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INTRODUCTION
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<Update on Lawsuit against Leonardo Arts Group >

Roger Malina, Chair, Leonardo/ISAST. E-mail: < leo@mitpress.mit.edu >  
9 March 2001

I regret to inform you that the lawsuit by Transasia against the non-profit arts group Leonardo has not yet been resolved and will not come to trial until late April 2001. The matter continues to consume large amounts of our energy and resources.

Transasia and the venture capital group Leonardo Finance have sued Association Leonardo in France for a million dollars in damages, claiming lost business because search engines often retrieve our Web sites rather than theirs. Leonardo Finance claims to have obtained a French trademark recently on the word Leonardo, which we have now requested be overturned because of our prior use in the publication of the art journal Leonardo since 1967 (we note that a similar affair has been brought to a successful conclusion by the etoy art group).

The trial was originally scheduled to be held in December 2000 but at the request of the litigants, Transasia, the trial was delayed because the litigants informed the judge that they were not ready to argue the case at that time.

We note that the search engine www.google.com continues to list our Web sites high on their search.

All e-mails received by Transasia and Leonardo Finance from supporters of the Leonardo network have been deposited as evidence with the judge by Leonardo Finance.

Leonardo continues to solicit donations for its Leonardo Legal Defense Fund to allow us to successfully fight this absurd case.

An auction of a donated work by pioneering art and technology artist Sonia Sheridan will be held at the end of March through ebay. Also to be auctioned on ebay are a hat and scarf knitted from wool shorn from the Leonardo Ram. The Leonardo Ram was named "Leonardo" by Harry Koenig in support of the Leonardo Legal Defense Fund. Further information on the ebay auction can be found on the Leonardo Legal Defense Fund site at:

< <http://mitpress.mit.edu/e-journals/Leonardo/isast/lawsuit.html> > and in the announcement following this one.

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< Leonardo Auction >

Support Leonardo by bidding on eBay!! Starting March 15 through March 22 you will be able to bid on a fine wool hat and scarf and at the same time support the Leonardo Defense Fund. The wool hat and scarf set is knitted from wool that originated at Rock House Farms in Virginia with the spring 2000 birth of the lamb Leonardo, named after the journal. The virgin wool was sheared exclusively to produce this fine hat and scarf. The money raised will be used for the legal defense of the Leonardo/ISAST and OLATS Associations. To find us on eBay, search for "Leonardo wool hat and scarf." Modeling the items is our own

executive editor, Roger Malina. For information on Leonardo and the trademark dispute, visit our web site at: <<http://mitpress.mit.edu/Leonardo>>. For the auction, bid at <<http://www.ebay.com>>.

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LEONARDO JOURNAL
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< Abstracts of articles forthcoming in Leonardo: Vol. 34, No. 2 (April 2001) >

The following articles have been accepted for publication in Leonardo. Contact the authors directly to get advance copies of texts.

Digital Art Takes Shape at MoMA  
Barbara London (curator), The Museum of Modern Art, 11 West 53rd Street, New York, NY 10019-5498, U.S.A.  
E-mail: <[barbara\\_london@yahoo.com](mailto:barbara_london@yahoo.com)>.

Adapted from a talk delivered at the ATC Colloquium, Berkeley, CA, 20 January 1999.

ABSTRACT

In the art world, technological advances have implications similar to those in science and industry. Digital art exists in a "development stream" that parallels software design; a curator must be skilled at rapid upgrades. On the other hand, the permanence of digital information allows a more complete documentation of artistic development in a swiftly maturing medium and fosters equal access to work from throughout the world.

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Sculpting in Time and Space: Interactive Work  
Emily Hartzell (artist, curator) 295 Prospect Place, Brooklyn, NY 11238, U.S.A.  
E-mail: <[hartzell@cat.nyu.edu](mailto:hartzell@cat.nyu.edu)>.  
Nina Sobell (artist, lecturer) 190 Eldridge Street, #3 South, New York, NY 10002, U.S.A.  
E-mail: <[sobell@cat.nyu.edu](mailto:sobell@cat.nyu.edu)>.

ABSTRACT

The authors have experimented with the Web to develop its potential for creative, collaborative expression and to explore and sculpt the boundaries between physical space and cyberspace. Their work grew directly out of Nina Sobell's interactive video installations of the early 1970s, in which she used the medium to sculpt space and time and to create bridges for shared human experience. Their inspiration in ParkBench has been to address the physical disconnectedness of the information age by creating a safe place to congregate in cyberspace. Their work has inspired the development of new technologies, including a wireless telerobotic video camera for streaming video to the Web from remote locations.

