

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

Emmerson does a beautiful job of integrating various streams of history, philosophy, ethnomusicology, and auditory perception together to demonstrate key theories in composed and improvised electro-acoustic, acoustic, and a few popular(!) musical compositions. The text is illustrated with a small number of Venn diagrams showing areas of overlap and enclosure in the philosophical realm. These figures helped my understanding of the broader concepts Emerson presented in the text.

I have decided to use this book as the primary text for my class in the fall entitled “Electronic Music of the 20th and 21st Centuries: Using Technology to Create Music.” I am looking forward to delving deeper into Emmerson’s view of electronic music with my students and creating a stronger “relationship to the sonic resources around us.”

### **Lektrowsky’s Will**

*by Max Mathews*

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

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 “The future may be a fiction.”

- Anonymous survivor of a  
 New Jersey mugging

New Universe Spaces, June 13, 2165

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

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

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

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

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

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

-BG

### **Will of John Lektrowsky**

I, John Lektrowsky, being of sound mind but unusual experience and having voluntarily left the company of man by joining the realms of eternal Chewlard practice, do nevertheless feel kindly toward the world

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

The need in every man to create something beautiful, at least to his senses, was not appreciated in my day, perhaps because it was partly fulfilled in the course of normal work. A lucky man might spend his years building houses or boats or gardens, which could be made more beautiful, or at least better, by the loving effort he put into their construction. Even the automobile worker could be proud of the sparkling chromium and bright colors on his cars knowing that somewhere deep inside he had tightened a vital nut to just the right torque, and that the motor might fall out if his work was neglected. (Editor's note: The automobile, an ancient form of transportation, was

used until about 2010 when the petroleum supplies were exhausted.) Now, with automatic factories, polyethylene grass, and the one-month work year, a sense of creativity in work is difficult to feel. To some extent this need has been filled by creativity in the arts and especially music where the new instruments and trainers have made it possible for almost anyone or any group to play a self-satisfying auditory performance. (Editor's note: Here the will continues at some length developing the argument that, with the outlawing of any form of live recording, auditory performance is pure creativity and can have no utility, hence it has rightfully been excluded from productivity rationing. Music is contrasted to painting where no satisfactory method for disposing of finished pictures has yet been invented, and they continue to pollute the walls of our buildings.)

### **On Quadraspeakers**

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

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

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

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

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

Even after hearing a recording, I cherished the hope that occasionally a monastery gate might open a crack to allow a select few to witness a recording session. My

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

#### On Audio Performance

To you, Audio Performance—Audance, as it is called—must have the comfortable familiarity of a close friend, but for me, coming from a time when each note had to be individually handcrafted, my first Audance seemed a miracle of mass production in which swarms of notes grouped and regrouped themselves to

embody the performers' musical ideas effortlessly as if in answer to their very thoughts. As I later learned, the computer was controlled by perfectly ordinary devices and the “miracle” lay in the trainer's program. I am most grateful to the government for making an exception to the strict laws banning audiences at Audances, though I feel it was entirely justified by my special circumstances. I believe my disguise as a repairman looking for an intermittent bug in the computer was accepted and the performance was normal.

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

From my chosen post, hovering over the card reader with miniscope in hand, I was able to watch the players assemble. All but one selected some control devices from a cabinet and plugged cables from these into their consoles. A box with knobs, an organ

keyboard, a wand that could be freely moved in three dimensions, or a set of foot pedals were popular with the younger players. Some devices looked vaguely like archaic instruments—a violin without a body, a clarinet with a solid tube, a board that could be struck with a stick. These were favored by the older players who I guessed might have studied traditional instruments.

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

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

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

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

The Audance began with some discussion, not entirely audible to me, amongst the performers and trainer in which, I believe, she ascertained the mood of the group. Next she selected a deck from her large music case and dropped it into the card reader. At the same time the performers took up their various devices. The trainer next inserted a key in the computer console and a low sound gradually swept round the

quadraspeakers, rising in intensity, pitch, and rhythmic modulation as it moved. The effect on the performers was immediate and utter. During the set-up time, I had to attend discretely to my miniscope and poke the card reader occasionally to assuage some slightly worried glances. From the first vibration of the Audance to its reluctant finale, I could have paced in Chewladian Tails in front of the oblivious performers, so completely was their attention captured by the sounds they were creating. The trainer explained that one of her most critical functions was to resolve and terminate the performance while the players were still alive. Early Audances, before trainers were mandatory, sometimes got into man-machine loops that were broken only by the collapse of the player, or in fortunate cases by some computer error.

