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INTRODUCTION
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< This issue >

Craig Harris

LEA has been blessed with some press recently. April's issue of Wired magazine contains a review on pages 47-48 (I include the page numbers here because sometimes it can be difficult finding anything specific in Wired without some guideposts), and LEA was featured in a Journal of the Month report in several Usenet news groups. The reviewer Mary Elizabeth Williams comments:

"With its editorial base in Minneapolis and contributions from all over the world, the Almanac is a digital bible for the low-down on the art scene. ... Already dense with information and ideas, the Almanac either promises or threatens to become a veritable thicket by the time its Web site is fleshed out."

We appreciate the visibility, and we are working to fulfill our desire to provide facile pathways through and among the information and ideas. I have already heard from several people expressing interest in contributing content, so we should see some positive results from casting a wider net.

A collection of events are taking place in April in San Francisco, CA, appearing in LEA as a feature article about the group exhibition "Virtual Female", a profile of The LAB Gallery, and an announcement about the Third Annual Conference on Feminist Activism and Art. LEA readers may have seen notices in FineArt Forum and elsewhere about "The Incident", an international symposium examining art, technology and phenomena in Fribourg, Switzerland. We have received and present additional details in a profile about this event.

This month Joan Truckenbrod and her Advanced Computer Imaging class at the School of the Art Institute of Chicago have created an exhibition for the Leonardo Electronic Almanac Gallery. The orientation of the course addresses the aesthetic of the image, and students explore theoretical concepts and the practical application of their perspectives. Some of the students provided brief insights into their work, and I present some of them here. I am still setting up the gallery exhibition at the LEA WWW site, so it should be installed by the middle of the first week of April. I welcome artists, groups of artists, students, and media facilities to propose exhibitions for the LEA Gallery. Exhibitions should include some degree of explanatory perspectives on work shown, concentrating on the underlying concepts of the work or group of works, providing the context for the use of specific technology selected to create the pieces included in the exhibition.

Roger Malina and the LDR reviewers provided a hefty review section this month, and there is a group of opportunities for those seeking work.

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FEATURE ARTICLES
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< Virtual Female - a group exhibition at the LAB >  
featuring work by Rebeca Bollinger, Marjorie Franklin, Colette  
Gaiter, Christine Tamblyn, & Gail Wight/Kristine Yaffe

Zoey Kroll  
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San Francisco, CA  
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Opening Reception: Wednesday, April 5, 6-8 pm  
On View: April 5-April 29  
Gallery Hours: 12-5 pm, Wednesday-Saturday

The LAB presents Virtual Female, a group exhibition featuring the work of women artists exploring the construction of gender in social systems and in cyberspace, biological and technological functions, narrative structures, the operations of both human and artificial memory, and the architecture of private and public spaces.

This exhibition is held in conjunction with UTOPIA/DYSTOPIA: The Third Annual Conference on Feminist Activism and Art, a co-production of The LAB and SF Camerawork, and will take place at Center for the Arts, Yerba Buena Gardens and the San Francisco Museum of Modern Art on April 7-9, 1995. The conference will focus on those processes by which women-centered communities and information systems are formed, with respect to both traditional communities and new community networks sustained through interactive technology. The conference will provide a forum for feminist artists and activists to address issues of shared concern, exchange ideas and information, and form new, diverse, and extensive community networks.

ABOUT THE ARTISTS IN VIRTUAL FEMALE:

% Rebeca Bollinger (San Francisco) presents work which examines the ethereal and technological artifacts produced by communication systems. Sorted alphabetically is a digital work which investigates female identity in the invisible social spaces of online communication services. By gathering and processing downloaded streams of hierarchical file descriptions from popular information services, this work creates a poetic context to reveal the perpetuated and mythologized gender inequities which exist in cyberspace. Sugar Conclusion and Analysis is an interactive computer installation which uses digitally iced cakes as a vehicle to explore layers of meaning, messaging, and consumption in the landscape of digital communication.

