30pm, Mimi's
by Stephanie Loveless

I arrived late for this particular event, the second of the late-night concerts at the 2006 International Computer Music Conference in New Orleans. The event was being held at a bar called Mimi's on Royal Street. On the ground floor were pool tables, locals, and rock music. I made my way to the back of the bar and up the stairs, passing scores of ICMC attendees going the other way. "Loud," they told me, some with resigned smiles, some visibly annoyed.

Scott Smallwood and Newton Armstrong organized four late-night concerts at ICMC 2006. Their laudable (and successfully realized) intention was to expand the ICMC community's reach beyond academic acousmatic music. According to Smallwood, these events sought to recognize the interesting and intelligent music being made in communities outside of academia, with its own "long history and streams of discourse." One of the artists selected for this series was Hiroki Nishino, whose performance was programmed as part of the Noise-themed late-night concert on Wednesday, November 8th.

There were still plenty of people on the top floor of the Mimi's when I arrived, but I didn't have to push my way through a crowd to reach the back area where Niroshi was performing. I inserted my earplugs and made my way towards the performance, my ears acclimatizing to the sound field at hand: piercing, complex, beautiful, and loud. But just as I reached the performance area, someone rushed behind the artist and the sound was abruptly cut off.

The 2006 ICMC was not without its moments of performance art (Meg Schedel's instructional Max/MSP/Jitter piece involving a rubber chicken comes to mind), and when Nishino's performance was unplugged by another composer, that was the lens through which I found myself viewing it. For, regardless of the appropriateness of the action, what happened sparked an incredibly responsive set of dialogues, going so far as to challenge the accepted relationship between artist and audience at a concert event.

The general post-incident analysis was straightforward. No one contested that an artist has the right to play loud—particularly, as in this case, when this volume is integral to their work. It was understood that this was a Noise piece, and that part of the aesthetic of Noise music is its loud volume, "just like some pieces need to be played soft," as Nishino pointed out in a later discussion. Also widely agreed

upon was that unplugging an artist is an inappropriate way to voice one's concerns.

What interested me, however, were other things I heard being discussed immediately after and in the days following this incident. For the first time, I heard people addressing larger concerns about playback levels at the ICMC that I had been struggling with myself. I overheard two people grumbling about the level of the concerts in general, and other complaints about the need to wear earplugs even during the daytime concerts. Of course, I heard and remember these grumbles because they resonated with me. Are we, culturally, bowing to the deafest denominator?

Personally, I love noisy sound; I just like it quiet. But then, I might be the most sound-sensitive, hyper-acusis-inflicted person I know. I am protective of my ears. So I avoid extremely loud shows and carry around earplugs. I do regret the amazing performances that I miss out on because I can't take the volume, or pieces that I hear a modified, muffled version of through my earplugs. But mostly, it hurts my sensibilities that we are shouting at one another. I don't want a silenced world, but I am also a bit of an underdog lover—I sympathize with the small, and would like to argue for creating the space for sounds of all sizes.

What happened when the composer unplugged the amplifier was that he shut out the sound that he seems to have felt violated by. While a more civilized response may have been to leave, I believe that the frustration that erupted onto Nishino's performance can be seen as a symptom of widespread inattention to sound levels, and of a culture in which the omnipresence and amplification of sound is increasingly naturalized.

It seems as though this incident was timely. Issue 9.4 of the Canadian Electroacoustic Communities journal eContact!, which appeared shortly after the conference, focused on "Hearing (Loss) and Related Issues." A recent article in the CBC argued that the problem is reaching "epidemic proportions."

In a recent conversation, after making clear how deeply he regrets his actions on the night of the concert in question, the unplugger made several constructive suggestions about how the creation of new protocols might address this contentious issue. Performers could mix in front of speakers, giving them access to the sound level in the space as the audience will experience it. Decibel readings could be made at rehearsals, and earplugs could be made available to the audience. To these, I would add that the expected sound levels of concerts could be made a standard part of event publicity.

I do believe that all of these ideas are useful. They do not limit an artist's freedom to play as loud as they like, but they do encourage sound levels to be approached rigorously, and with care. In fact, I feel that such protocols can create the space in which conceptually intended loud concerts can be far more meaningfully engaged with. I would argue that in a context in which the level of sound is not attended to with the same diligence as any other sonic element, we are missing the framework for sound art that seriously explores volume—whether the barely audible or the painfully loud.

R. Murray Schafer once wrote that it is not through increased legislation that issues of sound ecology will be successfully addressed, but rather through increased listening. Scott Smallwood's closing thoughts in one of our email exchanges about the incident demonstrates this idea beautifully, I think:

> In any case, what happened happened. I think this might best be summed up by Pauline Oliveros's comment to me, when I asked her what she said to (the unplugger) that night at the concert, after he pulled the plug. She said, "I just listened."

Concert X, Thursday, 9 November 1:30pm, McAllister Auditorium
by Seongah Shin

The tenth concert of ICMC 2006 started with an announcement of a change in the order of works to be performed at McAllister Auditorium. The venue is a huge charming auditorium with many doors in various locations and a high ceiling that gives a very long delay time with various different times from almost-round walls. This character of the space gives the perception that the sound of the music is roomier than in a normal space. The performance ran smoothly without any major issues.

The first piece was composed by Christopher Ariza, *metalloidesque electronico-clankered* for two percussionists and computer, and was performed by Ensemble Surplus and NeXT Ens. The opening of the piece was very peaceful, with microscopic sound and minor movements by the performers. The small musical gestures moved very slowly, but also gave way to huge dynamic changes within a very static musical form. The metallic sounds by percussion and computer had similar timbral characters and sounded well with the delay characteristics of the room. The continuous development of musical elements was impressive gestures until the end.

I thought the second piece, Ronald

Parks's *Afterimage* 7 for flute, violin, cello, piano, percussion and computer, was the best piece in this concert. It also got very impressive feedback from the audience. Flute, piano, and cello were grouped in a sustained timbral sound with percussion. Flutes have an excellent rule as a typical jazz instrument. Parks's musical idea in this piece was an improvisational jazz style with a walking bass for the rhythmic pulse and sustaining washes of sound with the piano and metallic percussion instruments. Those two musical elements were alternated from the opening and toward the middle, until at the end the opposing forces mixed both horizontally and vertically. The interaction of the computer with the musical elements was more active than the vertical musical elements. The action of the ending happened without any warning, but it seemed very natural and effective.

One of the noticeable themes of this 2006 conference was the Korean composers' works that were composed for traditional Korean instruments. It is an encouraging attempt to combine traditional music and new computer music with constructive technology. In this concert, Parang by Korean composer Su Jin Ko was a piece for the traditional Korean instrument Haegum and tape. A Haegum is a major Asian fiddle instrument with two strings. There are similar instruments in various cultures (including China and Japan), and all have a very characteristic expression with microtonal pitches and moving tones. The tape part sounded like flowing sustained grains and micro-sonic sound. The instrumental part was rather like a solo piece, and tape part was working as an accompaniment throughout the piece. Curiously, the solo instrument and tape was just ended without any particular musical attempt. It is hard to say what is a good example of traditional instrumentation and computer music. We just continuously need to try to make various musical events for every kind of musical gesture with traditional instruments. Only this kind of attempt will expand the new language of musical expression with music and technology. I am also looking forward to hearing more combinations of various traditional sound and instruments with technology at future conferences.

The fourth piece, *balanfo* for tape, was composed by Austrian composer Daniel Blinkhorn and lasted almost 15 minutes. This tape piece used very natural sound material with wood, cracking wood, wooden instruments, the natural voice of Guinean, etc. Two-thirds of the piece consisted of wooden sounds with very natural sound effects and wide dynamic level changes. Toward the end, a voice sound came in. The natural voice was not touched by special signal processing. The sound of the voice and the natural wooden sounds made an intimate timbral reaction together. The duration was long; however, it did not feel that long for the listeners.

The fifth piece, *Luna* for saxophone and tape, was by American composer Lou Bunk. The program note was very short without any musical or technical explanation. I am guessing that the topic was the moon. The saxophonist stood on stage with two stands, a microphone and headphones. The opening was a deconstructed musical gesture with various unsettled pitches. The form of the piece was rather diffuse without settling in any particular form. The dynamic range of the saxophone and tape seemed constrained, but the saxophone sound flowed naturally and the tape part never took over the instrument part. The function of the accompaniment in the tape was effective and there were two parts that had a similar variation in timbre with micro-sonic development. The performance was smooth and attractive and the technology was unobtrusive, except that the page-turning noise made by the performer was rather distracting in very calm musical moments.

The sixth piece, *Vague Speech* for tape composed by American composer Daniel Zajicek, started with a characteristic bell-like metallic sound. The entire piece sounded like timbral variations of this metallic sound. Other granular micro-sonic sounds moved as ascending and descending directional gestures throughout the piece. These two musical elements sometimes stood alone and also mixed together later with various development. Lower frequency pulse sounds appeared toward the end and filled the lower frequency spectrum effectively. Another typical bell-like metallic sound pulled the power up to make a nice matching ending.

The last piece was *Nebulae* for harp and computer by Stephen Taylor. The musical intent of this piece seems to be to extend the instrumentation beyond idiomatic musical expression by using various extended techniques. The opening gesture of plucking the string was impressive. The placement of the microphone covered the weakness of the amplitude of sustained notes, but it also brought out note attacks. The harp part may have blended better with the electronics if the microphone had been slightly further away, but overall the acoustic instrument and electronics blended well and brought a calm and harmonized end to the concert.

Concert XII, Friday, 10 November 11:00am, Dixon Hall
by Carmen Caruso

When I came into Dixon Hall that morning to review a concert, I found that Concert XII was one of the stronger sets of performances I'd heard at the conference. It started out with a fast-paced video piece called *Underground* by Tom Lopez. Lopez

used constantly moving slotted bars on the screen to capture the rhythm of subway trains. Sometimes the bars would even contain video of the underground itself. The music also had a steady rhythmic component, becoming more frenzied at the end. The one thing I wished more from this piece was that music and video were more closely connected at the end. As the music got more and more turbulent, the video didn't completely follow suit. However, overall, the idea was very unique and I enjoyed this piece very much.

Annie Mahtani's piece, *Cidade Maravilhosa*, was very suggestive, with electronic whooshes and clicks that suggested waves, reverberant chimes, and even cicadas. Natural field recordings are also incorporated into the sound, including Brazilian chanting and chirping tropical birds. If I closed my eyes (easy to do in a dark hall), I felt transported to some exotic land. The piece also had a very ambient texture underlying these accent sounds, which gave it an almost foreboding element.

The next piece, *Nodule*, was very interesting. Donna Hewitt and Julian Knowles moved the concert toward a more secular vein, which was refreshing. Hewitt's voice provided some very interesting rhythmic vocal percussion. Towards the end, the piece reminded me of IDM (Intelligent Dance Music) with its building complex rhythmic collection of vocal pops and clicks. What also amazed me was their ability to sustain interest throughout a 20-minute piece. To me, this was a very difficult task in a concert setting, and they really pulled this piece off well. Part of the reason for this was the vocal performance. Hewitt took the visual role of a lead singer (albeit not in the traditional sense) on stage as she moved the eMic (a mic stand controller) around her to create different sonic textures, providing a strong focal point for the audience. I did feel, however, that a morning concert was not the best setting for this piece; it would haven been much more suited to an evening or even a late-night concert.

Charles Nichols's *The Blue Box* was unfortunately stunted by the fact that the dance element was missing from the piece. The piece was designed to use a motion-capture system with a dancer to create an interaction between computer and dancer, and in turn project the interactive animation of the computer on the screen. Thus, because there was no interactive live performance, only video, this piece really lost one of its core elements, leaving me unable to write a comprehensive review of this piece.

Paul Rudy's *November Sycamore Leaf* starts with an unveiling of chimes. Rudy describes the piece as inspired by a particular Christmas card: "The moment I slid the card out of the envelope sound literally exploded in my head. The bright orange leaf leapt off the card and into my sonic imagination." The introduction of his piece also reminds me of drawing an explosion of sound out from underneath its cover. This segues into a series of electronic chirps that reminded me of crickets, grasshoppers, and frogs. These quiet chirps are taken over by a building harmonious ambient texture, which also brings in touches of cello, organ, and the chimes played earlier, resolving the piece nicely, and bringing a wonderful concert to a close.

Concert XIV: Friday, 10 November 8:00pm, Dixon Hall
by John Arroyo

This concert, in my opinion, was one of the finest of the conference. There was an eclectic mix of styles and presentations. Above all, the quality was rather high and consistent. Many of my favorite pieces from ICMC 2006 were in this concert.

The night began with the piece *American Dreamscape* by Steven Ricks. It is a piece for saxophone and video with plenty of free jazz interludes. There was heavy use of sounds whirling around the speaker array. In the middle of the piece was some staccato sax work, which served to divide the piece nicely. It played out like the unfolding of a classic jazz piece. The fading between the video and performer was simple yet quite effective. In the video, however, the juxtaposition of old jazz footage and bubbles was not as effective. Unfortunately, the sound textures were not rich enough to sustain long-term enjoyment and the piece failed to ever take off.

Lametta by Ewan Stefani began with a somewhat cliché intro, then soon became interesting. The composition incorporated field recordings of children and animals as well as other sounds like bells. The piece expertly incorporated rhythm, including a great bass drum sound. Mr. Stefani managed to pull off the piece without overdoing it. He maintained a nice balance between subtleties and full audio texture.

Torrid Mix: featuring Jazzy King and Master L.T. by Mike McFerron was a piece for piano and tape. The sound texture of the piece used gibberish talking, clangs, and banging pipes, erupting into a powerful crescendo near the end. The vocals of the piece were very effective; however, the dialogue between the piano and electronics was often disconnected. Although the piece was good, it needed more unity. I found that each part was more effective on its own rather than together.

Under the Sea by Chien-Wen Cheng incorporated some very beautiful sounds. They were rich and inviting, but they never came together as a composition. The sounds were too sporadic to get the listener

to become engaged in them. I felt as though the piece was very close to becoming fully engaging, but failed to coalesce in the end.

Secret Pulse by Zack Browning followed and was performed by the NeXT Ensemble. This composition was definitely one of the highlights of the week! It began very powerfully, with all of the members of the ensemble engaged. The whole piece had a great interplay of the electronics and the performers. The cello's reinforcement of the electronic part was brilliantly syncopated. Sounds seemed to flutter in and out of the sound texture. The rhythm of the piece was beautiful and avoided common rhythmic pitfalls and clichés. Overall, there was an excellent synergy between the performers and the electronics that eluded many of the ICMC works.

Circles and Rounds by Dennis Miller was a tape piece with video. The first thing to mention is the beautiful visuals. The video accompanying the music was great, non-representational and quite exquisite. It began with abstract shapes resembling aquatic plants in outer space. The shapes morphed and grew a brilliant texture of fur. There was a great fusion of sound and image. Later in the piece some plant and water 3-D spirals moved around and morphed from organic shapes into a rigid spaceship-like object. The video definitely steals the show, but the sound is still strong enough to hold up on its own. This was one of the best pieces of the week.

Erwin's Playground by Fishman Rajmil was a tape piece with some great sounds. These start out sounding like a metallic jungle. Later, it sounds like insects running around on a tin roof. At times, the passages are too long, even teetering on self-indulgence. The excellent sounds, however, are not quite interesting enough on their own to hold your attention for the whole 9 minutes of the piece's duration.

Substitute Judgement + Metal Catalogue by Jeffrey Treviño was a piece for video and percussion. This was a very unique use of video. The video was rear projected onto 4 round disks that look like a cross between an art installation and an instrument. Three of the disks were translucent, the fourth was opaque (metal). Percussionist Ross Karre and the video were very engaging. Occasionally the video was too bright, and watching it hurt your eyes. I felt that the live drums should have been complimented by the use of electronic drums (either triggered or sequenced). Overall it's a cool piece, very artistic and creative. It would be great to see more works in this vein in the future.

Finishing the concert was *Juggernaut* by Paul Oehlers, a cello and tape piece. The juxtaposed classical playing and harsh noises doesn't work for me most of the time. Perhaps the room acoustics or micing were detrimental to the performance. The melody is effective only part of the time. It incorporated some neat sounds, but the plucked string sounds (possibly a clavichord) were timbrally weak. The composition was good, but it falls short in its realization.

The concert had many great moments and truly was one of my favorite of the week. *Secret Pulse* and *Circles and Rounds* were standouts of the night. All of the pieces in this concert, even the pieces above that were criticized negatively, were good compositions.

Concert XVI:Saturday, 11 November 1:30pm, McAllister Auditorium
by Noah Keesecker

The Saturday afternoon concert (XVI) proved to be one of the more diverse collections of works during the conference. The focus on electronic works with live musicians always adds a welcome physicality to any electronic music conference, and this concert certainly had its fair share of corporeal performances.

Oddly enough, the first piece of the concert, *Multiplication Virtuelle* by Mei-Fang Lin, was intended for percussion and computer, but was instead represented by a recorded performance. The documentary quality of the recording (complete with applause at the end) lent an interesting performance juxtaposition of the absent musicians. The interspersion of gestural and rhythmic percussion against the more depictive use of a distant creaking ship noise and residual processing effects actually served to create a dynamic space that was not at all devoid of a human touch. Similarly, the contrast between atmospheric and localized sounds accentuated the "missing" performers in a way that pulled the listener into a different contextual dialogue between audience, performer and machine, as well as ideas of live performance works compressed into fixed media format. This was most likely not the composer's intent, but it was an intriguing artifact nonetheless.

The grouping of the first three pieces of the concert also served to accentuate notions of "presence." Mark Applebaum's John Oswald-esque *Plundergraphic* performed/piloted by Guys w/ Big Cars tackled a vast and intricate onslaught of sounds that came across as both wonderfully chaotic as well as sonically relevant in a most peculiar way. The slightly alienating disconnect between the dry acoustic material—particularly the subtleness of the piano—and the diffusion work kept the piece on its toes, but in the end left something to be desired structurally. On a macro level, the work felt like something more complex than could be appreciated in a single listening.

The third piece that helped to culminate this strikingly distinct trio of opening works

was Eric Lyon's *Introduction and Allegro.* This work was both intriguing and confounding at the same time. The pervasiveness of an overtly ironic wit behind what could potentially be described as a type of neo-classical-post-modern circus betrayed any air of stuffiness. Yet the stark referential character of the sectionalized structure and tongue-in-cheek "beats" compared to traditional chamber ensemble practice as well as orchestral hat-tipping (was there a ghost of Respighi present?) did not allow for a clear understanding of the topics at hand. The pastiche quality of traditional instrumental techniques of tremolo and coloristic pairings against deliberately (?) alienating electronic elements such as the stiff vibrato or pointed tertiary harmonic progressions, dashed together with minimalism, Americana and impressionistic swaths of material was almost too much to digest. However, it was packaged so neatly and so openly that it was difficult not to be constantly engaged by the music. Certainly the work was enjoyable on the surface. More importantly, it raises a number of deeper aesthetic questions, but leaves the answers to the listener.