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My Only Sunshine: Installation Art Experiments with Light, Space, Sound and Motion  
Jennifer Steinkamp (artist, educator), 12029 Marine Street, Los Angeles, CA 90066, U.S.A.  
E-mail: <[jennifer@artcenter.edu](mailto:jennifer@artcenter.edu)>.

Web site: <<http://jsteinkamp.com>>.

ABSTRACT

The author discusses her interactive architectural installation art. As an artist who works with new media, she finds herself refitting existing genres and creating new languages for her particular art form. Her artwork consists of projected interactive computer-animation installations. She investigates illusions that transform the viewer's perception of actual space in a synthesis of the real and the virtual.

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Where Surfaces Meet: Interviews with Stuart Kauffman, Claus Emmeche and Arantza Etxeberria

Nell Tenhaaf (artist, teacher), 20 Brockton Ave., Unit 2, Toronto, Ontario, Canada M6K 1S5.

E-mail: <[tenhaaf@yorku.ca](mailto:tenhaaf@yorku.ca)>.

ABSTRACT

This article, shaped by the author's interest in convergences between art and science, presents scientists and philosophers of science who explore that convergence. However, since their expertise lies in science, they each speak from a principally scientific point of view. In fact, a common ground that emerges among them is an overt interest in point of view, which takes the form of examining the modeler's investment in and engagement with the model. Each speaker finds some potential there, rather than limitations. Since artists tend to project their subjectivity explicitly into their work and also to be aware of how the forms or media they use influence the representations they make, the interviewees' approaches to modeling do offer points of connection between art and science.

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Does Lara Croft Wear Fake Polygons? Gender and Gender-Role Subversion in Computer Adventure Games

Anne-Marie Schleiner (educator, artist, curator, writer), 943 Stevens Street, White Rock, BC V3B 4H5, Canada.

E-mail: <[amschle@cadre.sjsu.edu](mailto:amschle@cadre.sjsu.edu)>.

(A previous version of this article appeared in 1998 in the on-line graduate student 'zine Switch, of the C.A.D.R.E. Institute in San Jose, California <<http://switch.sjsu.edu/web/v4n1/toc.html>>.)

ABSTRACT

The subject matter of this article emerged in part out of research for the author's thesis project and first game patch, Madame Polly, a "first-person shooter gender hack." Since the time it was written, there has been an upsurge of interest and research in computer games among artists and media theoreticians. Considerable shifts in gaming culture at large have taken place, most notably a shift toward on-line games, as well as an increase in the number of female players. The multi-directional information space of the network offers increasing possibilities for interventions and gender reconfigurations such as those discussed at the end of the article.

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Henri Poincaré, Marcel Duchamp and Innovation in Science and Art

Gerald Holton (professor of physics and history), 358 Jefferson Laboratory, Harvard University, Cambridge, MA 02138, U.S.A.

E-mail: <[holton@physics.harvard.edu](mailto:holton@physics.harvard.edu)>.

ABSTRACT

In the early years of the twentieth century, the striking scientific developments of the period included a great increase in popular and professional

attention to non-Euclidean geometry. One of the leading scholars of the subject was Henri Poincaré, who was also a widely read theorist of the scientific discovery process, keenly concerned with the role of intuition and the subconscious. His writings, and those of his interpreters, could well have increased the appeal of four-dimensional geometry for artists already attracted to the possibilities presented by these concepts. The working notes of one such artist, Marcel Duchamp, record directly his debt to ideas linked to Poincaré - an example of the interaction of greatly different parts of the wider culture.

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ENDNOTE---PIERO SCARUFFI: The Multi-Track Evolution of Mind

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Editor-in Chief: Michael Punt  
Managing Editor: Bryony Dalefield  
Web Coordinator: Sudhira Hay

This month on the Leonardo Digital Reviews website (<http://mitpress.mit.edu/e-journals/Leonardo/ldr.html>), fourteen new reviews have been posted, some of which were held back by the disruptions of the Christmas vacation, etc. The publication of such an unusually large amount of material provides an opportunity to celebrate the breadth of interests that our panel covers. It also encourages a moment of reflection on the relevance of some of the material that we cover relative to the developing discussions at the diffuse borders between art, technology and science that define our constituency. At first glance, a discussion of Anna Pavord's book *The Tulip* may appear to be an odd choice for this column, and yet it seems to touch on a raw nerve in the post-digital age. George Gessert's account of this book is a model of understatement as he exposes a history of art and biology with a reminder of a symbiosis between horticulture and art that all but disappeared after World War II. There is little doubt that the sorts of activity in which the idealism of one insists on the genetic adjustment of the other was distasteful. As Gessert suggests, the ideological proximity to certain pre-war political regimens encouraged this neglect. Horticulture and genetic design are now commonplace, popular and an economic force as a new army grafts new uniform hybrids in favor of unruly nature. Aside from this trend, however, in the past year no plant has featured more outside the gardening press than the tulip. The reason, of course, is the striking similarity that many commentators have seen between the self-reflexivity of e-commerce and the tulip-mania of the seventeenth century (glossed for us by Gessert). The headlong passion for tulip bulbs provides a timely model of an economy that can, in certain conditions, overheat when rarity becomes a commodity in itself. As such, the case of the tulip and tulip-mania shows us that some things can be both a mirage and a material object at the same time.

