This book strives to provoke. Its arresting dust jacket, rendered in jangling green and blue, bears the nightmarishly distorted image of a human scream. Should contemporary musicians, particularly those involved with computer technology, expect to find anything inside relevant to their own activities?

The title presents a paradox. How could such disparate notions as “noise,” “water,” and “meat” have much of anything to do with sophisticated artistic concerns? And the subtitle—A History of Sound in the Arts—seems to presume and promise so much. Is it really possible for a single volume to adequately address such vast implications?

Anyone curious enough to crack the cover of Noise, Water, Meat: A History of Sound in the Arts certainly will find an intriguing premise stated at the outset: “Sound saturates the arts of this century . . . None of the arts is entirely mute, many are unusually soundful despite their apparent silence, and the traditionally auditive arts grow to sound quite different when included in an array of auditive practices” (p. 2). Surely this seems reasonable—it actually is quite easy to imagine how other arts might be able to point toward new ways of thinking about sound. But which arts, which practices, and to what end?

A specification of the work’s purview offers a compact answer:

The book concentrates on the generation of modernist and postmodernist techniques and tropes among artistic practices and discourses . . . The main ones discussed here are noise, auditive immersion in spatial and psychological domains, inscription and visual sound, the universalism of all sound and panaurality, musicalization of sound, phonographic reproduction and imitation, Cagean silence, nondissipative sounds and voices, fluidity at the nexus of performance and objecthood, William Burroughs’ virus, and the bodily utterances of Michael McClure’s beast language and Antonin Artaud’s screaming. (pp. 2–3)

Thus, much of the content centers on elements of philosophy, aesthetics, and cultural history. Regrettably, however, there is little or no direct discussion of the pioneering technological developments of Leon Theremin, Maurice Martenot, or Robert Moog, or the no less revolutionary artistic contributions of Otto Luening, Vladimir Ussachevsky, or Milton Babbitt. The book’s purview essentially ends with the late 1950s and only makes brief references to developments in the early 1960s, so many of this century’s most interesting aural achievements are never dealt with.

A later statement of its purpose also clarifies at least part of its intended audience:

The history and theory of the arts are regularly used by artists in developing their own work. . . . [B]y concentrating on the actions and statements of artists within specific conditions, especially in acknowledging the complexities involved and the artistic possibilities that stem from them both then and now, I am attempting to maintain a perspective on art making that might be of use to working and aspiring artists. (p. 14)

Noise, Water, Meat is an interdisciplinary study designed to illuminate novel and provocative ways in which artists incorporated sound and aspects of sound into works created during the first half of the 20th century. In addition to music, examples are drawn from literature, the visual arts, theatre, and film. Indeed, it is less about music, per se, and more about various artistic genres of particular interest to the author. And like any “history,” it is opinionated, rather than objective, polemical rather than comprehensive. Readers simply will need to decide whether its contents and attitudes are of any interest to them.

The author, Douglas Kahn, is on the Media Arts faculty at the Uni-
versity of Technology in Sydney, Australia. Computer Music Journal readers may be familiar with the volume edited by Mr. Kahn and Gregory Whitehead, Wireless Imagination: Sound, Radio, and the Avant-Garde (The MIT Press, 1992), which contains his essay, “Death in Light of the Phonograph: Raymond Roussel’s Locus Solus,” as well as his introduction to the collection, “Histories of Sound Once Removed.” The present volume grows out of ideas originally presented in these sources, expanded into many new areas.

Structurally, Noise, Water, Meat consists of an Introduction, plus 12 chapters grouped into five main sections, each of which contains two or three chapters linked by a common theme. The Introduction begins with a discussion of modernism, arguing that it “entailed more sounds and produced a greater emphasis on listening to things, to different things, and to more of them and on listening differently” (p. 9). To dramatize his point, Mr. Kahn examines a truly disturbing passage from Comte de Lautréamont’s Les Chants de Maldoror (1868), in which a deaf observer’s response to a fantastically horrific scene was a scream so physically wrenching that he finally became aware of the presence of his own voice through its intracranial vibrations. Mr. Kahn also surveys how phonography changed the act of audition and the perception of time.

Part One, Significant Noises, argues that one of modernism’s great accomplishments was the admission of sounds previously dismissed as extraneous “noise” into the artistic palette of possibility. “Immersed in Noise” surveys the presence of noise in handwriting, visual arts, nature, poetry, and city life. The next chapter, “Noises of the Avant-Garde,” offers a brief historical review of such early 20th-century movements as Bruitism, Dadaism, Simultanecism, and Futurism.

Part Two, Drawing the Line: Music, Noise, and Phonography, seeks to illuminate connections between these three domains within the sphere of the 20th-century avant-garde. In “Concerning the Line,” Mr. Kahn explores aspects of acoustics and recording technology, discussing how they influenced the thinking of composers like Luigi Russolo, Henry Cowell, and Edgard Varèse. “The Sound of Music” traces the increasingly blurred line of demarcation between sound and musical sound, drawing upon the work and thought of Pierre Schaeffer, Karlheinz Stockhausen, John Cage, and Olivier Messiaen. “Ubiquitous Recording” focuses on the phonograph and on film in order to illuminate how these technological advances gave rise to new artistic possibilities.

Parts Three, The Impossible Inaudible, and Four, Water Flows and Flux, are likely to hold the greatest interest for readers of this journal. “John Cage: Silence and Silencing” places the composer’s influential ideas on sound in a broad intellectual and cultural context. “Nondissipative Sounds and the Impossible Inaudible” introduces the notion of conceptual sounds, like astronomical and molecular sounds, metaphorical sounds like rumor and slander, and the perception of sounds emanating from memory, the future, and the afterlife. “The Parameters of All Sound” investigates some of the implications of loud sounds and poetically implied, imaginary sounds. “A Short Art History of Water Sound” begins a brief survey with Erik Satie, mentions Cowell and Cage, and concludes with Surrealist authors Louis Aragon, André Breton, and Raymond Roussel, who each pursued the theme of women immersed in sound and water. “In the Wake of Dripping: New York at Midcentury” draws parallels between Jackson Pollock and John Cage.

Part Five, Meat Voices, comprises the book’s concluding chapters, “Two Sounds of the Virus: William Burroughs’s Pure Meat Method,” and “Cruelty and the Beast: Antonin Artaud and Michael McClure.” The first of these inadvertently delves into the “Beat” author’s sexuality by exploring his concepts of “viral tropes” and “schlupping,” as well as his fascination with pseudo-science, while the latter probes primitivism in some of Artaud’s plays and the rather physical beast language in some of McClure’s poetry.

In Noise, Water, Meat, Mr. Kahn has produced an inquiry with few precedents and still fewer peers. Its far-flung text is heavily documented (there are 85 pages of notes), though it is lightly illustrated (there are only four figures and no musical examples of any kind) and lacks a comprehensive bibliography. With such a diverse range of topics, it will undoubtedly find favor among art historians, philosophers, aestheticians, and perhaps musicologists specializing in 20th-century issues.

But one question remains to be asked—and answered. Will this study promote inspiration or indifference among Computer Music Journal readers? I suspect the latter. The modern and postmodern aesthetics focused on here—which often seek to provoke, shock, and at times even offend—now seem rather old, tired, and even irrelevant to contemporary life. Born in a time of social disruption, cultural upheaval, and personal disaffection, the spirit behind them belongs to an era now
past. Yet a new era, what some have called the Digital Age, can begin to define itself by determining what it is not, by deciding what it values and what it must reject in order to assert its own individuality. And perhaps Noise, Water, Meat may serve in that process.

Bruce Haring: Beyond the Charts: MP3 and the Digital Music Revolution


Reviewed by Anna Sophie Christiansen Copenhagen, Denmark

Bruce Haring’s Beyond the Charts: MP3 and the Digital Music Revolution is a sequel to his Non-Fiction Book of the Year [1997], Off the Charts: Ruthless Days and Reckless Nights Inside the Music Industry. Where the latter book attacks the immense control exerted over music by the marketing mechanisms of giant corporations, Beyond the Charts cuts to the bone of the music industry by criticizing the record companies for hiding in the bushes and thus ignoring the dangers of digital distribution of music through the Internet.

A striking example pointed out by Mr. Haring is the record companies’ employment of semi-retired policemen to enforce copyright by raiding street vendors selling pirated copies while computer geeks were already distributing music from “bedroom to bedroom” over the Internet.

When the recording industry finally got its act together to attempt to legally define and reinforce copyright for World Wide Web distribution, it was, according to the author, already too late!

But this is not Mr. Haring’s only compelling revelation about the record industry’s reluctance to enter the digital age. And if you need to catch up on the digital revolution of music distribution and find out why the technical achievement of compressing sound files still has not led to the wide availability of music online, this book is definitely worth both the money and the time.

Through interviews and “soft” technical explanations of the bits and bytes of digital sound and the history of music distribution, Mr. Haring makes a convincing case that MP3 in its many manifestations is here to stay. The book lays out the problems, pointing out that the record companies have hitherto always had the final say in the development and distribution of music playback hardware. One example is the jump from vinyl to compact discs, in which the battle was fought mainly between Sony and Philips.

In a more philosophical vein, Mr. Haring brings in the voice of John Perry Barlow (co-founder of the Electronic Frontier Foundation, and lyricist for The Grateful Dead) who, at the MP3 Summit ’99, quoted Thomas Jefferson’s definition of intellectual property, that an idea can be infinitely propagated, whereas any tangible medium employed for its transmission can be copyrighted and submitted to controlled distribution. Whoever is in control of producing and distributing this medium is in possession of its value. Thus, the author tells the story of a bunch of innovative programmers who, from their respective bedrooms, developed software which, by means of a rapidly evolving infrastructure, could transfer music independently of any medium controlled by the record companies. The recording industry’s know-how about the recording and marketing of music is elaborated in a longish preface in which the issue of digital music is presented as a matter of a few companies’ control over the market, the artist, and hence the consumer. Mr. Haring’s elegiac soliloquy echoes the famous ideas of the late Frankfurt School in which commercial interest was seen as the antidote to artistic freedom and therefore creativity.

Beyond the Charts reveals to what extent MP3 and its offspring posed, for the music industry, an entirely unanticipated shift in who is in control of selling music. As the extent of copyright infringement on the Internet finally became clear, the legal and ethical dispute began in the courtroom as well as in the forum of press conferences.

The recording industry is represented in the book mainly by the Chief Executive Officer of the Re-
cording Industry Association of America (RIAA), Hilary Rosen. The RIAA rhetoric speaks of the rights of the artist (a biased presentation of the dispute can be found on the RIAA website, www.riaa.com). A less organized counterpart is represented by a series of “dot-coms.” Among these, of course, is Michael Robertson, the first person to realize the potential of the MP3 format, the founder of MP3.com, and perhaps most importantly, the author of “Michael’s Minute,” the polemical voice of the MP3 site.

In an attempt to question to what extent the RIAA really speaks on behalf of the artist, Mr. Haring brings in an interesting third party, artists who have gone virtual. I find, however, that he tends to ignore this particular viewpoint by reduc-
ing it to a rhetorical guise for the RIAA or by listening to the voices of relatively established artists such as Prince (or rather, the artist formerly known as such!), Alanis Morissette, Thomas Dolby, and The Grateful Dead, who have (successfully) found refuge on the web as a result of dis-agreements with their respective record companies.

Mr. Haring’s sympathy for the musicians is understandable, especially after he outlines the modest earnings as negotiated in an average contract. His point of view resonates with the democratic ideology prevalent on the Internet and which has caused it to develop into a global medium of communication. However, despite the au-thor sharing his ideological stance with the “dot-commers” and hackers, I think that the arguments of the record companies speaking to artist rights should not be ignored. While the digital revolution continued in bedrooms and college dormitories, beyond the reach of authorities and in-dustry, the RIAA’s legal dispute takes its point of departure in how to copy-right music distributed over the Internet. The solution appeared to be either to confine it to streaming audio such as RealAudio, to explore new media of distribution (such as the “enhanced CD,”), or to tag downloadable files and thereby limit their ability to be reproduced. The latter approach is best known as the Secure Digital Music Initiative (SDMI).

According to Mr. Haring, the RIAA had to acknowledge that there was no clear-cut solution to the problem, and as it slowly realized that it was no longer up against street vendors but instead an anonymous enemy, an infinite army of innovative hackers. The sole leverage of the recording companies has been to rely on consumer ethics, “to protect the rights of artists and copyright owners” (www.riaa.com/MusicIntro.cfm). To that end, the RIAA initiated educational programs to create awareness of copyright infringement. In the legal paranoia of the post-Napster era, this program has become significantly extended (see www.soundbyting.com).

Unfortunately, Mr. Haring tends to force the legal saga of digital music into the Hollywood mold of bad guys (the record companies) versus good guys (the digitalists). Thus, he avoids discussing the crucial issue of whether free downloads can exist independently of the usual intermedi-ary link of commercial promotion either by a record company or by a dot-com. This model presupposes that the website functions as concert promotion, mail order, or another hub for CDs and other musician-related merchandise, using free down-loads as bait. In his foreword, the author briefly suggests a model for the future record contract as a two-pronged agreement: online and offline contracts. Perhaps Beyond the Charts will get its own sequel, Between the Charts, taking as its point of departure this new form of recording contract and the copyright issues it inevitably raises, such as distin-
guishing music, performance, video-clips, re-issues of old material, etc.

The question remains whether artists’ success in going virtual and hence promoting parts of their reperto-ire on the web for free represents the norm or the exception among people who are potentially capable of supporting themselves by selling their music. In other words, does the artist need promotion from a record company in order to make a living? According to Mr. Haring, the answer is no, and the industry’s legal efforts to enforce royalties is an entirely selfish act in a desperate attempt to carve out a niche for itself in the digital age. The recent problems of Napster, though, certainly cast doubt on the unconditional accep-
tance, by both consumers and the above-mentioned already-established artists, of music over the Internet.

In avoiding this discussion, the author ignores the problematic question of whether the artistic dem-o-cracy offered by music distribu-
tion on the World Wide Web could become a utopia in which any mu-

sic is available to anybody at any time. Apart from their ability to create an immense diversity—to the benefit of niche genres such as com-
puter music, in which the composer does not intend to make a living through selling music—there is the question of whether such sites can support themselves without the im-age cultivation and promotion hitherto provided by the record industry. After all, some artists and perfor-
mers are highly specialized and do not have the option of carrying on a sec-
ond career on the side. This raises the issue of whether the immense popularity of artists such as Ma-
 donna or Prince (as it were) is but a mere artifact of the massive market-
ing and distribution mechanism of the corporate machine or whether is it a manifestation of some meta-phenomenon that one might signify as Art. Perhaps the digital music revolution has revealed even further that there is more to so-called artistic success than musical talent.

Despite Mr. Haring's obvious bias, *Beyond the Charts* is an interesting and easy-to-read account of a course of events for which the record industry's reluctance to go digital is inescapably to blame. Its thorough index adds to its usefulness by providing a convenient aid for any reader who easily gets lost in the ubiquitous acronyms of the digital age.

The sole criticism of the book's form is its accompanying website (www.OFPtheCHARTS.com). It could be expected that a book on such a rapidly evolving topic would take advantage of the online medium by providing updated material; this would be a great way to prevent the book's content from becoming obsolete a week after its publication. As of August 2000, the site is limited to brief descriptions of the book and its 1997 predecessor, along with a couple of "blind" links. The website could have been used to shed light on the latest major example of copyright dispute: Napster! The Napster affair, a massive and blatant example of copyright infringement, eagerly assisted by Gnutella (this website features a metaphoric contemplation of the copyrights issue), might have inspired Mr. Haring to add a few gray tones to his description of the artists' obvious benefits from digital distribution. The recent hearings in the United States Senate have shown that the legal system cannot keep up with the digital revolution. Apart from the legislative battle, it appears that consumers are also subject to ethical change (see www.quicktake.com).

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**Martial Robert: Pierre Schaeffer, des transmissions à Orphée**

Softcover, 1999, ISBN 2-7384-7975-8, 416 pages, preface, illustrations, annotated lists of recordings, films and videos, archives and libraries, thematic bibliography; L'Harmattan, 5-7 rue de l'École-Polytechnique, 75005 Paris, France; L'Harmattan, Inc., 55 rue Saint-Jacques, Montreal, Quebec H2Y 1K9, Canada

*Reviewed by Carlos Palombini*  
Porto Alegre, Brazil

Pierre Schaeffer, *des transmissions à Orphée* was published in May 1999 as the first volume of *Communication et musique en France entre 1936 et 1986*, a trilogy on Pierre Schaeffer by Martial Robert. The book appears in the Communication and Civilization Collection, which Nicolas Pélissier edits for L'Harmattan of Paris and Montreal. Mr. Robert, who possesses a doctorate in musicology, is a composer of electroacoustic music, a researcher, and an educator. *Pierre Schaeffer* comprises a photograph of the subject, a preface by Jean-Claude Risset, an introduction by the author, five chapters, a postface, and thirteen illustrations. There are annotated lists of sound documents and images, lists of archives and libraries, a commented thematic bibliography, and a table of contents. The author has examined eight thousand pages [many unpublished], two hundred radio broadcasts, and ten television programs. This volume was approaching completion in August 1995, when Mr. Schaeffer died.