The final work of the first half, James Brody's *transport* for tape, felt distant in comparison to the previous works. This was in no way due to a lack of quality, but the sudden contrast of the performance space. Brody's work actually complimented some of the previously mentioned trends in sectionalized structure and compartmentalized sound. The seemingly vertical windows of sound were coupled with spatialization that was visual, yet not as dynamic as one would have expected. However, this conflict or joining of ideas between transport and stasis rounded out the first half of the concert subtly.

The second half of the concert felt as though it was still recovering from the first. *I understand, sort of* for saxophone and tape by Brian Willkie gave a fitting impression of the title. The textural and ambient quality of the work, coupled with the distinctiveness of the very physical and recognizable sound of the anvil, explored an area of interaction that was minutely changing and slowly organic. Similarly, *Firmament* by Hyejung Yoon for bassoon and computer felt equally reserved and nuanced in a way that perhaps suffered a bit due to the performance space. Both works felt like they were reaching for small, intimate sonic spaces that invited a personal, introverted contemplation.

Consort for One by Kristina Wolfe, on the other hand, came across as refreshingly crisp, despite the technical complications. The choice to allow the natural beauty of the viola de Gamba to dominate the space, as well as the simple yet sinewy lines, spoke volumes in favor of a humanistic and thoroughly musical expression.

Javier Garavaglia's enigmatic *NINTH* for viola and tape was the endurance champion of the concert. The strength and determination of the long gestures and noise elements outside of the harmonic material allowed the performer to stretch out into a more rich and expressive realm.

The concert was concluded with J. Anthony Allen's frenetic and rhythmically driven *Saturations III-C.* This work, choreographed by Barbara Hayley, felt like a quiet riot of tenuously bound music that pulled the listener forward as much as the refreshingly clear beats pushed the boundary between dance music and art music.

Concert XVII:Saturday, 11November 8:00pm, Dixon Hall
by James Harley

Concert seventeen—the last one. Phew! The audience had dwindled a bit, but those who were there were enthusiastic, either punch-drunk from over-stimulation, or rested from having already taken a break from the relentless six-day schedule. (Sightings of ICMC attendees lurking about Bourbon Street over in the French Quarter had been reported.) The evening's festivities began with a wild splurge of freebies tossed out into the clamoring crowd by conference organizer Tae Hong Park: cool software, t-shirts, and Radio Batons autographed by Max Mathews (just kidding on that last one!).

The show got going with a dance piece, *Transparent Body*, featuring Rebecca Lazier along with composer Dan Trueman playing his e-violin through his custom-built hemispherical speakers. The choreography was very well done, and the music was fine, if somewhat unengaging, at least for me.

Howard Kenty's *Spider* followed. This electroacoustic piece was built on pulsations derived from physical modeling instruments, with various spatial and timbral trajectories spinning webs around us. It was also… short. Bravo!

Rodney Waschka, brave soul that he is, found a way to harness the dangerously manic energy of the Convolution Brothers (Cort Lippe, Zack Settel, Miller Puckette) by way of paying tribute to the equally dangerous Jerry Hunt. *Keeping the Core Pure: In Memory of Jerry Hunt* was good fun, and I suspect that Mr. Waschka succeeded so well in this performance because he is taller than the other guys.

Butch Rovan's *Hopper Confessions: Room in Brooklyn*, for interactive cello and video, required a re-start, but was otherwise an interesting, complex work drawing inspiration from a poem by Anne Carson that refers, among other things, to a painting by Edward Hopper. The video

included bits of text and images taking off from the Hopper.

Manuel Rocha Iturbide's recorded work Purusha-Prakrti, produced in Bourges, makes use of a number of noisy sources, both natural and electronic. I particularly enjoyed the fine transitions across the rich, sustained textures.

Members of Cincinnati's NeXT Ens convened once again for Yu-Chung Tseng's *Reminiscence of Pipa* for flute, percussion, and recorded sounds. Inspired by a Tang Dynasty-era poem, this was dramatic music. The composer showed a definite flair for the flute and percussion instruments. I otherwise found the music pretty predictable.

Jacob Rundall's *This too shall pass…* is an electroacoustic work based on analyses of bell and cymbal sounds. The music didn't make much of an impression on me; I suppose it "passed" a bit too easily. It's all been done before, I suppose.

The concert concluded with an updated remix of Laurie Anderson's mega-hit from the early 1980s, O Superman. Joshua Clausen was joined by a couple of his (uncredited) colleagues from Minneapolis to perform live with their laptops. They got a nice groove going, and the video was cool, too. Imagine, tributes to Laurie and Jerry, all in one program!

ICMC 2007 Reviews
Aalborg University Esbjerg, Copenhagen, Denmark

Monday, 27 August
17:00, PLEX Music Theatre
by Iowain Thomas

There could be no doubt that the concert was hot. An overflow crowd pressed forward, brandishing their hand-printed tickets at the bottom of the stairs leading to an elegant, steeply raked hall, where the temperature hovered around 30 degrees Celsius (hotter at the top). The less fortunate remained cooler in the cafe outside, speaking animatedly about (we may assume) the concert they were missing.

The overall form of the concert was (in pseudo-American parlance) a double-decker Chowning sandwich on harp bread. This programming choice was both practical (the harp parts were substantial, so consecutive performances would have been unkind at best) and refreshing.

The combination of harp and electronics, while by no means novel, is nevertheless unusual. This is a pity. The relative consistency of the instrument's timbre is well complemented by the Protean world of disembodied sound, while the unusual constraints of the instrument itself can give direction to an electroacoustic composition in fascinating ways.

In some sense, Chowning's compositions on the program—particularly *Stria*—reflect a similar dichotomy between instrumental constraint and inventive freedom. After 30 years, *Stria* still astounds with its depth of exploration of a rigorously limited terrain. To elicit such musical range and force from a single compact harmonic/timbral structure and a single synthesis technique is no mean feat! Likewise, in *Voices*, Chowning relies on a simple event-driven score-following model and a well-chosen palette of timbres and techniques. He treats the voice with dignity in elegant, almost *bel canto* vocal lines that leave ample room for nuanced interpretation. The imaginative room he finds within these boundaries vastly exceeds that of most works that are more technologically profligate.

Either it was the digital reconstruction of the work by Olivier Baudouin and Kevin Dahan, or else it was the Princeton Sound Lab's 3-D rendering of its spectrograph, but this writer heard elements in *Stria* that he had never noticed before, despite years of engagement with the work. The creators of the spectrograph video may have been more entrenched in video game culture than

some of us; the sweeping, shifting point of view (occasionally ducking below the plane of the spectrogram) induced occasional seasickness (no, madam, I had not been drinking!). Nevertheless, on the balance of things it added to the experience.

Voices was inspiring. Maureen Chowning's performance was scintillating, and the electronic setting was subtle, sensitive, and spacious. Synthesis and spatialization were foremost in the sonic techniques of the work, creating an eerie and immersive sound world. The integration of timbre and harmony based on artificial scales within pseudo-octaves evoked the world of *Stria* from a distance. The serpentine hissing of vapors in the cave at Delphi, the frenzy of the oracle possessed by Apollo, the space between the internal vision and the cavernous space of the Pythia's temple—all were represented and integrated into a deeply engaging and moving experience.

The drama and musicality of the work aside, how on earth is it that the guru of early digital synthesis has now become a master of the art of interactive music? While recognizing Chowning's unique mind and spirit, the author received new hope of being able to transcend his own current music technology armamentarium several decades hence!

Returning to the harp music: Robert Rowe, a more established master of interactivity, pulled out all the stops in *Moon on the one side, Sun on the other*. Inspired by an image in Marilynn Robinson's novel *Gilead*, the work's intensity reflects the notion of following two lights across the horizon as the moon rises and the sun sets. Swooping gestures and clouds of sound translate the harp timbre into an evocative soundscape. Gestures triggered by the harp take on their own shape and life. However, in some places the work might have benefited from greater independence between triggers and their responses.

Fausto Romitelli's *Bad Trip Remix 1998* is inspired by the hallucinatory, drug-fueled world of Henri Michaux. This Dionysian impulse results, strangely, in a well-ordered and Apollonian work: idiomatic harp gestures receive a delicate, well-crafted electroacoustic setting. The tape part continued in a long coda after the harp finished playing; the dramatic awkwardness of this raised the question of whether or not it was intentional. The intensity and conviction of Sofia Anunción Claro's playing tipped the balance toward the composer's culpability.

Ms. Claro seemed most at home in Kristine Burns's *Nuance* (*Nuage* in the program, but not on the composer's web site), a well-chosen ending to the concert. The conversation of harp and electroacoustic sound in this work spoke with a simpler, more direct language. Burns's composition seemed to lay especially well under the harpist's fingers (and feet), letting the instrument sing in its own voice. Alas, nearly overcome by the heat of the hall, some listeners may have been counting the minutes until they could again breathe the fresh air of Copenhagen's ancient cobbled streets.

Tuesday, 28 August
12:00, School of Architecture
by Mara Helmuth (final piece reviewed by Daichi Ando)

I will begin with some general comments. The lawn setting for the noon concerts generally enhanced the presentation, giving an acoustically dry space. Occasional construction sounds sometimes led to confusion over whether the piece or real construction was being heard. Also, on the days that it rained, the umbrellas did not help in hearing the eight-channel diffusion. If there was a "front" and "back" to the acoustic space in the piece, people were not aware of this, and sat facing in all directions. Most, if not all, of the acousmatic and fixed format music was packed into these noon concerts. This programming has the advantage of providing a focused set of concerts for those interested, but the weakness of overly homogenous concerts. Particularly with acousmatic music, which demands intense listening without the "entertainment" of watching a performer, it was a good idea to keep the concerts under one hour. The quality of music on this concert was quite good. Since the noon concerts often were at the only break between morning and afternoon paper sessions, choices had to be made between research and music presentations if one wanted to eat lunch. (A similar choice also had to be made in whether to attend late night concerts or morning papers.) This kind of dilemma could be avoided by exercising more selectivity in programming overall.

Daniel Barreiro's *(Un)folding* was composed of acousmatic textures with some nice brief shrieks, and filtered long extensions going into crunchy erratic buildings. I would not have known the piece was made from paper, as the notes describe. Outside environment construction sounds went with the piece nicely at times. The piece moved into violent eruptions and tense high "suspensions," then dropped to lower frequencies. The high sounds returned in hollower timbres, then lower registers with a final crinkling. The element of unexpectedness in phrasing worked well in this piece.

Piéce de Derriére no. 2 by Volker Hennes was, according to the composer, created after analyzing a hurricane's structure. Perhaps this contributed to the integrated-ness of some of the sounds, which sounded as though they contained other sounds within them. This effective phenomenon

occured with long noisy sounds containing punctuation, and later with high sounds containing voice-like sounds. I was reminded of gunfire at times, with bursts of around four attacks recurring as a motive near the beginning, and siren-like sounds later on. The clear sectioning and multi-level timbral construction worked well.

The third work, Robert Sazdov's *Sv Kliment,* made the most effective use of the eight-channel format on this concert, and was based on the composer's research in 3-D sound perception. Kliment was a scholar who probably established the first university in Europe. The piece drew on world music and vocal sounds, more traditional harmonies and repeating rhythms. I enjoyed the sounds, including some whispery/whistly/choral-like sounds, and did not perceive an attempt to create a satisfying structure. I wondered if documentary music was the compositional goal.

I enjoyed Takayuki Rai's *Labyrinth* the most of those I heard on this concert. The exploration of the urban landscape covered diverse timbral worlds, from jackhammer patterns revolving around the listener, dreamy wind-chime-like granular textures (which I think could have been slightly shorter), combinations of these with spatial argument, and some softer bird-like textures.

I left to set up for my presentation, and asked Daichi Ando to review the final piece, Kari Besharse's *Ear to the Ground*.

The real sounds—sounds of the piano performing—were very interesting. The contrasts between non-real sounds and piano sounds were a nice novelty, and filled me with curiosity. The structures of the piece were precise due to the sound constrasts. Moreover, the sounds functioned effectively with the ingenious spatialization.

Wednesday, 29 August
12:00-13:00, School of Architecture
John ffitch

The lunchtime concerts were open-air affairs. In the middle of a circle of 8 speakers, we sat in disorganised groups to listen. For this concert there was sun, but it was rather colder than I like, so I was wrapped in coat, scarf and hat on my portable chair.

The first work was *Acheron* by Paul Oehlers. The program notes did not give much away about what to expect, but the six-minute piece was most enjoyable. From its start in the midst of long static-feeling sound, which developed slowly but deliberately to include bell-like highlights, there was an intense feeling of immersion in the sound. At the three-minute mark there grew more harmonic and chordal sounds, which achieved some kind of stasis before a bubbling instability took the sound to a quiet conclusion. Overall, there did not seem to be much individual spatial location of the sounds, but a unity all around. It was perhaps a little quiet overall for the outdoor location, and a light plane near the start was a little disturbing. Certainly this is a piece I would like to hear again.

The piece that followed, *Friction* by Chikashi Miyama, was a contrast. Reading the program notes after the concert, I learned that all the sounds came from a double bass, activated in a number of ways. My notes at the time indicate that I had in mind something falling on a violin string. The development took it to less identifiable sounds, but still within the same world. This piece made use of the 8-speaker system to locate individual events around the space. The sounds were of varying amplitude and gave an overall jagged sound world. In the middle I lost the sense of development, but the introduction of longer sounds led eventually to more explicit bowed string sounds, emphasising the title and the source. The end returned to the disjoint world, and the end had what I heard as brutal bangs before dying away. I appreciated the craftsmanship
of the composition, but this was not really to my taste. At 10 minutes, it seemed a little too long for the material. It is worth adding that experience has shown that my taste is not that of the majority.

The third work in the concert was not played, so we moved directly to Brian Willkie's *Noche Oscura*. This was a stereo work, but played through four speakers per channel. The opening of the piece featured buzzing sounds with continual variation and movement; clearly the influence of Gendy and Xenakis-like grains was to the fore. For two minutes, these sounds danced and gained in intensity before giving way to a very quiet passage. Indeed, this quiet reflective and contemplative passage was unfortunately rather too often swamped by external factors (light airplanes being the most common). The mode was broken by bangs and heavier, metallic sounds, with the buzzes now sounding menacing. Longer, steady pitched events were introduced before the bee-like sounds took us back to the mode of the opening. What a shame it was that the conditions were not right for this work. Its continuous activity within tight boundaries were
very well composed, and I want to hear this work again without the planes and other sounds.

The concert ended with another contrasting piece, *Kaleidoscope: Arcade* by Peter Batchelor. The conceit of the work was that it was inside a pinball machine. The sound world is of industrial sounds, broken up at times with whistles and attention-seeking bangs. The surround sound was used to give the

illusion of the listener being inside the process. Overall, the piece worked. At times I lost the surface structure, but the unity of the sounds kept me involved for its eight and a half minutes. Apart from the introduction of long static tones at the end, the work was entertaining and engaging. In fact, it was sufficiently popular with the sound crew that it was given a second playing later in the week.

The concert as a whole was enjoyable. The works contrasted with each other and used the format in different ways. My only reservation was the extraneous noises; airplanes and a police siren at times dominated the otherwise well-constructed concert.

Wednesday, 29 August
17:00, PLEX Music Theatre
by Dan Overholt and Graham Wakefield

The concert began with Sami Klemola's *Fragile*, a 14-minute work commissioned by the Uusinta chamber ensemble with the support of the Sibelius Foundation. Klemola's program notes are drawn from quotations of Rene Magritte, Paul Klee, Eliel Saarinen and a Chinese proverb. The Chinese proverb informed the title of the work, with the statement "You cannot prevent the birds of sadness from passing over your head, but you can prevent their making a nest in your hair." The performance started with a pair of delicate and meditative *sul ponticello* bowstrokes processed and accentuated by piano motifs, followed immediately by the flute's entrance along with the ensemble. The evolving harmonies in the work consisted primarily of held sonorities connected by interjecting lines, manipulating the listener's ear with increasingly rich, busy, and complex tones. The Saarinen quote is therefore an appropriate metaphor for the harmony: "Always design a thing by considering it in its next larger context—a chair in a room, a room in a house, a house in an environment…"

Overall, the form of the work progressed into more active and frenetic lines overlaid on the harmonies. The program notes provide us with some insight into the composer's thoughts about the form through the Paul Klee quotation "Things appear in an extended and multiplied sense, often seemingly contradicting the rational experience of yesterday." Again from the program notes, the final quotation (referring to the use of computers in the work) is by Renee Magritte: "One object suggests that there is another lurking behind it." The computer-based elements of the work (at least in the performance context) consisted primarily of the processing of the *sul ponticello* held notes of the string section. Sparingly used, this provided an engaging, masterfully used, well executed expression of beautiful and moving sounds. A full assessment of the creative process involved in the composition of the work would have to include the detailed examination of Klemola's use of altered orchestral timbres that express quite faithfully the meaning and feeling of the work's title, *Fragile*.

The next work on the program was *Lasso and Corral: Variations on an Ill-Formed Meter* by Dan Trueman, himself performing on the Hardanger fiddle along with the Uusinta ensemble. Seven is a wonderfully uneven number, suggestively approaching crystalline eight yet naturally falling away before reaching it, emerging out of flowing mixtures of threes and fours, an obstinately asymmetric factor with a magical quality. Trueman masterfully plays with the structural rhythmic layering and sequencing of sevens throughout the various moments and sections of this composition, through an almost demonstratively presented audible click-track. Trueman himself notes the somewhat didactic quality: "at times the underlying pulses speed up and slow down, but in highly consistent, learnable ways." The Lasso in the title refers to Trueman's conception of click-track itself, "a valiant attempt to corral an out-of-control fiddle band." The pre-recorded tempo variations within the click-track were clearly anticipated in extremely fine detail by Trueman on the Hardanger fiddle, with the ensemble close behind while following along with the insistent beats. Somewhat reminiscent of other American composers such as Steve Reich, the feeling provided by the work was that of a beautiful exploration of the expressive timing inherent in the meter of 7, dominated by sonorities implied by the unusual tuning of the Hardanger fiddle's strings to A, E, A, and C#.

In addition to their rhythmic function in the work, the metronomic pitched pulses also construct a harmonic guide around which the ascents and descents of the fiddles gambol. On the whole, the work manages to ride out the potential traps of such a didactic or demonstrative constraint, with perhaps one exception: as the central, driving master of the work, the click track was perhaps too harsh a master. At times overstating its presence in terms of amplitude, the pulses sometimes had an aggressive quality that seemed out of keeping with the otherwise lightly musing harmonic and gestural feel. We cannot imagine that this amplitude was for the sake of the performers, who scarcely at all glanced at the visual click-tracks on their iBook screens.