This apparently contradictory state of affairs occupies Douglas Kahn in his book *Noise, Water, Meat: A History of Sound in the Arts*, reviewed for us by Yvonne Spielmann. As she points out, "The relevance of Kahn's research, [is] that, without doubt, [he] reaches further than merely writing a 'history of sound in the arts.' This is because the stress on the complexity of aurality counters the prevailing orthodoxy of maintaining the visual and visuality as the dominant expressive forms of media in the age of modern technology that begins with photography and film." The problematics that are mooted here are also revisited in the charming anecdote that opens David Topper's review of *Descartes and the Possibility of Science*, by Peter A. Schouls. The themes of the determining effects of human imagination upon the perception of reality are also touched upon to one degree or another in various other books reviewed in this month's LDR, such as *Color and Meaning: Art, Science, and Symbolism* by John Gage and *What is Life?* by Lynn Margulis and Dorian Sagan, both reviewed by Wilfred Niels Arnold. Although David Topper considers that there is little in Gerald North's *Observing the Moon: The Modern Astronomer's Guide*, that meshes with the art/science agenda of Leonardo, his subsequent comments on Galileo's drawings (included in the volume) and more valuable material that he draws to our attention, serve to remind us that an instrumental determinant of our current perception of the heavens was the wide acceptance of certain quattrocento graphic conventions in the arts.

Elsewhere in LDR, the rich mix of topics covered yields an enviable range of expertise weaving in and out of this theme. The apparently relentless trend towards interdisciplinary study in academic research (to say nothing of academic

publishing) which manifests itself often as nothing more than intellectual tourism should not deflect us from the epistemological significance of the broad constituency of the LDR panel and the material that we cover. As the reviews posted this month show, at stake in the challenge to orthodox definitions of fields and boundaries is nothing less than a possible revision of the limits of the imagination (and what we imagine consciousness to be). The reviews cited above, together with other valuable contributions by Roy R. Behrens, Curtis Bahn, Rahma Khazam and Mike Mosher can be viewed at <http://mitpress.mit.edu/e-journals/Leonardo/ldr.html> along with other new reviews as they come in.

Michael Punt, Editor-in-Chief, Leonardo Digital Reviews  
February 2001

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In this month's reviews:

< Books >

Descartes and the Possibility of Science, by Peter A. Schouls.  
Reviewed by David Topper.

Noise, Water, Meat: A History of Sound in the Arts, by Douglas Kahn.  
Reviewed by Yvonne Spielmann.

Color and Meaning: Art, Science, and Symbolism by John Gage.  
Reviewed by Wilfred Niels Arnold.

What is Life?, by Lynn Margulis and Dorian Sagan.  
Reviewed by Wilfred Niels Arnold.

Observing the Moon: The Modern Astronomer's Guide, by Gerald North.  
Reviewed by David Topper.

December 2000:

Distant Shores: The Odyssey of Rockwell Kent, by Constance Martin.  
Reviewed by Roy R. Behrens.

Fonts and Logos: Font Analysis, Logotype Design, Typography, Type Comparison,  
and History, by Doyald Young.  
Reviewed by Roy R. Behrens.

The Swastika: Symbol Beyond Redemption, by Steven Heller.  
Reviewed by Roy R. Behrens.

Turn-of-the-Century Viennese Patterns and Designs, by Koloman Moser.  
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The Tulip, by Anna Pavord.  
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La Musique Electroacoustique Groupe des Recherches Musicales (GRM).  
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Ruskin's Journey: Teaching People to See, produced for Lancaster University Television, U.K.

Reviewed by Roy R. Behrens.

Topsy: William Morris, produced by Boxwood Productions.

Reviewed by Roy R. Behrens

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Visit Leonardo Digital Reviews online to read these reviews in full, together with the latest postings, in LDR Raw as they come in.

<<http://mitpress.mit.edu/e-journals/Leonardo/ldr.html>>

Your comments are welcome at <[ldr@Leonardo.org](mailto:ldr@Leonardo.org)>

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From Handel to Hendrix: The Composer in the Public Sphere

by Michael Chanan. Verso: London, England, 1999. 342 pp. Cloth, \$30.00. ISBN: 1-85984-706-04.