% Gail Wight (San Francisco) has produced a compelling body of work consisting of a variety of sculptural and narrative structures and devices which reorder our perceptions about artificial intelligence and the operations of the human mind. Her interactive installations and performances question the assumption that technology necessitates machinery, employing video, interactive computer systems, the mythic narratives of

the Inuit and dozens of other female cultures, modern myth, her own scientific experiments, biomedical tools such as the memory patch used by neurologists, computer chips, and other unusual materials and methods. Wight's interactive art involves the viewer/participant in a process of perception which evokes awareness of her own bodily functions, memory processes, and thought structures in regard to 'the models of Einstein, Bohr, Shroedinger, and Heisenberg; the emerging structure of the human genome; and the nightly news in all of its masks.' For the Virtual Female exhibition, she is collaborating with neuro-psychiatrist Kristine Yaffe to create a piece exploring the ways in which hormones interact with the shaping of an infant's brain, and the subsequent social repercussions.

% Colette Gaiter (St. Paul, MN) presents an interactive computer installation called easily remembered/conveniently forgotten, which looks critically at how popular media images serve the needs of their creators in presenting 'reality' or history. In this work, the artist uses HyperCard to construct her own world view while simultaneously examining existing ones. Appropriated photographs, engravings, and texts are presented in altered contexts on the computer screen along with collected memorabilia. The texts and images selected by the artist reference historical incidents of interracial conflicts and sexual discriminations involving the silencing of women in various social contexts. Through their interaction with the installation, participants are invited to manipulate iconic representations which destabilize the boundaries of race and gender. The user becomes involved in a discourse of the systematic processes by which values held hundreds of years ago in American history are replicated in current cultural and societal phenomena.

% Christine Tamblyn (Miami, FL) presents Mistaken Identities, a project incorporating a variety of imaginary pornographic tableaux featuring a plethora of 'wicked women' drawn from the history of arts and sciences (Marlene Dietrich, Frida Kahlo, Catherine the Great, Maya Deren, Margaret Mead, Marie Curie, Simone de Beauvoir, Josephine Baker, Mary Shelley, Zelda Fitzgerald, Gertrude Stein, Isadora Duncan, etc). Altered archival photographs are interwoven with the texts of letters and diary entries in multiple digital prints. The project incorporates "gender blending, anachronisms, abrupt elisions in point of view, egregious exotica, theoretical interlocutions, lyrical interludes, personal vendettas, artificial embellishments, paradoxical pastiches and salacious lacunae. Pharmacological adventures/addictions, fashions, jewelry, perfumes and gardens, tragic accidents, nervous breakdowns, violent skirmishes, obsessive compulsions, legal transgressions, masquerades, seductions, psychic cannibalism, hysteria, bizarre domestic arrangements, lavish expenditures, eccentric eating habits and sentimental deathbed scenes will be fetishistically eroticized."

% Marjorie Franklin (Chicago, IL) presents Seduction, an interactive computer/audio installation which explores physical and emotional relationships between humans and computers. The computer becomes a desiring subject, lusting after the bodies of humans it sees in the installation space. The participant triggers vocal responses from the computer as she walks around in the installation space. The 'voice' of the computer reacts to the movement of the participant by comparing its own body to hers, making seductive and complimentary comments with degrees of emotion which correspond to her navigation of the space.

Through her interaction of her body with the voice, the viewer becomes attuned to the shape of the voice's space.

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< "Out There Art" - Exhibition of Student Artwork >

Advanced Computer Imaging  
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The artwork in this exhibit was created by students in the Advanced Computer Imaging course taught by Joan Truckenbrod at The School of the Art Institute of Chicago. This course engages students in a dialogue concerning the aesthetics of the digital image, and the critical and theoretical issues surrounding digital media. Students study computer imaging techniques using high resolution Silicon Graphics computers. Projects require exploration and experimentation using various methods for creating compositions based on constructs such as abstraction, fragmentation and synthesis. In this process, students integrate traditionally different modes of artistic expression including use of the lens of a camera, the stroke of a brush and the gesture of the hand. Students study the aesthetic traditions that have influenced artists in their use of computers, in order to develop an awareness of these movements and an understanding of the intentions of these artists. The artwork of contemporary computer artists is discussed. Students develop the skills, knowledge and creative imagination necessary to create their own unique body of work.