Members of the "Internet generation" (if there is such a thing) may well have appreciated the next piece, Max Savikangas's *Pussyhead 69*. As an intermedia work, the video components were composed by Teemu Mäki, and brought to mind elements of online video sites. Many "extreme" video clips were

organized into a patchwork of visual abandon filled with somewhat common vernacular and seemingly unnecessary hype. Despite the intention to "leave room for immersive interaction between music and video", as the musicians could also watch the screen, what appeared to come across was quite the opposite: an awkward sense of disjunction. At many points we were compelled to close our eyes in order to hear the music undistracted by the relatively ungainly rhythms of Teemu Mäki's video jockeying. Musically, the work was quite capable of standing on its own, and was well performed by the Uusinta ensemble (Savikangas is in fact a member of the ensemble). Each performer had a small display, which appeared to indicate the open form module changes to the ensemble. However, the use of effects foot-pedals produced quite audible clicks when the performers tapped them. One remarkably well-done element in the music was the effective deployment of contrasting and complementary extended techniques, showing the dichotomy between processed and non-processed sounds. Savikangas deftly juxtaposes these sounds to create what seemed, at times, to be a dueling relationship between traditional and extended techniques as well as processed and non-processed sounds.

The concert finished with Tommaso Perego's *Incastro di Mondo* (perhaps "tangle of the world" or perhaps "joints of the world"). Perego himself performed with the ensemble with a wireless gamepad controller. As the last paragraph of the program notes states:

Flute, Bass Clarinet and Violin are connected to computers through microphones and are creating musical events upon some rules of a sort of a game. They listen to the electronic real-time processing on their sound, expecting unexpected and sudden changes coming from the computer. The role of the Wireless Gamepad Controller player is to provoke and manipulated the electronic responses.

The beginning of the program notes may well have put the audience in a mental state of tension before the piece even began, with phrases such as "loud and powerful metallic spheres of sound," "piercing the audience's ears," "ominous advance," and "wild forgers of violent appetites." However, the work did not offend in the slightest with such sonic atrocities. In fact, the program notes had no mention of the work's judicious use of silence, intensity of attention between musicians, details of the electronic algorithms, or the rules of the game they were playing. These are elements that were all extremely well formed in the work, no doubt due to Perego's diligence and attention to detail.

The first and second gestures in the work (and the nearly 20 seconds of silence between them) quite immediately and wonderfully switched the listener to a different state of listening. Between these gestures, a little noise from the electronic processing seemed to be leaking through the sound system. Although this could perhaps have been eliminated with a simple noise gate, it seems to us that the sonic result would not have been nearly as satisfying, and it is imagined that its absence was quite intentional. The work presented an overall diminuendo after the first minute to the end of the work (quite unusually), yet managed to hold the audience rapt. The length of the performance was just over three minutes, a perfect time in which to absorb the disparate sounds combined from the electronic processing and natural timbres. Was this a pre-composed structure, a natural output of the game rules, a result of improvisational skill, or an epiphenomenon of a different nature? Certainly the immediacy and focus of interaction between performers was quite evident and viscerally enjoyable. It was clear that the electronic processing was certainly subordinate to the performer's interaction. Perhaps the only pity, however, was that the audience was faced with Perego's back for much of the performance, only able to see his actions on the gamepad controller in the moments at which he needed to glance over to his laptop screen.

Considered as a concert event on its own, this was a show marked by a wide range of diverse compositional approaches, intermedia materials, and ambitious works. Within the scope of the entire week of ICMC 2007's wonderful programs, it showed that the assortment of works on just one concert can provide audiovisual works with enough variety to give the conference a successful and fascinating artistic focus. It was a delight to experience these works, and we will be looking forward to seeing what these composers come up with at ICMC 2008.

Thursday, 30 August
19:45, Tycho Brahe Planetarium: Omnimax dome concert
by Toine Heuvelmans

To be honest, after attending the first Planetarium video concert, I was a bit afraid of what the subject of this review might turn out to be. This, of course, had little to do with the Planetarium itself, an awesome venue for video concerts with its gigantic Omnimax dome and very comfortable seats. The Tuesday concert, however, was all but comfortable; there had been low video quality (both technically and artistically) and minimalist music (in both composition and the variety of sound material) that was often too loud. Luckily, it was rumored that this evening all the video would be HD. Although it still only filled a fraction of the entire dome, the videos did indeed turn out to be of great quality, really

making use of the extra pixels. However, let me remind you that this is all part of the International Computer MUSIC Conference, so the audience's attention should in the first place be attracted to the music and sound. A good piece in this context is one in which the music and video are of equal importance and quality, or in which the emphasis lies on the music, but the video relates to the music and is of a quality that isn't distractingly low. If you close your eyes, you still have something interesting to listen to.

The first piece, Rajmil Fischman's *¿Te Acuerdas, hijo?*, is almost the only piece in this concert that doesn't fit this description. It is as with Hollywood movies (though this work is more interesting than many of those movies)—your attention is mainly directed to the visual story and spectacle, whilst the music and sound accompany all that on a more subconscious level. The music was so supportive to the visual activity that it could hardly stand on its own if you closed your eyes. There wasn't much variety in sound character, and though this can be a virtue sometimes, it sounded more like a river of grains to me. Nonetheless, it was a pleasing piece to watch. It was well dosed, didn't numb your senses, and told a story. Visually, *¿Te Acuerdas, hijo?* was of good quality. It contained some transitions, morphs and other parts (like a speaking face) that I thought were quite impressive, but this evened out with the rest of the piece to be just a nice work.

I've seen *Music, When Soft Voices Die...* with music by Roderik de Man and video by Marcel Wierckx once before in Holland, though it was in a relatively small room on a small screen with a lower resolution. Without the HD quality, it was already a beautiful piece both musically and visually. The composition dates from 2004, but the video was added three years later. As you might expect, then, the composition is strong enough to stand on its own. It has three chapters: first slow, then energetic tension, and then a serene ending. The sounds used are varied but do not clash, and often I couldn't distinguish right away how they were produced, which makes it more interesting. However, there's one part in which a voice utters the name of the piece (and another bit from the poem it originates from), and de Man doesn't pull this off as well as Fischman in *¿Te Acuerdas, hijo?*; it just doesn't fit in as well. The video intentionally uses the HD standard to reach a level of detail that reflects the amount of detail in the music. It visualizes movements and moods from the composition in such a way that it increases the emotional impact, but does not distract the audience's attention from the music. The video serves more like a guideline through the composition.

The best way to explain what I find great about *Elements* from Jawshing Arthur Liou (video) and John Gibson (music), the third piece of the evening, is to quote Roderik de Man: "Reading programme notes at concerts, I often find that the more complicated they are, the more disappointing the piece turns out to be..." *Elements* had none at all. It made me think of the deterioration of a smoker. The video alternated between something that looked at first like snow but turns into ash at the end, and an extremely detailed pumping organ that turns from (almost) healthy red to black. At the end, there's a somewhat holy golden glow shining from within, perhaps representing something like recovery. This small color palette of gray, red and gold tones combined with the slow movement and very realistic 3-D animation made watching *Elements* an interesting experience. The slowly moving music was calming but at the same time a little frightening, complementing the video. At the end, when the golden glow occurred, a clerical voice even joined in. I wasn't bothered that the overall emphasis lay a bit too much on the visual side, because I was too much hypnotized by the combination of it all.

From one emotion into another, Dennis Miller's *White Noise* evoked a very strange feeling in me. It felt like peeking inside Pandora's box, or into the heart of a star nebula. Its overwhelming beauty and unreachably surrealistic complexity go hand in hand with a frighteningly chaotic destructiveness. *White Noise* utilized almost the same color palette as the previous piece, but there was nothing holy in this piece: hell opens right in front of you, and it's impressive!
Noise in all its forms is present in each level of both the music and the images. A constant industrial rumble is disrupted by chaotic and detailed bursts of noise, which create a well dosed but unpredictable trip through a hostile landscape of sound. Without this music, the video would be a chain of beautiful graphics, and on its own the composition is already really interesting, but the combination is extremely powerful.

Autarkeia Aggregatum by Bret Battey had a somewhat meditative musical quality, but contradicting this tranquility were the more than 11,000 points crawling around on the screen. The points moved around in a similar motion (changing from big to small circles to Brownian motion, from fast to slow movement), and were present throughout the entire piece, constantly changing color, together functioning as an organic screen. The sounds seemed to have a bit of an Indian influence, adding to the meditative character. Further into the piece, something that sounded like a reed instrument joined in, and I later read that the "natural" glissandi it played were actually generated by a tool from Battey (PICACS); it fooled me. The piece evolves and flows gradually and without cuts, making it a very relaxing piece.

In this relaxed state the concert ended, and I left the Planetarium, satisfied that I had something worth writing about.

Friday, 31 August
20:00, Queen's Hall
by Sever Tipei

Friday's 8pm concert in Queen's Hall featured the ensemble Insomnio, conducted by Ulrich Pöhl. Insomnio is a very disciplined ensemble, and the use of live electronics appears to be one of their trademarks. However, on this occasion, the amplification of the piano sometimes got out of hand. On the whole, though, they served the music very well, and there were a number of beautiful moments.

Per Bloland's *Negative Mirror, Part II* and Konstantin Karathanasis's *Obscuritas Luminosa, Lux Obscura* were the highlights of the evening. Both works are well constructed and make effective use of instruments. Although the overall results were commendable, I was left wondering if the use of the Electromagnetically Prepared Piano Device in Per Bloland's piece was really necessary from the point of view of the composition or just another gimmick.

I particularly liked *Obscuritas Luminosa, Lux Obscura*, which displays a refined sensuality and shows great care for detail. Karathanasis uses a beautiful old Greek text as a subtext for his composition, which becomes an exquisite metaphor conveying a profound philosophical thought in vibrant corporeal sound images. When disregarding the motto, the music stands on its own and remains effective while nevertheless conveying a world view embedded in its minutiae.

Deep South by Lars Graugaard was the least conventionally built work on the program, with the timpani commandeering the piece at around the golden mean point and taking it into a new realm. The result is puzzling at first, and it reminded me of the morphogenetic music idea promoted two decades ago by Romanian composer Aurel Stroe. According to Stroe, some of the most interesting pieces lack stylistic unity, their formal characteristics changing during the unfolding of the work.

The other two offerings on the program were a disappointment. Dietrich Hahne's *Ecoute 2*
(announced in the concert booklet as *NUT*) incongruously pitted a rather trivial instrumental section against the speakers. Too long for the amount of the information delivered, the piece was swamped by Prokofiev-like sonorities.

The last work on the program, *Mal di Luna* by Calliope Tsoupaki, also wandered too long trying to highlight the virtuosity of the six-string electric cello of Frances-Marie Uitti without gaining in substance. Meant to draw attention to the genuine virtuosity of the soloist, it didn't rise above the level of a technical exercise and didn't demonstrate a justifiable need for the uncommon instrument.

A final word of praise for the sleek volume dedicated to the music programs. It is deeply regrettable that the paper schedule didn't benefit from similar attention.

Festival Reviews

Bellingham Electronic Arts Festival (BEAF)
November 30 - December 3, 2006, Bellingham, WA
by Jacob Gotlib

There's a famous scene in the movie *Austin Powers* where Mike Myers is laying in bed with a woman who asks him to describe himself in a nutshell, and he suddenly exclaims, "Help! I'm in a nutshell! How did I get into this nutshell?" We composers doubtless ask ourselves this question often; we all have nutshells in which we exist, small niches or scenes that are subdivisions of the greater musical world. And within these musical gated communities reside composers, performers, theories, philosophies, histories, and even audiences—what more could one possibly need? It's easy to see why many of us never leave the comforts of our homes, be they "classical," "electronic," "experimental," or any of the infinitely small subgenres within each. However, just as a person who doesn't stray far from home can never get an idea of the vastness and wonder of the world, neither can a musician that fails to venture outside his or her self-prescribed niche see the beauty of the broader musical universe.

Enter the Bellingham Electronic Arts Festival (or BEAF), whose goal was to take everyone working with electronic media out of their cushy artistic suburbias, and place them all in a giant mixed-income neighborhood in the middle of the city. The festival brought together artists from all over the world, from nearly every scene or niche in the electronic music community (excluding most popular dance genres). Academics, pop musicians, DJs, VJs, dancers, installation artists, laptop improvisers, turntablists, and many more met and mingled for four days of concerts, lectures, and parties. No one got shot (to my knowledge), but many minds were doubtless blown.

BEAF displayed its *raison d'etre* brilliantly in the Opening Gala Concert held at the American Museum of Radio and Electricity. The works ranged from ambient noise pieces to techno-pop performances to experimental improvisations to academic electroacoustic music. From the start, BEAF unveiled its secret weapon: talented video artist Peter Rand, who performed live video improvisations to many of the works, both on this concert and all the others at BEAF. Scott Smallwood began the concert with an impressive set of ambient noise improvisation, displaying subtly changing textures of static and distortion that, while often soothing, were continually thrilling to hear. Jeff Morris's *Improvisation*, while more firmly rooted in academic electronic music, was equally as evocative with its wide variety of sound sources and quick pace. Ligyro, a group from Bloomington, IN, changed things up with a set of electro-pop/rock songs, featuring the sole usage of human vocals on the entire concert. Their music was exceptionally broad, ranging from more up-tempo dancey tunes to mellower, more ruminative pieces, showcasing the expressive voice of Neil Cain. The centerpiece of this concert, however, was the nearly evening-long *Six Axioms* by Randy Jones. The work featured interactive synthesis and video that the composer controlled with an instrument called a "radio drum," which operated like a combination sensor and drum pad. The visual and sonic textures in this piece were gorgeous, and though it was lengthy, the consistently meditative mood created a hypnotic and ethereal space. The interaction between the music and Jones's gestures were engaging to watch, often giving the impression that the sounds were controlling Jones as much as he was controlling them. This opening concert, as the rest of the festival, provided a space where arbitrary divisions of "scenes" and "styles" were completely obliterated.

Throughout the next three days, the concerts were programmed by particular style, i.e. "Sonic Explorations (experimental)," "Intersections (immersive electroacoustic)," "Rhythm & Noise (post-industrial)," etc. The shows took place in a variety of venues around Bellingham, from the gorgeous (but freezing) American Museum of Radio and Electricity, to the Western Washington University concert hall, to the Nightlight Lounge, a rock club downtown. Sebastian Roux delivered a blistering, noisy set that achieved beauty and intensity through its sheer variety of sound sources and treatments; its relentless energy and thrilling movements were a perfect bridge between academic electroacoustic music and more popular experimental styles. Rocco Di Pietro's *Deconstructed Fountain From Ravel With Derrida Watching* for piano and tape was mysterious and intriguing, with both piano and tape parts slowly expanding and blooming like a flower. Lusine (aka Jeff McIlwain) presented subtly textured ambiences, creating an entrancing yet always rich and fascinating atmosphere. Chris Biggs's *Inconspicuous Impulses* for piano and tape attempted to reconcile the "contradictory tendencies" of electronic and serial music. Though I'm not sure if I noticed these contradictions, the rich counterpoint and Davidovsky-esque interactions between the performer and the tape, as well as the virtuosic performance by Shu-ching Cheng, made for a captivating listening experience.

BEAF's guest lecturer this year was Barry

Truax, a composer and professor at Simon Fraser University in Vancouver. Truax gave a fascinating lecture on the history and philosophy of Soundscape composition and Acoustic Ecology, or the idea that recordings of a particular space's environment yields not only material for composition but an auditory "snapshot" of a place, and that by comparing recordings of a single location over the course of many years, we can learn about how it has been changed and affected. Truax presented several of his works throughout the festival, including *Island*, a mesmerizing piece that uses techniques of soundscape composition to take the listener on a journey through the landscape of an imaginary island. The octophonic presentation of the work created an immersive world that once again had ties to classical electroacoustic music and to more popular ambient styles.

Some of the strongest, most engaging music at BEAF came from the live/interactive performances. Kinesthetech Sense, a multimedia dance group from the Bay Area, lectured and performed a thrilling work for electronic music, interactive video, and dance called *FleshLightMovement*. TrioMetrik, another group from the Bay Area, weathered technical difficulties and delivered an engaging set using Zeta instruments, acoustic sounds, and gorgeous interactive video featuring image synthesis, paintings, and text. Both TrioMetrik and Kinesthetech Sense created an electronic network of visual and sonic elements, all linked via computer, to express a kind of information synesthesia where aural senses were mapped to visual ones, which were mapped to bodily ones, and back again.

Perhaps the strongest performer at the festival, however, was Prefuse 73 (aka Scott Herren). Somewhat of a star in the experimental hip-hop world, Herren and his performing partner (whose name was not listed) performed their brand of dense, eclectic, textural music to the largest crowd of the entire festival. Manipulating turntables, samplers, drum machines, and computers, Prefuse's set was not only musically exciting, but the performance itself was easily the most energetic and engaging of the entire festival. This was no sitting-calmly-behind-a-laptop performance: the duo was constantly moving their hands (and feet) across a sea of electronic gear, heads bobbing with the music, eyes locked in concentration, even actual sweat pouring down their brows. Many listeners claim electronic music is boring to experience in performance because the performers hardly *do* anything; Prefuse 73 would easily prove them wrong, delivering one of the most exciting, interactive, and *human* electronic performances I have ever seen.

Aside from the eclectic music, the one thing that made this festival stand out from any that I've been to before or since was the audience. At every concert (even the electroacoustic ones), there was a nearly full audience of both composers and "civilians" – open-minded music lovers who were not professional musicians. After attending countless new music festivals that were populated entirely by composers and academics, to see a *general audience* that was excited and enthusiastic about this music was thrilling. Bruce Hamilton and his staff did an amazing job not only organizing and overseeing a festival as extensive as this one, but for setting a new precedent for contemporary music festivals. If contemporary classical music (including electroacoustic music) is to thrive, it becomes imperative that we as composers break out of our nutshells, and start interacting and coexisting with our colleagues in other fields (including more "popular" ones). BEAF, and similar festivals like it, is a breath of fresh air and a bold step in the right direction.

NWEAMO Festival
Morelia, Mexico,
September 19, 2007
by Jerónimo Rajchenberg

In the Purepecha lands in the central plateau of Mexico is Morelia, a calm city with a large music tradition. One of Mexico's most important music conservatories, the Conservatorio de las Rosas, has been there since 1743. Yet the music landscape in Morelia has been traditional and, somehow, conservative. I should say that in Mexico contemporary music and technology music concerts have rarely a crowded audience. That is why it was so surprising and interesting to see the NWEAMO concerts and the reaction and acceptance of the audience.

Concerts took place at the CMMAS (Mexican Center for Music and Sonic Arts), a technology art center directed by Rodrigo Sigal that allows instrumentalists, composers, video and installation artists to meet and work in a creative and rich environment.

First of all, it was striking to see the concert hall filled to capacity. Not only were all the seats taken, but there were also people standing here and there, listening with attention throughout the entire concert. The CMMAS received more and more people every day—all kinds of people, from experts in technology and art to people who came for the very first time to know this thing called contemporary musical art.