As Mr. Risset notes in the preface, the writing is enthusiastic and apologetic. Its function is neither to assess nor to put into context. However, because Mr. Robert has worked extensively on public archives, an unexpected amount of objective data is brought into play. Chapter One (pp. 19–86) surveys Mr. Schaeffer's biography, from his ancestry and birth (1910) to life in post-Vichy Paris (1944). Chapter Two (pp. 87–126) focuses on the 1946 publication, "Notes sur l'expression radiophonique" (in *Machines à communiquer; genèse des simulacres*, Paris: Seuil, 1970, pp. 89–118) and the 1948–1951 *Journals* (À la recherche d'une musique concrète, Paris: Seuil, 1952, pp. 9–120). Chapter Three (pp. 127–174) tackles Mr. Schaeffer's transition from "musique concrète" to "recherche musicale," with particular reference to his experimental method. Chapter Four (pp. 175–242) presents Mr. Schaeffer as divided between composition and musicology. Chapter Five introduces *Traité des objets musicaux* (Paris: Seuil, 1966).

To evoke the early years, Mr. Robert puts together a collage of autobiographical excerpts from Mr. Schaeffer's prose. The account of his activities under the collaborationist government—a seldom tackled and potentially controversial issue—is direct and convincing. The author places Mr. Schaeffer's radiophonic experiments in the context of early French thinking on radio art. However, no reference is made to the rich German "Hörspiel" tradition (see Mark Cory's "Soundplay," in *Wireless Imagination*, edited by D. Kahn and G. Whitehead, Cambridge: The MIT Press, 1992). Commenting on the 1943 radio series *La coquille a planètes*, the 1948 *Etudes de bruit* (the first musique concrète pieces), the 1950 *Symphonie pour un homme seul*, and the 1953 opera *Orphée*, Mr. Robert stresses the continuity between Mr. Schaeffer's radiophonic art and his musique concrète pieces. There are accurate descriptions of such machines as "the most general piano," the Morphophone, the three-
Do universal principles underlie the construction of musical form? And if so, what do they look like? By means of numerous illustrations and accompanying descriptive prose, composer and theorist Pozzi Escot ventures provocatively in search of answers to these questions. She draws on H. E. Huntley’s *The Divine Proportion: A Study in Mathematicai Beauty* (1970), citing his notion “that there is a definite connection between music and mathematics . . . based on the similarity between the deep-seated structure of musical form and that of mathematical ideas.” Although all of her analyses include discussion of this “divine proportion” (or Golden Mean), she also investigates ways in which arithmetical, harmonic, and geometric means create compositional structure. In the process, she identifies multi-layered symmetrical constructions present within the organization of pitch and rhythm, discusses the notion of “gnomonic growth,” and describes specific techniques that have been used to create linear and non-linear musical structures.

Each of the ten chapters of *The Poetics of Simple Mathematics in Music* includes introductory material and detailed descriptions of how these specific mathematical structures may be found within selected compositions. This material is followed by charts and graphic diagrams; scores of individual works are included for reference. Ms. Escot has analyzed music by European and American composers including Hildegard von Bingen, Guillaume de Machaut, Franz Schubert, Frederic Chopin, Anton Webern, Ruth Crawford Seeger, Milton Babbitt, Luigi Dallapiccola, and György Ligeti. She has also worked with several compositions from (in Ms. Escot’s terms) “Across Mountains and Oceans to Worlds Beyond Europe,” specifically, songs of the West African Eve (or Ewe), the North American Kwakiutl and Zuni, and the South American Piro cultures.

Chapter One discusses the inter-relationship between mathematical principles [ratios] used in the construction of Gothic cathedrals and those used in the construction of liturgical chants. The perfect ratios of the Pythagoras/Theano school (1:1, 1:2, 2:3, 3:4, 4:5) are explained in reference to the architecture created by the Cistercian order, a reformed Benedictine order founded in 1098 (the year Hildegard was born). The Cistercians emphasized that the purpose of chant was to radiate truth, and, as in the construction of cathedrals, attempts to accomplish this were based on geometrical ratios. Ms. Escot discusses the contributions of St. Augustine and Boethius to the formulation of the principles of mathematical means, and she gives diagrams and accompanying analytical descriptions of four chants by Hildegard von Bingen. Through these analyses the author illustrates how proportional structures were used in the creation of both individual melodic phrases and the ordering of these phrases in relationship to one another. In a sense, this first chapter forms the basis for all that follows, as it includes explanations of almost all of the analytical procedures as well as

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**Pozzi Escot: The Poetics of Simple Mathematics in Music**


Reviewed by Ann Warde
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the mathematical principles that are used in the remaining discussions.

An additional principle, the notion of “gnomonic growth” (which Ms. Escot attributes to the naturalist D’Arcy Thompson, author of On Growth and Form, from 1961), underlies the analyses of Chopin’s Prelude No. 1, Dallapiccola’s Colore (from the Notebook for Annalibera), and Mr. Ligeti’s Continuum. In the case of the first and last of these, the ordering of significant musical events is found to coincide with measured time divisions based on the Fibonacci series. Dallapiccola apparently derived his own numerical series from measurements of the individual phrases within a composition by noting pitch relationships according to the onset note of the phrase, the high point (“apex”), the low point (“nadir”), and the pitch at the end (“decay”) of the phrase. This data is combined with durational measurements and are together plotted on an x-y plane. Drawing lines between these points creates the geometrical forms themselves. The symmetries pointed out in the textual descriptions are clearly evident in these graphic diagrams.

Other methods of analyses result in graphics that allow the reader to gain visual insights into the works from a wide range of perspectives. For instance, in works which can be broken into three segments of lengths a-b-a, Ms. Escot has found that the geometric form of a *rabatment* may be superimposed on a plot of pitch vs. time. The rabatment includes a diamond shape created by drawing lines from the high and low points (of the composition’s overall pitch range) at the start of each segment to low and high points, respectively, at the end of the following segment. In the case of Schubert’s *Wehmut* and Ms. Crawford Seeger’s *First Diaphonic Suite for Oboe*, the range of the middle segment’s pitch material coincides with the placement of this diamond.

Ms. Escot associates non-linearity first with non-Western music, which she represents by transcriptions based on A. M. Jones’s 1959 Studies in African Music, and her own transcriptions from the Folkways Ethnic Library (music of the Kwakiutl), and recordings of Piro music by Casa de la Cultura del Perú. Robert Cogan (co-author of the theory text *Sonic Design*) contributed the transcription of the Zuni Buffalo Dance, found on the Everest recording, *Music of the American Indians*.

The author attributes the onset of non-linear thinking in the realm of Western art to an article in Der Blaue Reiter [1912] by the Russian painter David Burliuk. Ms. Escot’s analyses of non-Western music and of Webern’s *Drei kleine Stücke* and Mr. Ligeti’s *Continuum* and *Harmonies* detail the use of “techniques classic to the non-linear conceptualization: multiple viewpoints, flashbacks, interruption, no connectivity, no development, constant abrupt register shifts, and color transformation.” These characteristics are illustrated graphically along with each composition’s use of the Golden Mean and other proportional structures.

Ms. Escot asks, “Is it not possibly correct to absorb the fact that creative structure is movable in reference to function?” The fundamental principles upon which these analyses rest appear again and again as each composition is discussed, suggesting specific “creative structures.” Observing the multiple kinds of music in which these structures can be found encourages investigation into a synthetic procedure—composition focused on creating a variety of poetic music through the use of simple mathematics.

**Alan Kefauver:**

**Fundamentals of Digital Audio**


Reviewed by Howard Sandroff

Chicago, Illinois, USA

Since I too, like the author, am a teacher, I tend to evaluate a book like Alan Kefauver’s *Fundamentals of Digital Audio*, published by A-R Editions, for its potential as a college text. In that, Mr. Kefauver’s book succeeds admirably. It is well organized, the elementary explanations are clear and succinct, and most of the charts and drawings are well rendered and illuminate the text.

The book begins with a chapter on the basics of sound and sound reproduction. More on that later. The balance of the book is organized similarly to the digital audio process itself. Chapter Two discusses all of the basics of analog to digital conversion, sampling theory, and quantization. This chapter well explains the Nyquist theorem and gives a clear account of the relationship of bit depth to signal-to-noise ratio. I was not entirely happy with the explanation of aliasing and the creation of false frequencies; the author could have easily included the computation of alias frequencies at dif-
different sampling rates. Mr. Kefauver goes to great pains throughout the book to avoid mathematical clarification or explanation. That he does this so admirably is a testament to his many years successfully teaching these concepts to aspiring recording engineers. Is it necessary or even desirable, though, to always bend over backwards to accomplish these highly technical topics with a minimum of math? I think not.

Chapter Three takes on the task of explaining how the digital information is reconstructed into an analog signal. Mr. Kefauver does an excellent job explaining digital-to-analog converters, error detection, oversampling, and one-bit conversion. While reading this chapter (and the next five), I had to constantly remind myself that this is an introductory text on digital audio for the student, not a comprehensive scholarly work targeted to computer scientists or electronics engineers.

Chapters Four and Five discuss storage systems. First, tape-based systems, then disc. Much effort is expended to explain the different formats currently in use for archiving and storage. Both optical and magnetic systems are discussed in detail. Special mention should be made concerning the author’s comprehensive descriptions of the various flavors of compact disc (CD) and digital video disc (DVD). In my opinion, this is the most comprehensive section of the book and well worth the purchase price.

Chapters Six and Seven discuss applications and techniques of digital audio editing and workstation operations. Mr. Kefauver first gives us a brief historical overview of computer-based audio editing and then proceeds to discuss, in a very general way, the operation of software for editing and production. Since tying these chapters too closely to a specific system would probably limit the potential audience, his explanations are extremely generic and therefore limited. I’m not sure what he hoped to accomplish in these chapters except to offer the reader a very brief and general overview of the subject with few specifics.

Finally, Chapter Eight gives a short overview of digital audio transmission schemes. AES/EBU (Audio Engineering Society/European Broadcasting Union) and S/PDIF (Sony/Philips Digital Interface Format) are the dominant formats discussed, with a word or two about their history and usefulness. Not much more is said after pointing out the brief existence of a few proprietary formats which are now obsolete. Brief mention is made of digital transmission in radio.

The appendix includes a good glossary of terminology, an excellent bibliography, and an index.

In my opening paragraph I mentioned that I would tackle the issue of Chapter One later. My question: Why does each and every audio or electronic/computer music text seem to begin with an introductory chapter on sound including a little acoustics and a little audio theory? There are many, many fine texts that provide excellent introductions to these foundational topics, including Mr. Kefauver’s own excellent The Audio Recording Handbook (MI Publishing, 1997). Assuming the readers are students, they should already have taken a course in the physics of sound or introductory audio theory before tackling more advanced subjects like digital audio (or computer synthesis, recording techniques, etc.). Why, why, why does every author or editor feel compelled to begin each intermediate or advanced text with yet another unnecessary introduction to sound and audio? These are always incomplete, rarely adequate to explain the complex material which is coming, and seem to be totally beside the point. The bad news: Chapter One of Fundamentals of Digital Audio is guilty of including an unnecessary introduction to sound and audio. The good news: it is short, easily passed over, refers the reader to more comprehensive sources, and does not detract from this otherwise excellent title.

I would gladly select this book as a text in an undergraduate course introducing the principles and practices of digital audio. My thanks to the author, whose book fills a serious void in the literature.


Softcover, 2000, ISBN 0-262-52261-6, 740 pages, illustrated, appendices, bibliography, discography, index, CD-ROMs [2], The MIT Press, 5 Cambridge Center, Cambridge, Massachusetts 02142-1493, USA; telephone (800) 356-0343; electronic mail mitpress-orders@mit.edu; World Wide Web mitpress.mit.edu

Reviewed by Robert Scott Thompson
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There are a relatively small number of texts that might be considered absolutely essential for the library of the computer music practitioner. Among the volumes on the studio shelf we might find The Technology of Computer Music by Max Mathews, Elements of Computer Music by F. Richard Moore, Curtis Roads’ Computer Music Tutorial, Computer Music by Charles Dodge and Thomas A. Jerse, and possibly John R. Pierce’s The Science of Musical Sound or Eduardo Reck
Mr. Boulanger has conceived his text with pedagogical intent, as evidenced by his own excellent tutorial chapter, this is also a book which will bring significant enlightenment to composers and sound designers who already have considerable experience working with this software or with other computer music systems. Those of us who work closely with Csound have come to rely on its considerable depth, relative ease of programming, excellent sonic quality, and technical generality. As one becomes more expert with the language, more and more possibilities for its use seem to reach to the horizons of creative imagination. Many have lamented, however, the terse documentation of the Csound manual. This is not to suggest that the documentation is flawed; on the contrary, it is quite excellent and well maintained as new opcodes are added and the language continues to develop (a complete manual is found on the accompanying CD-ROMs). It is simply that the manual does not provide sufficient examples of how the various opcodes and features of the language may be used by composers and researchers. Such insights have up to now been rare and sorely missed by beginner and expert alike. The Csound Book succeeds brilliantly in filling the void. Even for the seasoned computer musician, the text provides numerous opportunities for “ah ha!” moments and spurs renewed creative responses to musical problems. Part of the reason for this lies in the abundant resources of the language itself (now comprising over 450 opcodes) and its continued development and refinement by members of the Csound community, many of whom are represented in this new publication.

Another reason that the text is a wellspring for the creative imagination is that each composer’s approach to working with Csound is likely to be somewhat idiosyncratic and personal. The language invites originality, as does the general method of software synthesis. It is very interesting to read in this book becomes an extremely valuable resource in that it displays the working methods of many fine practitioners, with well-documented and concrete examples, while at the same time explaining the finer aspects of the language and providing general edification on topics central to computer applications for music.

Mr. Boulanger’s efforts to create a fine book shine through admirably in every aspect of this project. The text, including the additional chapters on CD-ROM, is replete with excellent graphics, uniform and well commented coding examples, illustrative instrument-design flowcharts, thorough indexing, appendices of various kinds—and all of it extremely well edited. There is an impressive unity to the text even though different authors have written the various chapters. The scope of the undertaking has been enormous. If there are errata they have evaded the careful eye...
of this reviewer. Further, the text and accompanying CD-ROMs are thoughtfully organized, beginning with Mr. Boulanger’s long and detailed tutorial chapter. In fact, he suggests that the book might work well for a variety of course loci. In the introduction, he outlines which chapters might be used for courses with special emphases in Csound, introductory and advanced music synthesis, digital signal processing, composition and aesthetics, physical modeling, and so on.

As someone who teaches Csound in the university context, the pedagogical attributes of The Csound Book are most welcome. Students love the text, have a much easier time getting started with the program (overcoming the notoriously steep learning curve much more quickly), and are able to satisfy their hunger for more sophisticated and engrossing synthesis methods much more quickly, with greater ease, and with a more thorough theoretical grounding. One feature of the text that may be overlooked by some is the treasure trove of instruments and compositions contained on the CD-ROMs. Many of these are by established composers of computer music and by the authors of the various chapters. Others, however, are by students from around the world. These instrument designs and compositions are of potential interest to other students and provide a resource for modification and analysis that is useful to the learning process. Their inclusion is far from superfluous.

The main text divides the 32 chapters into three basic headings: Software Synthesis, Signal Processing, and Programming. The chapters are further organized under subheadings. The Software Synthesis section comprises a bit more than half of the text and includes 19 chapters. The subheadings used in this section are: Csound Fundamentals, Imitative Synthesis, Algorithmic Synthesis, and Mathematical Models. Some of the chapters are more general than others but they are all well positioned and together provide a rich collection of perspectives on software synthesis. Each of the chapters in this section is useful but a few stand out as being particularly helpful for the Csound musician. For example, Jon Christopher Nelson’s “Understanding and Using Csound GEN Routines” does an excellent job of demystifying function table creation and usage with carefully considered instrument designs used to illuminate the various techniques. Rajmil Fischman’s “A Survey of Classic Synthesis Techniques in Csound” presents excellent examples of additive, subtractive, ring modulation, waveshaping, frequency modulation, and granular synthesis. This chapter would be very useful in an introductory course. His discussion of frequency modulation provides a good introduction to Russell Pinkston’s “FM Synthesis in Csound,” which takes the concepts further and describes instrument designs for the emulation of classic Yamaha DX7 algorithms. Michael Clarke’s chapter, “FOF and FOG Synthesis in Csound,” is a thorough and lucid discussion of two of the more complex opcodes used for formant synthesis and granular synthesis respectively. Martin Dupras’ chapter, “Using Global Csound Instruments for Meta-Parameter Control,” describes ways in which complex synthesis algorithms can be more easily implemented and simplified by using various types of meta-level control signals. The chapter provides examples of time-varying stochastic generators and context sensitive instruments.