In this course a history of electronic arts is presented, including exhibits and artists using electronic technology in the artmaking process. It is important for students to have a familiarity with the ideas of artists creating art in this medium as their work extends upon the artwork of these early pioneers. The artwork of artists currently working with electronic media, including imaging, kinetics and interactive work, is also discussed. Aesthetic traditions of this electronic artwork are also discussed as traditions such as photo montage and collages share ideas and processes with computer imagists. The traditions of cut-and-paste, fragmentation, abstraction and reconstruction have a direct impact on the way artists use the computer to create images.

The objective of this course is to activate students into exploring and experimenting with ideas and imaging techniques until their own vision about their artwork comes into focus. Through class discussions and individual critiques, each student begins to sharpen their ideas and refine their artwork. Technical skills and knowledge are built up as increasingly more complex projects require more technical expertise. Technical skills and knowledge of hardware and software are critical for artmaking in the electronic arts. However, the teaching of this information must take place within the context of artmaking, integrating the computer into the creative process. New knowledge needs to relate to some existing body of knowledge - in this case art and artmaking. However, the most important aspect of teaching computer imaging is developing a vocabulary necessary for critical thinking and discussion of the theoretical and aesthetic issues in electronic artwork.

Megan Daly

I am an artist/writer/educator, currently living outside Chicago, attending SAIC as a graduate student, and working for a small interactive/multimedia company. These images are the first set in a series which will illustrate a piece of verse I wrote several years ago. The text in the five images comprises the first stanza of the poem. While I often combine text and image in my professional work for others, this is my first attempt to do so in my personal work. I welcome any feedback.

Soo Yun Eo

Two images I present are about my family and my native country. Since I left my native country, Korea, I came to realize that my family and my heritage as a Korean are the true anchors for my life in the new country. I appreciate the love my parents and my siblings have shown to me. Now that I am forced to be adjusted to a new life, I cherish the memories from my native country. The source of these images are old family photos.

Chris S. Johnson

Art is only a representation of an original that we will never see or understand. Viewers perceive minute details of the processes and the influences on the artist and their work. As with Duchamp's work we get a glimpse of another dimension. A person in today's Technological / Information society counts on the computer, e-mail, telephone, the cash machine and many other things to be there. How many though, understand the complex processes that go on behind these machines. The computer has become my sketch book, drawing board and gives me the finished product. The computer is a creative environment with a flexibility unavailable in other mediums. The variety of tools and possibilities, gives me a veritable image processor. All my creative energies are expended and preserved as an electronic file (mathematical formulation) only to be viewed when called upon. The original will never be touched by human hands. It exists without space or time.

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PROFILES
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< The Incident - An international symposium to examine art, technology and phenomena >

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June 30-July 2 1995, Fribourg, Switzerland

The Incident is a new international event, taking place in the mediaeval city of Fribourg, Switzerland in which major figures from the worlds of art and technology will sit down for the first time with researchers into phenomena, covering areas such as UFO research, parapsychology, dreams and other subjects that concern exploration of human consciousness.

Speakers so far are are Jacques Vallee, astrophysicist and UFO

researcher, James Turrell, light and earth artist currently creating an artwork from an extinct volcano in the Arizona desert, Terence McKenna, ethnobotanist, explorer and millennialist commentator on the politics of consciousness, Ulrike Rosenbach, performance artist and former associate of Beuys who will be discussing her work on angels, Roy Ascott, electronic networking pioneer and philosopher, Michael Lindemann, political researcher into military cover-ups, Kathleen Rogers, virtual reality artist who proposes a synthesis of psi phenomena and telepresence technology, Jim Schnabel, author of 'Dark White' and 'Round In Circles' which examines the sociology of the UFO research community and the crop circle phenomena respectively, Keiko Sei, who will present her research on telepaths in Eastern Europe, Michael Heim, author of 'The Metaphysics of Virtual Reality', Kristine Stiles, art historian, Budd Hopkins, researcher in UFO abductions, H-R Giger, sculptor and creator of the sets and creatures in 'Alien' and Homer Flynn, representing the Residents, legendary anonymous music group, who will present a live CD Rom demo of their 'Freakshow' and 'The Gingerbread Man'.