In the NWEAMO festival, the music of twelve composers was presented, with a very large range of aesthetic and technological approaches, from a cello piece (the traditional all-written-in-a-score) to the dance-video-cello-computer music proposal of Kinesthetech Sense. All of them performed over a four-channel speaker system array. I'd like to write about the pieces and performances that

have contributed, from my point of view, to the Mexican music scene.

Le Repas du Serpent, by Mexican composer Javier Alvarez and vigorously performed by cellist Iracema Andrade, was the first piece in the festival to create a multimedia ambiance, including cello played in very different ways, computer sounds and video. The video of *Le Repas du Serpent* is an old French recording of a snake eating a rabbit. It must be in a zoo or a biology class, because we can see people looking at the snake. It is as interesting to see the snake eating the rabbit as it is to see the reactions of the people in the video. The piece has a delicious variety and development of timbre, and spatialization that locks in music the audience's attention. The cello performs several glissandi, to which the tape responds with changes in the size of grains. The tape's sound's texture, then, changes in a glissando way, creating a dialogue between them.

Another very interesting work was the one presented by Mexican-Dutch group Presidentes con Bigote (Presidents with Moustache), created by Carlos Iturralde and Keir Neuringer playing several instruments and sound devices. The first piece they performed was a very surprising guitar-sax-tape composition (with large improvisational parts) that used several non-standard techniques. They began with a loud shout performed by both musicians, and suited by a very deep and complex net of instrumental and synthetic sounds. The second piece consisted entirely of non-harmonic sounds, all kinds and colors of noise worked and presented in balanced doses in order to make it violent but easy to listen to. It was surprising that the Morelian audience, who rarely hears non-traditional sounds in concert halls, was very attentive and vigorously applauded the work of Presidentes con Bigote.

Two performances were particularly interesting in this festival: one was the Japanese-Irish group called Ibitsu and the other was Kinesthetech Sense, an American duo that masters equally the computer processes of sound and video, the use of instruments and the consciousness of the scene through dance and movement.

Ibitsu performed a piece named *Hystère* for an especially innovative instrument they created themselves called the "E-clambone," which is a technological hybrid of clarinet and trombone that uses a saxophone mouthpiece. *Hystère* consists of mostly improvised music for the E-clambone with a real-time computer music and video counterpart that responds to the music, but in a non-linear way so that it's not predictable and easily holds the attention of the audience. While Satoshi Shiraishi on his E-clambone and Alo Allik on the computer create an inner and contemplative sound design, Yota Morimoto gets the view of a camera set in front of the stage, transforms it using both video and sound information, and outputs the result in a screen set behind the stage.

In my opinion, Ibitsu has attempted the right balance between music and sound, between viewing and hearing, and—maybe the most difficult challenge of all—between balancing the artistic guidance of the audience and the unpredictable changes that make the entire piece something you want to keep watching and hearing.

Kinesthetech Sense performed in the same concert a work called *The Color of Waiting*, in which they used a video projected on a non-continuous screen in whose "holes" were set the cellist and the dancer. *The Color of Waiting* is truly a multimedia work—not just a juxtaposition of different media works (for example, a musical piece with a video added or with choreography added), but a work in which the parallel development of dance, video, instrumental and computer music is obvious. And there's still another field of art involved in this creation: the video part is made out of the design of a graphic artist which is "sliced," and the alternation of these slices produces a particular sense of movement. As the image taken is a water design, the resultant movement of waves is neither the usual behavior of water nor a computer emulation of that movement, but something that deals with the audience's time perception.

The NWEAMO festival in Morelia was a surprising contemporary art (not just music) event that people from Morelia and visitors enjoyed and profited from. It is now up to the Mexican artistic community to continue with these kinds of festivals and to expand the research of technological applications in art in order to create a truly contemporary Mexican art.

The Future of the Concert Review

by Jennifer Bernard Merkowitz, Co-Editor

In our last issue (Winter 2006, p. 43), we published an article by Leigh Landy entitled "Why Haven't I Written about the Pieces Played at ICMC?" In his article, Landy questioned the usefulness of reviews of "one-off events." Many of the pieces performed at the ICMC are new works that are not easy to come by. Generally, only the people who attended the concert have had the opportunity to hear them. Subsequent hearings—which are necessary to fully appreciate *any* type of music, and especially music that is presented at an ICMC—are difficult, if not impossible. Chances are that if you have been reading this issue of *Array* from the beginning, you have already complained that the pieces discussed in the reviews are either distant memories or completely unknown to you.

Landy also lamented the practice of what he terms "Mutual Back Patting" in many ICMC reviews. The author of the review engages in little more than technical explanations, polite encouragement, and deliberately vague language. Lacking is an actual assessment of the success of the work from an aesthetic standpoint.

I am happy to say that many of the reviews published in this issue do attempt to grapple with the issue of the composer's intent and a piece's ability to hit the mark. However, there still remains a fair bit of blow-by-blow commentary and program note paraphrasing that gets passed off as serious reviewing, and *Array* is not the only place that such reviews appear. This phenomenon is woefully present in many realms of the new music world. Are we afraid that being frank about our colleagues' work will hurt their self-esteem? Or are we afraid that someone else might look at our own work with a similarly critical eye? Are we—composers, performers, and engineers dedicated to the development, promotion and appreciation of computer music—doing ourselves any favors by not speaking our minds about what moves us? No, we are not.

Array is certainly not equipped to solve this entire crisis of reception on our own, but we'd like to attempt to make our own reviews more relevant to our readers. So how do we solve these problems? There are two main issues: the first is the problem of enabling repeat hearings, and the second is the lack of honest and intelligent debate. In his article, Landy wished to see "active musical debate (and distribution) replace the review until the status of appreciation has been improved." With the release of ICMA's new website, we hope to come closer to that goal.

Margaret Schedel, Toine Heuvelmans, Jeffrey Treviño and I (along with a few others) have been discussing the best way to use the website to enable a "hyper-print" version of *Array* to exist—one that, while not eschewing the "traditional" printed reviews, enables repeat listening of select pieces and the capacity to discuss them online. The role of the "reviewer," then, would not be someone who jots down notes on his or her program booklet and types them up a week (or a month, or six months) later, but someone whose role is more like that of a moderator who leads a discussion board and summarizes the discussion afterward in printed format. The printed review would contain a link to the discussion, enabling interested readers of *Array* to listen to the piece and contribute to further discussion. We could not do this, of course, without the permission of the artists involved; while some might be enthusiastic to distribute their piece to a wider audience, others might be hesitant for any number of good reasons. This might be solved by adding a checkbox to future ICMC submission forms that lets artists choose whether they give ICMA the right to post their submitted piece on the website. Discussion could still take place about pieces without online documentation. If all goes well, we could extend the format to deal with other events posted by members on the website.

Before we roll out such a system, however, we'd like to get your opinion. Do you read the reviews in *Array* as they currently stand? Do you think it is a good idea to have an online discussion forum available for each ICMC concert? Would you actually participate in these forums if they existed? Do you think we should dispense with written reviews, or do you think that no amount of online discussion can replace the written review? Would you agree to have your work(s) exist in some form on the ICMA website? Please direct your comments to array.journal@gmail.com. We will take them into account when the board discusses the future direction of *Array*. We look forward to hearing from you.

CD Reviews

Erdem Helvacioglu
Altered Realities
(New Albion NA131, August 2006)
by Nathan Wolek

In *Altered Realities*, Erdem Helvacioglu has found a balance between guitar and real-time processing that results in a cohesive disc with moments of true beauty. The titles of the tracks are visually suggestive and offer vaguely poetic extensions of the disc's title. Names such as "Sliding on a Glacier" and "Shadow of my Dovetail" betray nothing of the musical mood, the programmatic intent or the creative inspiration. They are almost interchangeable on a disc that has no lyrics or program notes, but maybe this betrays Helvacioglu's aesthetic intent to create a compact disc that plays like an extended composition, as each track flows effortlessly into the next. Because the disc works so well as a unified whole that unfolds its macroform over the course of 53 minutes, it makes little sense to isolate the tracks from each other and talk about them as individual compositions. So instead my review will focus on the connective elements that Helvacioglu uses throughout the disc: his method and materials.

Helvacioglu's method of music making on this disc begins with his performance on acoustic guitar. The steely timbre of the strings grounds the sonic explorations as he augments the guitar with real-time processing. Helvacioglu's platform of choice for affecting his guitar sound is AudioMulch, the interactive computer music environment developed by Ross Bencina. The sound is captured and extended by a variety of processing techniques over the course of the disc. In addition, he uses sampling to achieve time-shifted playback within each track and what sounds like the occasional synthesized timbre to accompany the guitar, although these could just as easily be some form of extreme processing.

To control the computer's activity while his hands are busy with the guitar, Helvacioglu uses a MIDI pedal board with his feet. This equipment setup allows him to perform each track in real time and simply record to DAT, something he is clear to point out in the liner notes. Limiting himself in this way and not succumbing to the allure of endless studio editing and tweaking gives the tracks a more organic feel. The grounding in human performance makes this a disc that even novice listeners of electronic music will enjoy, and because the method employed to realize each track is the same, it is a big reason for the unified sound of the disc.

Helvacioglu's materials include a combination of simple motives with tasteful doses of processing, and his careful interactions between human and computer achieve compelling musical results. The melodic material for the guitar is never more than a short fragment lasting up to four measures. The minimal character of these riffs by themselves would likely come off as calm and sterile, not unlike a twenty-first century Satie. They struck me as poignant at times, but lacked the inherent musical tension to sustain focused listening over the duration of the disc.

It is the addition of processing that injects a subtle dose of drama into Helvacioglu's music. Without it, *Altered Realities* would be just another ambient disc (and I say this as someone who enjoys ambient music!). The processing never remains static for very long as it carries out its duet with the melodic material, where the timing of changes often follow the same formal divisions that govern the guitar playing. These arcs and progressions provide a form of tension and release that intensifies the underlying melodic figures.

The processing rarely seems to overpower Helvacioglu's guitar, providing artificial spaces, spectral alterations and granular shuffling. However, there are times when the intensity of the computer's voice surges and the clarity with which it usually augments the guitar is lost. The duration of these moments never feels too long and the guitar is always returned gently to a position in the foreground. Because Helvacioglu dynamically changes his processing parameters in longer, sweeping motions, he provides a perfect foil to the short, simple guitar motives. Had either one been pushed closer to the other in character, the balance would have likely been upset and jeopardized the success found in their contrasting natures.

The structures of individual tracks exhibit a striking simplicity and allow the changes to unfold gently over time. Most tracks have no more than five alternating motivic ideas in the guitar, with the one exception being a track called "Pearl Border on a Dune" that had ten by my count. Even this variety could be condensed if one accounts for harmonic and rhythm relationships that exist between the motives, as Helvacioglu often alters these parameters to provide something new. Each idea is established and repeated before moving on to the next one, but Helvacioglu seems to have carefully measured the amount of time he can extract from each idea without boring the listener. The guitar's repetition is also tempered with the longer arcs presented by the computer processing, as it morphs mostly within and sometimes between the formal boundaries created by the changing guitar motives. It is easy to read each track as a dialogue between these two

elements, in which the guitar is pushing the discussion forward with new topics and each conversation ends in a calm, cordial resolution.

If one considers the entire disc as a macroformal structure, there is a clear progression from beginning to end that shows careful planning on the part of Helvacioglu. The first three tracks set up a light, playful mood, as the guitar sounds like it is testing the possibilities of its computer companion. Track three, entitled "Frozen Resophonic," is by far the sweetest sounding track on the album, with melodic content that could easily be mistaken for a children's song. "Dreaming on a Blind Saddle" is the track that follows and it is a definite turning point in the mood of the disc. The bleak character, immediately apparent in the opening guitar motif, provides a good setup for the track that is the climax of the disc: track five. Entitled "Shadow of my Dovetail," it combines touches of melancholy with a rhythmic drive that is reminiscent of classic blues, although without the usual progressions. From here the last two tracks give the listener more of the dreamy qualities found in track four, as the processing asserts its transformations evermore on the guitar. The final track ends its unmetered meanderings with a time-stretched and pitch-shifted arpreggio that slowly decays away, gently returning the listener to the real world.

Overall, Erdem Helvacioglu's *Altered Realities* is a compelling sonic ride that functions as a cohesive whole. The unified sound is an obvious result of his decisions to use consistent methods and materials throughout the disc. It is the ebb and flow between computer processing and acoustic guitar that shapes the music in convincing ways. Neither feels out of place as the computer works effortlessly to extend the possibilities of the guitarist. I felt it was a successful album that captures what it might sound like to hear Helvacioglu perform a live set at the local venue, and should be of interest to those who enjoy an intimate evening of electronic music.

RedASLA: Red de Arte Sonoro Latinoamericano, Vol. 1
(Self-released, April 2006)
by Jonathan Seiden

In 2006, RedASLA (the Network for Latin-American Sonic Arts) released *RedASLA Vol. 1*, a compilation of Latin-American electro-acoustic pieces. The album consists of ten pieces over twelve tracks by various contemporary Latin-American electro-acoustic composers. While many of the pieces challenge traditional notions of coherence and congruity within music, the album as a whole delivers a reasonably listenable and very interesting aural portrait of electro-acoustic music today. It is interesting to note that while some of the pieces on the album contain atonal sections, odd combinations of timbre, and seemingly random bits of noise, the album also contains many sections that would not sound completely out of place on a modern popular record.

In discussing this album, I will overview the tracks and then focus on the three I felt represented some of overarching themes of the compilation best. The album begins with Rodrigo Sigal's *Mudra*, a contemplative piece that blends electronic and organic elements together with beautiful dynamic contrast. The jazzy reedy timbre in this piece lends itself as an effective focal point. *What You See is What You See* by Daniel Quaranta follows with an interesting exploration of synthetic soundscapes. Raúl Minsburg's *Entre Sueños* can be best understood by translating its title, *Between Dreams*; this eerily compelling piece was extraordinarily introspective and produced vivid musical pictures. Daniel Schachter's three-part piece, *Espejos Virtuales I-III*, would make an effective film score. Its subtleties, punctuated by periods of sonic brilliance, could easily provide the backing to a range of film genres. Óscar Chaves's *Estudio Sobre Mi Gatita*, or *Study on My Kitten*, is one of the most fun pieces to listen to on the album. Beginning with various human imitations of the composer's cat, the sounds are quickly edited into oblivion to create a varied aural experience. *Sentimiento Plástico* by Edson Zampronha is a composition in which nothing truly sounds natural. True to its title, *Plastic Feeling*, this piece effectively illustrates the nature of unnatural feelings through synthetic sound. Jorge Martínez Ulloa's *Leitmotiv No. 6* combines the seemingly incompatible timbres of a nearly unprocessed brass instrument with various shimmering electronic instruments. The effect of this combination causes each element to be highlighted in its position and offers an intriguing sonic contrast.

Otto Castro's *Mala Fé* presents an intriguing examination of a main theme of the album: the barriers, or lack thereof, between electronic music and sounds found in nature. The initial soundscape of the piece, presumably entirely electronically synthesized, sounds as if it could have come from a recording of jungle insects. The electronic nature of this piece heightens towards the middle as increasingly "electronic" sounding noises take over the piece and the electronic-mimicry of nature fades into the background of the noise tapestry. Usage of stereo panning techniques as well as variable frequency synthesized tones and modulations dominate the majority of the middle of this piece. Organic components once again return to the mixture with what sounds like heavily edited and modified bursts of a human voice. After this disappears from the piece and "electronic" sounds reappear as the substance, organic noises only return towards the end with a faint piano heard

in the background. The piece finishes with a recitation of one of Castro's poems, only slightly altered, which provides an interesting conclusion to a piece that mostly consisted of completely foreign sounding electronically produced noise.

Bryan Holmes' piece *Canción de Cuna* provides an interesting contrast to Castro's piece. The opening lines of organic saxophone, electronically distorted and made to sound nearly alien, provide the primary texture for the beginning of the piece. The saxophone melody is heavily altered and then reorganized in various traditionally classical compositional manners. After the decay of the final sax note, the reversed sound of a music box is first heard; this will prove throughout the piece to be the most important sonic component. The double entendre of the title, which translates to "Song of the Cradle," is somewhat explained in the liner notes. The notes tell that the piece was composed using both old and new components of electro-acoustic composition and performance; the simultaneous use of the music box as a main producer of sound provides a more real sense of the "cradle" within the piece. The dual usage of earlier electro-acoustic recording techniques with organic instruments, which the liner notes identify as everything from a double bass to a vacuum cleaner, create conflicting motifs within the piece. The haunting but oddly comforting reverse music box and saxophone themes are set against more electronic and distorted noises that no one would ever want near a cradle. The piece uses these dual motives to keep the listener on edge and create a sense of tension between the two worlds of electro and acoustic. As the title of the piece would indicate, the ultimate prevalence of comfort and organics are displayed in the final seconds of nearly unaltered music box sample.

Presumably named for the famous German mathematician known best for discovering a three-dimensional object that retained one side, Eleazar Garzón's *Moebius* shares qualities with the geometric construction it refers itself to. The piece was comprised of altered samples from John Ffitch's "The Transport Project," a project that challenged electro-acoustic musicians to create short pieces based on an unaltered source sample of various city transport noises. The recombination of this singular source material and extrapolation into various musical ideas can be seem as the creation of a multidimensional object from a one dimensional object. The first of these distinct motifs is reminiscent of Castro's piece as an insect-like, near organic soundscape provides the background to the introduction of the piece. The "transport" sample, once heard in its original, is easily identifiable throughout the piece, as Garzón uses nearly unaltered sections to carry the majority of the forefront musical material. The clacks, clangs, and hisses of the city street can be jarring. However, after listening to the original sample, I was amazed at how varied a sound and effect the composer was able to achieve.

RedASLA Vol. 1 gives interesting insight into the world of Latin-American electro-acoustic music today. Any listener can appreciate the meticulous care, attention to detail, and sonic intricacies that went into these compositions.

Sources:
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Tanja Orning and Natasha Barrett
DR.OX
(c74 records, c74-013, March 2008)
by Krystal Grant

Dr.OX is an album by cellist/composer Tanja Orning and composer Natasha Barrett. The third track, "Polycomb," reveals the source of the overall aesthetic of this record. Here, the cello serves as a noise generator, making contact with the strings via pizzicato, tapping, spiccato, creaking, and col legno. These techniques are layered on top of each other as the computer remains unobtrusive, emerging only with a flutter of accents and reverse pizzicato toward the end. Most of the computer sounds throughout the record seem generated from cello timbres, most of them falling into one of four categories: 1) ringing, ethereal mid-to-high register chords that sound like a flanging of cello harmonics; 2) droplet sounds that seem to be softened pizzicato; 3) roars that appear as a magnification of the creaking of high bow pressure; and 4) metallic scrapings that might be generated by filtering a tremolo or mimicking the granular quality of creaking. This collection of duos works well because of these types of timbral similarities.