Reviewed by Sean Cubitt. E-mail: <[s.cubitt@waikato.ac.nz](mailto:s.cubitt@waikato.ac.nz)>

From Handel to Hendrix, the third volume of Chanan's critical history of Western music, joins its predecessors, *Musica Practica* and *Repeated Takes* (both also from Verso) to complete a classic work of contemporary criticism. The first volume dealt with the making of music, and especially with its professionalization; the second was a brilliant and challenging history of the impact of recording. In this third volume, a meticulous criticism of the formal trajectory of the art music of Europe is held in place by an overarching concern with the relation between composers and their world.

Chanan bases his reading on Jurgen Habermas' "The Structural Transformation of the Public Sphere," an oft-quoted essay first published in the late 1960s (the term "public sphere" translates the German "Oeffentlichkeit"). If there is a weakness to the book's political analysis of art music, it lies in this reliance on an essay that has come in for serious criticism, both from Negt and Kluge in their construction of a proletarian public sphere and from Miriam Hansen's feminist critique in her magnum opus on early cinema, *Babel and Babylon*. Historians too have made critical inroads on the idealization of the coffee house as the origin of bourgeois democracy as the reasonable dialogue of equals. Yet the utopian dimension of Habermas' theory, if it is leaky in terms of political history, seems to work well for the utopian constructions of music.

Chanan's thesis is that the composer was, at a certain point, an integral figure in an integrated musical culture. Two centuries later, contemporary art music is marginalized, accused of elitism and excluded from the concert halls where only the dead white males reign with a supremacy unmatched even in the art galleries and museums of the West. It does a great injustice to this book, however, to start from this level of generality; what delights is the freshness and the detail of the accounts of composers in their social roles. Biographical detail and innovative readings of compositions are used to illuminate not the psychology but the sociology of music over a 200-year span, from the courts of the last monarchs to the Darmstadt summer schools and thence to Jimi Hendrix's "Star Spangled Banner" at Woodstock.

Central to the argument is a subtle dialectic of individual subjectivity and commodified psychology, analogous to the descent from urbane debate into opinion polling. But equally central to it is the reading of Schubert's *The Trout* on page 90, where, as so often in the book, the author's critical acumen makes the classical and Romantic tradition seem not only relevant but critical to the study of contemporary culture. If there are points of detail where one would like to criticize, it is generally in the spirit of wanting to dialogue with the book. The openness of the argument, the catholicity of taste, the readiness with a sharp jab or a critical analogy make this a highly readable work, while still



making demands on the reader.

Music always evokes a certain utopianism. That is its function. At least, that is the argument of Theodor Adorno. As Basil Bunting wrote of Pound's "Cantos": "There are the Alps, you will have to go a long way round to avoid them." Adorno sits astride art music as he does over aesthetic philosophy. The bleak pessimism of his negative dialectics, however, needs rethinking in an age in which the negative, from grunge to simulation theory, has become the dominant. Chanan's achievement is that his meticulous historical and musical scholarship opens up a new, hard-won vista on what a positive dialectics might look like after Adorno.

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LEONARDO MUSIC JOURNAL
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< Ten Years of Leonardo Music Journal >  
by Nicolas Collins [ 1]

< This essay was first published in Fineart Forum Volume 15, No 1 (Jan 2001).  
Reprinted by kind permission; <http://www.fineartforum.org> >

Some time in the spring of 1990 I received a phone call from Larry Polansky [ 2] asking me to contribute an article to the premiere issue of Leonardo Music Journal [ 3], a spinoff from the venerable "journal of record" in the field of technological art, Leonardo [ 4]. Larry's timing was auspicious: I was, figuratively if not literally, twiddling my thumbs in my Bleecker Street loft, waiting for my firstborn to emerge from my wife's impossibly cantilevered belly, as I engaged in rewinding and fast-forwarding the tape of my life. Fearing the blessed event would hit our house like a bomb, rendering me incapable of composing for months (or even years) to come, I accepted Larry's offer on the assumption that writing words would be somehow easier than writing music. I was wrong on both counts: the expanded family slipped into a blissful (if perhaps self-opiated) trio state, curiously devoid of chaos, but writing turned out to be a more serious challenge than I had anticipated.

The invitation to reflect on the technology and aesthetics of my music gave me something distinctly un-biological to focus on in the first few months of Teddy's presence. My previous writing experience had been largely confined to grant applications, concert and liner notes, and the odd lecture. Leonardo Music Journal provided an excuse to indulge in musical self-analysis on a larger, more detailed scale. So, between extended periods of baby gazing, I cobbled together an essay whose style owed more to the ghost-written sports autobiographies of my childhood than to academic journals, but that I felt accounted reasonably well for my activities to date [ 5].