The aim of the symposium will be to study different approaches to consciousness as more and more people are becoming convinced that phenomena, such as UFO sightings or contacts, psychic activity, or other anomalous events have become real in their lives. Whether as hard fact, the product of the subconscious or simply a projection of imagery from mythology or science fiction, it is useful to look at this subject through the eyes of the contemporary artist as well as the scientist in the act of visualising and mediating the nature and value of reality and experience. The symposium intends to bring together parallel debates from often differing fields, for example, the comparison of cyberspace, virtual reality and artificial life with studies of the nature of religious experience, shamanism, and dreaming. Attending The Incident will place you at the forefront of discourse in this rapidly developing area.

The symposium will be part of a larger artistic programme which includes exhibitions, performances, video, film and music and which takes place as part of the Belluard-Bollwerk International 95, the arts festival of Fribourg, Switzerland, which will be devoted to the themes of 'The Incident', taking place from June 30-July 15 1995.

For further enquiries about the programme please contact Rob La Frenais (Artistic Director), for details and booking form (advance booking is advised) please contact The Administrator, at the Belluard-Bollwerk International.

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< The LAB Gallery >

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The LAB/The%art%re%grp, Inc. is an interdisciplinary artists' organization which supports the development and presentation of new visual, performing, media and literary art. The LAB assists artists in the creation of new work and presents new work of

the highest quality by interdisciplinary and experimental artists. Of interest is work which crosses boundaries -- material, cultural or presentational -- and encourages new artistic and social dialogue between artists and audiences.

Over the past ten years, The LAB has earned a reputation as one of the San Francisco Bay Area's foremost presenters of visual and interdisciplinary performance art. Since its inception in 1983, The LAB has consistently received critical acclaim for its presentation of new experimental work in a variety of media by local, national and international artists. The LAB presents exhibitions, performances, new music, and literary events. Video programs, community forums, and workshops are frequently presented in conjunction with exhibitions and performances.

The LAB supports emerging artists and under-recognized mid-career artists by providing honorariums, publicity, technical support and access to unique technical resources such as SoundLAB, a state-of-the-art digital audio editing facility. The LAB is the only gallery/performance space of its kind in the Bay Area which provides free computer sound editing workshops for lower-income women and urban youth, and artist residency opportunities for compelling projects incorporating innovative uses of sound, including video/radio projects, and music/sound scores for dance, theater, performance art, and audio/visual installations.

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LEONARDO DIGITAL REVIEWS
MARCH 1995

Editor: Roger Malina  
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< Introduction: Conflict of Interest by Roger Malina >

It is a sunny Sunday afternoon in Marseille, France. I have just finished going over this issue of Leonardo Digital Reviews as assembled by Kasey Rios Asberry in San Francisco. I enjoyed it- from Buckminsterfullerene to Data Trash, passing through Karnow's reviews of two CDs (he liked one, sort of).

But then I noticed that Emmer's review deals with books written by Hargittai, who wrote the Editorial in this LDR. I also noticed that in the table of contents we had credited the authors of the reviews but not the authors of the original work- whose work is it - ah those critics!. And then the



positive review of The Well Tempered Object - well that book is by an author whose work is published by the same publisher as Leonardo, and is a friend of the editor of LEA. And the negative reviews in this LDR were written I suspect by reviewers who had no personal connection with the author of the work. Hmm. Cozy group this LDR bunch, we like our stuff and hate the other stuff. But then it's easier to write a negative review of work by someone you never have to meet. But then, let's be optimistic and hope that maybe we get to know people whose work we find interesting.

One of the wonderful things about the internet is that the cozy work of a community of scholars can easily be exposed to new influences and ideas. And outsiders can easily become insiders. So if you disagree with the reviewers - send us email at [davinci@uclink.berkeley.edu](mailto:davinci@uclink.berkeley.edu) and we will publish your alternative thoughts. If you want to write reviews about work that we never even mention, contact us. In fact I just got email from Kevin Murray (Nil Desperandum) ([kmurray@werple.mira.net.au](mailto:kmurray@werple.mira.net.au)) in Australia- he asked to be added to the LDR Review panel. He found the LDR reviews posted on the LDR WWW page (check Reviews or LDR at URL <http://www-mitpress.mit.edu/Leonardo/>).