The cello is the anchor of "Anchor Synthesis." It begins with forceful low-register double stops, sometimes suggesting a rhythm. The computer's sirens, dangling chains, and thunderous granular static are disconcertingly split between left and right channels. As the cello plays low col legno, the computer imitates it with a fluttering between sides. The cello's ensuing combination of pizzicato and col legno is gradually overcome by a cacophony of popping, sirens, static, col legno, and ringing chains. Its return is confounded by

being split between three channels. When the cello returns to the center, its creaks are accompanied first by low knocking, then by wind-like sounds, then by the previously heard col legno. This fades to low bowed and pizzicato cello utterances and the fluttering col legno. For the ending, the cello plays low double stops similar to the opening, as the computer adds popping to the col legno.

"Zinc Finger" is a collage of high and low pizzicato that would be impossible to produce by a single cellist plucking the strings. A few sonic events color the continuous pizzicato: a loud boom, reverb that enters then fades out, and reversed pizzicato.

Throughout "Toothrin," the cello improvises with creaking sounds. Through simultaneous processing, the creaking becomes gurgles of slightly reverbed granular synthesis and analog popping based on the attacks. These computer sounds begin as an accompaniment to the cello but grow to encompass the entire sound field. The cello responds to this climax by adding pizzicato to the creaking, both of which are heard in reverse via the computer. The cello signals the coda with one distinct bowing; the computer answers with a mid-register ringing sound and analog popping reminiscent of the gurgling, though clearer and higher. The cello returns with long creaks; instead of gurgling, the computer bellows by using a reverbed low pass filter of the creaking.

Likewise, "Axial Landmark" layers several cello sounds. An airy hissing pervades the background as the cello's high-register creaking is layered with low-register creaking and pizzicato. An airy siren sweeps beneath these from right to left, increasing in volume and clarity as it descends in register, becoming a low cello multiple stop. This is repeated a few times as the creaking and pizzicato continue. Brief high register statements are spattered above these sweeps, noticeably a pitch shifting of cello playing. Silence abruptly concludes the piece.

Three tracks occur which seem to suggest a landscape that contrasts the natural with the synthetic. "Myelin" seems to open with the cries of seagulls or whales in dialogue with metallic scraping underneath. The cello plays ascending glissandos on harmonics colored by an airy reverb; these sounds are echoed in diminution. The scraping gradually becomes more present. At the climax, the cello and its reverb are buried under a mass of a synthesized glissandos in granular synthesis, a multitude of mini cries, and the airy reverb loud, fast, reversed, and rapidly panned. This brief climax is followed by an even shorter cello and reverb solo. Immediately, the mass returns more chaotic than before, with the cello harmonics staggered on top of each other. The mass fades, and a new sound emerges: granular synthesis and filtering of the airy reverb become the chirp of insects, vinyl record pops, and finally a motor driving away.

In "Meiotic Recombination," cello harmonics are interspersed with creaking that sounds like falling trees amidst sweeps of white noise. When the creaking stops, the white noise continues with water-imitating amplitude fluctuations, and the high cello harmonics begin a dialogue with a mid-register moan of recombined string sounds. The cello takes a solo over the white noise as a bell chimes five times, then six times, carrying the music out of the forest and into the metropolitan chatter of pedestrians talking and cars passing by. The cello softly comments on the people's laughter, and a descending moan concludes the piece.

In "Cellobiohydrolase," the cello produces a buzzing sound through bowing and pitch sliding. The computer processes this with a monstrous reverb and augmentation of the low frequencies. Whirring, water, and electronic chirping sounds are added. Their frequency decreases until the cello plays alone and unamplified, buzzing its double stops. The water sounds and the reverb and rising of lows (albeit quiet) return as the piece ends.

In "Beta Receptor," the relationship between natural and synthetic is less clear. At the beginning, the cello bows an unpitched tremolo at various speeds. Electronic chirping is produced in imitation of this motion. When pitches are added to the tremolo, it is a roar of low *sul ponticello.* The chirping becomes a miscellany of tweets and squawks as the tremolo and echoes of it continue. A wave of white noise washes over the flock. The cello fragments the tremolo to *sul ponticello* pitch bending as the chaos of chirping enters in the low register. A rattle of white noise signals the end.

Outside the realm of arrhythmic creaking and tapping, "GFP-fusion" has a sense of stasis with a high heterodyning tone and the cello improvising on a major ninth chord. The resultant sound is almost spectral.

The only other instance of ideas based on the pitches of the cello is "Motif of Myo1p." The cello plays two forceful beats of double stops, a herald strangely reminiscent of the opening of Beethoven's *Eroica Symphony*. Crackles of droplet sounds underlie the cello's free development of the motive. Next, the cello plays double stops that end in a tremolo that launches a flight of wispy electronic sounds. The ensuing cello dialogue seems to reference Vivaldi, alternating between the cello tremolo and the ethereal computer sounds.

With a similar construction, "Homolog 1" opens with the cello playing double- and triple-stop harmonics. The opening six

harmonic dyads and triads are separated by a few seconds of silence. The computer enters with synthesized chimes immersed in reverb. This timbral exploration continues as the cello moves to the low register and the computer causes overlaps between the cello and previously played multiple stops. A low drone enters as the cello plays multiple stops in the middle register; one of these is looped as the cello continues to improvise and the chimes fade out. The computer adds sweeps of white noise. After the white noise stops, the drone ceases, and the cello plays a final triple stop.

The most convincing composition is also the longest. "Axial Budding" opens with a long descending slide that lands in a monstrous creaking. Shorter slides soar around. The next section begins with a low scraping sound, adds amplified *sul ponticello*, short squeaky motions, and a flurry of brief backwards fragments until one is surrounded by a field of sound. This is followed by the contrast of cello harmonics bleeding into one another over a background of white noise. The noise rises in volume as the cello dissipates into another long slide. Unlike the first, this slide ends in a soft rumble of creaking and heterodyning. The miscellany of sounds returns, but this time a patterned sizzle rises from the texture. When it fades out, a violent tremolo begins in the cello with ethereal slides flying around. The piece ends with low noise.

Tanja Orning's inventive use of the cello is commendable throughout the album. Although the building of textural climaxes is formulaic in some of the tracks, the interaction of processed and computer-generated sounds with the cello is always exciting. *Dr.OX* is a recording that vividly emulates a live electroacoustic performance.

Bob Gluck
Electric Brew
(EMF Media, EM169, 2007)
by Nathan Wolek

Bob Gluck's new compact disc *Electric Brew* features an eclectic mix of influences. The backbone of the disc is formed by four original compositions that were inspired by and use motifs from famous jazz compositions by Miles Davis and his collaborators, namely Joe Zawinul and Dave Holland. In addition, Gluck offers up two additional interludes that he describes as "collages," formed by editing together several live performances of his original compositions. Gluck mixes these jazz references with his eShofar, a twenty-first century take on an instrument typically used in Jewish religious ceremonies and Stravinsky's infamous *Rite of Spring*. Unfortunately, these varied influences often yield muddled results.

Prior to hearing this disc, I had never heard any of Gluck's music, although I knew of him by reputation. He has been director of the University of Albany's Electronic Music Studios since 2001 and currently serves as an Associate Director of the Electronic Music Foundation. He has studied jazz piano and holds degrees from a rabbinical college. These aspects of his background help contextualize the influences cited on this disc. They helped me understand the concept of the disc, but I still felt like I was missing something after my first listen.

After reading about the musical works referenced in the liner notes, I knew I needed to get better acquainted with these recordings. It had been a long time since I had heard *Bitches Brew*, the album to which Gluck's disc title is an homage. I thought it was important to grab this jazz-rock masterpiece from the library and dive into the sound world that inspired Gluck's compositions. It addition to the titular track, Gluck also cites Zawinul's *Pharaoh's Dance* as source material that he has reworked in respective compositions. I also listened to Davis's *Is There Still Time?*, a similarly referenced work by Gluck, but could not get my hands on *Q&A*, a piece by Dave Holland, who also played bass on *Bitches Brew*. After listening to all these and a cursory refresher on *Rite of Spring*, I felt more prepared to dive back into Gluck's disc.

After all this extra listening, a logical question followed: Is it fair to compare Bob Gluck's work with that of Miles Davis and friends? My answer was yes. Gluck has invited it based upon his admission to this influence and source material in the liner notes of the disc. In my opinion, you cannot write music that is inspired by another artist, draw motifs from his work and then absolve yourself from comparisons. The materials in Gluck's music are not obstructed and will be clearly evident to anyone familiar with the original recordings. I have no ideological qualms with him using these materials; sampling musical materials is par for the course in our post-modern world, and I will concede that Gluck has done something unique and original with them. However, Gluck's compositions do not rise to the level of those works by his muses.

What amazes me about Gluck's disc is that out of references to such highly energetic, rhythmically impassioned and unmistakably exciting music, he produces mostly bland offerings. The original pieces are all about rhythms and grooves that propel the listener forward with such undeniable force that you cannot sit still. I want to move when Miles plays a solo and groove with the bass ostinato. I can't help but be energized by the intensity of the bass clarinet on *Bitches Brew* or the electric pianos on *Pharaoh's Dance*. All this is lost in Gluck's attempt to take motifs and ideas

and pin them down under his microscope for reflection and study.

Admittedly, "energy" and "intensity" are vague musical traits that beg for more specificity. The biggest contributor is likely the percussion on *Bitches Brew*, which featured two drummers on sets plus additional players on congas and shaker. Together these formed a consistent, layered pulse. Gluck only gives us percussion on *Pharaoh's Spring*, and here it is a MIDI conga that is a poor facsimile of Don Alias. The keyboards on the originals feature a funky Fender Rhodes, so when Gluck transfers these motifs to a concert grand, they seem to lose some of their edge. Gluck's eShofar with its chaotic processing system is no match for Davis's trumpet and his carefully placed delay effects. There is also something to be said for the recording quality on the originals, where nearly everything was close miked, giving the sounds a stronger presence in the mix. When compared to Gluck's choice of concert-style recordings where the listener is kept at a distance, one could easily make the case for this being the biggest difference between the two discs.

I felt the strongest track on the compact disc was the last one, entitled *Is there still time?*. It's an odd realization that this was the only composition in which Gluck dispensed with all the electronics and treats the listener to some straight-up jazz piano playing. This provided the track with some clarity and identity and it was all the better for it. After hearing it, I wondered if this track would have been a better choice to start off the disc so that the listener could proceed through the rest with a better sense of how Gluck's piano stylings were extended by his electronics.

One piece that is not part of this jazz-rock milieu is *In the Bushes* for computer-assisted piano. It uses samples of George W. Bush to form what Gluck calls "a political commentary on the war in Iraq"—very much a sign of the times. I am usually resistant to pieces that try to be overtly political, whether they are right or left in their ideology. Artists in centuries past had to veil their political commentary or risk being persecuted by their governments. Today there is no need to finesse, and the freedom to be forthright coupled with sampling from well-known media sources can lead to a situation where the artwork loses its relevance over time. The materials have meaning to us now because we have heard them in their original contexts. I have now heard several of these "Bush pieces" at various concerts and conferences. How will it all be perceived in 20 or 50 years when the speeches are a distant memory? I don't know for sure, but I'm guessing that the impact will fade.

There are two additional compositions on the disc not composed by Gluck. *Akeda*, composed by Ofer Ben-Amots, is a simple yet evocative setting of a liturgical lamentation for the departed. Here again, Gluck's piano playing is given the chance to shine without electronic intervention, and listeners should be appreciative. Together with *Is there still time?,* we get a clear sense of the range of abilities Gluck possesses as a pianist. Shlomo Dubnov's *127 Digits* is described as "a duet for computer-assisted piano." Although I have worked with Disklavier and understand how one could go about the process of ornamenting the work of a pianist, I found myself a little lost trying to follow the duet in this piece. Perhaps it is the fact that the audio recording flattens the two into a uniform sound field and any sense of the duet is blurred. This piece likely works much better in live performance, preferably up close so that you can see what the performer and computer are each adding to the music.

It should be clear to any listener that the jazz-rock elements dominate this disc, easily demanding more attention than these other compositions. Gluck obviously has a personal fondness for the material from this period in Miles Davis's career and has used these compositions to explore it for his own amusement. While the success of the results is debatable, a definite positive is that one has to listen first to *Bitches Brew* in order to have any chance of appreciating *Electric Brew*. And directing new ears to this masterpiece is perhaps the disc's most redeeming quality.

Robert Normandeau
Puzzles
(empreintes DIGITALes, IMED 0575, 2005)
by Julio d'Escriván

Perhaps every review should start with a confession. It seems fair that if you're about to discuss somebody's work, you should say something about yourself. Otherwise, it is far too comfortable. This is it: I have been playing acousmatic music on my iPod while I train for my endurance events, alongside The Kooks, Juan Luis Guerra, Keane, José González, Snow Patrol, Juanes, Porcupine Tree, Caetano Veloso and Orishas. Actually, the only other acousmatic composer besides these pop guys is Dhomont. As often happens, I started wondering why I was doing this and what this told me about myself.

Runners need cadence; it helps if you can follow a groove. It keeps you going beyond the eighth mile, which is when any training actually starts (for me, anyway). Normandeau's music is permeated throughout with pulse or the promise of pulse. *Puzzle* (2003), the first piece on this disc, is part of a long lineage stretching back to a piece called *Rumeurs* (1987) from the composer's early release *Lieux inouïs*, which also uses opening/closing doors and various sounds which are begging to be looped and pulsed, some which are clearly pre-reminiscent (I know the word doesn't exist, but is coined here as a "pataphysical"

concept). The doors in *Rumeurs* are used as structural pivots to parcel the work into sections or scenes, whereas in *Puzzle* the doors actually become the rhythmic material of the piece itself. I would suggest that the two pieces illuminate each other and should be heard in tandem, as they seem to explain each other in music. *Puzzle* fulfills the promises of rhythm in *Rumeurs*, and belongs to the continuum of pulsing pieces Normandeau has made in the intervening years (including of course *Le renard et la rose* (1995) and *Clair de Terre: Montage Metaphorique* (2001), which are also forerunners of this piece and perhaps easier to link on the surface level).

But *Puzzle* does something that is also very modern: when you start playing it, you find that it was already playing before you started it. This *Puzzle*—which gives the disc its name—is but an instance of *n* potential Puzzles, or so the author tells us in the liner notes. It is not that in some ways it could be construed as an algorithmic piece, or that because of the way the musical loops have been tailored you have some material in search of rules, but rather that a non-linear compositional approach has pervaded a style of music which is known for being very linear. In acousmatic music, normally, development is made into a virtue. Interpolation is revered, careful remixes of brassaged textures prompt much beard scratching, furrowed brows (if no beard) and hushed "aaaahs." The process of making it has traditionally been rather linear. Tape was bounced onto tape. Old habits are reproduced to this day, profitably, on non-linear editing software. Yet here is a piece made of loops—re-arrangeable, freshly pulsing, infectious loops. It is more Ableton Live than ProTools, more Dance remix than cinema for the ear. A puzzle of patterns, yes, but perhaps also evidence of a shift in Normandeau's electroacoustic thinking.

Éden (2003) begins with beautiful Vietnamese singing, and before you know what's happening you are flying over the clouds in the dusk, no land below to be seen, just the textures of clouds and the strange twilight of the northern hemisphere, and the stewardess voicelessly asking you to switch off your iPod as we are about to land in Toronto (yes, this is actually what happened and rebelliously I only took one earphone off and proceeded to listen to, well, half the piece). Again, as the mature piece that it is, it reflects concerns that Normandeau has voiced earlier but perhaps never in this way. Perhaps the greatest musical affinity to this work can be found in his CD *Clair de Terre* (1999-2001). As the slowly changing and pulsing layers reveal perhaps the sound of the sea, the suspending in time of the female voice and the sudden explosive openings of vistas, new and old musical material washes over the listener and submerges them into Eden (the title is so damn appropriate!).

Chorus (2002) is conceptually based on the story, taken from Gotthold Ephraim Lessing's "Nathan the Wise," of a dying father giving his three children a ring made out of his own ring, thereby avoiding having to give the original one to any of the three. A parable on the three religions "of the book" and the fact that—wait for it—they May ALL be right (!), the piece is a layered stream form that uses shofar, bells and voices, stretching them all out with liberal punctuations that do not detract from the textural unity that is achieved here. These punctuations work as statement "markers;" they define parts and sections, but as the piece progresses, they give way to blends of sounds that allow us to forget the earlier divisions. It's a fitting metaphor for the spiritual place we should all be striving to reach. *Chorus* also reminds me of a much earlier piece worth re-listening to, *Jeu* (1989). In that piece's opening section, Normandeau treats the voices similarly, and this fascination with vocal sounds, arguably a feature of all of Normandeau's music, is portrayed nearer its infancy (as is the use of rhythmic pulsing, actually).

There are not a lot of ways in which I could be induced to listen to much hurdy-gurdy playing, but if it is to be mutated into these elongated beautifully textured layers found in *StrinGDberg* (2001-2003), I am all for it. Normandeau calls this a "deep listening work," perhaps unwittingly referencing Pauline Oliveros (he actually said "écoute en profondeur," which I believe has not been trademarked yet). The piece is seemingly static, but as with so much of Normandeau's music, full of life that reveals itself upon successive listening as you unpeel the layers. This piece is also punctuated with sudden starts that eventually make you aware of a pulsing motion. This is music to endure with. Or should I say music that helps you endure? Anyway, it is tactile, sensual and immersive, not conventionally "acousmatic." I feel I would like to listen to it many times (and I have), as there is still so much to be heard.

Another feature of Normandeau's work is that a number of his pieces, such as *Hamlet-Machine with Actors* (2003), have a previous existence as incidental music for the theatre. This is always a challenge for a composer. As opposed to what happens in film music, the composer has no exact measurement of pace in the theatre, as the action is realised live on stage. In practice, this means that the music must approximate without exactly shadowing; the composer has to allow for imprecision, and this always takes its toll on the musical pace. In film, on the other hand, you can compose to the quarter of a frame and know that the action will always be supported in the same way. This is why, I think, Normandeau is at pains to explain to us in the liner notes that he has "reworked every sound and recomposed every sequence to produce

an autonomous work." The piece as it stands evokes visual imagery and does not hide its close relationship with the stage. I wonder if I should have watched the play to derive maximum pleasure from listening to this. As it unfolds and I listen repeatedly, I find more connections and put together some kind of mental plot, but it comes back to reconstructing in my mind what the original must have been like. Should this piece be able to stand on its own in concert as, say, *Petrushka* can be played without the ballet? Perhaps. It is for each listener to decide. In any case, the sounds of the actors at work and the inclusion of the aural environment of the industrial neighbourhood where the rehearsal building was located seem to add a dimension of "acoustic ecology" to the work, but maybe that is a facile reference. I am sure this piece will have a very diverse impact depending on how close you are to the original play and how much you enjoy "theatrical" environments. I can't separate it from the original idea, and I wonder, if I had not read the liner notes, whether the effort in aural reconstruction would have been equal to the pleasure I have had listening to other works on this disc. I think *Clair de Terre* (1999-2001), which also has a theatrical background to some of its movements, is worth listening to in order to more clearly show the dexterity with which Normandeau has surmounted these challenges in the past.