The chapters of the Signal Processing section are organized into four subsections: Understanding Signal Processing through Csound, Delay, Chorus, Reverberation and 3D Audio, Working with Csound’s Signal Processing Utilities, and Modeling Commercial Signal Processing Applications. The various articles are all useful and interesting. In particular, Erik Spjut’s “An Introduction to Signal Processing with Csound” is very helpful for those computer musicians who may wish to brush up on the mathematics of digital signal processing, filter theory, convolution and so on. Hans Mikelson provides an excellent discussion of reverbs based on nested all-pass filters, while Eric Lyon’s chapter, “An Introduction to Reverberation Design with Csound,” describes methods for reverberator design for specific timbral results. “Working with Csound’s ADSYN, Lpread and Lpreson Opcodes” by Magdalena Klapper discusses two of the powerful techniques for analysis/resynthesis made possible with Csound. This chapter, like nearly all of the others, also presents some interesting ways of working with Csound in general. Another highlight of the signal processing section is Richard Karpen’s excellent discussion, “Csound’s Phase Vocoder and Extensions.” This chapter underscores the importance of The Csound Book to the computer music community. Mr. Karpen is responsible for a number of important opcodes that work with phase vocoder analysis data. They are complex and it is extremely useful to have his elaborated discussion included. To the uninitiated, the Zak system of opcodes can be confusing. Mr. Mikelson’s chapter, “Modeling a Multi-effects Processor in Csound,” explains the Zak system cogently while also providing Csound instru-
ment designs for compressors, limiters, noise gates, de-essers, and so on.

The final section of the main text consists of just two chapters, but these are potentially very important. Both concern the extensibility of Csound and clarify the various requirements for adding to the already extensive library of opcodes. In fact, Csound was designed so that users who were not necessarily familiar with the operation of the entire software system could add new opcodes. In his chapter, “Extending Csound,” John ffitch explains in explicit terms how opcodes are added and provides a concrete example. Marc Resibois’s “Adding New Unit Generators to Csound” takes the concept a bit further by discussing how to turn algorithms into code for inclusion as a new opcode. As an example, he presents a new algorithm, the “dynamic amplitude modifier,” a compressor/expander, and follows through the various steps required to make it into a new opcode.

The various appendices of the book include a useful listing of the instruments referenced in the book which are found on the CD-ROMs, short lists of recommended reading and listening, tables for sound intensity and formant frequencies, a pitch conversion table, and a comprehensive listing of Csound’s error messages. A useful Csound Quick Reference Guide completes the set.

Obviously, the text covers a lot of ground. However, it is only one aspect of a much more comprehensive treatment of Csound which is completed by the two CD-ROMs. The CD-ROMs are in ISO 9660 format and are Macintosh and Windows compatible. The contents listing in the printed text only references the disc which includes HTML versions of 45 additional chapters, eight chapters reproduced from the book, twelve tutorials, over 2000 Csound instruments, more than 40 complete compositions, the HTML Csound Reference Manual, the Csound Frequently Asked Questions [FAQ], Csound Magazine Volumes 1 through 4, XTCSound, photos, biographies, and links.

The CD-ROM chapters are organized in a manner that complements and builds on the book, adding some further subject areas. One topic of significant current interest concerns the real-time usage of Csound, the first six chapters on the CD-ROM are under the heading of MIDI and Real-Time. Mr. Boulanger provides an introductory chapter that is followed by various perspectives offered by Bill Alves, Michael Berry, and Gabriel Maldonado. Mr. Maldonado presents three chapters and his “Using Real-time Csound MIDI with Windows” is especially welcome. The section concludes with his chapter, “Implementing MIDI Opcodes in Csound.” The next group falls under the heading of Algorithmic Composition and includes a very useful discussion of Csound by Archer Endrich and a general discussion of algorithmic score generation by Michael Gogins. These two articles are joined by a large collection of chapters found in the section Composing with Csound. A broad array of compositional perspectives is presented in these 17 chapters ranging from ambient music composition to granular synthesis strategies. Discussions of fractal systems and chaos are balanced with articles on the use of Csound as a sampling and sequencing platform and as a means to create microtonal music. Under the heading of Interface Design, some very intriguing tools and techniques are proposed by Mr. Gogins, Matt Ingalls, Mr. Maldonado, Jean Piché, and Alexandre Burton. It is important to point out that these chapters are not static discussions of techniques but include complete and functional software applications (located in the various application directories on the Data and Applications CD-ROM). Examples of these applications include Mr. Gogin’s Silence and AXCsound (and others), and Cecilia, a useful production interface for the Macintosh by Mr. Piché and Mr. Burton. The bulk of the remaining CD-ROM chapters fall under the heading Software Synthesis, Signal Processing and Sound Design.

The complete software suite and many associated programs, interfaces, and helper applications are found on the second CD-ROM. The software version presented is 4.01 (for Windows, Macintosh, Unix, and other platforms), which is quite stable and bug-free on the various platforms. Located here, too, are the manuals in HTML, .pdf, Word, and text versions with translations in Spanish. Mr. Boulanger’s introductory chapter and his useful guide, “The Original Csound Toots: A Sound Design TOOTorial for Beginners,” are also translated into Spanish. There are a total of ten tutorials that include Keith Hamel’s “A 12-week Csound Course,” Mr. Mikelson’s “A Csound Primer,” and “The Eastman Tutorials” by Allan Schindler. Some resources are available online and the CD-ROM presents them as links. These are but some of the features of both discs. All in all, the CD-ROMs are easy to navigate and well thought out and organized. One very important feature of the CD-ROMs is the information provided concerning XTCSound, the new real-time version of Csound for the SHARC DSP. Included in this documentation are “Performing with MIDI and Extended Csound” by Scotty Vercoe,
The Analog Devices Extended Csound Manual" by Barry Vercoe, and other pertinent information. We can anticipate more information on this at both the Csound Front Page (a browseable copy of which is located on the CD-ROMs) and at CSounds.com. According to the editor, with each printing of The Csound Book the CD-ROM contents will be updated to reflect current versions of software. It is also likely that new articles and instruments will be added to the discs as well. He is also personally committed to providing updated information at the various websites. In fact, the CD-ROMs have already been revised for the second printing of the book reflecting a more streamlined interface and design and including updated versions of the Csound code and other improvements.

Csound is very well represented on the Internet. In fact, Mr. Boulanger has suggested that as the software develops and as new instruments are made available to him they will be online at cSounds.com. In the meantime, two Internet sites will be useful in finding out more about The Csound Book, the various flavors of Csound, people using it, and the like: [1] The Csound Front Page (www.csound.org), where interested readers can learn more about the book, see how the CD-ROMs are organized, and download some nice instrument collections; and [2] Everything Csound (www.cSounds.com), the home of Csound Magazine and related information and links, featuring an online video introduction to scanned synthesis [a recent Csound innovation developed by Interval Research and coded by Paris Smaragdis] by Max Mathews.

The Csound Book is a labor of love. According to Mr. Boulanger, it has been nearly fifteen years in the making and the collaboration of numerous individuals, many of whom contributed in important ways from "behind the scenes." This is a highly successful and major effort that firmly establishes the editor as an important contributor to the field of computer music.

Recordings

Sever Tipei: raw cuts

Compact disc, 1998; available from Computer Music Project, University of Illinois Experimental Music Studios, 1114 West Nevada, Urbana, Illinois 61801, USA; electronic mail s-tipei@uiuc.edu; World Wide Web cmp-rs.music.uiuc.edu/people/tipei/index.html

Reviewed by James Bohn
North Dartmouth, Massachusetts, USA

Sever Tipei immigrated to the United States from Romania in 1972. He studied composition and piano at the Bucharest Conservatory and at the University of Michigan. He has taught at the University of Illinois since 1978 and currently manages the Computer Music Project of the University of Illinois Experimental Music Studios.

An enthusiastic proponent of computer-assisted composition, Mr. Tipei has been actively involved in the creation of programs to such ends since 1975. In MP1, the first of such programs, sonic events are treated as vectors in a multidimensional space. It operates through the use of stochastic distributions, sieves, and Markov chains. The process involved is modeled after that of a scientific experiment, where initial conditions are set, a process set in motion (and left to run its course), and results received which are used unaltered as the final composition.

DIASS (Digital Instrument for Additive Sound Synthesis) is a virtual instrument developed from the Music4C sound synthesis program. DIASS can be used to create complex sounds with numerous partials, each able to be controlled independently of the others. One additional feature of DIASS is that it scales the amplitudes of sounds based upon the relative complexity of their harmonic content in order to have dynamics work in a perceived manner rather than as absolutes. MANIFOLD is a program for computer-assisted composition employing sieves with static and dynamic random distributions.

The compositions contained on raw cuts are manifestations of Mr. Tipei’s view of composition “as an experimental and a speculative endeavor that delivers a particular world view." The pieces “want to provoke and intrigue more than to please.” Most of the works included on this album reflect the composer’s interest in computer-assisted composition and his view of the computer “as a collaborator whose skills
and abilities complement those of the human artist."

The title *Many Worlds* (1989) was derived from the "Many Worlds Interpretation of Quantum Mechanics." This allusion is played out in the composition by having each of the five percussion parts start in unison then become increasingly independent of one another. This is aided in a concert situation by placing room dividers between the performers. Each stream of the composition, which was written with the aid of MP1, progresses through four areas, each dominated by a single timbre: metal, glass, skin, and wood. In this sense, the piece is similar to Iannis Xenakis's *Pléiades* for six percussionists [1978], a work that also treats the percussionists in terms of timbral families.

*Curse* is a setting of a poem by Romanian poet Tudor Arghezi (1880–1967). The text, written in 1927, presents a series of increasing intense curses, which function as "a perverted prayer capable of triggering dreadful events." The composition is written for a male reciter accompanied by four female backup singers and an underlying computer-generated tape part. Composed of both prerecorded and synthesized sounds, the tape part clearly reflects the energy level of the poem, as does the volume and emphasis of the recitation. Throughout the tape part, a bass drum-like sound is reiterated in a relentless manner. The four female vocalists sing in a style that is reminiscent of European folk music. They also vocalize on animal sounds as well as nonsense sounds. The work is a collection of unique sounds from a variety of sources that are assembled to create a clear design leading toward the climactic ending of the poem. Unlike many other "theater" pieces, *Curse* retains much of its power as an audio recording.

"Kings Nap," for solo piano, was written in 1994, and is performed here by Mr. Tipei himself. Much of the pitch material (which centers on F) and the rhythmic material were generated by sieves (a kind of logical filter). The composition consists of two parts, the first alternating between thick harmonies or clusters and lighter passages that include runs. The second part focuses on sounds created inside the piano in the lower range of the instrument. Near the end of the second section, there are a couple of allusions to the lighter material from the first section that round out the work, to an extent.

The text to *Portrait of the Artist as a Young Woman Killing Herself* with a 'coup de telephone' in MI 48105 reflects Mr. Tipei's ideas on the collaboration process between computer and composer: "I cannot judge by myself, I judge as I am bid, and my sentence is just because my aim is not my own will but the will of Him who sent me" [John: 5:30]. The composition is a drawn-out setting of this text for four female voices, ending with the ring of a telephone. The vocalists employ many non-standard means of tone production (e.g., singing, breathing, and singing while breathing inward).

Written in 1975, this was the second composition created with the aid of the MP1 program. The work was generated by employing a *cantus firmus* approach, which was loosened by using Markov chains to create approximations of the source material (five popular melodies).

Mr. Tipei characterizes his *Lament* for solo piano (1980) as a "look at the irrecoverable past." Admiringly performed by the composer himself, the piece is clearly pianistic in its approach to the instrument. It is in three sections, the outer two based on "modal intonations" that are "reminiscent of European folklore." The relatively brief central section features some low tessitura, heterophonic treatments of a tone-row in addition to "rhythmic canons in continuo diminution."

Written in 1994, *Cantus Interruptus* is a partial setting of Petrarch's "Rime 246," with an interruption in English about halfway through the piece that comments on the earlier text. The composition is for baritone voice and prepared piano. Here Mr. Tipei is joined by baritone Ronald Hedlund.

Composed with the aid of MANIFOLD and synthesized by DIASS, Mr. Tipei's *A.N.L.-folds* are examples of what he calls a "manifold composition." Introduced in 1989 by the composer, this term defines "all actual and potential variants of a musical work produced by a computer program which contains elements of indeterminacy and uses only one set of data." Mr. Tipei adds that "manifold compositions represent an idiomatic way of using computers by mass producing slightly different and, at the same time, unique versions of the same archetypal." His personal wish is that "each version be performed in public only once, thus underscoring the desire to distance himself from the production of 'art objects' and stressing the ephemeral quality of any musical activity."

Each version of *A.N.L.-folds* is 2:26 in duration. They all begin and end with the same sonority, which Mr. Tipei calls the "Argonne chime" (A, Re, G, O=sol, N=non pitched percussion, and a large E gong). This sonority, which is named after the Argonne National Laboratory where the work was realized on the facility's IBM SP computer, is also included in the middle of the piece. Five "manifolds" of the composition are included, and each contains the same classes of sounds,
which are employed to demonstrate the capabilities of DIASS.

The performances included on this album are quite good, and perhaps one of the greatest qualities of the collection is variety. Each piece is clearly distinct from the others, preventing the ear from getting lulled into a rut by the intrinsic redundancy of consistency. Actually, the notion of variety is very important in Mr. Tipei’s music. He often treats sounds as unique events which occur only once in a given work. _Curses_ is perhaps the best example of such an approach. Another composer who is known for this sort of approach to sound is John Cage (particularly in works like _Water Music_ or the _Concerto for Prepared Piano_). The use of unique events in composition encourages active listening, and perhaps points to a “world view” where time is ephemeral, and therefore precious.

Gerhard E. Winkler: _Chambres Séparées_, KOMA, _entrop_, Zwischenwelten

Compact disc, 1999, ORF Edition Zeitton LC-5130; available from Ensemble die reihe, Taborstrasse 24a/2/25, 1020 Vienna, Austria; telephone +43 1-21-600-65; fax +43 1-21-852-86; electronic mail diereihe@aon.at; World Wide Web members.aon.at/diereihe/index5.htm

Reviewed by Oliver Schneller
New York, New York, USA
A recent release with music by Austrian composer Gerhard Winkler (b. 1959) contains recordings of three pieces for instruments and “interactive live electronics,” and an earlier, purely instrumental quintet entitled Zwischenwelten. Mr. Winkler, who has worked extensively in the experimental studio of the Heinrich-Strobel-Foundation in Freiburg, at the Zentrum für Kunst und Medientechnologie (ZKM) in Karlsruhe, and at the Institut de Recherche et Coordination Acoustique/Musique (IRCAM) in Paris, is currently lecturer for Multimedia Art in Salzburg and one of the pioneers of real-time interactive composition in Europe.

The three pieces involving electronics, _Les chambres séparées_ (1995), KOMA (1996), and _entrop_ (1998), form a trilogy in which the computer’s function is not only to transform sounds live, but extends to shaping the formal procedures of each individual performance to a significant degree. The musicians find themselves in a complex computer-controlled environment in which the written score has been replaced with a virtual score generated live and relayed to the players through laptop screens. The interaction between the musicians and this set-up entails, according to the composer:

- influencing the computer environment, which reacts in a complex and non-linear way according to the inner system-attributes of the chosen simulation-program, thus forcing the musicians to “live” with the [partly unforeseeable] results of their actions: in regard to sound in the live electronics, in regard to notation with the score or the playing instructions projected on the screens in front of each musician. Thus a non-linear feedback cycle is created; the work tends toward musical self-organization.

The recording of each of the pieces of the trilogy sounds very different, but they all leave one thing to be desired: to hear and see them live. Merely hearing a recorded stereo version of the pieces is unsatisfactory, not only because an intricate eight-channel spatialization is built into them as a compositional parameter, but also because the second work, _KOMA_, makes use of colored movable lighting that plays an important role in providing the listener with a visual/acoustic orientation through the highly complex and dynamic procedures involved with the performance.

_Les chambres séparées_, commissioned and performed by the Trio Accanto (saxophone, piano, percussion) along with interactive electronics, operates via eight loudspeakers in four virtual sound-spaces which correspond to four different modes of sound transformation, or rather, sound retention. The first mode consists of certain patterns of repetition of live-sampled ensemble sounds. The second mode “coats” an instrumental sound with melisma-like figures derived through amplitude-modulation. The third mode produces filtered glissandi through microtonal transpositions, and the fourth extracts a brief sample and repeats it with pendulum-like regularity. All four modes of transformation are then further processed by a program simulating the growth and decline of biological dynamic sys-

Recordings 75
tems (STELLA II by High Performance Systems) and spatialized corresponding to one of the four sound spaces. The actions and re-actions of the three musicians influence the whole system, hence the course of spatialization. The recording of this performance suggests the attractive, agile, and busy world of mobile sound objects. The listener can detect that processes are in progress by gestures of stagnation, acceleration, accumulation, and repetition.

While *Les chambres séparées* is more pointillist in character, the second piece of the trilogy, *KOMA*, for string quartet and interactive electronics, commissioned by IRCAM, has a more epic and continuous nature, in part through the use of predominantly sustained sounds. The electronics operate more in the background and seem to only marginally accompany or interfere with the string quartet. The computer here is put to similar use as in the preceding piece but what controls it this time is the “catastrophe theory” developed by mathematician René Thom. What attracted Mr. Winkler to this model was the unpredictable sudden leaps from a given state to another [“catastrophes”]—the discontinuities within a continuity—that this system simulates. In between such states can lie the possibility of an “inner zone” of tranquility which, however, is short-lived and labile itself.

Each of the four musicians exercises and passes on the leadership role in order to control the spatial disposition of sound by their actions in three categories: range of glissandi, change of dynamics, and timbral inflections. The outcome of the recorded version reflects more continuity than discontinuity, and one misses the colored light projections that, in a live performance, illuminate the sound-space where an acoustic “inner zone” lies.