So - if you think we have a conflict of interest - join in! email to [davinci@uclink.berkeley.edu](mailto:davinci@uclink.berkeley.edu). If you would like to have your work reviewed- send it in- physical works by snail mail to the Leonardo Editorial Office ( 236 West Portal Avenue, #781, San Francisco, Ca 94127,USA)

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< Editorial: Istvan Hargittai >

Member LEONARDO Editorial Advisory Board  
E-mail: [hargittai@ch.bme.hu](mailto:hargittai@ch.bme.hu)

#### A Fuller Bridge

The discovery of the sphere-like C60 Buckminsterfullerene molecule, followed by the emergence of a whole new fullerene chemistry seems to provide a unique opportunity to lessen the separation between C. P. Snow's two cultures. The drama of the discovery and the magnificent simplicity of the structure are capable of attracting the attention of not only other scientists outside chemistry but a broad circle of interested lay persons. Both the story and the structure are rich in cultural implications.

In a laser beam evaporation experiment of graphite, at the beginning of September 1985, a group of scientists at Rice University in Houston, Texas, identified a set of conditions in which the C60 species could be produced in an incredibly high relative abundance in comparison with any other cluster. This extraordinary relative stability prompted the researchers to look for the structural reason of its formation. First they came to the conclusion that it should be a closed cage structure. Having known this much they could have quickly come to the conclusion of the shape of the truncated icosahedron, one of the thirteen Archimedean polyhedra. In hindsight this is what should have happened.

Instead, they were merely searching for a sphere-like structure composed mostly of same-size regular hexagons, based on the graphite sheets. They remembered the U.S. pavilion of the Montreal Expo 67 which led them to the works of Buckminster

Fuller. Playing with models then, they came finally to the conclusion of the structure consisting of 12 regular same size pentagons and 20 regular same size hexagons.

The route to the discovery thus was connected to Buckminster Fuller's name in the researchers' mind and they named the new molecule buckminsterfullerene. This is a very long name for a relatively simple compound. However, any exact name would even be much longer. It is also a respectable name for an important molecule whereas names such as footballene, soccerene, buckyball and the like sounded too playful. In fact, though, the official soccerball consists of the same number and form of patches as the truncated icosahedron. Buckminsterfullerene is the third modification of carbon, in addition to graphite and diamond, and Nature seems to have kept it secret for a long time. There is now an avalanche of similar all-carbon molecules, all belonging to the fullerene family and technically as many new modifications of carbon. One of the most intriguing features of fullerene chemistry is that metal atoms may get inside the C<sub>60</sub> ball and even a new designation had to be devised to describe this mode of forming chemical associations. Thus, for example, the buckminsterfullerene molecule containing a lanthanum atom within is designated as La@C<sub>60</sub>. An interesting feature of the discovery was that it was a lucky crossing of two separate lines of research. In one, Harry Kroto was looking for molecules of interstellar space and for him the laser beam evaporation of graphite served for mimicking interstellar conditions of forming new species. In the other, Rick Smalley had built a sophisticated apparatus in which loosely bound groups of atoms were formed and observed, called clusters. The graphite evaporation experiment combined their experience and interest, and brought cluster physics and astrophysics together in a chemical exercise.

Their experiment though was not the first of its kind. About a year before, another group in a similar experiment detected and published the products of graphite evaporation by laser beam. Although the relative abundance of C<sub>60</sub> was not so striking as in the Houston experiment, in hindsight again, it could have been noticed. It was not though, and not only by the researchers who produced the data but by the readers of the prestigious journal either, where the report had appeared.

When the report of the Houston group was published, it invited interest but the landslide in the new chemistry started when another team found a way to produce buckminsterfullerene in measurable quantities enabling any chemist who wished to do so to experiment with the new substance.

The discovery of buckminsterfullerene was serendipitous but it was not luck alone but hard work, training, experience, and curiosity that all came together in utilizing the serendipity. As Louis Pasteur stated, in the field of observation, chance only favors those minds which have been prepared.