Book Reviews

Simoni, Mary, ed.
Analytical Methods of Electroacoustic Music
Routledge, December 2005
(312 p., ISBN 0415972694)
Reviewed by Kristian Twombly

The field of electroacoustic music is still quite young, and precious little exists in the way of analyses and published theoretical approaches to this music. It is only in the last few years that collections of such analyses have begun to appear, and Mary Simoni's *Analytical Methods of Electroacoustic Music* is a valuable addition to this important field of study.

The collection of essays represents a variety of musical and analytical approaches and, after an introduction from the editor, is launched with a welcome discussion of some basic concepts in acoustical and electronic analysis, written by Norman Adams. This essay briefly describes various methods of representing audio signals visually, from time-domain representations to spectrograms, each with numerous examples from a variety of audio sources. While the spectrogram is the primary representative tool used in the book, Adams' essay presents both the usefulness and drawbacks of each form of representation, including fundamental (and often overlooked) aspects, including logarithmic versus linear frequency graphing and window sizing.

The next essay, by Leigh Landy, is perhaps the most distinct in the collection. Most of the essays focus on timbral and compositional issues, but Landy presents what amounts to a sociological study on compositional intent in electroacoustic music. As the author states, "This investigation is based on the premise that certain forms of music deserve a larger audience than they currently have" (p. 29). The Intention/Reception Project therefore attempts to empirically measure audience response through questionnaires and post-listening discussion. For the purposes of the study, the study groups were divided primarily according to familiarity with electroacoustic music. Each group heard two different works—*Prochaine Station* by Christian Calon and Claude Schryer and *Valley Flow* by Denis Smalley—multiple times. Composer intent was determined primarily through answers given to a series of questions by each composer, and listener response was similarly garnered with the addition of a group discussion following each listening session.

This essay was challenging for a number of reasons. *Valley Flow* proved to be too long

to play in its entirety until the final listening session, and one wonders if perhaps a shorter work could have been chosen. Some data was disregarded due to varying testing conditions, and ultimately Landy proclaims "no large-scale conclusions should be drawn here due to modest sample sizes" (p. 35). The descriptions from the testing subjects reflect a desire to link the sounds heard to imagined sound sources, such as "a kettle," "recording of a stomach" and "animal sounds" (p. 45). While none of the composers stated expressly that they favored reduced listening practices[1], Smalley states that he wishes that the listener hold onto "the layering of sonic material, pitch, the work's sonic language" (p. 43). I can see the usefulness of continued study in this area, albeit for a particular style of electroacoustic music for which listener intent occupies a greater level of interest, such as soundscape composition. However, the implication that "intention information" demands consideration stands in direct contrast to those composers who might follow a different compositional methodology (a Cagean approach springs immediately to mind). While my feelings about the project remain guarded, I look forward to further research in this area with both a larger listener sample and an expansion of the pool of compositions utilized.

1 Pierre Schaeffer's *écoute réduite*. mentioned by Landy as a mode of listening that is nearly in opposition to what he wished to study, namely the "access to or the communication of meaning" (p. 31).

As If by Paul Lansky is the subject of the next essay, by editor Mary Simoni. This work for tape and string trio was composed in 1981 and 1982. Simoni's analysis focuses primarily on the pitch material, with an exhaustive set theory analysis for each of the four movements. While there are a few spectrograms that accompany the analysis, these are used primarily descriptively, and for the most part the tape is analyzed according to set theory principles as well. In fact, of the 34 figures and 8 tables that accompany the analysis, only 15 include spectrograms, with the rest comprised of lists of sets and musical examples from the score. However, given the pitch-based nature of the score and tape accompaniment, an analysis of this type is perhaps appropriate.

Brenjamin Broening's analysis of Alvin Lucier's classic *I am sitting in a room* appears next in the collection. Appropriately, Broening addresses the process-oriented aspects of the composition, comparing it to contemporary works by Steve Reich. In Lucier's work a text is projected into a space (in this case the composer's living room) and recorded, with the resulting recording projected into the same space and the process repeated until the original recording is destroyed, leaving only those resonant frequencies activated by the recorded speech. Spectrograms are used both to illuminate timbral evolution as well as the spectral degradation and filtration

that occur as the piece unfolds. Individual words are extracted and compared at both selected moments and for the all 32 repetitions of the source material. Broening ends the analysis with a comparison of Lucier's work with that of Reich's *It's Gonna Rain* and Luciano Berio's *Thema (Omaggio a Joyce)*, placing each within a greater context of compositions that explore the continuum between speech, sound and music.

Mortuos Plango, Vivos Voco by Jonathan Harvey is the subject of Michael Clarke's contribution. While this work is well known, Clarke's approach is novel—using Max/MSP and SYBIL (SYnthesis By Interactive Learning), a software program developed by Clarke, the reader is encouraged to explore various facets of the analysis in conjunction with any commercially available CD recording. The interactive analysis is not necessary to fully appreciate the essay, which itself is illustrated with Harvey's sketches, pitch diagrams and sonograms. Quite purposely, Clarke illuminates the fundamental aspect of all analysis: careful listening. The interactive analysis facilitates this process for novice and experienced analysts.

The interactive features of Phillipe Manoury's *Jupiter* are discussed at length in Andrew May's analysis. This influential work, composed at IRCAM in 1987 (and later revised), was one of the first works to use real-time pitch tracking and score following, first realized using Miller Puckette's Max language for the IRCAM 4x computer. May uses software code from the most recent version, written in Puckette's Pd software, as well as peak-graphs, examples from the score and numerous tables in his analysis. Ultimately, May illuminates the relationship of the live performer to the computer, weaving historical and technological information into this enjoyable essay.

Mara Helmuth contributes an analysis of Barry Traux's pioneering work of granular synthesis, *Riverrun*, composed in 1986. She worked closely with Truax, even gaining access to the computer system on which the piece was composed. *Riverrun* was originally composed as a four-channel work and released in stereo, but was realized in an 8 channel version in 2004. After an extensive discussion of the background of the work itself as well as some of the processes used to generate the sonic material, Helmuth adds a multidimensional analysis in which various methodologies are explored, arranged by levels. Level (1) presents a textual description, (2) groups events (or "phrases"), (3) describes pitch, (4) shows amplitude and (5) is a spectrogram. The entire composition is described in this manner, broken into 30-second segments. As one would expect, there are moments in which particular dimensions are more analytically useful than others, but ultimately the multidimensional approach

works quite well, giving a more complete view of this interesting work than any single dimension could. A minor issue is found in the presentation of the spectrograms, as it appears that a too-wide amplitude range was used in their generation, leading to dark pictures. I understand the need for this, as a narrower range sometimes fails to reveal sonic energy that one's ear perceives, but a wide range can produce results where the ear cannot perceive sonic energy (as can the application of a Fletcher-Muson curve), lending a quasi-perceptual interpretation to the amplitude shading.

The final essay, Momilani Ramstrum's discussion of another Philippe Manoury work, the opera *K…*, is an ambitious look at the entire production. With lavish staging, multiple channels, a mixture of live and electronic, solo and ensemble performance and a formidable length of three seamless Acts, Ramstrum does an admirable job with this challenging piece. After a look at the inspiration of *K…*, Franz Kafka's *The Trial* (itself a formidable text!), Ramstrum uses the MSD (Music Structure Discovery) software developed at IRCAM to illuminate the aural self-similarity in the Prologue and Scene XII. While a single chapter is not nearly long enough to tackle the analysis of an entire opera, particularly one as technologically and musically complex as K…, Ramstrum's descriptive analysis illuminates many aspects of the work, particularly for those readers that have not had the opportunity to experience the opera live.

A DVD is included with the book, containing most of the examples included in the text and short audio clips of some of the pieces analyzed as well as a few short videos from Manoury's opera K… This DVD plays on both a regular DVD player as well as on a computer, although not everything available on the DVD-ROM is shown when playing the DVD in a regular player.

A particular concern was with the figures in the text. Many of them are reproduced poorly and are difficult to read. Fortunately, many are reproduced on the accompanying DVD, but a computer is not always available when reading through the text. Also, some of the figures that are misprinted in the text (for example a figure in Simoni's essay is repeated, resulting in a "missing" figure) are also inexplicably missing from the accompanying DVD. Additionally, many of the spectrograms are missing vital information, such as the legend for the amplitude range, or the frequency scale. This information is essential to full understanding of these sonic representations, and if the scale is missing the reader is left assuming that two spectrograms show the same frequency ranges when in reality they may not.

Extensive use of the composer's notes appeared in nearly every contribution in this collection. While these can be illuminating, I found myself wishing that less attention had been paid to these musical inputs (sketches, software code, musical scores) and more attention paid to the output—the actual sonic result. Spectrograms are merely representations of sonic energy and thus must be used with an analytical ear. Simoni's inclusion of a spectrogram of a cantor performing "Alleluia" in the introduction, for example, includes a discussion of the usefulness of the spectrogram as a possible tool for proper performance practice, but only briefly acknowledges the progression of vowel sounds from emphasis in the higher formant regions to lower formants. Ultimately this performance of a single word is a marvelous oppositional exploration of nearly the entire vowel formant range of the human voice, with a clear timbral evolution over this short example. Simoni goes on to present and analyze the same musical material performed by a synthetic bell but again focuses mainly on the differences in representation, rather than the clear lack of timbral evolution in the second example.

Overall, *Analytical Methods of Electroacoustic Music* achieves its goal of presenting a variety of analytical methodologies for a variety of musical works. Simoni has created a website, http://www-personal.umich.edu/~msimoni/analytical-methods/ for updates and supplemental materials.

Elizabeth Hinkle-Turner.
Women Composers and Music Technology in the United States: Crossing the Line
Burlington, VT: Ashgate Press, 2006
(301 p., ISBN 0754604616)
Reviewed by Jennifer Bernard Merkowitz

A person new to the field of electroacoustic music could easily assume that women have not played a significant role in the history of the genre. A brief inspection of two standard electronic music histories—Joel Chadabe's *Electric Sound* and Thom Holmes' *Electronic and Experimental Music*—reveals that in about 300 pages, these authors both mention about 20 women. In contrast, Elizabeth Hinkle-Turner's book *Women Composers and Music Technology in the United States: Crossing the Line* chronicles the lives and works of at least 165 women in the United States alone! A few, like Bebe Barron, Wendy Carlos and Pauline Oliveros, are already established "greats" in the field, and for good reason. However, as I was reading the book, I kept marveling over the amount of information that was completely new to me. It is information that should be shared with any young woman considering a career involving music technology. In addition, the snapshot of women involved in academia (circa 2005) will be helpful to young people researching college and graduate programs in composition and electronic music. The book also includes web resources and an

extensive discography for 91 artists.

Crossing the Line is arranged into seven chapters. The first chapter ("Introduction") contains a survey of previous scholarship on women in music and an introduction to the methodology of the book. The next three chapters "focus on women who have significant ties to the academic world either through their training, their engagement in the teaching profession, or their active participation in many academically-sponsored events such as workshops and festivals" (p. 10). These chapters are the bulk of the book, weighing in at just over 75% of the text. They progress chronologically according to the generation in which the women were born and educated. Chapter 2 ("Precedents and Pioneers") starts with Johanna Magdalena Beyer (1888-1944), whose *Music of the Spheres* was "one of the first pieces for purely electronic instruments" (p. 13), and carries us through the generation of women who were born in the 20s, 30s and 40s and were involved in early developments of electronic and computer music.

As the book progresses, Hinkle-Turner continues to emphasize the theme of mentoring (in particular the master/apprentice relationship) and networking as important to the emergence and encouragement of women in electroacoustic music. She notes that her own foray into the study of contemporary women composers was fueled by her search for a professional role model. This viewpoint has a large effect on the organization of the book as a whole. The women featured in Chapter 3 ("A Generation of Growth and Influence") studied with women from Chapter 2, and the women from Chapter 4 ("Continued Promise for the Future") studied with women from Chapters 2 and 3. Chapter 3's women were born in the 40s and 50s, educated in the height of the women's movement and mentored by early pioneers such as Pauline Oliveros, Alice Shields and Pril Smiley. The chapter is organized by centers of activity (NYC, Columbia-Princeton, Mills, UCSB, Stanford CCRMA, and "other West Coast." The rest of the country is lumped under "Other."

Chapter 4 explores the generation of women who came of age during the 1980s, when home digital technology expanded opportunities for women and other marginalized groups. The advent of MIDI technology enabled instrumentalists to explore new roles as composer/performers, while the growing availability of computer technology encouraged composers with technical aptitude to become composer/programmers. Hinkle-Turner also examines the next generation of independent composers in New York City and in academia, women with alternative careers and "creative expatriots" who were born in the US but are now based elsewhere in the world. The chapter finishes with a brief discussion of young women who were working on doctorates at various institutions at the time of publication.

Buried in this chapter is one of the most intriguing issues raised in the book: the notion, raised by Pamela Z, that the "women who garner the most respect in the area of electroacoustic music are those who take a proactive role in developing and inventing tools and theories of composition rather than settling for current perceptions and situations" (p. 135). These women have entered a realm of "true geekdom" where gender becomes irrelevant and "what is most valued is raw brain power and technical aptitude." Outside of the women who are designing tools, the women who act in acceptably "feminine" ways—for instance, the vocalist/composers who use their body to communicate—gain the most positive reactions from their audience. It is certainly a thought-provoking idea.

Chapter 5 ("In the Spotlight: Role Models Rise in the Mainstream") breaks outside of the world of academia and covers "women who have made a contribution in more popular music, and who create most if not all of their electroacoustic work themselves" (p. 10). These include film composers, composers of commercial music, and audio engineers. Their work is particularly important because it is more in the public eye than that of their colleagues in academia, contributing to the public perception of women's roles in music technology.

The ability of visual and interactive technologies to add a further documentary or autobiographical element to one's work has contributed to making music with video "a powerfully feminine and feminist art form" (p. 245). Chapter 6 ("Finding Their Visual Voice: Composers Explore Multimedia Technology") focuses on electroacoustic music composers who use film and video in their work. The field is narrowed to discuss only women who create their own video, with only a few paragraphs reserved for collaborative endeavors—a great loss, in my opinion. The author places herself into the former category, which may have contributed to her neglect in the area of collaboration. She provides extensive discussion of her own work from a personal perspective, but one wonders if the material may have been better served by an unbiased assessment from an outside source.

It would seem, after reading this book, that the amount of female mentors in the field has grown dramatically and that the number of women in electroacoustic music will only continue to rise as a result. However, Hinkle-Turner focuses on the question of future women in her final chapter ("Where Are We Now?"), sharing the disturbing news that "research conducted in connection with this

text indicates that there may be an actual decline in interest and technical activity among young women." She discusses the possible reasons why, noting that in her research she has observed a difference in the way women talk about their work. "Many exhibited a reluctance to discuss equipment, programming languages and software for its own sake…Utilizing the medium because of its sonic possibilities took precedence over a desire to learn about technology for its own sake" (p. 250). The commonly held notion of the dichotomy between "boys with their toys" and "girls with their tools" may not be as black and white as some may think, but the remarks of the women interviewed for the book showed a definite bias for working toward a musical end product as opposed to concentrating on the musical means. If we are to succeed in encouraging more young women to become involved in music technology, this knowledge should have an impact on the way that we recruit and teach young composers in the field.

As Hinkle-Turner notes, "the majority of my research comes from the primary sources of personal correspondence and unpublished resumes, vitas, biographies, and program notes sent to me by the women themselves" (p. 11). This is really the great strength of the book. She has put together an invaluable collection of information that comes straight from the artists themselves. Indeed, she considers the book "a true collaboration between myself and the composers."

Women have been involved in electroacoustic music since the beginning, but we just don't read about them. This book brings to light many important women who are not normally mentioned in general electronic music histories. This, of course, begs the question of *why* they are not in mentioned. Certainly there are some women who are discussed in this volume simply because this is an in-depth study focusing specifically on women, but there are others who have played a pivotal role in the development of the genre and *should* be mentioned in general histories. (In particular, I am thinking of composers like Alice Shields, who played an important role at the Columbia-Princeton Electronic Music Center but is absent from both Chadabe's and Holmes's books.) Hinkle-Turner muses, "Perhaps the issue isn't so much a difference in gender and numbers but an issue of *documentation*" (p. 255), and indeed that may be the case. This is a project that has been long due, and it is one that will be a great resource for composers young and old, male and female. In particular, it serves as an inspiration for young women who find themselves the only female in their respective programs.

Unfortunately, something must be said about the awkward prose in this book. Hinkle-Turner's reluctance to use commas—particularly in long, run-on sentences—is particularly frustrating. The reader is forced to read a passage several times in order to grasp the information that is being

communicated. It is true that I am a copy editor, so bad grammar is a particular pet peeve of mine. But when I had to resort to reading with a pencil in hand so that I could parse convoluted sentences more quickly, I came to the conclusion that this was no small problem. I am alarmed that Ashgate Press released a manuscript in this condition.

The author intends to continue her research and release future volumes on continental Europe, the United Kingdom, Mexico, South America and Australasia. I applaud her for this, and only hope that she works more closely with an editor on subsequent manuscripts.

Gareth Loy
Musimathics, Volume 1: The Mathematical Foundations of Music
MIT Press, 2006
(500 p., ISBN 0262122820)
Reviewed by Brendan Aanes

Throughout history, the intersections of music and mathematics have been studied, pondered, and debated by practitioners of both disciplines. With the last century's advent of electronic sound as well as more numerically-focused compositional techniques, math and music have come together in even more ways. A trip to the library reveals thousands of books and articles in fields as diverse as analysis and acoustics, most of them intensely technical and full of the jargon of their subfield. To the musician seeking to understand the mathematical foundations of their art, it can be daunting. Gareth Loy's book *Musimathics* aims to change this by compiling basic (and some more advanced) information on the mathematics of music in a concise format, aimed at a wide audience of students, composers and mathematicians looking to expand their knowledge of a closely related field. One of the distinguishing characteristics of this book is that it only presupposes mathematical training through advanced algebra and geometry, further widening its audience.

Musimathics begins with a few basic chapters. The first covers "music and sound" (fundamental physical concepts of waves, forces, and harmonic motion), and the second covers the traditional representations of music in western culture (musical notation). The inclusion of these chapters helps make the book suitable for classroom use, but anyone with a background in either field could probably skip them. That Loy begins with physics instead of traditional musical concepts illustrates the book's main approach as examining music from the perspective of mathematics rather than the other way around. This isn't to say that Loy lacks sensitivity to musical issues, but that his focus, like much of the book's content, is scientific.