The last part of the trilogy, *entrop*, for English horn, female voice, and interactive electronics, seems at first listening to relate back to the sound world of *chambres séparées*. But, as the piece unfolds, a very different character emerges, in part due to the following interesting premise: each performance of *entrop* is based on a tape containing the sounds of various rocks and smaller stones. This tape part is transformed live by the actions of the singer and the instrumentalist and then recorded onto a new tape. This transformed version then becomes the basis of the next performance which subsequently documents the new transformations. Through this process the piece acquires a kind of “historicity” as a stone itself might carry imprints of its own history. While this particular feature obviously cannot be appreciated by the listener of the CD, the piece has an engaging, atmospheric character which is held together by the recognizable and recurrent sounds of stones and some rather unusual processing of the human voice.

The most intriguing feature of this trilogy is perhaps the notion and realization of the dynamic, self-organizing work. Instead of positing and configuring musical material to a point where it becomes determined and, in a way, finite, Mr. Winkler creates a set of potentialities and probabilities from which a vastly different work grows every time a performance takes place. But not only does the system remain flexible and open, in the case of *entrop*, the notion of growth transcends the single performance by retaining a memory of previous transformations, thus concretely shaping the piece through its own history. With Mr. Winkler’s work, a new chapter is opened in the discussion of open form in composition.

**John Cage: Bird Cage**

Compact disc, 2000, EMF CD 013, available from Electronic Music Foundation, 116 North Lake Avenue, Albany, New York 12206, USA; telephone (518) 434-4110; fax (518) 434-0308; electronic mail emf@emf.org, World Wide Web [www.cdemusic.org](http://www.cdemusic.org)

Reviewed by James Bohn North Dartmouth, Massachusetts, USA

One day in 1972, John Cage was on route to the Walnut Street Bookstore in downtown Philadelphia when he discovered a bar called The Bird Cage. From this establishment, he procured a beer coaster that featured an attractive design of the name of the bar in the shape of a bird cage. What would for most composers seem a rather pedestrian situation became for Mr. Cage inspiration for a new piece. Constructed over the course of less than a week in Albany, New York, with the aid of Joel Chadabe, *Bird Cage*, for twelve tapes, is a work intended as an installation for “a space in which people are free to move and birds to fly.” The work was constructed from a number of source tapes, which fell under three categories: bird sounds that Mr. Cage “had recorded in aviaries during the previous two weeks,” a recording of Mr. Cage singing his work *Mureau* (which is based on the writings of Henry David Thoreau), and recordings of environmental sounds, including the brushing of teeth, someone blowing their nose, typing,
Musician John Cage used chance procedures to instruct the assemblage of these source recordings into twelve "submasters." He then applied chance procedures to determine the manner in which these submasters would be processed, using filters, ring modulation, and other equipment. As Mr. Chadabe reports, "Sometimes John would say something like, 'that's absurd.' Sometimes we would all laugh. Sometimes we were delighted."

In performance, Mr. Cage used an 8-input/8-output mixer built for him by Pete Linder in Basel, Switzerland to route the sound to one of eight loudspeakers. The Bird Cage disc released by Electronic Music Foundation is a two-channel mixdown version of what John Cage was. This recording breaks the experience into nine different tracks in order to "allow a listener to pause and find different sections for further listening."

I find these breaks to be somewhat jarring to the continuity of the piece. It may have been more effective to produce the recording as one long piece. Not having seen the score for Bird Cage (published by Henmar Press, available through C. F. Peters), it is hard to determine whether Mr. Blakeney may have "stacked the deck" in the sense of shaping it more than originally intended. As an example, the first track starts off with an interchange between Mr. Cage and a talking bird. "What's your name?", the bird asks. "My name is John," replies the composer. This comes off as being perhaps overly cute.

Two additional tracks at the end of the disc provide bits of conversation between Mr. Cage, Mr. Chadabe, David Tudor, and others prior to the American premiere of the work at the State University of New York in Albany, 9 September 1973. These recordings were made for Tom DeWitt's film, Bird Cage at Albany. These conversations help to humanize the CD, reminding us that this piece is about people and experience as much as it is about music. The art direction of the disc's packaging is very attractive too, likewise pointing to the enthusiasm surrounding this experience.

Bird Cage received its New York City premiere later that year as the finale of "Two Evenings with John Cage" at the new Wooster Street location of The Kitchen. Sautéed mushrooms were provided, as were Bird Cage beer coasters (a reproduction of which is included in the disc tray of the CD) for the potables.

Personally, I prefer the densely rich vitality of HPSCHD, or the fast-edit excitement of Williams Mix. In comparison to these works, Bird Cage is somewhat static and atmospheric. However, both in the liner notes and in the conversational track at the end of the disc, Mr. Chadabe reports what an enjoyable time he had in his involvement with the piece. This joy comes through clearly in John Cage: Bird Cage, not only providing a document of what this composition is, but also a vignette of who John Cage was.


Compact disc, 1999, Neuma 450-99, available from Neuma Records, 71 Maple Street, Acton, Massachusetts 01720, USA

Reviewed by Thomas Licata
Oneonta, New York, USA

Neuma's recent release, Electro Acoustic Music VI, adds to an already impressive series of recordings devoted to electronic music. Comprised of works for tape alone and tape with solo instrument, this disc offers an exciting and refreshing collection of works that approach both sound and structural design in a variety of new and interesting ways. Several works incorporate imaginative applications of concepts borrowed from chaos theory.

The first piece, Jerry Tabor’s engaging Causey (1996), is an exciting and highly charged work for tape that incorporates a rather original approach to compositional design through inventive applications of chaos theory concepts. The composer writes:

Structural concepts . . . are represented as sonic articulations of behavioral principles revealed in the Feigenbaum Final State Diagram. During the compositional process an abstraction of the diagram was
created that eventually served as an indeterminate score. This new structure allowed the process of composing to become divorced from the final state diagram and allowed for more abstract behavioral principles to be intertwined with the concrete local articulation of the system through ‘composed improvisation.’

The sonic result of this unique approach constitutes an amalgam of engaging and at times unpredictable behavioral patterns of the work’s highly rich and diverse soundscape.

Jean-Claude Risset, a pioneering composer and researcher, contributes Saxtractor (1995), a captivating work for soprano/tenor saxophones and computer-generated tape. Extracted and varied from part of an earlier piece for clarinet and tape (Attracteurs étranges), the tape part of Saxtractor is predominantly composed of computer-processed clarinet sounds that beautifully interact with the soprano and tenor saxophones. In creating this work, Mr. Risset also adapted principles from chaos theory. The composer writes:

Saxtractor tries to illustrate metaphorically the idea of attractors as geometrical descriptors of dynamic systems: punctual attractors, which correspond to equilibrium positions, and strange attractors [with a fractal structure] which correspond to chaotic systems whose destiny is highly sensitive to initial conditions. The saxophones occasionally resort to turbulent flows and multiphonics, which are instances of chaos.

Daniel Kientzy, the saxophonist, gives a sensitive and altogether stirring performance.

Otto Laske, an important composer, musicologist, and cognitive scientist, contributes a powerful and dramatic work for tape, Furies and Voices (1990). Composed with the aid of Barry Truax’s GSX software for granular synthesis, this piece is an example of what Mr. Laske has described as rule-based composition. With regard to the work’s form, the composer writes: “Furies and Voices comprises three movements, entitled Prelude, Scherzo, and Song, each lasting about three minutes. It owes its title to the progression from an anonymous, and at times furious, sound stream to the intimation of human song, intoned in counterpoint with relentlessly moving sound masses.” The three movements, clearly demarcated by a brief pause, are, to varying degrees, each composed of multi-layered sound streams teeming with energy. (This piece is discussed in great detail by the composer in Otto Laske: Navigating New Musical Horizons, an important new book edited by Jerry Tabor from Greenwood Press.)

Agostino Di Scipio’s 5 Piccoli Ritmi (1996), for tape, is a particularly refreshing work. It consists of five sections, each announced in Spanish by a female voice. Sampled sounds from the scraping and scratching against the E-string of a guitar provide most of the non-vocal materials. These sounds were mixed using iterated nonlinear functions, concepts creatively borrowed from chaos theory. The piece opens with mostly abrasive scraping and scratching [processed with granulation algorithms] juxtaposed against the smoother, more fluid sonic characteristics of the woman's voice, providing for a very effective contrast. In the fifth and last section, with the scraping and scratching transformed to softer, less coarse sounds, and the voice reading from a poem by Chilean scientist, Humberto Maturana, these two sound types are beautifully superimposed, culminating in a particularly striking blend of what was once two very distinct and separate sound events.

Michael Hamman’s replâtrage (1993, 1995) is an imaginatively conceived work for bassoon and computer-assisted transformations of pre-recorded bassoon sounds. Throughout the piece the bassoon sounds are stretched, enhanced, and neutralized, offering a wide array of timbral extensions to this instrument. The composer writes:

The bassoon is made from wood and metal parts. Together these form a resonant tube, a collection of precisely placed remote-control switches, and a lip-controller. These components collectively generate particular acoustic behaviors. replâtrage concerns a framework for the differentiation of the instrument’s technologies while urgently attempting to cancel its ‘literature.’

The interaction between the live bassoon and the many intricate manipulations and transformations of the bassoon’s sonic makeup continually engage and surprise the listener throughout the course of the work. The performer, Charles Lipp, gives an impressive performance of a piece that offers exciting challenges to all bassoonists looking for quality new music to perform.

Mark Sullivan’s thirty-two prose segments: a computer sound in child’s speech (1995/1997), for tape, employs an interesting mix of recorded sounds of a child’s voice (speaking, reciting children’s games, laughing) and non-vocal sounds generated from various granular synthesis programs. Concerning the structural roles of these sounds, the composer writes:

The speech segments provided structural models for the temporal
proportions that nest both speech and computer sound. The lengths of the segments vary, and the boundaries between one segment and another are often blurred: some segments have little speech, some none, some have sequences of many speech fragments and others relatively long segments of speech, and so it goes for the computer generated sound and the combinations of the two as well.

The musical results of this design constitute an effective if not particularly playful articulation of both the speech and computer sounds alone and their integration.

Insook Choi's *The frog in a machine* (1997), an evocative work for tape, is another piece that employs chaos theory. The composer writes that this work "is a study of enharmonic changes with the Chua’s circuit. The series of experiments and documentations were aimed at achieving enharmonic shifts from one phase trajectory to another in the system." Throughout this piece, there are many captivating moments where the sonic fabric shifts in very subtle and interesting ways, traversing from rather sparse to at times much more richly textured materials.

Thomas DeLio offers two pieces for tape alone that beautifully reflect his recent compositional work, *m,nce* (1997), and *plinh,h* (1997). The titles are borrowed from language poet P. Inman, a poet whose work is generally concerned with the sounds of words and less with their contextual meaning as a whole. Mr. DeLio similarly focuses more on the unique sound qualities of musical events and less on the continuity of those events. Typically, long silences separate these musical events, enhancing not only the experience of each sound but the silences as well. It is the supreme concentration and clarity of creative intent that I find so appealing about his music. The composer writes:

My goal is to isolate and emphasize the direct experience of each moment. As such, I am always more concerned with presentation than development and the identification of junctures between apparently unrelated sonic events. Such unrelatedness, I believe, forces the listener to confront each gesture—each sound—as if heard for the first time and adds a heightened sense of immediacy to the musical experience.

*m,nce*, made of four distinct sound events that resonate with one another in a variety of interesting ways, and *plinh,h*, exquisitely composed of austere shades of white noise and sine waves, are elegant realizations of Mr. DeLio's personal aesthetic.

Electro Acoustic Music VI presents a collection of fresh, challenging, and rewarding music that encompasses a wide range of uniquely personal approaches to sound and structural design. It is highly recommended listening.

Elaine Barkin, Benjamin Boretz, et al. Steven Mackey, J.K. Randall: *Open Space 3, 4, & 5*

Compact discs, 1992/1993; available from Open Space Publications, Sycamore Drive, Red Hook, New York 12571, USA; telephone (914) 758-5785; fax (914) 758-6740; electronic mail postmaster@the-open-space.org; World Wide Web www.the-open-space.org/

Reviewed by James William Sobaskie
Stevens Point, Wisconsin, USA

Open Space is a new music collective that fosters aural imagineering, encourages collaborative creativity, and provides an “open space” for sounds, words, and other media which may not find accommodation elsewhere. Founded by Benjamin Boretz and others, the collective produces a periodical called *The Open Space Magazine*, maintains a web-based publication/forum called *The Open Space Web Magazine* (www.the-open-space.org/osonline/osonline.html), and issues compact discs, videos, books, and scores through *Open Space Publications* (www.the-open-space.org/oscat.html).

Some of the thirteen titles in the *Open Space* CD catalog are of historical as well as purely musical interest. These recordings present compositions, represent philosophies, or exhibit techniques originally discussed by their authors in *Perspectives of New Music* and other forums during the 1960s through the 1980s, and thus provide valuable aural documentation of that vital era. Such is the case with the three discs under review here, which include works dating from 1965–1968 through 1989. Each release features a diverse group of compositions, which nevertheless
bear some fascinating touchpoints. 

*Open Space 3* features a compilation of pieces by Elaine Barkin, plus a collaborative effort by Benjamin Boretz, Jill Borner, and Charles Stein. All these works draw heavily on the spoken word for their essential content. Ms. Barkin’s liner notes for her *Five Collages* offer a cogent characterization:

> textmusicvoicesoundsoliloquymeditations on eruptive internal & external shifts of focus & purpose; and assemblaged resonances of collaboration work done in intimate environments, work whose conception & realization scrap the requirements of public display, idiosyncratic soundworlds arising out of in&at-the-time interpersonal experience.

The set begins with “on the way to becoming...” (a soliloquy), whose spoken text is vivified by a range of interactive, independent, and at times irruptive sounds. Next is Out Back, an electronic essay designed for dance and assembled with the assistance of Cynthia Woll, Warren Burt, Paul Humphreys, and Mr. Boretz. *To Whom It May Concern* #2 begins with an intimate monologue whose repeated text (“In music, as in everything, the firmest reality is the disappearance of experience”) is joined, gradually enveloped, and eventually overwhelmed by an external sound-world. Contributors to this engrossing theatre piece include Mr. Boretz, Ms. Woll, Mr. Humphreys, Chuck Benesh, and Dan Kalantarian. *Anonymous Was A Woman* achieves a remarkable kind of temporal and physical remove using layered timbres, bell sounds, and repeated text, all shaped with panning, reverb, and echo effects. Finally, “past is part of...” (a meditation) mixes spoken and whispered text with children’s voices, unpredictable piano punctuations, and a heavy dose of almost inescapable echo, to offer us the sage advice about living fully: “the trick is to move on . . .”

Completing the disc is an *experiment in reading*, a dramatic interpretation of Samuel Beckett’s radio play *Cascando*, whose primary human agents, Opener and Voice, are joined in this 21-min production by another, an acoustic/electronic agent known as Music, who occasionally steps forward to offer oblique conversation of its own.

*Open Space 4* contains compositions by Steven Mackey and J.K. Randall that explore the possibilities of piano timbre and technique. Mr. Mackey’s *a matter of life and death*, for piano and amplified piano, is all about timbral and registral contrast. In two parts, the first half alternates between stratified textures and fast, register-bridging gestures, while the second uses extreme amplification to achieve feedback, distortive effects, and surprising colors. Jimi Hendrix would have been proud!

Mr. Randall’s *Greek Nickel #1* is also a two-part piece, but in this instance, the first performer [Jeff Presslaff] hands the keyboard over to another [the composer]. And here, time, dynamics, register, timbral evolution, and a brief melodic gesture serve equally as fundamental shaping forces. *Greek Nickel #1* is well-recorded [by Brad Garton and James Moses]—listen to the track in a darkened room for maximum effect! *Greek Nickel #2*, live, which features Tania Cronin (piano), Wiska Radkiewicz (improvising piano), and Ron Pejril (electroacoustics), significantly involves the audience as well, whose ambient sounds dominate the beginning of the piece before receding to allow the piano to come to the forefront. Particularly interesting is the use of precisely-controlled amplification to create counterpoint between sustained tones and subsequent melodic motion, as well as to enhance the bloom of the piano’s tone and to add resonance.

The next track, Mr. Mackey’s *a matter of life and death* [parts III and IV], is a live and very dramatic performance by the composer (complete with ominous footfalls in the middle!) in which amplification is used to elicit, project, and shape piano harmonics normally too weak and fleet to be clearly heard.

Finally, Mr. Randall’s *Greek Nickel #2* concludes the disc, returning the performers of the first version and the pure, unprocessed sound of the piano. This reprise also has the unique effect of drawing attention to the recurrent melodic gesture, first heard in *Greek Nickel #1*, whose gradual evolution over three versions is now readily apparent.