Curiously, several suggestions, unknown to the discoverers, preceded the discovery. They all pointed to the feasibility of the substance that we call today buckminsterfullerene. In 1970, a Japanese scientist suggested C<sub>60</sub> of a truncated icosahedral shape, purely out of symmetry considerations. In 1973 a Moscow group of scientists did some theoretical calculations leading to the suggestion of the great relative stability of C<sub>60</sub> molecule of the truncated icosahedral shape. Even before, in 1966, a British chemist and science writer mused in print about

the possibility of graphite sheets curling up into hollow ball-like molecules. There are thus many threads of the buckminsterfullerene story, and Buckminster Fuller's entering the picture had more than symbolic significance. Fuller was not only the creator of geodesic domes but an advocate of physical geometry in which the dodecahedron and the icosahedron played an important role. His writings may be controversial if looking for the specifics but it is his influence, exerted over broad ranges of disciplines, that not only survives him but appears to provide fruitful stimuli in different fields.

The physical importance of the icosahedron and the relevance of Fuller's teachings were stressed by the discoverers of virus structures, in the early 1960's who stated that the solution we have found... was, in fact, inspired by the geometrical principles applied by Buckminster Fuller in the construction of geodesic domes. The resemblance of the design of geodesic domes to icosahedral viruses had attracted our attention at the time of the poliovirus work Fuller has pioneered in the development of a physically orientated geometry based on the principles of efficient design. Alas, it seems that the influence on this important microbiological research did not spill over to other fields.

The situation may be different with the buckminsterfullerene story. A whole new field is being created, one that is new not only by the unique shape of the C60 molecule but by the size-range that is getting involved. Fullerenes appear not only as isolated molecules but as sheets and tubes and molecular wires in a great variety. The potential applications range from superconductivity to anti-AIDS agents. Fullerene chemistry is becoming an important part of a new area, often called nanochemistry, referring to sizes of the magnitude of many, though rather finite number of molecules.

There is added attraction in this new chemistry in the accessible shape of the buckminsterfullerene molecule. The truncated icosahedron is not too common, such as the cube but not too complicated either to make it difficult for lay persons to understand and recognize. It is special enough to catch the eye. It is pleasing not only to chemists but to interested lay persons as well when this shape is recognized outside chemistry. It may be a children's climber, a lamp, the soccerball itself and others, including a conspicuously beautiful drawing by Leonardo da Vinci.

Had the original discoverers known their geometry better, had Euler's formula popped into their mind as soon as they started looking for the shape of the cage consisting of 60 carbon molecules, they might have had no reason for reaching out to Buckminster Fuller, or, eventually also to one of the illustrations in Darcy Thompson's Growth and Form, for that matter. In that case the synergistic impact of their discovery would have almost certainly been much less significant, although this is not equivalent to praising the lack of being versed in geometry. On the contrary, one of the side benefits of this outstanding chemical discovery may be an enhanced interest in three-dimensional geometry and a strengthened commitment towards geometry education in our schools. This is but one aspect in which the smooth rolling buckminsterfullerene molecules may facilitate bridging our two cultures.

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REVIEWS  
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< Book Review: Symmetry >

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Symmetry: a Unifying Concept, Istvan Hargittai and Magdolna Hargittai,  
Shelter Publications Inc., Bolinas, CA., 1994. 222 pp., Illus.,  
\$ 18.  
ISBN 0-936070-17-X.

Reviewed by Michele Emmer, Dipartimento di Matematica,  
Universit` Ca'  
Foscari, Dorsoduro 3825/E, Ca' Dolfìn, 30123 Venice, Italy.

+Symmetry is a vast subject, significant in art and nature. Mathematics lies at its root and it would be hard to find a better one on which to demonstrate the working of the mathematical intellect. This phrase is quoted from a little and well-known book entirely dedicated by the mathematician Hermann Weyl to the theme of Symmetry [ 1]. The volume was first published in 1952 and it was a revised version of the series of lectures that Weyl gave in the previous year at Princeton University. One of the authors of the volume Symmetry: a Unifying Concept, Istvan Hargittai, has edited two large volumes, more than 1.000 pages each, dedicated to the same topic, with almost the same title. The first one in 1986, Symmetry: Unifying Human Understanding, [ 2] the second one in 1989 by the title Symmetry 2: Unifying Human Understanding [ 3]. Ervin Y. Rodin in his foreword to the first volume explains that: +The project Symmetry presented here was an ambitious one. Its scope is tremendous, with subjects from fractals through court dances to crystallography and literature. Symmetry is really a vast subject! In his preface to the same volume, Hargittai, editor of the volume, quotes from the letter of invitation he sent to prospective contributors: +It is, of course, commonplace today that not only is symmetry one of the fundamental concepts in science, but it is also possibly the best bridging idea crossing various branches of sciences, the arts and many other human activities.