The introductory chapters are followed by an encyclopedic but brief chapter on the

history and practice of tuning systems. Rather than simply enumerating scales along with their strengths and weaknesses, Loy first compares equal-tempered and just intonation, then guides the reader through the problems of such scales and the various solutions that have been proposed, including both western and eastern microtonal scales. The microtonal portion of this chapter in particular is extremely well written, and makes an excellent introduction to a topic that is often intimidating. My only wish was one that came up often in reading *Musimathics*: that Loy would extend the chapter and cover the material in more depth. Given the scope and aim of the book, this isn't a criticism but rather a testament to the openness and clarity of the author's writing.

From here, Loy moves on to the physical and geometrical bases of sound, each with their own chapter. Much of this part of the book covers basic concepts of physics and geometry, expanding on the first chapter. Despite the abstract nature of the material, it is explained with remarkable clarity, although here as in other chapters there are several confusing errors (corrections are listed on the website: http://www.musimathics.com/). Fundamentals out of the way, methods (RMS, peak, etc.) and motivations for measuring intensity are covered as well, leading to the evolution of the DB scale. While the material covered in these chapters is necessarily fundamental, their placement in the middle of the book is a little strange, particularly when there are already fundamental chapters at the beginning. However, given *Musimathics*' ambitious scope, there is no clear linear or growing path between all the material. When viewed as an encyclopedia rather than a narrative, it isn't a problem that the book suddenly shifts gears from detailed discussion of tuning systems to basic physics.

These basics aside, we come to the real meat of the book: chapters on psychoacoustics, acoustics, and vibrating systems, as well as a long chapter on composition and methodology. On the first three of these I have little to say, other than to echo my previous sentiments on Loy's remarkable clarity and ability to pack lots of information into a small space. Due to the expansiveness (and relative underdevelopment) of psychoacoustics, this chapter is broader than it is deep, but it adequately covers the relationship between objective and subjective variables, localization, sound masking, loudness and pitch perception, giving enough detail on each for the reader to understand many acoustic phenomena. As one would expect, the chapter on acoustics discusses the effects on sound of different media and their boundaries, again in an easy to understand manner. In his discussion of vibrating systems Loy describes the fundamental operation of almost every traditional instrument well enough that I suddenly felt qualified to build them. Again, although I have little to say on these chapters (other than to rave about their ease of reading), with a book like this that is a strong endorsement.

The last and most expansive chapter in the book deals with composition and methodology. Here, unlike in the other chapters, Loy necessarily departs a bit from his encyclopedic, mostly objective viewpoint to give some of his own views as to the principles upon which composition can be studied scientifically. Among these is the conviction that composition can be divided into its methodology and the choices made within that methodology by the composer. This approach defines the first half of the chapter, as he focuses on Guido d'Arrezzo's method of composing chant to fit a text, Baroque and Classical experiments of *Musikalisches Würfulspiel*, the serial methods of the Second Viennese school, and finally the stochastic methods of Xenakis. While each of these techniques is well described, Loy's examination of methodologies is limited to those which have a clear numerical basis and which dramatically reduce the element of compositional choice, or at least clearly limit it to a position defined by the system, and begs expansion into describing other methods. As much as this fits the book and chapter's stated purpose, the omission of many other styles of composition implicitly splits music into that which obviously has mathematics at its root and music that may not, raising aesthetic and philosophical questions that Musimathics does not explicitly address. If math is really the foundation of music and not just sound, shouldn't all music be easily describable, at all levels, through mathematical language as well? If it isn't, then what is the point of enumerating methods that are just special cases? I suppose these questions have not been adequately answered, so there is some merit to leaving them out of a quasi-introductory book. Also, I was glad that Loy did not try to force all music in to a reductionist mathematical framework. Mostly, the trouble with this section is that (in contrast to the rest of the book) it is incomplete both as an overview of compositional methodologies throughout history and as a mathematical theory of composition. It does, however, succeed as a relatively complete description of compositional methods that have deliberately embraced mathematics, and is certainly worthwhile reading for one not familiar with those methods.

After his description of methods used by composers to directly compose music, Loy enumerates a number of methods used by computers to compose, evaluating their success based on the belief that music is about the manipulation of "expectation and interest." As hesitant as I am to accept most attempts to define music, this ends up being a good working definition,

particularly given the nascent state of most experiments in automatic composition. Loy's explanations of varying rule-based systems, Markov Chains, and other methods are as usual elegant and clear and supported by various diagrams. In this section as well as the previous, many examples are given using the Musimat programming language that Loy has developed. Musimat is easily understandable by anyone familiar with C or similar functional languages, and an appendix is included so that those who are not familiar can learn the basic principles. While the inclusion of so many Musimat examples has the benefit of showing techniques concisely and in full detail, I am not sure how valuable it is in the long run. Many computer musicians could easily write the programs themselves given a verbal description of the procedure, and those without programming experience may find their understanding impeded by the unfamiliar method of presentation. Also, in order to use some of the techniques presented (such as operations on serial rows) without a computer, a reader would have to abstract the knowledge from the program into a manual procedure.

Loy follows his description of the basic theoretical procedures of computer-based composition with some real-world examples such as Hiller and Isaacson's *Iliac Suite*. That few of such early attempts were successful, even by Loy's simplified definition, clearly shows the complexity of compositional activity. Loy dedicates much space to David Cope's Experiments in Musical Intelligence (EMI), which have been remarkably successful at composing new Mozart symphonies based on the analysis of Mozart's own music. Like the earlier descriptions of methodology, this section of *Musimathics* provokes philosophical questions on the nature of music and composition, but this time the author does begin to address them. In his belief, a system like EMI passes a musical "Turing Test" by being for all intents and purposes indistinguishable from human composition. Despite its success, it is worth noting (as Loy does) that such a system is based entirely on previously-composed input. Although we like to think otherwise, composers are all affected by outside input, and so this actually isn't such a failure. Loy suggests an experiment in which EMI is recursively fed its own results to mimic the process by which a human composer develops their own style; the results of such an experiment would probably be quite a development for the field of computer composition as well as setting a model for future tests.

A book as broad as *Musimathics* is usually a bit unfocused and sprawling, but Gareth Loy does an admirable job of organizing and explaining his subject matter. Musimathics makes an excellent introduction to the topics it discusses and gives a solid footing on which to expand. While I think the book will be of most value to students, experienced musicians will probably also find at least a few things to learn within it, and due to its rigorous organization it is easy to pinpoint the sections one wants to find. On the whole, I would highly recommend *Musimathics* to anyone interested in learning about the basic intersections of math and music, and have already loaned my copy to several friends.

Gareth Loy
Musimathics, Volume 2: The Mathematical Foundations of Music
MIT Press, 2007
(576 p., ISBN 0262122855)
Reviewed by Brendan Aanes

Gareth Loy's first volume of *Musimathics: The Mathematical Foundations of Music* provided an excellent overview of many areas in which music and mathematics intersect. The second volume of this series aims to provide the same lucidity to the much narrower area of digital audio. Unlike the first volume, this narrowness allows the book to become more encyclopedic, through its focus on a single umbrella of topics rather than a tangentially related set. On the other hand, unlike tunings, psychoacoustics, and compositional strategies, which were covered in the first volume, the Fourier transform, spectral analysis, and the other topics of this second volume involve more higher math, in the form of calculus and differential equations, which fewer readers are familiar with.

Musimathics Vol. 2 begins with a novel description of sampling and other basic concepts of digital audio. Loy asks the reader to imagine a seismograph-like system for recording the height of waves as they pass by a buoy anchored to a piling; an attached pen records the height of the bouy relative to the piling. This metaphor is then extended with a sample-and-hold system to represent sampling of the continuous wave motion, as well as the low-pass filter found in the typical ADC. Loy's metaphor seems like an effective description of the basics of sampling, even as the mechanical system described becomes rather complex by the time the full ADC is modeled. On the other hand, it also seems that Loy is reinventing the wheel; many readable explanations of sampling already exist. Still, it is always good to have different explanations that may appeal to readers with different backgrounds or learning styles.
After explaining sampling in terms of his tidal metaphor, Loy switches over to a more traditional and technical account of sampling, which is then followed by information on encoding, quantization and distortion. Continuing the standard set by the first volume, well-labeled graphs abound when appropriate. Loy's language here is concise, yet somewhat more technical than one would expect after his metaphorical introduction. Still, this chapter provides a

detailed look at sampling that should be understandable to readers willing to put their mind into it.

The second chapter in *Musimathics Vol. 2* plunges even deeper into mathematics, beginning with a very brief explanation of complex numbers. Here, Loy relies far more on equations than he did at any point in the first volume, although in his defense that book used simpler math. I'm unsure as to the value of this section. Those who have no familiarity with complex numbers will likely have a hard time understanding them with such a short explanation, and those who do understand them won't need to read this. Readers who did learn about complex math at some point but haven't used it for a while will probably be the only ones to get much out of this section, but even then some portions of it are very terse and equation-dependent.

Loy continues to build an increasingly complex set of equations once the reader is familiarized with complex numbers and their associated properties. He then uses this mathematical vocabulary to discuss sinusoidal motion and phasors, aiding the reader by returning to more verbal than mathematical descriptions. This portion of the book is very abstract, forming the background for much of the material found later. However, I had a hard time following it. Gareth Loy clearly has an incredible ability to make complicated mathematics understandable through verbal description and metaphor, but here he seems more interested in getting on to the more musically-interesting later chapters and hesitant to fully deploy this skill.

Returning to more familiar territory, Chapter 3 covers spectral analysis and re-synthesis, heady topics by most standards. Here, I found Loy's explanation of the operation of the Fourier transform to be incredibly understandable, and the final description of a "real-life" discrete transform seemed obvious based on the preceding steps. I would highly recommend this chapter to anyone seeking a thorough understanding of Fourier transforms and related operations. Although most readers will probably not be interested in going out and writing their own FFT implementation, understanding these mechanisms leads to a better understanding of how to work with FFT-based applications of many types.

The next chapter's introduction of convolution begins again with an unusual metaphor. Rather than stating the typical (and simplistic) explanation of convolution in relation to spectral multiplication, Loy describes the operation of a moving-shutter camera and its effect on images, likening convolution to this mechanism's effect of "scaling and time shifting." He then gives an equation for convolution and moves on to simple convolution of sets of numbers, followed by windowing and musically-relevant convolution applications. This approach has the downside of seeming overly abstract at first, but it pays off by thoroughly explaining the operation of convolution. Also in this chapter, Loy references his Musimat programming language. My thoughts on this remain ambivalent: to a programmer, the Musimat examples don't provide anything that isn't already in the text, and to a non-programmer they only complicate things unnecessarily.

Most computer music textbooks introduce filtering well before Fourier transforms and convolution, but in *Musimathics* Gareth Loy places these topics before his extremely in-depth look at filtering and resonance (one chapter each). This is probably a good choice because the math involved at this level makes a little more sense when introduced in the context of the Fourier transform than it would have if it had been introduced alongside filtering. Another mark that sets Loy's treatment of filters apart from most is that, writing in the age of computer music, he can approach them from a mathematical standpoint that correlates directly with the operation of digital filters, rather than getting caught up in the necessary design concerns and components of analog systems. That said, Loy's take on filtering is again heady but manageable. More so than in the previous topics, he returns again to extensive use of equations, which make the chapter more difficult. Again, the greatest complaint I have about Loy's writing is that sometimes his faith in the comprehensibility of well-presented equations leads him to trust them over his excellent capacity for verbal explanation. This is somewhat less the case in the chapter on resonance. Although the requisite calculus is, like complex numbers previously, given a whirlwind introduction, this brief chapter comes out much more readable than its predecessor.

Taken together, *Musimathics*' next chapters, "The Wave Equation" and "Acoustic Systems," can be seen as a comprehensive exploration of sound production by any instrument or source. Although they are equation-heavy and utilize a lot of calculus and trigonometry, Loy here provides more commentary on his equations than in some other chapters, making it possible to either quickly read and grasp without working through what is going on mathematically, or to dig further into the inner workings of sound production. There isn't much else for a reviewer to say on these chapters; although the subject matter is very complex, the presentation of it on multiple levels is very welcome. Like the chapter on Fourier transforms, these segments of the book provide valuable knowledge that will be useful to musicians and readers from diverse backgrounds and fields.

The second-to-last chapter of *Musimathics* is a brief encyclopedia of synthesis techniques. Being a new book, *Musimathics* has the advantage of being much more up-to-date than the classic computer music textbooks, and in addition to going into more detail than usual on the old standards also devotes considerable space to developments in physical modeling. Beginning with the classic Karplus-Strong algorithm, Loy moves on to Julius Smith's waveguide synthesis, a new development that generalizes the Karplus-Strong algorithm to form a model based on the reflections of waves in media. Everything in this chapter is well explained, and it makes an excellent and very deep introduction to the field. Following this look at synthesis techniques is a chapter on "dynamic spectra," most of which is spent discussing the short-time Fourier transform and its applications. This chapter was, for me, one of the best of the book, and although I'm not sure why it didn't come nearer the chapter on Fourier transforms, it provides an excellent note on which to end.

On the whole, *Musimathics Vol. 2* is an interesting examination of the mathematics of computer audio. Although at times it fails to deliver on its promise to make its topics easily understandable, it is still easier to read and more in-depth than many of the classic computer-music texts, even as it lacks some of their depth. Together with its companion volume, it forms an excellent work suitable for musicians of varying experience levels and a useful reference for those working with computer music.

Simon Emmerson
Living Electronic Music
Ashgate Publishing, 2007
(195 p., ISBN 0754655482)
Reviewed by Margaret Schedel

(Editor's Note: This review also appears in an upcoming issue of the Computer Music Journal; this is the first of what we hope to be more cross published articles.)

Living Electronic Music is a direct and careful treatise about the performance, practice and perception of electronic music. Aimed at composers, researchers and musicologists, it is more than a historical overview—Emmerson blends the philosophical, the scientific, and the musical into his wide-ranging thesis. He "asks questions that may have no answers" and throughout the book casts questions, invoking glimmers of meaning instead of making declarative statements. Full of cerebral provocations, this book needs to be discussed rather than simply read. The full experience also requires listening—the book boasts an extensive discography full of pieces both in the electro-acoustic canon and others less familiar. Emmerson doesn't simply list these works; he places them into a larger context, giving the reader a rudimentary listening guide.

Living Electronic Music is divided into six chapters with an introductory essay called "Between Disciplines." Emmerson designed each chapter "to be a self-sufficient essay, yet all cross reference and 'need' each other to get the bigger picture." The chapters are paired: Chapter 1 (Living Presence) is paired with Chapter 2 (The Reanimation of the World), which discusses the two-way exchange between the animate presence and inanimate worlds. Chapter 1 is further subdivided into three parts: physical presence, psychological presence and personal/social presence. This pair of chapters is the most challenging in terms of introducing new concepts to the average reader. Chapter 3 (The Human Body in Electro-Acoustic Music) examines the physical body in electro-acoustic music, and is paired with Chapter 4 (Playing Space), which unfolds the personal and public space surrounding the physical body. Chapters 5 (To Input the Live) and 6 (Diffusion-Projection) are the easiest to understand, and deal with transducers that are the paths between the "animate" and "inanimate" worlds: microphones and speakers respectively.

I wished for a concluding essay. Though Emmerson feels that "no chapter is really first or last and there are no definitive conclusions," I would have liked some sort of final essay to balance the book, even if it simply contained more questions about the bigger picture. The introduction ends with the provocative question, "exactly what is it to be alive in music making?" while the last sentence in the entire book reads, "nonetheless an 'authentic sound' from any of the last eight decades would demand attention to the loudspeaker construction of that time." I had to return to the introduction to feel fully satisfied with the book.

Emmerson is a strong and clear thinker; he is able to turn the most complex philosophies inside out so that we can see the seams and understand how his thought process is put together. While I appreciate his desire to make each chapter function on its own as part of a larger whole, I wanted more substance after Chapter 6. Perhaps this is a great compliment to Emmerson's writing, but I think the same system of organization would have worked just as well with a concluding essay tying themes from the various chapters together.

As a writer who is sensitive to cadence, variety, accent, and nuance, Emmerson has created a book that is a bit dense in places, but still a pleasure to read. He is also a very thorough researcher. For example, there are seven citations in the second paragraph of the introduction alone. These range from the expected (Pierre Schaeffer and Jean-Jacques Nattiez) to the surprising (James Gibson, a perceptual psychologist, and even Tim Ingold, a social anthropologist). This slim volume contains fifteen pages

of references to books, articles, scores and CDs. One minor annoyance is that the references for recordings and books are not clearly located for the reader. They are cited identically within the text, but are then found in different sections in the references. The reader must look both in the "books and articles" section and the "scores and recordings" section, as it is not clear where an individual citation might be.

Emmerson does a beautiful job of integrating various streams of history, philosophy, ethnomusicology, and auditory perception together to demonstrate key theories in composed and improvised electo-acoustic, acoustic, and a few popular(!) musical compositions. The text is illustrated with a small number of Venn diagrams showing areas of overlap and enclosure in the philosophical realm. These figures helped my understanding of the broader concepts Emerson presented in the text.
I have decided to use this book as the primary text for my class in the fall entitled "Electronic Music of the 20th and 21st Centuries: Using Technology to Create Music." I am looking forward to delving deeper into Emmerson's view of electronic music with my students and creating a stronger "relationship to the sonic resources around us."

Lektrowsky's Will

by Max Mathews

At his keynote address at the New Orleans ICMC, Max Mathews referenced a short story he had written. He graciously allowed us to republish it in Array.

"The future may be a fiction."
- Anonymous survivor of a
New Jersey mugging

New Universe Spaces, June 13, 2165

John Lektrowsky, the world's only STARNAUT, joined the Chewlard Order yesterday. The massive gates of the students' portal of the Chewlard Monastery opened briefly to receive his body and instrument. He entered clad in the traditional "Tails" with violin (the 1704 Betts Stradivarius) under right arm, Tourte bow dangling from thumb and forefinger, and the page of manuscript in left hand. Observers speculated that it was the opening of the Back Chaconne, but, of course, this information is not revealed by the Order.

Lektrowsky's sensational return from Alpha Centauri preempted the headlines nine months ago. He was the first and only STARNAUT to be declared sane on arrival, although some consider his subsequent application to the Chewlards at the certified age of 35 to be an indication of, at least, judgmental disequilibrium. Others attribute it merely to long practice or time alienation from the world. Lektrowsky, himself, maintained that his choice was a reasonable consequence of 20 years acceleration during which space he practiced the Chaconne and that only the impossibility of playing the music preserved his motivation and sanity. Whether or not his opinions are believed, the Chewlards broke their traditional rule limiting novitiates to five years of age or younger. The argument over Lektrowsky's age has never been satisfactorily resolved. He was born August 14, 1985, entered space in the year 2001, and returned in 2164, earth time. According to both his records and the certifying physiologists, he spent twenty life years under acceleration attaining a speed greater than 99 percent of the speed of light. Physicists still have not been able to explain the time discrepancy. One group maintains the theory of relativity must be revised, another that he passed close to a Black Hole.