*Open Space 5* presents landmark works by Mr. Boretz and Mr. Randall, plus an improvisational session involving both musicians. Anyone—like me—who encountered Mr. Boretz’s *Meta-Variations* in its original form as a dissertation [Meta-Variations: Studies in the Foundations of Musical Thought, Ph.D. dissertation, Princeton University, 1970] naturally would be curious about the composition printed at the end of the second volume. [Interested readers may wish to see “Meta-Variations, Part IV: Analytic Fallout (II)” in *Perspectives of New Music* 11/1, 1972: 189–203, for the author’s exegesis of this work.] *Group Variations* was composed in 1964–1967 for chamber orchestra, recomposed using computer during the early 1970s for release on vinyl, and finally reconverted, remixed, and remastered by Paul Lansky in 1993 to become *Group
Variations II, as reproduced here on disc. Precise control of pitch and duration is clearly perceptible at the surface level in the unfolding of event sequences, but what really carries the piece are the contextual elements—lines, counterpoint, associative harmonies—which emerge at levels above the musical surface. Also readily apparent is the swing from extroversion to introversion and back that shapes the broad formal gesture of the composition.

For me, Mr. Randall’s Lyric Variations for Violin and Computer (1965–1968) is a real treat, and perhaps the most transcendent piece on the three Open Space CDs reviewed here. Paul Zukofsky’s virtuosic violin playing (multitracked in spots to achieve stereophonic separation) is complemented by the composer’s equally virtuosic electronic counterpart. The interaction of these two instrumental personalities is simply stunning. Lyric Variations begins simply, almost primordially, with the violin articulating a brief pentatonic gesture. Before long, however, its pitch palette gradually expands and seemingly elicits the entrance of its partner for conversation. Mr. Randall’s written commentary sheds light on what he was after in the work: “What I wanted then [and still value now] was flux—the flux, say, of intense utterance, of internal vocalization even, to which the term ‘Lyric’ was intended to point.” His success in achieving this objective is immediately evident in this intimately expressive piece, where the media and structural processes recede to reveal a most personal form of musical communing.

And finally, Two (no. 8), a 45-min “InterPlay” session, presents Mr. Boretz and Mr. Randall exploring “soundtime” on acoustic and electric keyboards. Whereas Lyric Variations presents a pre-defined and precisely determined interchange, Two (no. 8) offers a more unpredictable and organic aural discourse founded on the spontaneity of improvisation. Here, the focus is not on the artistic object but on the aesthetic activity of music-making, the immediate communication of internal states of mind and mood. Like all of the recordings reviewed here, Two (no. 8) preserves a “moment” for future reflection and response. For an example of such a response, see Allan Hibbard’s “Improvisatory Word Piece on a Tape by Ben Boretz and J.K. Randall,” in Perspectives of New Music 23/2, 1985: 96–101, which is thoughtfully included here in the liner notes.

Open Space 3, 4, and 5 showcase an important span of the recent past which deserves revisiting. But they also demonstrate forward-looking approaches to organizing words and sounds which engage the imagination without savaging the senses. All open new aural spaces for us.

Ludger Brümmer: CRI

Compact disc, 1996, Akademie der Künste/Production Sender Freies Berlin, edel 0014522TLR, available from Akademie der Künste, Hanseatentüpfel, 10, D-10557 Berlin-Tiergarten, Germany; telephone +30 390-76-0; electronic mail info@adk.de; World Wide Web www.adk.de

Reviewed by alcides lanzamontreal, Quebec, Canada

CRI was produced at the studios of the Berlin Akademie der Künste (commissioner of the piece) in 1995. It includes a dexterous use of samples of children screaming and playing. A phase vocoder was utilized to change the spectra. One interesting aspect of the piece consists of long, tension-creating crescendos which are then dissipated by the use of sudden accents. The sonorities are rich and striking. The extended cresendo after the initial pause is enticing and magical. It gives the impression of whale sounds, submerged tones like mating calls in suspended animation. The suspense is abruptly broken after four minutes, the sounds now grinding and caressing at the same time. The second part develops these haunting sounds, teasing in the upper spectrum. Remote voices are embedded within trembling tones. The last part presents a low rumble, almost at the threshold of hearing. A good start for an impressive, climactic ending, the voices still calling (“crying”) from inside dense textures. This is sample-based musique concrète at its best.

The Gates of H. was created at the Center for Computer Research in Music and Acoustics (CCRMA), Stanford University, in 1993. It was derived from a 120-msec sample of a folk song performed by a female choir. This piece has a completely different sonic atmosphere from CRI, with a highly contrasted dynamic profile. Particularly appealing
is the initial hypnotic quasi-breath- ing rhythm, articulated by loud sound interruptions. Higher harmonics richly reverberate, producing a mysterious “singing” quality. The treatment of the sampled material makes it sound as if it were a male choir. Over all, the digital manipulation is flawless. The voices are telling a story by telling nothing.

*Le temps s’ouvre,* from 1994–1995, was created at the Institut für Medien [ICEM] in Essen. It uses only piano samples, triggered via MIDI commands. This creates a truly stunning superbasso, with supervirtuoso virtual playing. The music makes one think of Conlon Nancarrow in the digital world. New timbral situations emerge, brought into existence by the sheer power of extra-fast repeated notes, by the use of rarefied decays, imploding sounds, and reversed envelopes. Imaginative and coloristic, this multidimensional piano work alone makes it worth your while to buy this disc. *Le Temps s’ouvre* brings the perceptual threshold to new limits. Is it logical to use 33 min to explore this universe? In a way, yes; the high density of textures and the marked angularity of lines sit comfortably in such a large temporal container.

This CD presents high-quality music mismatched with a booklet that is almost unreadable at times. Whether an artistic decision or one concerning cost, the liner notes in German are interlocked with those in English, both running in different directions with different color inks. Hint for listeners: follow the upper left corner’s coded info (“e” is for English). It might help you with the outside of this fold-out booklet. On the other, the biographical side, the English is in the center (get your magnifying glass out).

Santa Fe author Melody Sumner Carnahan explains in her notes the principal origin of the CD: “I didn’t like the sound of my own voice. . . . Most of my friends were musicians. . . . One day I got the idea to have THEM put the words to music so I could avoid having to do readings myself.” Ms. Carnahan wrote her first short story collection between 1979 and 1981 after moving to Oakland, California. The pieces resulting from these stories were recorded by the composers during the years 1983 to 1996. All of the works utilize audio technology in some respect; yet despite the lengthy delay between the earliest and the most recent offerings, none sound “dated” in any way. This is a tribute to the integrity and vitality of each composer’s musical approach.

While listening to the 15 tracks, I found myself dividing them into separate categories: straightforward and quite well done “traditional”-sound pieces, “kind of goofy”-inspired works, and “genuinely inspired” works. However, Robert Ashley’s *Victims* (1984) falls into none of these easy characterizations. Providing one of the best commentaries not only about Ms. Carnahan’s texts but about the composer himself, *Victims* is simply a recording of Mr. Ashley reading the story of the same title. As someone not previously familiar with the author’s writing, I appreciated this approach because it allowed me to hear one of her texts purely as a story instead of a “story with a soundtrack,” giving me a reader’s rather than a listener’s insight. I also found it interesting that Mr. Ashley is the only composer on the disc who uses his program notes solely to talk about himself and not about Ms. Carnahan and her text.

I drew the conclusion that in this case the composer enjoys the sound

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Robert Ashley, John Bischoff, Nick Didkovsky, Barbara Golden, Joan LaBarbara, Elodie Lauten, Maggi Payne, Larry Polansky, Brian Reinbolt, Laetitia Sonami, Susan Stone: Melody Sumner Carnahan, *The Time Is Now*

Compact disc with 80-page booklet from Burning Books, 1997, FP20; available from Frog Peak Music, P. O. Box 1052, Lebanon, New Hampshire 03766, USA; telephone/fax (603) 448-8837; electronic mail fp@frogpeak.org; World Wide Web www.frogpeak.org

Reviewed by Elizabeth Hinkle-Turner

Denton, Texas, USA

 inspectors' creative thoughts and processes while also providing a critical introduction to the written work.

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The *Time Is Now* is another of the interesting collaborative projects featuring musical interpretations of text by a selected author sponsored and published by Frog Peak Music. As a collection of pieces by composers of different experience levels and aesthetic sensibilities, *The Time Is Now*, like its predecessor, *The Frog Peak Collaborations Project* (based on a text by Chris Mann), provides a fascinating and insightful survey of the music-makers’ creative thoughts and processes while also providing a critical introduction to the written work.
of his own voice and his own thoughts. This delightful egocentricity, however, does not detract from the text, as one would expect, but instead offers the purest appreciation of her creative output.

The more traditional text-sound pieces offer a variety of approaches to the genre. Brian Reinbolt’s *Tuesday 3 a.m.* (1983) and the collaborative *Cocks crow, dogs bark, this all men know...* (1987) provide the greatest creative contrast. Mr. Reinbolt describes his work as a “heartfelt rather than a practiced reading” and the casual informality of his self-made “gift to Melody” is refreshing in its raw emotional content (it also sounds like it was recorded on a two-track cassette recorder). Mr. Polansky’s notes for *Cocks crow* read like an equipment catalog, and what one hears is a well-rehearsed and executed series of algorithmic vocal processes, admirably crafted but musically lifeless. Utilizing primarily “concrete” accompaniment material for the soundtrack to a story, Susan Stone’s *Ruby’s Story* (1983) provides an adequately dramatic interpretation, as does Laetitia Sonami’s *Perfume* (1993). I was most intrigued by Ms. Sonami’s second contribution, *What Happened* (1989). In this, the composer allows the listener to hear the opening of a fascinating story and then slowly abstracts the text through sonic disintegration and deconstruction. The notes of both works indicate that they are performed live with her glove controller; I hope to see them presented someday! Maggi Payne’s *She Began Cutting the Situation into Sections* (1983) shares a similar compositional approach to the works by Ms. Stone and Ms. Sonami, but in my opinion has a much richer and more interesting sonic palette.

“Goofy” is often a pejorative descriptor, but in this case I don’t mean it to be so. “Unique” would perhaps be more apt, especially in the case of Elodie Lauten’s *Answer* (1983), scored for two sopranos and a six-piece instrumental ensemble (here presented to its detriment as flute with MIDI accompaniment). *Answer* sounds like a Baroque opera and is refreshingly startling in its contrast with the other tracks. *The Time is Now* (1983), by Nessie Lessons (a pseudonym, I think, for Ms. Carnahan herself), is simply a text reading accompanied by a rather mundane player piano-like score, while the Larry Polansky/Nick Didkovsky ...*slippers of steel* (1991) is a raucous work for processed electric guitar which I thoroughly enjoyed. Margherita Cordero provides a smother program note for her *Lovely* (1996), however the piece itself is a fun and inventive bit of rave music (also thoroughly enjoyed). Rounding out this category of work is the Clark, Weinstein, and Hrabetin guitar, bass, and drum garage-band trio, *The Future Is Our Only Invention* (1993).

Finally, adding creative weight and ingenuity to this selection of pieces are tracks by Barbara Golden (*My Pleasure*, 1983) and Joan La Barbara (*de profundis: out of the depths, a sign*, 1996 and *A Different Train*, 1996). Ms. Golden’s work has always reflected her gleefully described experiences as “an ex-housewife/ schoolteacher in pre-AIDS days,” and the story of her piece’s title is tailor-made for the composer’s particular brand of music-making which often mixes the serious with the deliberately silly. Using the format of the radio drama as a model, her reading of Ms. Carnahan’s delightful tale puts the pleasures of the single girl’s life into refreshingly candid perspective. Make no mistake, however, like much of Ms. Golden’s work, what often at first seems banal emerges as a thoughtfully feminist commentary upon subsequent hearings.

Ms. La Barbara’s contrasting contributions showcase her strengths as a composer and performer. *de profundis* recalls her 73 *Poems* (with Kenneth Goldsmith, Lovely Music CD 3002) in its literal sonic reconstruction of the graphic layout of the text. In this case, she created a score for her interpretation of the work placing the words in their proper time and space and providing accompanying graphics. She then translated this score to audio using precise placement of each word in its proper sonic space in the stereo spectrum. In fact, of all the contributors, this composer seems to be the only one concerned with the placement of sound in space (this was 1996, before “diffusion” achieved widespread popularity in computer music). Recalling the theme of the similarly-named work by Steve Reich, Ms. La Barbara’s *A Different Train* emphasizes her dramatic talent as she acts out the final words of an elderly foreign women recalling atrocities committed in her youth.

Final mastering of this CD was completed by Ms. Payne and the sound quality is clean and effective. *The Time is Now* offers the listener an engaging mixture of good, fair, and great works with a variety of aesthetic approaches and is recommended as an addition to one’s collection. I hope that Frog Peak continues to sponsor such collaborative projects.

François Giraudon

Compact disc, 1998, Chrysopée Electronique—Bourges, LDC 278 1110; available from Institut International de Musique Electroacoustique—Bourges, Place André Malraux, BP 39, 18001 Bourges Cedex, France; telephone (+33) 2-48-20-41-87; fax (+33) 2-48-
François Giraudon

Because François Giraudon is such a young man (he was born in 1967), the arrangement of works on this disc from earliest to most recent invites the listener to trace his technical and musical growth. The development of his technique over eight years is clear enough. The earlier works are skilled enough. The earlier works are skillfully done, but the later works are more sophisticated. Musically, Mr. Giraudon describes four “tracks” in the piece in which sounds are transformed from a rigid to a flexible state, or vice-versa. L’invisible (1992) and Eude 1994 both draw on instrumental sounds, with differing results. The violin and double bass of L’invisible suffer from a slightly distant microphone placement, making it difficult for them to blend with the more spatially immediate synthetic sounds. The bowed strings simply seem out of place, their tone too complex and rough. Eude 1994, for baritone sax and a tape which makes extensive use of the instrument, fares better in this respect. Like the bass clarinet, the baritone blends swimmingly with synthetic sounds, and takes well to processing. Eude 1994 is programmatic, tracing the development of a man-machine from conception to gestation to experience in the world.

For the final two works on the disc, Mr. Giraudon turns to poetics and to concrete sound. Histoire d’un Rêve (1996) is based on Le Rêve de l’escalier, a novel by Dino Buzzati. The choice of text seems apt. The themes that the composer draws from the novel have to do with time, space, and the opposition of static and dynamic objects, all ideas that have ready analogues in music. These concepts seem to be played out only in a blunt fashion in Histoire d’un Rêve; the music is a bit too simple texturally and syntactically to convey much depth. The first section, for instance, consists mostly of processed voices over drones. The profound concepts of spatial and temporal stasis are clear enough, but only the surface of these profound concepts seems to be probed. A question arises: are abstract sounds better suited than concrete ones to convey complex ideas? Because they contain fewer received meanings, abstract sounds can form a more flexible and perhaps more syntactically complex language. Vox i (1997/1998), finally, also treats the subjects of time and space, as well as tradition and modernity.

Leo Kupper: Ways of the Voice

The Belgian composer Leo Kupper is the founder and director of the Studio de Recherches et de Structurations Electroniques Auditives in Brussels. For this recording, we assume that materials for the four compositions...
were recorded and gathered in Brazil, while the actual composition and editing were done at the above-mentioned studio. Credit is also given to Todor Todoroff for the use of a NeXT computer and granular synthesis software at the Faculté Polytechnique de Mons. The creators of the textural, attractive artistic cover and photos of Leo Kupper and Anna Maria Kieffer are not identified in the booklet.

Rezas populares do Brasil (Brazilian Popular Prayers), from 1998, opens with a truly enchanting movement, Meu Anjo (My Angel). Materials were taken from rites and religious ceremonies, the popular prayers of African and indigenous origins still commonly practiced in Brazil. A magnificient vocal drone sets the pace and tone for the first piece in this quasi-religious set. It is particularly effective when accompanying the improvised chanting of mezzo-soprano Anna Maria Kieffer, truly a co-composer in many of the songs in this disc. The second part, O ar vivo, also utilizes the voice of bass Eduardo Janho-Abumrad and is at times a bit simplistic and naive in its step-by-step transpositions. Interestingly, roving sounds assigned to the mezzo-soprano give a new coloration to the third piece in this set, O ar vivo, representing two alternating states between the living and the dead (Living Air, Dead Air). The last part, Sabatrina, is very effective in involving the two voices in creating their own accompaniment, with Ms. Kieffer delivering an emotive, supplicant chanting. The prevalent compositional technique is that of granular synthesis applied to extending consonant and vowel sounds.

All the other titles on this CD seem to indicate Mr. Kupper’s recognition of Ms. Kieffer’s talent and contribution, since they relate to her name: Anamak, Anmkea, and Annazone. In Anamak (1996), the birdsong recordings are particularly effective, combining perfectly with vocalizations of a rhythmic nature, utilizing a pseudo-language with ethnic-sounding words (“aniamembe-guca-oyoyo-yomama,” for example). Also very clever is the transition of “native” language into an imitation of the birdsong. This composition has tremendous logic, particularly reinforced when one knows that “anama” means “nation,” or “people,” in the Tupi language, which the composer has deftly combined with the name of the singer. Annkéa (1984), at 20 min, is an extended composition structured upon, and utilizing as its only source, the voice of Ms. Kieffer. The five component sections are clearly delineated and sufficiently differentiated. They are deployed in arch form around the more extended “Récit 2,” the third of the set. “Récit 1” opens in an animated manner, followed by the more intimate “Vocalique.” After the central movement, richly articulated with rhythms echoing Brazilian birdsongs, the mesmerizing “Mélodique” is a nice preparation for the final segment. “Glissandi Vocaux” is an exploration of vocal tones sliding up and down in all registers, an effective ending for the piece. The occasional spoken parts are all in invented language.