The experience was cathartic, and broke the ice for me as an author. Over the next few years I became increasingly involved in writing and editing, from essays and lectures to "An Incomplete Handbook of the Phenomenology of Whistling." Self-reflection gave way to more general analysis of the interaction of musical aesthetics with technological and economic developments. Writing became an integral part of my life [ 7].

Seven years later, I found myself sitting in a splendid Berlin apartment, a guest of the DAAD Kunstlerprogramm, while fellow composer Jonathan Impett [ 6] tried to persuade me to apply for the position of editor-in-chief of the Leonardo Music Journal. The gummy grin of my 18-month old Charlotte triggered dÚjÃ vu of my first contact with the journal and prompted me to reflect on the current state of the musical world.

Post-Cagean composers developed approaches to technology that were experimental, analytic and, above all, idiosyncratic. The existing tools of musicology are ill-suited for describing music based on echolocation, computer networks, CD error correction, doppler shift or speech patterns. Moreover, much interesting contemporary music has fallen into a gap between the journals serving academic composers and musicologists, and the magazines and fanzines dedicated to pop music. As a result we are left with a body of music -- conveyed largely in oral tradition, unlabeled circuits, obsolete synthesizers and forgotten computers -- whose aesthetic has never been adequately articulated. The flurry of attention surrounding electronic pop in the 1990s only served to distract from the groundbreaking work of earlier pioneers, and a sense of impending ignorance fueled my activities as a writer and editor as the decade continued.

Leonardo Music Journal has, since its inception, been an invaluable resource in the documentation of fascinating, if often marginalized, music. By emphasizing writings by composers and audio artists themselves over those by musicologists and journalists, it has provided a direct channel for voices that might otherwise have remained unheard. The compact disc that accompanies each issue has made many rare recordings available for the first time. By 1997, I found that the musical public's awareness of the Journal far exceeded its modest distribution, and had imbued it with a quasi-oracular value. Leonardo Music Journal gave me my first opportunity to make a statement about my own work, and it seemed appropriate for me to repay the debt by offering others a boost onto the same soap box.

But I would be insincere if I did not confess to a baser motive: I saw my term of editorship as an opportunity to produce, at someone else's expense, five beautiful books, with stories, pictures and sounds by friends and artists I admire. I have organized each issue around a theme, in an attempt to make it more like a book, less like a magazine. Topics have included the conflicting influences of history and futurism (LMJ 8) [ 8]; aspects of identity and responsibility (LMJ 9) [ 9]; music out of Africa & South America (LMJ 10, the current issue) [ 10] and Britain (LMJ 11, due at the end of 2001) [ 11]; and I plan to wrap up my tenure addressing the role of pleasure in music (LMJ 12, due at the end of 2002) [ 12]. Similarly, I trust my audio curators to make each CD [ 13] a stand-alone record album, not just sonic illustrations for the text. I have somehow managed to cajole a wonderful array of artists to contribute to the project, and have been extremely pleased with the results so far.

In this age of Internet publishing and virtual texts, there is something indulgently nostalgic about turning a page, even if the pleasure is tempered by the poignant knowledge that a tree must give its life for this luxury. Books are real, and seeing an essay in print gives it a sense of value and permanence; the printed word bestows pedigree to my fellow inhabitants of the lunatic fringe. These feelings may be unsubstantiated by facts, but they are important nonetheless, like the affirmations of a twelve-step program. It was the love of books that finally drove me to accept the hair shirt of editorship, and the sheer pleasure of holding them has easily made up for any itchiness the job may entail.

Thank you, Larry Polansky.  
Happy Birthday, Leonardo Music Journal. [ 14]

< References and Notes >

References and Notes for this text can be found on line at  
[http://mitpress.mit.edu/LEA/CURRENT/lea\\_9-2new.html](http://mitpress.mit.edu/LEA/CURRENT/lea_9-2new.html)

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< LMJ 10-Year Anniversary Event >

Leonardo Music Journal (LMJ) celebrates its 10th anniversary on the evening of 31 March 2001 with a concert and festivities at Engine 27, 173 Franklin, New York City, at 8:00 p.m. Since its inception in 1991, LMJ has been devoted to aesthetic and technical issues in contemporary music and sonic arts. Currently under the editorship of Nicolas Collins, each thematic issue features artists/writers from around the world, represents a wide range of stylistic viewpoints and includes an audio CD or CD-ROM. LMJ is published yearly by the MIT Press. The evening on 31 March will start off with the sounds of Nicolas Collins, with Groove, Pit & Wave, the final concert of Electronic Music Foundation's Expanded Instrument Festival. Collins became editor-in-chief of LMJ beginning with Volume 8 in 1998 (see above item for biography).