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

How did the music affect me? Technically, there was no question about its excellence, and indeed there could hardly be any since the compositional rules were part of the program and the computer would

allow exceptions only on command of the trainer. The sound quality was also superb. All the normal instruments could be heard at various times with the brilliance we have come to expect from their enhanced reproductions on the quadraspeakers. But in addition, many new sounds were incorporated—some so different from normal instruments that it would be useless to attempt to describe them, others which seemed like crosses between standard instruments. I amused myself inventing names for some—the Trumpolin, the Obow, the Piananet, the Harpsibone. My fantasies were closer to the truth than I realized. Players could construct timbres by mixing traditional instruments, for example, 10% violin, 30% trombone, and 60% tympani. The classic instruments provided a convenient palette to be combined into these new sounds. The three-dimensional wand was a popular tone control.

However, comments on technique and sound quality are procrastination to delay answering my original question, which must now be faced. Without risking violation of the criticism laws, I can certainly say I was not moved by the performance as deeply as were the performers. Many times the music rose to great peaks and fell beautifully into the intervening valleys, which are as necessary as the peaks themselves to define the summits. But the succession of climaxes did not form, for me, a convincing landscape.

I do not know the reason—perhaps the environment was constructed by the trainer for other personalities, perhaps the players' improvisations limited the organization, perhaps my mood was unreceptive. In any case, I did not regret the non-recording act which, as the Audance ended, condemned the last never-to-be-repeated vibration to oblivion. But the thoughtful departure of the players testified to memories that would be long cherished. (Editor's note: The Spaces take no responsibility for the above statements, which border dangerously close to criticism. Fortunately, the arm of the law seldom reaches inside the monastery walls.)

#### On Trainers

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

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

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

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

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

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

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

#### On Monastic Music

As far as I have been able to determine, no layman has ever before interviewed a High Mabbot in any of the musical orders. Not only was I granted this privilege, but the Mabbot answered all my questions and appeared to withhold nothing. It almost seemed as if he wished to communicate a better understanding of the Order to the world through me. Why he chose this poor vehicle I cannot say, except that the customary audition at the beginning of the interview went well. As the demonstration I had chosen the quintuple stops at the beginning of the second measure of the Back Chaconne, having practiced these from my second through thirteenth years in space. As written, all tones must be struck with precise simultaneity. This I achieved during final acceleration to the speed of light, and though the non-

relativistic performance at earth speeds is immensely more difficult, nevertheless the Mabbot was well pleased. (Editor's note: W. A. Back, who is occasionally confused with J. S. Bach, lived in the remote Green Forest of Bavaria in the 17th century. His music was lost and rediscovered in 1981 in the men's room of the New York Public Library on some old paper pressed into service during the great paper shortage which resulted from the Sierra Club's legislation forbidding all tree cutting. In the Green Forest, during Back's time, a five-string variant of the violin was popular, which greatly simplifies performing some of his music.)

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

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

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

Even if the art of performance would vanish, the classics would be perpetually preserved on the quartz archives located deep inside a granite cave cut into the heart of a mountain whose location was unknown even to the High Mabbot. On these plates are written in sputtered gold, numerical samples of the four sacred signals used to drive the quadraspeakers. Each signal is sampled 440,000 times per second, and each sample is quantized into a 440 digit binary number, so to human senses the recordings are flawless. But, in addition, the samples contain not only check sums, but also error correcting digits, so that errors are unthinkable. In only one case was the perfection of the archives challenged. In

the year 2051, the 126,532,543th sample of Beethoven's Ninth Symphony changed from 124613 ... to 124615 ... due to a most unlikely constellation of flyspecks. A High Synod was called immediately to deal with the emergency, but fortunately before they acted, the difficulty was cured by an ingenious Archivist who washed the plate. The role of the Untouchables at first seemed enigmatic within the purity of the musical Orders. Their function is to handle the unclean electronic apparatus used to record performance, slow the speed to the proper listening tempo, abut and mix the various performers and compute the quadrasignals. This last operation included such enhancements as reverberation, filtering and noise stripping, whose existence is seldom mentioned to the performers. But, as the Mabbot so clearly put it, one must eat to play, and the income of the Order comes from record sales. Hence, it must compete in quality with the other sounds coming from the quadraspeakers. I was moved by the beauty and directness of his wisdom.

#### A Farewell Warning Against Misinterpretation

The day of my entry into the Chewlards dawns and I must end this will with one caveat. My choice should in no way be interpreted as evidence that classical performed and recorded music is superior to audio performance. A man is a prisoner of his age and, in fact, is bound to what he

has learned as a child. In my time, before Telespeak became universal, different peoples spoke many languages. Although it was possible for an adult to learn a new language, he could never master it in the way he would have learned it as a child. Today's music is a new language for me, and I can intellectually appreciate its power, yet in another sense I can never learn it. Audance is the privilege of the youth of today and I must seek the music of my youth, which happily is also a rich language.