Annazone (1985), a play on “Amazon” and the “zone” of Anna [Ms. Kiefer], is built on clear avian rhythms and imitations of insect calls. However, it is the vocalist’s invention of the songs of flowers, butterflies, and plants that really creates this macroscopic, atmospheric world of sounds. One imagines her in the rainforest, guiding this most exciting ornithological counterpart. Mr. Kupper has done imaginative and musical work. The digital techniques used are well chosen and applied for musical rather than technical reasons.

Undoubtedly, this CD has all the markings of a wonderful, exciting project. Each piece is in itself a good listening experience. Nevertheless, the competition is fierce in the field. There have been other outstanding “bird” composers of all ages and styles of music. Just think of those two giants of 20th-century composition who expressed interest in birdsong: Heitor Villa Lobos, and Olivier Messiaen. Ways of the Voice presents individual songs of interest, with good musical moments and excellent production. The whole set, though, has enough similarities of treatment and technique to threaten monotony. The accompanying booklet is very informative, a small treatise, in fact, on phonetics, multilingualism, and the special compositional and studio techniques of Mr. Kupper.

Paul Lansky: Things She Carried

Compact disc, 1997, Bridge 9076, available from Bridge Records, P.O. Box 1864, New York, New York 10116, USA; electronic mail bridgerec@bridgerecords.com, World Wide Web www.bridgerecords.com

Reviewed by Jon Appleton
Hanover, New Hampshire, USA

Paul Lansky and Hannah MacKay’s collaboration, Things She Carried, brings to mind Henry Wadsworth Longfellow’s verse:

When she was good
She was very, very good,
But when she was bad she was horrid.

The eight movements that comprise the hour-long work have a distinc-
tive, largely laid-back aesthetic which at times recall the feelings evoked by the music of Laurie Anderson, David Byrne, Charles Dodge, Arvo Pärt, Steve Reich, and the percussive way Igor Stravinsky used the piano. These references are only intended to place the work into context stylistically.

The first movement is the weakest and I suggest that one start with the second, Things She Noticed, as it is a much more subtle introduction to what follows. This movement evolves from spare recitation to a rhythmic flowering with a wonderfully understated bass-line. It continues through several diverse musical and poetic episodes that are effortlessly stitched together.

Mr. Lansky is famous for the moods he creates with voice processing and sustained gestures. These qualities carry the work along with grace and internal consistency. The third movement, Wish in the Dark, one of two called “wordless songs” by the composer, is one of the most striking and evocative pieces of electro acoustic music I have heard. I don’t know why he calls it “a fake pop song” since it contains no evidence of falsehood or even parody.

The fifth movement is stunning. Mr. Lansky calls it an “interlude” and it consists of various ostinati that evolve and revolve around sustained pedal tones. The seventh movement has some magnificent chordal, choral passages and contains momentary, dramatic harmonic movement, yet it concludes merely a half-step lower at the end of its 6:33 min duration.

I listened to Things She Carried in several different settings: when first awakening at dawn in the quiet of my house, while following a woman walking around in a supermarket, and while seeing the wind blow the clouds across the sky. All of these experiences enhanced the out-of-body sensations created by the music.

In this musical portrait of a contemporary woman, the authors claim that “we learn a lot about her,” but one never cares much about what one learns. The weakest part of the work is the text but the liner-notes provide a “listening suggestion” which in part states that “it really doesn’t matter that you understand all the words.” Intentional or not, it is difficult not to understand the text in the sixth movement, Things She Read, which is loaded with clichés. These make it difficult to care about the woman. The movement includes traffic sounds and is supposed to have “the resonance of a detective story,” but its exaggerated dramatic content makes it seem out of place in the larger work.

The seventh movement, Everybody Heard, is based on stepwise, mostly ascending, vocal lines. It includes a return of the lovely chords of the Interlude, layered with a filigree of rapid, bell-like tones. Underneath this two-part texture often emerges a percussive, “electric piano” rhythmic motive that creates darkness in the otherwise serene environment.

The final movement, Things She Knew, is the longest. It brings back several of the more prominent timbres from earlier in the work, and momentarily introduces (at 1:27) a harpsichord passage that is remarkably like the passacaglia movement of César Franck’s Symphony in D Minor. There are, unfortunately, some slightly annoying passages of text:

She knew her stuff.
She knew her way around.
She knew the back of her hand.

She knew the shape of things to come.
She knew what she had to do.

... She knew London, she knew France
... She knew how to hedge her bets.
She knew a faker when she met one.

Still, the movement makes a successful finale and leaves one aware of the distance traversed by the work as a whole. Mr. Lansky has always created his own path in electro acoustic music and Things She Carried is no exception. He is not afraid of embracing diverse traditions, or of being stylish and attuned to contemporary sensibilities. These traits are what make his work rewarding and original in the best sense of the word.

Daniel Leduc: Le voyage d’hiver

Compact disc, 1999, empreintes DIGITALes IMD 9945; available from DIFFUSION i MédIA, 4850 avenue de Lorimier, Montreal, Quebec H2H 2B5, Canada; telephone (514) 526-4096; fax (514) 526-4487; electronic mail info@electrocd.com; World Wide Web www.electrocd.com/

Reviewed by Laurie Radford
Edmonton, Alberta, Canada
The 45th release from Montreal’s bastion electroacoustic label, empreintes DIGITALes, is a collection of works produced between 1994 and 1997 by the Montreal composer and radio producer, Daniel Leduc. Mr. Leduc has worked extensively in the medium of radio, a fact that helps explain his penchant for the voice as the primary sound source in most of the works included in this compilation. The first, the in-source in most of the works included the voice as the primary sound, Leduc. Mr. Leduc has worked extensively in the medium of radio, a fact of Mr. Leduc’s work to providing an initial summary of Mr. Leduc’s sonic world, proves an appropriate thematic opening for a more exaggerated and fragmented presentation. Despite these variations of approach, the vocal element is always maintained as the motivating agent in the piece, thus remaining faithful to the time-honored tradition of the lied as championed by Schubert.

A ringing, bell-like vocal sound (a recognizable offspring of the Groupe de Recherche Musicale’s Syter system) serves throughout the work as a unifying element, a refrain which haunts the speaker of the poems and accompanies the diverse collection of natural sound materials which populate and attempt to give dimension to Müller’s poignant and often desolate images. The short pieces that make up this substantial work run seamlessly from one to the next in a successful pacing of vocal declamation, interjected non-vocal materials, and more extended electroacoustic interludes.

The piece utilizes an ample assortment of recognizable wintry sounds such as the wailing winds, snow-crunching footsteps, and jingling bells that make up the first poem, Gute Nacht (Good Night). The sound world becomes immediately more diverse and evocative in the succeeding poems, Die Wetterfahne (The Weathervane), Deformer Tränen (Frozen Tears) and Erstarrung (Numbness). While an incessant string timbre and a vivid, chattering, high-frequency texture propel Der Lindenbaum (The Linden Tree) and Wasserflut (Flood) respectively forward, Auf dem Flusse (On the River) is illustrated simply with running water and the return of the ringing, bell-like refrain. Speed-varied voices and traffic sounds harry the voice in Rückblick (Looking Back), while a raging fire and rapidly moving filtered white noise provide a backdrop for Irrlicht (Will-o’-the-wisp).

A curious, noisy, orchestra-like interlude introduces Rast (Rest) and brings to the fore the most predominant electroacoustic timbre in the piece, a high frequency noise that seems an appropriately illustrative element for a winter topic. It is, though, overused in this long work. Frühlingstraum (Dreams of Spring) stands out as one of the work’s most
successful segments in terms of both illustrative measures and vocal integration. The voice is tracked with a parallel stream of chattering vocal fragments while the sound stage is filled with a joyous din of cymbals and whirling synthesizer drones. Waves of filtered noise return as a staple of the sound world in Eisänkeit (Solitude) and Die Post (The Post), as does the parallel voice-tracking in Der Greise Kopf (The Grey Head) and Die Krähe (The Crow), where it is complemented by the more-than-obvious use of cawing and chirping birds.

The final segments of the cycle begin to grasp at ways of supporting the voice: the descending tom-tom solo at the end of Letzte Hoffnung (Last Hope) as an illustration of falling; the tolling of bells in Das Wirthaus (The Inn); reversed, distorted, and tolling bells, as well as a distant church organ hymn in Mitt! (Courage!); telephone push buttons, busy signals, and answering machine beeps in Die Nebensonnen (The Phantom Suns); and finally, an out-of-tune plucked instrument and reversed versions of the same in Der Leiermann (The Hurdy-Gurdy Man). The minute-long coda is a bewildering final touch to this lengthy opus with its initial outburst of breaking glass followed by footsteps (now on a wooden surface) moving off into the distance and the roar of a motorcycle, the latter two sounds accompanied by the twittering of a music box melody.

Mr. Leduc shoulders a huge challenge in setting this quantity of text and image in the context of an electroacoustic work. His decision to concentrate on the vocal recitation and to provide simple electroacoustic illustrations in support of the text succeeds in many instances but not in sustaining the grand span and depth of the original poems. The piece is ultimately radiophonic in nature and original and would unlikely be as suitable for an acousmatic concert experience as for a hörspiel-type broadcast.

A second short electroclip, Traverser les grandes eaux (To cross the great waters), follows Die Winterreise and serves as both an interlude and a transition to the final extended work on the disc. Its droning string textures, rapidly panning metal rattles, wisps of wind, and aperiodic pulses of tonality provide a point of repose from the flanking works. A central swell of string pads, as well as the well-orchestrated entries of muffled voice and high string drone, contributes to this brief sonic essay’s convincing shape.

The concluding work on the disc is the most recent of Mr. Leduc’s creations to be presented. Troposphère, from 1997, is a suite of four pieces in “minimalist style,” lasting over 15 min. The objective is alluded to by the titles of the four pieces: Stratus, Cumulonimbus, Altocumulus and Cirrus. The music is “realized through a heuristic composition process by stratifying layers of sound.” Combining similar or dissimilar layers of sound is a standard process in many if not most types of electroacoustic music (from hard-core acousmatic works to electropop). The success of such an approach lies in both the possible implications of the materials used and the interplay that results between the coexisting sound streams, a result of either conscious design or haphazard chance. At times, the composer’s choice of materials fuses admirably into an engaging polyphony where time and timbre cavort and produce a meaningful texture, gesture, transformation, or punctuating event. But too often the layers of sound remain isolated from each other in terms of both gestural and timbral attributes and implications, leaving one with the sense of listening to improvising musicians who are oblivious to each other. There is an obvious attempt to produce programmatic textures and a sense of gravitational suspension in keeping with the tropospheric subject of the work. Unfortunately, these attempts are overly static and underdeveloped, lacking a sense of dialogue between or fusion of the contributing sound materials. The over-use of materials such as storm, rain, and high frequency noise, in combination with the chattering of hammers and the cliché of passing cars on wet pavement, simply does not create a sonic statement worthy of the title Cumulonimbus. The continued predominance of a thick band of noise and gurgling lo-fi sounds in Altocumulus, although briefly punctuated by a singular, large bell sound that gradually distorts in an interesting manner, does nothing to stem the impression of a gratuitous combination of materials. The fleeting entry of a soprano voice, intoning a melodic fragment amid a jumble of garrulous sounds reminiscent of analog sequencers circa 1975, seems an all-too-obvious and forced attempt to elevate the work into the ether in the penultimate moments of Cirrus.

There are no stunning, ear-melting timbres or moments of gestural ecstasy in Mr. Leduc’s work. He endeavors to create a type of hybrid sonic poetry where voice, natural sound, and processed or synthetic sound combine to buoy textual content or carry abstract compositional goals to fruition. The harvest is at times rich and promising, at other times wanting in depth and content.
Kristoff K. Roll: Des travailleurs de la nuit, à l’amie des objets

Compact disc (mini), 1997, Collection Cinéma pour l’oreille, Metamkine MKD024; available from DIFFUSION i MeDIA, 4850 avenue de Lorimier, Montreal, Quebec H2H 2B5, Canada; telephone (514) 526-4096; fax (514) 526-4487; electronic mail info@electrocd.com; World Wide Web www.electrocd.com/

Reviewed by Laurie Radford
Edmonton, Alberta, Canada

In 1993, the French electroacoustic performance and composition duo, Kristoff K. Roll, consisting of Carole Rieussec and Jean-Christophe Camps, released their musical travel diary, Corazón Road [recently reissued by the Montreal electroacoustic label, empreintes DIGITALes]. This disc presents an acousmatic document of their travels in Mexico and South America, a reworking and reliving of the sound materials they captured during their voyage. This genre of sound art combines natural soundscapes, cityscapes, conversations, and the sound of life on the road with subtle in-studio processing, editing, and composition. Corazón Road beckons the listener to embark on an audio fantasy that reflects both the sound events and the emotional environments inhabited by the original auditors, a type of fanciful artistic re-creation of the creators’ sonic memories. The duo amply demonstrated their skill and adeptness at integrating and transforming large masses of diverse material into a convincing and coherent audio portrait. Since then, Kristoff K. Roll has worked on numerous pieces originating from travels and excursions in various parts of the world including Africa and South America. A trip to Brazil in the late 1990s resulted in “a long political epic . . . which brings together the ‘bearers of utopia,’ companions, and friends.” Des travailleurs de la nuit, à l’amie des objets [From Night Workers to the Friend of Things], from 1997, originally an extensive live work involving several performers, has been released in a shorter acousmatic version as part of the Metamkine Collection. This “Cinéma pour l’oreille” series is issued on mini CDs [not minidiscs!], each comprising a single electroacoustic work with a typical duration between 20 and 35 min. Other composers represented in this series include Luc Ferrari, Michel Chion, Patrick Ascione, Éliane Radigue, Christian Zanési, and Jim O’Rourke.

The principal materials and focus of Des travailleurs de la nuit are recordings of street demonstrations, conversations, and monologues connected with particular political protests which occurred during 1995–1997 in various locations in South America, France, and Sarajevo. Grafted onto these are sonic interventions by live performers at a concert in May 1997 during the Musique Action festival in Vandœuvre-les-Nancy, France. These interventions consist of a diverse collection of sounds including synthetic timbres, percussion, and various sampled materials that are integrated with the ongoing protest and conversation materials. These function sometimes as background, sometimes as solo material, and sometimes as punctuation. The entire work was subsequently refined and sculpted in the studio into this final 21:45 min version. The tension and energy of the shouting and chanting of the protest segments is often taken up and continued in the purely electroacoustic and performance sections by means of analogous rhythms and timbres. The lengthy conversation segments provide havens of reflection and insight where the timbres of French and Spanish dialects co-mingle in a unified texture spiced with urgency. This collection of voices, street events, and electroacoustics becomes a virtual roundtable on political dissent and protest, a convention of powerful thoughts, beliefs, and convictions typically avoided, unknown, and unheard. The listener is taken to the street to become one of the voices of protest, taken into people’s homes to listen to their tales of repression and resistance. It is storytelling, political critique, documentary, and soundscape fantasy rolled (no pun intended) into a finely structured audio work that engages the auditor simultaneously on a sonic and political level.

Jacques Tremblay: Alibi

Compact disc, 1998, empreintes DIGITALes IMED 9842, available from DIFFUSION i MeDIA, 4850 avenue de Lorimier, Montreal, Quebec H2H 2B5, Canada; telephone (514) 526-4096; fax (514) 526-4487; electronic mail info@electrocd.com; World Wide Web www.electrocd.com/

Reviewed by Anna Rubin
Obetlin, Ohio, USA

Recordings

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The recent Jacques Tremblay compact disc, *Alibi*, includes six pieces dating from 1990–1995. Mr. Tremblay is a young composer who explains in the program notes that he began as a guitarist and encountered electroacoustic music as a “revelation.” Further, he grounds his work in the use of concrete sound, both vocal and ambient, and favors a rich, dark sound palette. The “typical” sonic makeup of the first three pieces, in particular, are so varied and rich, yet oddly similar to each other, that listeners may prefer to listen to the CD in the following order: tracks 1, 4, 2, 6, 3, 5.

The first work, *Hérésie ou les bas-reliefs du dogme* (1990), is a relatively long 21-min piece, which includes extended recordings of an American fundamentalist Christian preacher along with snippets of Frank Sinatra and Muslim and Gregorian chant. The extended “rant” of the preacher is countered with French dialogue which I could not follow, but which another reviewer characterized as “papal posturing.” Most of the quoted speech is enmeshed in a rich stew of repetitive, mechanical sounds, and long stretches of bell-like overtones emphasizing upper partials over repetitions of tonic and dominant. Occasional stretches of Tibetan horns and Gregorian chant (sung by a woman, yet another heresy!) gradually distort and slither away. The religious spirit is perhaps viewed here through the lens of those dark, Spanish baroque paintings, all blood, fire, and damnation, although religion itself is viewed as the evil. The piece inscribes a long 18min arc, pauses, and then has a 3-min coda of similar material. I am not altogether convinced by this large-scale form, but certainly Mr. Tremblay has a feel for climactic intensity and gnarly sounds which get under your skin.