Collins' performance will be followed by a champagne toast to LMJ and merry-making. Copies of the just-released LMJ 10, Southern Cones: Music out of Africa and South America, along with the CD of the same title, will be available for purchase at a special discounted price. LMJ10 shifts the focus away from technological music's traditionally Eurocentric domain and concentrates instead on contributions to modern music coming out of Africa and South America.

Space is limited! Contact <e27@emf.org> for information or telephone (1) 212-431-7466.

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ISAST NEWS
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< Leonardo/OLATS collaborate in new art and education venture: FluidArts >

FluidArts, a nonprofit corporation jointly sponsored by Leonardo/OLATS and ISAST, MillÚnaire, and The Miksike Student Factory (Estonia), embarks this summer on its inaugural multilingual global learning project, WaterRoots: A study of Migrations. The project will result in an educational component of Leonardo/OLATS Virtual Africa's "The Spirit and Power of Water" project (see LEA, Vol. 9, No. 1, and following news item). FluidArts is also collaborating with the Estonian "Student Factory" through its Estonian international advisor, Mihkel Pilv (see <http://www.studentfactory.org>), whose official website, [www.fluidarts.org](http://www.fluidarts.org), premiered in spring 2001. The website unites artists, educators, scientists and university students in a real-time, multilingual virtual learning network, facilitated by on-line mentors. The organization began its initial project work last winter, linking a Thinkquest team from John F. Kennedy High School in New York with students from the StudentFactory. Together, they translated Camel Zekri's Burkina Faso River Festival 2000 project into English, French, Spanish and Russian. This team has continued to work together, creating bilingual, graphically illustrated templates on the theme of space.

FluidArts' founding principles champion the role of the arts as an integral part of the global learning environment and celebrate the arts as a potent catalyst for the recognition of individual cultural perspectives, as well as universal artistic and educational concerns. Founding members include board members Deborah Phelan (MillÚnaire), Roger Malina (Leonardo), Arana Greenberg (Chiliad) and Elizabeth Underwood (MillÚnaire); international advisors Mihkel Pilv, Jocelyne Rotily (curator, Virtual Africa) and Rejane Spitz; educators Carole Treasure, Bonnie Bracey (George Lucas Educational Foundation and World's Children Media in Greece) and Steve Feld (J.F. Kennedy High School, Bronx, New York). Student interns are Adinah Curtis (University of California, Berkeley), Courtney Delano Williams (Middlebury) and Johanna Schultz (Stanford). Leonardo board member Barbara Lee Williams produced the site's initial content launch.

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Virtual Africa, in collaboration with FluidArts, the River Festival, Africultures and the Institut Charles Perrault, is pleased to announce the launching of its new project, The Spirit and Power of Water, a multimedia project addressing scientists and artists from Africa and the other continents (see [http://www.olats.org/africa/projets/gpEau/genie/genieEau\\_Eng.shtml](http://www.olats.org/africa/projets/gpEau/genie/genieEau_Eng.shtml) and LEA, Vol. 9, No. 1).

Throughout the world, water has always been a crucial political and socio-economic stake but the question we now face, at the threshold of the twenty-first century, is will this stake grow to such a catastrophic level that we will live in fear of a world war for water? Having appeared on the Earth some 3-5 billion years ago, water, like fire, air and earth, is certainly a primordial element. Water ruled over the creation of the universe and remains the pre-condition for the blossoming of all living creatures. It is because water is such a precious substance that it quickly took on a privileged place in the history of humanity's imagination and artistic creation.

The first group of artists and scientists to join the Spirit and Power of Water project includes:

- Iba Ndiaye, an artist of Senegalese origin, who is currently presenting a series of paintings entitled "Paysages du Sahel" (Landscapes of Sahel). The paintings, realized in the 1970s during a journey in Mali, express in an emotional way, without romanticism, Ndiaye's attachment to his native country. These abstract landscapes were depicted when his country was the victim of a devastating drought that turned the land into desert.

- Elisabeth Piotelat, French engineer and member of SETI (Search for Extra Terrestrial Intelligence). In an article entitled "Le Reflet des Étoiles À la surface du point de l'eau" (Reflections of stars on the surface of a pond), Piotelat insists upon the importance of water, an indispensable element to life. "Water makes the planet Earth a 'unique' planet in the solar system, the only one to have an ecosystem; the richest but also the most vulnerable one." Hence she points out the importance of studying the presence of water in the solar system. Piotelat quotes Malian engineer Cheik Mobido Diarra, from when he addressed children in Mali: "If we can find the water hiding up there (on Mars), we will be able to find the water hiding here. The tools used on Mars could be used here. The techniques developed to find water on Mars, to exploit it, purify it and distribute it, will help us resolve the problem of water on the Earth."