Lektrowsky left a will to be made public in two weeks.

New Universe Spaces, June 27, 2165
STARNAUT'S WILL READ

John Lektrowsky's will was communicated today from the offices of Burk and Fint in an unusual transmission.

Lektrowsky is assumed to be still alive somewhere in the Chewlard auditoria, though his existence will be confirmed only if his style can be identified on a recording, which—as is well known—are the only messages ever to leave the monastery gates. Although public interest in Lektrowsky has somewhat abated, Burk and Fint's communications were copied by all major news media. The most unusual feature was the will. The only property involved is the information in the document itself and this "wisdom" Lektrowsky left to the entire universe in order that "the future may profit from the experience of the past." Following the Spaces longstanding policy, the entire document will be published in the Moonday Supplement and annotated excerpts are given below.
-BG

Will of John Lektrowsky

I, John Lektrowsky, being of sound mind but unusual experience and having voluntarily left the company of man by joining the realms of eternal Chewlard practice, do nevertheless feel kindly toward the world and wish to give to it the wisdom that I, the only sane and surviving STARNAUT, possess. Accordingly, I hereby will this document to the entire Universe for whatever good uses can be made of these unique opinions. Since time is short, I will simply attempt to describe my reactions, those of a 20th century man, to the 22nd century world. My comments focus on music, because both the world and I owe our sanity to these vibrations. Their unique effect on our brains has never been explained or understood and I can subtract nothing from the mystery, but it is clear that without this form of expression race suicide might end our great civilization, even as apparently happened to the strange earless creatures on the inner planet of Alpha Centauri.

The need in every man to create something beautiful, at least to his senses, was not appreciated in my day, perhaps because it was partly fulfilled in the course of normal work. A lucky man might spend his years building houses or boats or gardens, which could be made more beautiful, or at least better, by the loving effort he put into their construction. Even the automobile worker could be proud of the sparkling chromium and bright colors on his cars knowing that somewhere deep inside he had tightened a vital nut to just the right torque, and that the motor might fall out if his work was neglected. (Editor's note: The automobile, an ancient form of transportation, was used until about 2010 when the petroleum supplies were exhausted.) Now, with automatic factories, polyethylene grass, and the one-month work year, a sense of creativity in work is difficult to feel. To some extent this need has been filled by creativity in the arts and especially music where the new instruments and trainers have made it possible for almost anyone or any group to play a self-satisfying auditory performance. (Editor's note: Here the will continues at some length developing the argument that, with the outlawing of any form of live recording, auditory performance is pure creativity and can have no utility, hence it has rightfully been excluded from productivity rationing. Music is contrasted to painting where no satisfactory method for disposing of finished pictures has yet been invented, and they continue to pollute the walls of our buildings.)

On Quadraspeakers
My star ship having been equipped with an excellent stereo system, I was somewhat surprised to learn that recordings were reproduced over only four loudspeakers, albeit excellent ones. I had really expected to find the walls of rooms papered with tens or even hundreds of speakers designed to attack the ear from every conceivable direction. Of course, I had no way of knowing about the quadraspeaker revolution that occurred in the year 1990 and was decisive, if brief.

At that time, manufacturers started phasing out the dual stereo tapes and their accompanying four speakers and making available only incompatible eight channel disks which required completely new turntables plus, of course, four more speakers. The response from the public, whose memories of the transition from two to four speakers were all too vivid, was immediate. Factory walls were stormed, production lines wrecked, and atrocities committed. An unfortunate Vice President of Advertising, who tried to sway the mob, was found with his head in a folded horn driven by a 500-watt amplifier playing both channels of an old stereo Rock recording.

Happily, a technical solution to the impasse was feasible. Some work of an early computer musician, Howning, was rediscovered and developed. By using ingenious techniques involving mixing reverberated and direct sounds plus Doppler frequency shifts plus time delays, Howning was able to demonstrate that four speakers are sufficient to reproduce sounds from any direction or any distance and to create moving sounds, in fact to create sounds moving faster than the speed of sound. These methods were developed into the quadraspeakers that have been standard for so long.

On the Absent Audience and Virtuosity
Some men, returning from a long trip,

yearn for ice cream or some other edible. I, coming home from an incredibly longer journey, dreamed of again hearing a concert, even the nonmusical parts of the performance—the orchestra tuning, the audience coughing, the conductor tapping his baton. You can imagine my crushing disappointment to learn that audiences had been banned many years ago from all auditory performances. Only gradually have I come to agree with the wisdom of this decision. I now understand that any live performance of any Index work would be bound to be far inferior to the flawless recordings, released in cathedra by the Ecumusical Synod, and reproduced to noiseless technical perfection over the quadraspeakers built into every room. (Editor's note: Although no one would argue against the superiority of recordings, the audience ban was enacted for another reason: to protect the performers. Auditory performance grew out of an ancient ritual, The Happening, invented in the mid 20th century by Allen Kupro, John Kage, and several other artists far in advance of their time, perhaps too far. The instruments available then were so poor that the result was frequently unendurable and performers were all too often lynched by the angry audience.)

Even after hearing a recording, I cherished the hope that occasionally a monastery gate might open a crack to allow a select few to witness a recording session. My naïveté was so great I had to be told that any virtuoso worthy of his tails would play at least twice as fast as the listening tempo and all recordings are carefully slowed down before being released. Paginenius, according to my informer—a man with rank of Mabbot—played nothing slower than four times real time including his measure from "The Flight of the Bumblebee." Such virtuosity, he explained, is achieved by having each performer concentrate on a short section, typically a measure, of one piece and practice it to the ultimate perfection. Complete performances are created by abutting the efforts of many such specialists. While I look forward to such an opportunity to perfect my technique, I must admit to occasional nostalgic memories of my voyage, when I played the entire Chaconne, however badly. (Editor's note: Certain restrictions are presently in effect to limit ways of achieving virtue. Paginenius resulted from the crossbreeding of a Congolese drummer with a Chinese ping-pong champion. Such genetic engineering is outlawed.)

On Audio Performance

To you, Audio Performance—Audance, as it is called—must have the comfortable familiarity of a close friend, but for me, coming from a time when each note had to be individually handcrafted, my first Audance seemed a miracle of mass production in which swarms of notes grouped and regrouped themselves to embody the performers' musical ideas effortlessly as if in answer to their very thoughts. As I later learned, the computer was controlled by perfectly ordinary devices and the "miracle" lay in the trainer's program. I am most grateful to the government for making an exception to the strict laws banning audiences at Audances, though I feel it was entirely justified by my special circumstances. I believe my disguise as a repairman looking for an intermittent bug in the computer was accepted and the performance was normal.

I arrived a little before the performers. The chamber, a pleasant room almost 15 meters long, was furnished with about a dozen consoles resembling TV sets distributed in a comfortably irregular pattern. Some had chairs, and others were at standing height so the performer could move freely as he reacted to the music. Only the control console of the computer and the card reader were actually in the room, the main circuits being in an adjacent room. The usual quadraspeakers were incorporated into the walls and the sound came from there just as it would have for any recording.

From my chosen post, hovering over the card reader with miniscope in hand, I was able to watch the players assemble. All but one selected some control devices from a cabinet and plugged cables from these into their consoles. A box with knobs, an organ keyboard, a wand that could be freely moved in three dimensions, or a set of foot pedals were popular with the younger players. Some devices looked vaguely like archaic instruments—a violin without a body, a clarinet with a solid tube, a board that could be struck with a stick. These were favored by the older players who I guessed might have studied traditional instruments.

In discussing the performance afterwards with the trainer, I learned that the simplicity of appearance of the devices was deceptive. The knobs responded not only to twisting, but also to how hard they were grasped and even to the skin temperature of the performer. The keyboard was sensitive to both vertical and horizontal pressure on the keys as well as to velocity and displacement of key stroke. As far as the computer was concerned almost any device could control any function so that the players could quite arbitrarily select something that fitted their training or mood.

The player who had rejected all mechanical devices merely stood in front of his console and watched the TV display intently, thus making me erroneously suspect him of being some sort of performance critic. (Editor's note: Criticism of audio performance is one of the few capital crimes in our society. Fortunately, it is rare, the last critic having been executed over 50 years ago.) Far from being a critic, the trainer explained that

this player, one of the most advanced in the group, was a looker. Built into each console is an eye-tracking camera, hence it is quite possible to play any note displayed on the TV screen simply by looking at it. With a more complex program, groups of notes can be played by sweeping one's eyes across them. Although eyeing a score is one of the most facile performance techniques, more eye training is required to become proficient than might be imagined and not many performers reach this advanced state.

An immediate quiet in the group was produced by the entrance of the trainer, a beautiful girl with long yellow hair, whose presence made it difficult to concentrate on the card reader. Trainers, in my time, would have been called composers, or conductor-composers, except that they would not have had the superb skill in programming achieved by the trainer through long years of understudying master programmers, nor the required certificate in psychotherapy.

The Audance began with some discussion, not entirely audible to me, amongst the performers and trainer in which, I believe, she ascertained the mood of the group. Next she selected a deck from her large music case and dropped it into the card reader. At the same time the performers took up their various devices. The trainer next inserted a key in the computer console and a low sound gradually swept round the quadraspeakers, rising in intensity, pitch, and rhythmic modulation as it moved. The effect on the performers was immediate and utter. During the set-up time, I had to attend discretely to my miniscope and poke the card reader occasionally to assuage some slightly worried glances. From the first vibration of the Audance to its reluctant finale, I could have paced in Chewlardian Tails in front of the oblivious performers, so completely was their attention captured by the sounds they were creating. The trainer explained that one of her most critical functions was to resolve and terminate the performance while the players were still alive. Early Audances, before trainers were mandatory, sometimes got into man-machine loops that were broken only by the collapse of the player, or in fortunate cases by some computer error.

Three and one half hours later, as the last sound reluctantly died into a reverberated distance far beyond the walls of the room, the players slowly laid down their instruments and slipped from the room, guiding their feet over familiar steps with unfocused eyes. They had returned from another world, an inner world immeasurably further away than Alpha Centauri.

How did the music affect me? Technically, there was no question about its excellence, and indeed there could hardly be any since the compositional rules were part of the program and the computer would allow exceptions only on command of the trainer. The sound quality was also superb. All the normal instruments could be heard at various times with the brilliance we have come to expect from their enhanced reproductions on the quadraspeakers. But in addition, many new sounds were incorporated—some so different from normal instruments that it would be useless to attempt to describe them, others which seemed like crosses between standard instruments. I amused myself inventing names for some—the Trumpolin, the Obow, the Piananet, the Harpsibone. My fantasies were closer to the truth than I realized. Players could construct timbres by mixing traditional instruments, for example, 10% violin, 30% trombone, and 60% tympani. The classic instruments provided a convenient palette to be combined into these new sounds. The three-dimensional wand was a popular tone control.

However, comments on technique and sound quality are procrastination to delay answering my original question, which must now be faced. Without risking violation of the criticism laws, I can certainly say I was not moved by the performance as deeply as were the performers. Many times the music rose to great peaks and fell beautifully into the intervening valleys, which are as necessary as the peaks themselves to define the summits. But the succession of climaxes did not form, for me, a convincing landscape. I do not know the reason—perhaps the environment was constructed by the trainer for other personalities, perhaps the players' improvisations limited the organization, perhaps my mood was unreceptive. In any case, I did not regret the non-recording act which, as the Audance ended, condemned the last never-to-be-repeated vibration to oblivion. But the thoughtful departure of the players testified to memories that would be long cherished. (Editor's note: The Spaces take no responsibility for the above statements, which border dangerously close to criticism. Fortunately, the arm of the law seldom reaches inside the monastery walls.)

On Trainers

The skills of a trainer, which encompass both an explicit theory of music and the most sophisticated programming techniques, could hardly be described here even if I understood them. I can only recount a few recollections of an after-performance drink with Alison, who immediately denied that she composed "works of art." In fact, she put down those pompous old soundbags like Beethoven and Brahms, whose delusions of grandeur let them write something so it could be played again and again. Her function was to create an environment in which her group could express themselves musically in ways satisfactory to themselves. This, she maintained, was both far more difficult than making a composition to be played by expert musicians and much more

valuable than endlessly repeating the same old notes. Of course, she admitted the old fogies had perhaps done as well as they could considering their crude instruments.

By contrast, the computer allowed almost any possibility from completely unrestricted improvisation to the exact replication of pre-composed notes, though she would only consider pre-composition for very inexperienced performers. Frequently, she would supply the harmonies by means of a program to a melody improvised by one of the players. The harmony rules could be changed from time to time, either by herself or one of the players. Alternatively, the computer might improvise the melody, and the players, as the spirit moved them, might improvise restrictions on it making it proceed rapidly or slowly, in scales or in great melodic leaps, or in arpeggios.

The most interesting, but trickiest, controls involved interactions among several players. One might create the durations of a note sequence while another made the pitches, or one might create a rhythm pattern and the second a counter-rhythm to go with it. When necessary, the computer would resolve any conflicts according to its rules by changing the notes of one or the other player. Even so, Alison had to carefully select compatible partners and, not infrequently, change the rules or arrange a hasty divorce to avoid a breakdown in the music.

The TV consoles were invaluable in controlling the Audance. They could show a selection of possible sounds that the performer could play in any order he wished or, with another subroutine, they could show a phrase pre-composed by Alison which the performer could start or stop at any time. They could reveal to one performer what another was improvising or show one of the global functions that Alison often provided to control the climaxes and valleys of the grand structure. In rare cases, they could picture a staff with notes that were played in the manner of ancient performance, except that the players could relax knowing that the computer would correct any mistakes they might make. I have already mentioned the unique use of the TV by the lookers. Alison confirmed my feeling that without TV, Audance would scarcely be possible.

In my century a woman composer was a rarity, so I inquired whether Alison felt out of place in a male profession. Her reply was delayed by a sharp spasm, which she was able to suppress with some difficulty by holding her napkin over her mouth. When she had recovered her voice, she explained that although the Men's Equality League occasionally cried discrimination or picketed an Audance, very few men were able to compete as trainers. She didn't know exactly why—something in the feminine outlook—men just never seemed to be able to learn how to properly maintain the climaxes so vital to musical finales.

We parted with her suggestion that, although group Audances were relaxing recreation, she also led private performances, which were incomparably more satisfying, and if I would come by her studio some evening, she was sure she could make me forget the violin. Unfortunately, I had an appointment with the Chewlardian High Mabbot on the following day and, by the time I again thought of Alison, my future was committed in other directions. Had it not been for this quirk of timing, I suspect things would have come out very differently and I might not now be writing this will.

On Monastic Music

As far as I have been able to determine, no layman has ever before interviewed a High Mabbott in any of the musical orders. Not only was I granted this privilege, but the Mabbot answered all my questions and appeared to withhold nothing. It almost seemed as if he wished to communicate a better understanding of the Order to the world through me. Why he chose this poor vehicle I cannot say, except that the customary audition at the beginning of the interview went well. As the demonstration I had chosen the quintuple stops at the beginning of the second measure of the Back Chaconne, having practiced these from my second through thirteenth years in space. As written, all tones must be struck with precise simultaneity. This I achieved during final acceleration to the speed of light, and though the non-relativistic performance at earth speeds is immensely more difficult, nevertheless the Mabbot was well pleased. (Editor's note: W. A. Back, who is occasionally confused with J. S. Bach, lived in the remote Green Forest of Bavaria in the 17th century. His music was lost and rediscovered in 1981 in the men's room of the New York Public Library on some old paper pressed into service during the great paper shortage which resulted from the Sierra Club's legislation forbidding all tree cutting. In the Green Forest, during Back's time, a five-string variant of the violin was popular, which greatly simplifies performing some of his music.)

The Chewlards contain three ranks of virtuosi: Performers, who are rightfully the only group entitled to wear tails; Archivists; and Untouchables. The duties of the Performers, as one would expect, are to practice their notes diligently and, when requested, perform flawlessly for the recording microphones.

The Archivists maintain the Index of Classics and the master digital recordings of all classics. In order to be put on the immortal Index, a composition must be unanimously canonized by the Ecumusical Synod of Archivists. Thereafter, a digital recording of the definitive performance will be kept on quartz plates in the archives, the Untouchables will be authorized to issue records and all performances will

be counted. The Chewlards, unlike some orders, do not maintain that the universe will end when all classics have been perfectly played 2440 times. They do, however, keep a careful count of all performances. Needless to say, few compositions achieve the Index; in fact, none have been canonized in the last century for reasons that are controversial. Some maintain that audio performance has diverted the interest of composers away from classics. Others feel that the reason lies with the unplayable (and unlistenable) music composed at the end of the 20th century by the successors of the 12-tone school. In any case, since no limit is ever put on playing speed, the existing classics are sufficient to provide an eternal challenge to the Performers.

Even if the art of performance would vanish, the classics would be perpetually preserved on the quartz archives located deep inside a granite cave cut into the heart of a mountain whose location was unknown even to the High Mabbot. On these plates are written in sputtered gold, numerical samples of the four sacred signals used to drive the quadraspeakers. Each signal is sampled 440,000 times per second, and each sample is quantized into a 440 digit binary number, so to human senses the recordings are flawless. But, in addition, the samples contain not only check sums, but also error correcting digits, so that errors are unthinkable. In only one case was the perfection of the archives challenged. In the year 2051, the 126,532,543th sample of Beethoven's Ninth Symphony changed from 124613 ... to 124615 ... due to a most unlikely constellation of flyspecks. A High Synod was called immediately to deal with the emergency, but fortunately before they acted, the difficulty was cured by an ingenious Archivist who washed the plate.
The role of the Untouchables at first seemed enigmatic within the purity of the musical Orders. Their function is to handle the unclean electronic apparatus used to record performance, slow the speed to the proper listening tempo, abut and mix the various performers and compute the quadrasignals. This last operation included such enhancements as reverberation, filtering and noise stripping, whose existence is seldom mentioned to the performers. But, as the Mabbot so clearly put it, one must eat to play, and the income of the Order comes from record sales. Hence, it must compete in quality with the other sounds coming from the quadraspeakers. I was moved by the beauty and directness of his wisdom.

A Farewell Warning Against Misinterpretation

The day of my entry into the Chewlards dawns and I must end this will with one caveat. My choice should in no way be interpreted as evidence that classical performed and recorded music is superior to audio performance. A man is a prisoner of his age and, in fact, is bound to what he has learned as a child. In my time, before Telespeak became universal, different peoples spoke many languages. Although it was possible for an adult to learn a new language, he could never master it in the way he would have learned it as a child. Today's music is a new language for me, and I can intellectually appreciate its power, yet in another sense I can never learn it. Audance is the privilege of the youth of today and I must seek the music of my youth, which happily is also a rich language.