*Oaristys* (1991) is described as following “the stages of a hypothetical night of love,” and is divided into six movements: *Call of Desire, Approach, Embraces and Sensuous Delight, Animal Urge, Scattering, and Inflection*. This work is highly sensual, but ominous as well. But then, great passion is often companion to a sense of danger, of vulnerability before the beloved other, even as union occurs. Mr. Tremblay draws from both these sides of the erotic experience. Waves, bird-like calls, cello quotes from a Bach Sarabande, and the stylized vocalizations of a Japanese Noh actor all enmesh the listener in a sinuously rich texture. The second section loops and cycles erotic feminine laughter with percussive patterns reminiscent of bird calls. The composer characterizes this section as a remake of the Erotica movement of *Symphonic pour un homme seul* by Pierre Schaeffer and Pierre Henry. Sounds progressively expand, speed up, reappear, distort, and disappear in a mercurial trajectory, and the succeeding four movements follow each other until ending with a slow, brooding finale.

The third work, *L’intrus au chapeau de spleen* [The Intruder with a Spleen Hat], is a mysterious sonic stew which incorporates favo-

*Rictus nocturne* (1992), again in six movements, evokes the jam session of jazz. I quote the composer: “Each movement follows its own story and develops a compositional problem: montage, play-sequence, of density, of silence, and of sketched, improvised and edited sequences from object instruments.” The jazz idiom, though, is absent in the composer’s own music, though it is intermittently quoted. Interestingly, this piece includes the most introspective and quiet music heard on the disc to this point. What Mr. Tremblay seems to love most of jazz is its quiet balladic side as well as the needle noise of old records which he riffs upon.

*Jeu d’ondes* quotes Maurice Ravel’s *Jeu d’eau*, and also includes quotes from historic recordings of reflections on the problems of creating an FM network for radio broadcast. Delightful confections of boat noises, much of it frothy and effervescent, make this a tasty morsel.

*La robe nue* [The Naked Dress] uses string sounds for a good deal of its material, as well as bells, train, and a horse. The composer evokes Marcel Proust’s *Cambray*, the first book of *Remembrance of Things Past*. Mr. Tremblay returns to a reflective mood, giving individual sounds room to gently resonate. This piece is extremely effective in maintaining a languorous, yet musically compelling, texture throughout.
Eve Beglarian and Kathleen Supové: t wis tedtu tu p lay n ice

Compact disc, 2000, oodiscs 0066; available from oodiscs, inc., 261 Groovers Avenue, Black Rock, Connecticut 06605-3452, USA; telephone (203) 367-7917; fax (203) 333-0603; electronic mail oodiscs@connix.com; World Wide Web www.oodiscs.com

Reviewed by Elizabeth Hinkle-Turner

Twisted Tutu, the collaborative duo of composer/vocalist/performance artist Eve Beglarian and pianist/keyboardsist Kathleen Supové, has long enjoyed audience appreciation and critical acclaim as one of the most inventive and innovative performance teams currently part of the New York "downtown" music scene. t wis tedtu tu p lay n ice is the duo's first disc, but both performers appear on many other recordings, primarily on the oodisc and CRI Emergency Music labels.

A visit to the duo's website gives the uninitiated listener a good idea of the artists' work, aesthetic focus, and creative purpose. Twisted Tutu states that their goals are "to be and to remain at the forefront of physicality, spirituality, and sexuality in music making." They go on to say: "We believe that these elements are lacking in today's New Music scene and that, using the highest artistic means, they can be exploited to capture and captivate a whole new audience. Breaking the boundaries between high and popular culture and between old and new is also central to our work." Also emphasized is the "band" format of the duo's composition and performance, which includes the integration of human and technological tools and the presentation of a series of small, unique pieces rather than the concentration upon the creation of a monolithic "masterpiece." Anyone familiar with the pieces and performances of groups such as the California Ear Unit, the No World Trio, or Basso Bongo will feel completely at home with the works on this recording, those unfamiliar will be given a high-quality and high-interest introduction to music that transcends the boundaries of pop and academia.

Kyle Gann, new music critic for The Village Voice, provides overly obsequious but informative notes and commentary in the CD booklet. Mr. Gann describes the traditional classical training of both Twisted Tutu members [Ms. Beglarian studied composition at Columbia and Princeton while Ms. Supové began her career as a pianist in Boston] and their gradual gravitation toward the downtown New York scene. He also presents an interesting commentary on the precedent set for such a transformation by others such as Pauline Oliveros, Robert Ashley, and Laurie Anderson. He further emphasizes the highly personal nature of the disc's music with the comment that here are "two artists willing to put themselves on the line, to communicate, to give you something of themselves that you might easily identify with." In other words, this is definitely not your father's New Music!

t wis tedtu tu p lay n ice opens with Boytoy/Toyboy, a wonderfully catchy tune by Ms. Beglarian featuring electronically processed vocals. Written "in reaction to a triple-header of boy music at the Knitting Factory," the piece has now become a personal tongue-in-cheek soundtrack to my own research about women composers and music technology. Ms. Beglarian is listed as the primary composer on the majority of the pieces, and all of her work includes varying degrees of storytelling and introspection. Another favorite is her Written on the Body, which closes the recording. Using a text by Jeannette Winterson, the arrangement gives the listener a close look into a composer's thoughts and reflections. Also conveying this sense of intimacy are several works in a lullaby style collected from Twisted Tutu's friends and colleagues and recorded by the duo and several guest performers. The traditional Vietnamese and Tanzanian songs of Ngat+Treva continue without interruption into a series of deceptively simple-sounding and highly varied works, including another strong offering by Ms. Beglarian, My Feelings Now (words by Hartati), and her less successful Play Nice, from which the recording gets its name. These are followed by Kitty Brazelton's painfully powerful I Touched Your Cheek, a documentary of a lovers' argument, and Arthur Jarvinen's God B's Lullaby.

The CD contains several works with intriguing beginnings that don't seem to fulfill their initial promise. An arrangement of Duke Ellington's I Let a Song Go Out of my Heart, Ms. Beglarian's own Buncacan Song, and pieces by Robin...
Lorentz and Guy Klucnevsek all sound as if a few more hours of compositional reflection and studio collaboration would have been helpful in developing some very creative ideas much more fully. Two other short selections, Touchtone Tony (a collaboration between Ms. Beglarian and Ben Rubin) and Randall Woolf’s One Touch Lama, are effective in their use of electronic processing of recorded materials.

Readers may have noticed and noted my seemingly indiscriminate use of the words “piece,” “song,” and “work” to designate the different tracks on this compact disc and the variety of composers and performers who contribute to its final realization. This easy descriptive interchange illustrates the effective collaborative effort presented and the almost familial connection between Twisted Tutu and their musical colleagues. Other recordings available by these artists are listed on their website (www.twistedtutu.com). I encourage readers to explore the variety of these offerings to expand their new music collections and to seek out this duo in performance in New York and elsewhere.

Iannis Xenakis: Persepolis

Compact disc, 2000, FractalOX, available from Fractal Records, 26 rue Garnier, 92200 Neuilly-sur-Seine, France; fax (+33) 1-4745-1702; electronic mail fractal.rec@wanadoo.fr; World Wide Web www.fractal-records.com

Reviewed by James Harley Moorhead, Minnesota, USA

Over some forty years, Iannis Xenakis created a series of seminal electroacoustic works, along with much else. Most of these pieces are now available on compact disc after languishing for many years as out-of-print LPs or as original tapes never released at all. Persepolis, after Kraanerg—a ballet for chamber orchestra and tape from 1969—is his longest continuous work. It had been available on the Philips label, but the LP, unfortunately, presented a distorted version of the piece, breaking it in half and cutting about ten minutes of material in order to make it fit onto two sides of vinyl. At long last, this impressive work is available in its uncut, uninterrupted glory (although the eight tracks of the original have obviously been mixed down to two).

Back in 1968–1969, at the height of the social activism that swept through Europe and the United States, Mr. Xenakis, well-known as a revolutionary in Greece during the period of World War II and after, was something of a figurehead, at least in Paris. Somehow, in spite of that, and for reasons that remain murky, he struck up a fruitful association with the Shah and Empress of Iran. His percussion piece, Persephassa, was premiered at the first Shiraz Festival in 1969, held in the picturesque setting of Persepolis, an archeological site in the desert of Iran. This center was important to the ancient Persian dynasty, and the modern Shah, for political as well as artistic motives, was seeking to reinforce pre-Islamic culture and combine it with Western modern artistic concerns. Mr. Xenakis, with his own attachment to the ancient civilization of his native Greece, as well as his leadership in the avant-garde, was a good match to the aims of the festival. His percussion ensemble piece, which surrounds the audience with six performers, was a major success, and he was given relatively free rein to create an even more ambitious work for the 1971 Shiraz Festival, which would celebrate the 2500th anniversary of the Persian monarchy. The invited audience was to include royalty and heads of state from around the world. If ever there was one, this was a prestigious commission!

Persepolis is a 56-min piece of multi-channel electroacoustic music, unrelenting in its density and continuously evolving architecture. The original presentation included two lasers, 92 spotlights, and bonfires and processions of torches on the neighboring hillsides. The music was diffused throughout the site over 59 loudspeakers. In the middle of the desert, in the middle of the summer, it would have been, and by all accounts, an awesome experience.

In style, the monolithic Persepolis is a cross between the noisy, overlapping textures of Bohor, from 1962, and the huge, but more finely shaped, La légende d’Eer, from 1977. In chronology, it falls almost exactly halfway in-between. The music is constructed from eleven textures, each developed independently and distributed across the eight channels of the tape. There are usually several of these textures sounding at once, but the piece is organized as a succession of “zones” in which one texture-type dominates for a period of time.
It is not at all easy to locate these sectional divisions, as different channels shift at different times and the dominance of one sonority over the rest is rather statistical than clear-cut. It is hard to identify the sources of the sounds, too, but they can be distinguished by spectral definition, continuity or discreetness, and register. The ceramic wind-chime–type sound, though, is easily spotted, and returns in La légende d’Eer. There are also processed clarinet multiphonics, low, distorted drum-rolls, high complexes of string harmonics, buffeting wind sounds, and more.

Perselopis is a demanding piece; it’s not one to use for ambient mood-music! But, like many of this composer’s best works, it provides opportunity for intense, transformative experience; you won’t be the same at the end of this piece as you were when you started listening (you may even hate it). As the ancient Zoroastrians of Persia sought eternal life in patterns of light, so too, perhaps, can modern artistic creation transcend time and place (and politics) and evoke the extraordinary. Mr. Xenakis, for one, found it worth-while to make the attempt.

Multimedia


CD-ROM, 1999; Cambridge Street Records, 4346 Cambridge Street, Burnaby, British Columbia V5C 1H4, Canada; fax (604) 299-3864; electronic mail truax@sfu.ca; World Wide Web www.sfu.ca/~truax/handbook.html

Reviewed by Laurie Radford
Edmonton, Alberta, Canada

The World Soundscape Project (WSP) was initiated in 1971 under the guidance of composer R. Murray Schafer. It brought together individuals such as Barry Truax and Hildegard Westerkamp to conduct sound and acoustic studies and to speculate on sociological and environmental implications of urban sound pollution and the intrusion of human sound into natural habitats. In 1993, The World Forum for Acoustic Ecology (www.interact.uoregon.edu/ MediaLit/WFAEHomePage/) was established, “an international association of affiliated organizations, and individuals, who share a common concern with the state of the world soundscape as an ecologically balanced entity.”

This growing global community of concerned and active individuals and organizations has created a need for demonstrative materials for pedagogy, lobbying, and research. It is therefore only fitting that the work of the pioneers in this area of research and activism be reviewed and renewed for present and future generations. The re-release of Mr. Schafer’s seminal work, The Tuning of the World (reissued in 1994 as The Soundscape: Our Sonic Environment and the Tuning of the World, www.destinybooks.com), and a 1996 conference and CD entitled The Vancouver Soundscape Revisited (www.sfu.ca/~truax/vanscape.html) have revealed some of the rich activities of the original WSP.

The reissue of Barry Truax’s Handbook for Acoustic Ecology in an easily searchable, cross-platform CD-ROM [MacOS/Windows] version makes available one of the fundamental theoretical works of the WSP. Mr. Truax is well known to the Computer Music Journal readership as a composer, programmer, teacher, and author. He is also the keeper of the Soundscape Project archives as well as a practitioner of what he preaches in his unique compositional output. Originally published as Volume 5 of The Music of the Environment Series in 1978, the second edition of the Handbook for Acoustic Ecology brings Mr. Truax’s classic lexicon of sound terminology in hypertext format to new generations of students and practitioners. As the back of the CD-ROM states, the Handbook contains “500 terms defined, with 125 graphics and 150 sound examples covering the areas of: Acoustics, Psychoacoustics, Environmental Studies, Noise Measurement, Electroacoustics, Music, Linguistics, Audiology, Communication.” If you want a definition of audiocentric, sociocusis, EPNLs, or thermal noise, they are now just a click away!

The Handbook consists of a collection of HTML and audio files. A copy of Netscape 3.4 is included on the CD-ROM for convenience, but for this review it was perused with more recent browsers from Netscape and Microsoft. There are numerous ways of searching this vast cross-referenced database of audio terms. Besides fixed alphabetical and keyword search facilities available from the main index page, one can also access an Interdisciplinary Thematic Search Engine based upon Mr. Truax’s years of cross-referencing these terms and definitions while using the text in his teaching at the School of Communication and School for the Contemporary Arts of Simon Fraser University. An interesting aspect of the thematic search engine is that the principle disciplines [as listed above] are indicated by a background color scheme (e.g., “Acoustics” terms are on gray pages, “Soundscape” terms are on orange pages, etc.). A search that leads from “electroacoustic” to “microphone” to “directivity” to “mini-
mum audible angle” to “ambience” traverses the disciplines of Electroacoustics, Psychoacoustics, and Noise. Terms that belong to more than one discipline are indicated as such on the appropriate page. For example “transmission” is clearly labeled as belonging to the areas: Acoustics/Electroacoustics. The col-orblind among us may have difficulty discerning the related discipline of a term that belongs to only one category since there is no indication of a term’s category on this type of page. A more flexible and updated alphabetical and keyword search mechanism would also be very welcome.

Graphs and illustrations of acoustic, psychoacoustic, and electroacoustic terms and phenomena are copious and for the most part clearly presented. Most of these illustrations are gleaned from the on-site measurements and studies made by members of the WSP in the early 1970s, as well as various scholarly journals and texts. Because they seem to have been scanned from the original printed version, some aspects of the more detailed graphs are difficult to discern clearly at a typical viewing resolution. This is a minor criticism and many of the tables from the original hard version have been updated in a more browser-friendly format.

The most noticeable and welcome addition to the Handbook is the collection of sound examples in AIFF format illustrating many of the entries in the database, easily auditioned from within the browser environment. “All of the environmental sound examples are drawn from the tape library of the World Soundscape Project and its catalogues of soundscapes from Vancouver, across Canada, and Europe, as recorded by Bruce Davis, Peter Huse, and Robert MacNevin.

The synthesized sound examples were produced with [Barry Truax’s] PODX computer music software.” The access to this substantial, and in many ways historical, collection of audio examples alone is well worth acquiring the CD-ROM.

An extensive set of appendices is included which provide details on several fundamental tools of value while perusing the remainder of the text. These include: A List of Abbreviations and Symbols, Units of Measurement, Comparison of Tuning Systems, Conversion from Power or Voltage Ratios to Decibels, Examples of Critical Bandwidths, and Loudness Summation.

The Handbook will not necessarily serve as a primary dictionary for sound engineers or digital audio enthusiasts. Its origins in the days of analog synthesis, tape recorders, and the infancy of computer music is evident—for example, on the Synthesis page where FM, AM, and Magnetic Tape are prominent entries, while physical modeling and other more recent synthesis strategies are nowhere to be seen. One must take into account the title of the work and its original purpose, that of a resource for the study of disciplines relevant to sound ecology. Perhaps in a third edition, the addition of terms that have entered the vocabulary and working methods of individuals in sonic art, popular electronica, and the areas of digital audio, MIDI, and network applications to audio and music can be added in a manner that expands upon the product as a knowledge resource, while maintaining its important disciplinary focus.

Despite a few minor criticisms as noted, the Handbook for Acoustic Ecology is an invaluable resource for educators, sound designers, composers, students of electroacoustic music, and anyone baffled by the lingo of sound, acoustics, and sound ecology. It should also be noted that the second edition of another important work by Mr. Truax, Acoustic Communication, is forthcoming from Greenwood Press (www.greenwood.com) and will include a copy of the Handbook CD-ROM.

Sergi Jordà: Faust Music Online

CD-ROM, 1998; La Fura Dels Baus; electronic mail sordi.jorda@ia.uip.es; World Wide Web www.uia.uip.es/~sergi/FMOL/fmoltrio/history_fmol.htm

Reviewed by Eric Strother
Lexington, Kentucky, USA

Faust Music Online (FMOL) is a new approach to collaborative composition. The concept was created by the director of La Fura Dels Baus’s production, Faust 3.0, Carlos Padrissa, in collaboration with computer artist and musician, Sergi Jordà. The aim was to create a method for composers around the world to produce music over the Internet. They did not want to be limited to MIDI, or even discrete pitches. What they were after was sound that could be arranged and composed in real time with a mouse.