- Jonathan Zilberg, an American anthropologist. In his article "Shona Sculpture and Shona Culture: The Water Spirit," Zilberg examines the representation of the water spirit "njuzu" in the sculpture and culture of the Shona people (Zimbabwe), on the basis of John Ndandarika's and John Takawira's works.

- Bob Gluck, an American composer, pianist and educator. In his piece of music, "Jonah Under the Sea" (1997), "the unwilling biblical prophet Jonah has been tossed from a ship during a raging storm, sinks into the ocean, and is swallowed by a whale. He is bombarded by many sensations---the rushing tides, confusion, sounds of passing whales, harbor memories and echoes of human voices."

- Cynthia Rubin, American electronic artist. Her interactive piece "Jonah's Memories" is somehow the visual matching piece to Bob Gluck's work. In fact, Cynthia confesses that Bob Gluck encouraged her to write her own commentaries on the Bible and to work on the Jonah legend. She chose to evoke the moment when Jonah is thrown back "into the waves to invite the viewer to reflect on the world outside of the contemporary construct of linear time."

For more information on the project, contact Jocelyn Rotily, curator <jocelyne.Rotily@wanadoo.fr>.

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functional DNA, marking intervals. For example, introns, or interruptions, subdivide genes, making it possible to specify different gene products [ 3 ]. When we shift attention from protein-coding DNA to the spaces in between, we are likely to open up unexplored areas.

These observations have some resonance with traditional figure-ground relationships, as well as with repetitive, background elements in many early two-dimensional or bas-relief artworks. We could view these elements as comparable to the "in-between" spaces in DNA. The unidentified faces of onlookers or crowds portrayed within Renaissance paintings may once have conveyed information about individuals alive at that time, but now they serve primarily as space-fillers, creating a context for the primary figures. In art, not only does the placement of minor elements matter, but these elements can also modify the concept of what constitutes significant information. If similar paintings of crowds were made now, the identities would be retrievable for years to come. Theoretically, unknown historical Renaissance figures might again be identified, and if so, the meaning of the total work might need reassessment.

The Parthenon frieze was once thought to represent a processional feast, but recently Joan Breton Connelly has reinterpreted it as arguably representing a sacrifice [ 4 ]. In this case, the key to the original code had been lost. To retrieve the meaning, Connelly formulated a new code, based partly on the assignment of greater significance to some of the elements previously considered minor, as well as to the repetition and placement of certain major units. As a result, the picture assumed a wholly different meaning.

The flexible model suggested by junk DNA bears analogy to a range of art, older and contemporary alike, that presents a repetitive background amid a matrix of information. We recognize the importance of the biological development of protein-coding genetic material. In contrast, although one does not expect art to be necessarily informative, the placement of information has always been a factor for artists employing systems to generate their art. Repeated phrases dividing the beginnings and ends of high-information sections are found both in non-functional genetic "junk" (e.g. CACA) and in system-derived art (e.g. repetitive background design units). These units secure particular positions within genetic material or artworks.

If we consider system-based art, we realize that computers have made it increasingly easy to incorporate or convert data to visual equivalents; this trend indicates how technology has changed art's relationship to information. If our aesthetic goals were to provide information alone, artists would simply write (as some conceptual artists have done). Instead, many artists intersperse elements that are high in information in their artworks (e.g. statistics), with others providing no numeric information (e.g. qualia) that nevertheless inflect the content of the entire artistic statement. Ornamentation, patterning and material properties figure in the entire meaning and mood of a work of art.

The painter Alfred Jensen, active during the 1940s and 1950s, was known for integrating information systems as varied as the Mayan calendar, Goethe's color theory, Tantric diagrams and Pythagorean numerical relationships into his art. He also transformed information related to DNA molecules, interspersing writing and symbols (specific information) with blocks of pure color (inflection) [ 5 ]. Although his flourishes and multiple references tended to confound the information he presented, the original systems could presumably be reconstructed with the clues he provided.

Many contemporary artists use information derived from extra-artistic sources as the basis for a work of art. An example is Jack Ox's intermedial translations of music. Many of these system-based artists create "in-between spaces" that modify the information derived from their sources. Lyrical, arcing, linear gestures connect the participants in Mark Lombardi's political-intrigue drawings. Expressive color marks and grids inflect Michael Banicki's art, consisting of charts of questionnaires. Other artists, including Marilyn Emerson Holtzer and Suzanne Anker, expressly reinterpret genetic information. Holtzer modifies

information derived from folded protein by using the qualities of her medium, weaving: producing repetitive stitches that highlight protein structure. Anker uses the refractive properties of water as a medium to modulate her sculpted chromosomes.