Whereas symmetry has been considered important for centuries, primarily for its aesthetic appeal, this century has witnessed a dramatic enhancement in its recognition as a cornerstone scientific principle. In addition to traditionally symmetry-oriented fields such as spectroscopy or crystallography, the concept has made headway in fields as varied as reaction chemistry, nuclear physics or the study of the origin of the Universe. At the same time, in its traditional fields its meaning and utility have greatly expanded. It may be sufficient to refer to antisymmetry, dynamical symmetry, generalized crystallography, or the symmetry analysis of music and of artistic design. Istvan and Magdolna Hargittai wrote together another volume, Symmetry through the Eyes of a chemist, in the introduction of which they wrote the following:

Fundamental phenomena and laws of nature are related to symmetry and, accordingly, symmetry is one of science's basic concepts. Perhaps it is so important in human creations because it is omnipresent in the natural world. Symmetry is beautiful although alone it may not be enough for beauty, and absolute perfection may be even irritating. Usefulness and function and aesthetic appeal are the origins of symmetry in the worlds of technology and the arts.

In his review of Symmetry 2: Unifying Human Understanding, Roger Malina wrote that the editor of this 1,000-page opus, has

accomplished an amazing task. He has found authors with new things to say about symmetry...This second volume extends the discussion to new areas (robotics, economics, medical sciences) and deepens it in well-known areas (crystallography, art, physics, etc.)

I have started my review of the new volume by Istvan and Magdolna Hargittai quoting from the prefaces and introductions to other volumes they dedicated to the theme of Symmetry. Perhaps the first question after this large selection of quotations could be: is it still possible to write something new on the theme of Symmetry?

Well, it is possible, of course. SYMMETRY is really such a vast subject, so many are the possible meanings of this word and its use is so different depending on the area in which it is used. This implies the danger of being vague and obvious, to put together too much different information without a common denominator. It is even difficult to answer the question: what is Symmetry? This was the title of one of the papers in the Hargittai's volume written by Alan L. Mackay, a crystallographer. The answer was: Symmetry is the classical Greek word YM-METPIA, the same measure, due proportion. Proportion means equal division and due implies that there is some higher moral criterion. In Greek culture due proportion in everything was the ideal.

This of course is only one of the possible answers to the question. So, why make a review of a new book on symmetry? Why have the authors written another book on symmetry? My answer to the question is that the volume adds something new to the subject. Of course the new volume is part of a large project on the theme of symmetry (titles are almost the same!) but this new book is different from the previous ones of the same authors and from other publications on the same topic. I will try to explain why. If I am not mistaken the word symmetry - wrote Herman Weyl [1, page 3] - is used in our everyday language in two meanings. In the one sense symmetric means something like well-proportioned, well-balanced; and symmetry denotes that sort of concordance of several parts by which they integrate into a whole. Beauty is bound up with symmetry in the sense that the idea is by no means restricted to spatial objects; the synonym harmony points more toward its acoustical and musical than its geometric applications. Harmony and proportion, in particular beauty, is the main topic of the new book by the Hargittai's. Much of what you will see in this book has to do with the beauty and harmony we have discovered in our travels throughout the world. We have taken photos and utilized graphic material that not only conform to one or more defined symmetry principles, but that have often appealed to our aesthetic sensibilities as well. In this phrase is the key of the book; it is a visual book, a very personal reportage of two chemists traveling around the world, making pictures and drawings, looking for symmetry in a very large sense. It is a very personal book. It is divided in two sections: the first half, chapters I-IX, deals with point-group symmetries, while the second half (chapters XI-XV) covers space-group symmetries. Chapter X is dedicated to the symmetry of opposites or antisymmetry.

All concepts are visually illustrated with very few written explanations. Quotations from literature are also included, like this poem from William Blake:  
Tyger! Tyger! burning bright

In the forests of the night,  
Tyger! Tyger! burning bright  
In the forests of the night,  
What immortal hand or eye  
Could frame thy fearful symmetry?