The software was made available for download in January 1998, and by April the database contained more than 1,200 20-sec submissions. During the process of selecting pieces for the production, they discovered many pieces which could be developed beyond the 20-sec limitation. In September 1998, some of the composers were given a disc of 300 of these short submissions to work with. The music on this recording represents their results.
Each of the seventeen tracks is an example of an “arranger’s” vision for some of these 300 submissions. The liner notes credit the individual compositions by the final arranger and also by the contributor of the original submissions. It is difficult to comment on the individual tracks because of the nature of the compositions. There are similarities between several of the tracks, which could be expected considering each person is working with the same materials. It is unlikely this collection would be used for pleasure listening, but that is not its purpose. It would, however, make good film music for the new wave of technological thrillers.

An added bonus included on the CD-ROM is a copy of the software that was used in this project. It can be run on a Pentium machine with Windows 95/98; an Internet connection is required to connect to the server and work with other samples, but the software can be run as a stand-alone application. The program installs easily and allows users to practice, record, and modify twenty-second samples that can be uploaded to the server of the Spanish Society of Authors and Publishers (SGAE). Once a sample is on the server, anyone who has the software can access the sample and modify it.

FMOL comes with two different interfaces, each having different ways of reaching the same end. Bamboo is designed for the musician who wishes to have a great deal of control over the creation. It consists of a set of virtual strings and bridges to which the composer assigns instruments and effects. The bridges can be moved to further alter the resulting sound. Medusa is designed for the less advanced user who simply wants to experiment. With this interface, the composer simply creates a sample by moving the cursor across a wildly pulsating screen.

Each interface has its own rules for completing the composition across the server. They also allow the composer to insert MIDI files and export the work to WAV format.

All in all, this is an intriguing project. I personally had more fun playing with the software than listening to the music. Regardless of personal tastes, FMOL is highly recommended for anyone interested in experimental music and collaborative online composition.

L’Institut International de Musique Electroacoustique de Bourges: Synthèse 97 and Synthèse 98

CD-ROMs, 1998/1999, Institut International de Musique Electroacoustique—Bourges, Place André Malraux, BP 39, 18001 Bourges Cedex, France; telephone (+33) 2-48-20-41-87; fax (+33) 2-48-20-45-51; electronic mail imebourges@gmeb.fr; World Wide Web www.gmeb.fr

Reviewed by Eric Strother
Lexington, Kentucky, USA

The Synthèse 97 and Synthèse 98 CD-ROMs are summaries of the events from the Festival International des Musiques et Créations Électroniques. Each contains good information, but the contents may not be easy to access. I found two obstacles to using these discs. First, getting into the material is too tricky. There is no executable file that runs the program. To gain access to the disc, the user must open the index.htm file and then click on the image that appears. That brings up another page of information with a link at the bottom to get to the information on the disc. The second obstacle is that the CD-ROMs are entirely in French, so if you are not familiar with that language you will have trouble knowing what you are seeing.

Once the user is able to get past the opening screens, the information is easy to find [provided you can navigate the French]. In addition to schedules, there are videos and photographs of some of the sessions as well as texts for some of the presentations from the festival that year. Based on what they have attempted to do on the CD-ROMs, a website might have been a better choice for distribution [readers may want to check the online information available from the Bourges site at www.gmeb.fr].

The Synthèse 97 CD-ROM runs only on a PowerMac. The Synthèse 98 disc runs on either a PowerMac or a Pentium 75 MHz PC.

Group of the Electronic Music Studio of McGill: Vox Machina

Compact disc (enhanced), 1999, McGill Systems, Inc., 550 Sherbrooke Street West, Suite 990, Montreal, Quebec H3A 1B9, Canada; telephone (514) 398-4477;
exploit the potential of computers and multimedia presentations to fully exploit the potential of computers in music. The live percussion meshes perfectly and serves to enhance the mood rather than to create a new one. In my opinion the piece could have ended there and would have been complete. The final two minutes seem unconnected and anticlimactic. This portion features mainly electronic sounds and rattling keys, which sound like the tinkling of wind chimes. The live percussion is absent from this section except for a final blow at the end.

The second, and most unique, piece is Raymond Luk's *Semiotic Rifle*. This work sounds more like the soundtrack for a 3D shooter game, for example, Doom or Quake, than it does a musical composition. It gives the impression of walking through hostile territory, alert to every footstep, clink, beep, or voice. Periodically, Mr. Luk breaks (or perhaps enhances) the tension by inserting group laughter into the work. The tension escalates as the track progresses through a climactic battle scene, complete with helicopters and machine gun fire, before returning to a highly suspenseful silence, penetrated only by occasional beeps and breathing. In the words of the composer, the sudden end of this piece is "often the last thing you ever hear."

The third composition on the recording is Michael Picton's *Ouvertures II*. This piece features percussion and electroacoustic sounds. It is an elaboration on his 1991 composition, *Ouvertures*, and involves the superimposition of D'Arcy Gray's percussion over the tape of manipulated samples of Chinese cymbals, church bells, bowed bells, and rattling keys. For the first three minutes the taped samples give the piece a transcendental quality, much like what one might expect in a film about a supernatural or extraterrestrial world. The live percussion meshes perfectly and serves to enhance the mood rather than to create a new one. In my opinion the piece could have ended there and would have been complete. The final two minutes seem unconnected and anticlimactic. This portion features mainly electronic sounds and rattling keys, which sound like the tinkling of wind chimes. The live percussion is absent from this section except for a final blow at the end.

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The fourth work, *Territorios*, by Osvaldo Budón, is a composition for percussion ensemble and electroacoustic tape. The goal was to establish a connection between sound and structure in the music. In order to accomplish this, Mr. Budón used the data from a spectral analysis of six instruments to create the proportional structure of the piece. The composer found traditional notation in a unified tempo cumbersome for the performers to read and perform accurately. To overcome those difficulties, he used different tempos for different parts which were then sent to individual performers by way of computer-generated click tracks. This enabled the performers to play complex rhythmic structures using simple notational figures. The result is a seamless performance which leaves the uninformed listener wondering how the performers were able to execute the complex rhythms with such accuracy.

The title track, *Vox Machina*, is a commentary on the relationship between God, humanity, and technology. It begins with a Prologue with acoustic instruments and soprano, and it ends with an Epilogue which uses only synthesized instruments with the voice. In the intervening sections, the sounds of the acoustic instruments are gradually altered mechanically. The progression from the Prologue to the Epilogue is an illustration of the change from an idealized, machine-free world to a
future world in which humanity has been completely suppressed by technology. Even the human voice is lost in the mix. By the fourth section the vocal text no longer has the character of an individual; at this point the text consists mainly of quotations from other people. By the end, the voice itself is stolen by the taped samples. This piece is an excellent example of the synthesis of acoustic and electronic music.

While all the music on this recording is well crafted, the disc's strength comes from the multimedia accompaniments on the "enhanced" section of the CD. GEMS uses multimedia to enhance traditional liner notes. Mr. Picton's notes include linked sound files for the sampled instruments. Mr. Harley adds details on the software used and a multimedia photo display to accompany the music. Mr. Budòn provides tables of frequencies and ratios used in the composition as well a video of the recording process. Mr. Ferguson uses a video of the recording process along with the text of the piece. Each set of notes also includes a picture of the composer, a biographical sketch, and a sample from the beginning of their work.

Anyone who is interested in the world of electroacoustic music should listen to this recording. Each composition takes a different approach, making the disc an excellent sampler of the processes being used in electronic composition today. The enhanced portion of the CD requires a PowerPC with a 4X CD-ROM and 24 MB RAM or a Windows PC with a 4X CD-ROM and 16 MB RAM.

Products

MTC Express Multi-touch Controller

Tactex Controls, Inc., #3 203 Harbour Road, Victoria, British Columbia V9A 3S2, Canada; telephone (250) 480-1132, fax (250) 480-1142, electronic mail sales@tactex.com; World Wide Web www.tactex.com

Reviewed by Randall Jones
Seattle, Washington, USA

The MTC Express (see Figure 1), from Canadian manufacturer Tactex Controls, is a touch pad controller with a unique multi-touch capability. Though it has other uses in a variety of applications including graphics, the device is definitely being marketed with computer music in mind.

Specifications

Using an internal web of fiber-optic strain gauges (produced under license from the Canadian Space Agency), the MTC Express senses multiple points of pressure applied to its surface simultaneously. Each contact point sensed by the pad provides its data, consisting of x, y, and pressure values, at a sampling rate of 200 Hz.

Software support is provided for both Macintosh and Windows computers in the form of libraries, example C code, and a demo application. For the Macintosh, an external for Cycling '74’s Max is also provided with an associated .help patch.

The pad generates its multi-touch data starting from a 6 × 12 grid of deformation measurements gathered by the fiber optic sensors. This data is reduced within the pad to produce a list of contact points. The raw values on the grid are available through the device’s Application Programming Interface (API) as well.

The unit is housed in red milled aluminum, into which the Tactex logo is etched. The active sensing area is 14.5 × 9.5 cm (5.75 × 3.75 in). This area has a black polycarbonate surface which is printed with a 3 × 3 grid in white. The entire unit is only a little over one centimeter thick. A single cable permanently attached to the rear of the pad forks off into both a nine pin serial interface and a “wall-wart” power adapter. A DB9-to-Mac serial cable is included for Macintosh use.

Impressions

The multi-touch capability of the MTC Express does indeed make it unique. There are other touch pad controllers on the market, some with built-in effects, and pen tablets have been around for years, providing multiple axes of control on a two-dimensional surface. But the ability to play using multiple simultaneous gestures on a single, portable, affordable control surface is entirely new and promises a wealth of performance uses.
I have been beta-testing the Macintosh version of the MTC Express for several months. Along the way, I wrote several Max/MSP patches and made an alternate Max external to communicate with the pad. The process of compiling the external was easy thanks to the detailed documentation and example code that is provided. The documentation is provided in Adobe Acrobat format as a combined owner’s and developer’s guide. The information is comprehensive, and treats Windows and Macintosh users with equal courtesy. Happily, no installation of drivers is required to use the system—it uses the native serial drivers on each platform. So, although no information is given specifically for Linux developers, it seems likely that a savvy programmer could get it up and running on that operating system without too much trouble.

The setup process for Max/MSP consists of installing the Tactext Max external and normalizing the pad. Normalizing is a slightly tweaky process designed by Tactex to allow for variations in sensitivity between different pads. It can also be seen as a way to work out the trade-off between sensitivity and noise in the data. To begin, you run the Tactex demo application or invoke the normalization mode in the Max external. Then you run a finger over the pad, traveling over the entire surface with an even touch. The demo program assists with a display showing the area covered. The pressure values generated are saved in a file to which the Tactex object refers on each startup. After a few tries you get the hang of it, and can then vary the pressure you apply in order to affect the pad’s sensitivity.

I imagine that for consumer applications of their technology, Tactex will have to come up with a way of normalizing each pad during the manufacturing process. Probably they already have. But the MTC Express is not yet a consumer product: its audience is limited for the moment to Max users and C programmers, so it makes sense to let these picky early users experiment with the normalizing process for themselves.

The touch sensing works extremely well, with positional accuracy of about one millimeter. Multiple simultaneous touches spread widely apart on the pad are equally accurate, but when moved closer to one another they exhibit a proximity effect which pulls the results together. It’s possible that this could be corrected by software in the future. This merging limits the number of usable simultaneous touches to about four.

The dynamic range of the touch sensitivity is surprisingly large. The pad will recognize a light touch, yet still produce sensibly changing data when you bear down as hard as possible with a finger. When this much pressure is applied, the pad takes a few seconds to return to a zero reading after the pressure is removed while the flexible backing of the sensor returns to its rest state; but at moderate amounts of finger pressure, this delay effect does not appear at all.

The polycarbonate surface is pleasant to the touch, not too rough on the fingers, and it seems fairly durable. In the time that I’ve been working with the pad, a grid of small round indentations has become worn into the surface, seemingly corresponding with the structure of the internal sensors. These can easily be felt, but don’t seem to affect the pad’s sensitive response. The solid aluminum enclosure is pleasantly rugged in this time of cheaply available but cheaply built plastic peripherals. I wouldn’t hesitate to kick it around some if I had a mind to!

Unfortunately, though, the cable which provides both power and data connections is permanently attached to the rear of the device. This makes packing a bit more difficult and warrants treating the device with care.

My only serious gripe about the MTC Express is with its connectivity. I imagine many performers currently using PowerBooks will be interested in this device. Unfortunately, recent generations of Apple computers lack native serial ports. To attach the MTC Express to a PowerBook, the only solution I have found is to use a serial-to-USB converter. And all such converters I’ve tried so far introduce signal latency on the order of 20–30 msec. So, unfortunately, I can’t recommend the pad for the “finger drumming” I had hoped to do, or other such musical applications where a stable response of less than 10 msec is needed.

If conducting or mixing is more your style of performance, or you are not after real time musical control, the extended latency should not be a problem. And, if you have a computer with native serial hardware, you can experience the 5-msec latency which the pad offers. The problem is not strictly with the pad, but with the lack of any good connection option for current computers. The Magma PCI expander for PowerBooks combined with a PCI serial card might offer another possible solution, but I haven’t been able to test this.

Overall, I have found the MTC Express to be an exciting and usable controller. I think the few compromises made in its design are reasonable ones. Its multi-touch capability, ruggedness, and portability all give it useful potential for any computer musician. If you are a laptop rocker looking to add more “live” to your live show, this func-
Digital Audio Interface

Digigram VXpocket PC Card Digital Audio Interface

Digigram, S.A., Parc de Prè Millier, 38330 Montbonnot, France; telephone (+33) 4-7652-4747, fax (+33) 4-7652-1844; electronic mail info@digigram.com; World Wide Web www.digigram.com

Reviewed by James Harley
Moorhead, Minnesota, USA

As components have shrunk and processing power has increased, it is becoming increasingly popular to do digital audio—recording, editing, processing, performing—using a notebook computer. The convenience of being able to travel with much less gear is an obvious advantage. Interactive performances can be more engaging as well, as musicians need not be quite so hidden behind a desktop computer components and full-sized monitors. One thing that has been lacking, however, is a compact, high-quality interface for importing, converting, and exporting audio. Digigram has filled that gap admirably with its VXpocket audio interface. At a list price of US$ 729, this 24-bit unit easily turns your portable computer into a two channel audio workstation.

The VXpocket is a sleek, credit card-sized PC card [see Figure 2] that pops into the built-in Type II slot that comes with most newer notebook computers, both Macintosh and Windows models. A single cable that attaches to the card splits into balanced XLR analog connectors (two channels each of input and output) and S/PDIF coaxial digital RCA connectors for digital input/output (see Figure 3). I found that the length of cable provided with the VXpocket is a bit short to allow one to plug into the back of a DAT recorder or CD player without having to re-position the computer or audio devices. The entire cable set is approximately three feet in length, with the break-out portion, containing the individual connectors, being no more than six inches. Of course, this is easily solved by connecting your own cables, but that does start to add to the bulk of your necessities.

Installation is very simple. Digigram has provided ASIO drivers for both Macintosh and Windows (95, 98, NT), and additional ones for Macintosh Sound Manager and Windows Wave (PC users must also have a free IRQ). Version 2.20b and higher ASIO drivers provide 24-bit support, and allow selection of internal or external clock synchronization. An announced upgrade adds SMPTE (LTC) time-code input, which will require purchase of an additional cable. I tested the VXpocket on a Macintosh G3 PowerBook [OS 9.0.4, 400 MHz, 192 MB RAM]. When installed, you need to verify that the ASIO driver is placed in the VX folder. Otherwise, the required extensions are added automatically and the controls for the card added to the Sound Manager interface, accessed either through the Control Panels folder or the Extensions Strip. Digigram has also provided its own control panel, an interface that allows the user to select Sampling Frequency [up to 48 kHz], Input level [line or mic], Monitoring, and whether the input and output levels are fixed (0 dB). If the analog gain of the output is not fixed, there is also a slider for adjusting the levels.

One minor problem you might run into is that if you want to monitor your audio at the same time as sending it out of the card to a recorder or some other device, you will have to plug your headphones into the external unit as there is no monitor output on the card. If you are recording onto your hard disk, though, and don’t need to send the signal back out to another device, then you can choose to send the audio out of the Macintosh interface and just plug your headphones into the Audio Out on the back of your computer.

The VXpocket works remarkably well. I tested it in several ways, and encountered no problems. I did find, I should admit, that it takes some adjustment to get the input levels set right when plugging a microphone directly into the soundcard. It is necessary to change the settings, and to make sure the input levels are not fixed so that you can adjust the levels. There is no phantom power element built in, so condenser mics cannot be used without their own power source. I found it easier to adjust the levels by plugging the mic into a mixer before sending it into the computer, and this option, while adding to the bulk of your luggage, also enables a wider range of situations to be accommodated [such as mixing a number of sources].

Otherwise, this unit works like a charm. I transferred soundfiles from

Figure 2. Digigram VXpocket PC card digital audio interface.
various sources to edit on the computer, and saw/heard no glitches or artifacts. In live performance situations, I processed live sounds in both SuperCollider and MSP, and the transfers and conversions ran flawlessly. In short, while the new generation of external audio gear, linked by USB or FireWire [IEEE 1394], is starting to come out, the VXpocket for now stands pretty much in a class by itself.

Digigram has recently released the PCXpocket 440 model, which is an expansion of the stereo PC card to four-channel balanced analog inputs/outputs [US$ 1,069]. This, together with the SMPTE time-code feature, should be of great interest to anyone wanting to do multi-channel audio or to incorporate video into their projects.