I became increasingly aware of such modifications while reading about an experiment Meyer Schapiro conducted in 1966. Schapiro had Michael Noll of Bell Laboratories produce a computer version of Mondrian's "Composition with Lines" (1917). He then photocopied both images and asked subjects to identify the real Mondrian and also to state their preference. Schapiro was surprised to find that most identified and preferred Noll's computer version, which appeared to be more randomly constructed. This preference was attributed to the vogue for abstract expressionist art, identified at that time with spontaneity.

In light of Schapiro's experiment, I constructed a drawing consisting of repetitive plus/minus units to explore some issues of figure-ground interpretation. The piece reproduces Noll's computer version of the Mondrian composition within a large white square. The square is superimposed over part of a depiction of Mondrian's composition. I then scattered dominoes over the paper, placing the images near some of the smaller depictions of the plus/minus units. Domino pips can represent the complementarity of DNA base pairs (e.g. abutting two dominoes when the pips of two half-dominoes arbitrarily total seven). In fact, dominoes have been used to create models by scientists studying complexity and can be thought of as containing information related to the number of pips and placement [ 6 ]. Without knowledge of the references to Mondrian and Noll, a viewer would identify the white square and white domino forms as key visual forms in my drawing, viewing the repetitive, smaller, plus/minus elements as background to the larger forms. If, however, a viewer identified the plus/minus units as constituting not individual elements but images of a Mondrian and a Noll (themselves composed of small elements), the emphasis would shift. The drawing would then become yet another interpretation of the original Mondrian.

Several years ago, Nancy Chunn annotated the front page of the New York Times every day for a year, displaying the pages all together at the Ronald Feldman Gallery in New York [ 7 ]. Three aspects of Chunn's work are of special interest. First, she left a good deal of the original text unmarked by her annotations, creating a sea of low information, in which islands of annotated areas were prominent. Second, the underemphasized information in these unchanged areas can be thought of as a reservoir for potential use; someone else could make quite a different presentation of the same original material. Finally, Chunn created an installation in which original information was presented all at once rather than as a daily ritual, redirecting attention away from the newspaper's original content and toward the ebb and flow of different kinds of information over time.

For all artists (especially those who do not rely on information-based systems or realist models to generate their art), basic attributes such as color, size, texture and medium serve as information and provide clues to content. For art based on realist models, the iterative depiction of trees or windows can constitute areas of low information. In general, these intervals are not neutral in either art or in science. In art, such visual noise may provide context and placement for other, highlighted elements while also securing breathing room for the major elements. In science, negative findings are often considered as significant as positive results, since they influence the direction of future research.

As Koop stated in Angier's article, " 'Junk' to me is just a euphemism for 'I don't know' " [ 8 ]. Junk DNA may have evolutionary potential for new functions as well as the role of occupying spaces in between the coding genetic material. The term "junk DNA" can also be viewed in a more literal way. From a cultural (but not scientific) standpoint, the designation "priceless" or "worthless" is periodically in flux for genetics as well as art.

In art, positive values like "flexibility" and "content" are sometimes provided by elements that are themselves deemed insignificant or abject. Artists such as

Schwitters, Gris and Picasso incorporated cast-off materials in their art, changing refuse into valuables. More recently, Nancy Rubins has transformed vast amounts of trash into sculpture while Nancy Chunn has gone to great lengths to de-acidify newsprint, the art student's perennially discardable material. Just as a mutation within junk DNA could provide biological advantage to new organisms, a changing discourse can suggest a new value for a previously overlooked or devalued feature. One can think of visual culture as an open-ended system, since by reinterpreting earlier images and methods we extend work into the present and future. As a result, the perception of content fluctuates and is shown to be dependent on a prior framework of associations that establishes a context. When artists recast earlier ideas, visual culture, like biology, would seem to exhibit an evolutionary dimension.

References and Notes

1. Robert Shapiro, *The Human Blueprint: The Race to Unlock the Secrets of our Genetic Script* (New York: St. Martin's Press, 1991) pp. 204, 315.
2. Natalie Angier, "Keys Emerge to Mystery of So-Called Junk DNA," *New York Times*, 28 June 1994, Medical Science section, pp. C1, C3.
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6. For discussion of domino models and complexity theory see Sara Lynn Henry (art historian, Drew University), "Ellen Levy's Disorder and Early Sorrow," catalogue essay, for traveling exhibition at Drew University, 1993.
7. Nancy Chunn, *Front Pages*, exhibition at Ronald Feldman Gallery, New York (1996).
8. Angier [ 2 ] p. C3.

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