Titles of chapters include Bilateral Symmetry, Shape & Movement, Right Hand, Left Hand, Pinwheels & Windmills, Reflection & Rotation, Snowflakes, Building from Above, Cubes & Other Polyhedra, Balloons, Walnuts & Molecules, Antisymmetry, Repeating Everything, Helix & Spiral, Bees & Engineering, Rhythm on the Wall, Diamonds & Glass.

I conclude with the words of the authors: "One can only marvel at the richness and diversity in the works of symmetry. Yet what we have seen here, in our mostly visual journey, is merely the tip of the iceberg. We have just scratched the surface. All of the subjects introduced, all the photos and drawings, all the roads embarked upon here can lead in many directions and may serve to introduce you to further discoveries and newer insights." A real visual book for everybody.

P.S.: if you wish to contribute to a future book on symmetry, write to:

Istvan & Magdolna Hargittai, Eotvos University, H-1431  
Budapest, Pf. 117  
Hungary

References:

- [ 1] Herman Weyl, Symmetry, (Princeton, NJ: Princeton University Press, 1952), p. 145.
- [ 2] Istvan Hargittai, ed., Symmetry: Unifying Human Understanding, (Oxford, U.K.: Pergamon Press, 1986); reviewed by M. Emmer, The Mathematical Intelligencer, vol.12, n.4 (1990), pp. 75-78.
- [ 3] Istvan Hargittai, ed., Symmetry 2: Unifying Human Understanding, (Oxford, U.K.: Pergamon Press, 1989); reviewed by R. Malina, Leonardo, Vol. 23, n. 2/3 (1990), p. 329.

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< Book Review: The Well-Tempered Object >  
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The Well-Tempered Object: Musical Applications of Object-Oriented Software Technology, Stephen Travis Pope, Ed. The MIT Press, 1991. ISBN 0-262-16126-5

Reviewed by: Jason Vantomme

It has been my experience in the past that reviewing "topic anthologies" composed of numerous related articles by as many authors is a difficult task at best. At first glance, the task might seem rather simple: read and summarize each article and make some statement about its relevance to the domain within which it exists. Upon further thought, one realizes that this is the job of the anthology's editor and one that isn't really a review at all. So, the question arises: What is the task of an anthology reviewer? The task of the reviewer, in this case, is to "review" the work of the editor in convincing the reader why this compilation is necessary (usually not very difficult), why s/he picked the articles that s/he did, organizing the articles in a logical fashion ("parts"), and providing summarizations for each "part."

Stephen Travis Pope, the editor of "The Well-Tempered Object" is no novice to the job; he has served as the editor of the

Computer Music Journal (MIT Press) since 1989. Pope is also no newcomer to music technology, and his choice of articles comprising each of the text's four sections are excellent examples of the use of object-oriented technology (OOT) in the field. It may also be true that the anthology is the complete sum of OOT-related articles (plus a few) printed in the Computer Music Journal up to the date of the text's publication. However, to avoid sounding cynical, one must assume that the editor's job has included choosing those articles that are representative of the "state-of-the-technology"; in fact, three of the articles appear not to have been CMJ reprints. (Though two articles do appear in another MIT Press music technology anthology!) Another point of consideration in recommending this particular anthology is its age. Four years in the development life of a software technology is a very long time (think about Apple's System 6 vs. System 7.5) and the articles describing them often follow this life span to a certain degree. (Note also that some of the anthology's articles date from as early as 1980.) Despite the age of "The Well-Tempered Object," the anthology provides an excellent glimpse at the earliest uses and descriptions of OOT related to musical applications. Additionally, it provides the reader with a basis on which to examine the progress of music technologists using OOT; in this way, the anthology becomes an extremely useful historical record and research tool.

In addition to assembling a coherent and useful text, Pope provided the answers to several questions that could be asked not only by traditional music theorists or musicologists, but also by those experienced in music technology. These questions include: What is this technology really about? Where did this technology come from and why should I choose it for my musical research? Will this technology be around long enough to make it viable for my work?

The answer to this first question is provided by Pope's assembly of three tutorial/summary articles describing the notion of "object-oriented," object-oriented programming and object-oriented software design into Part I of the anthology. These articles, by Glen Krasner, Henry Lieberman [1] and Pope himself, provide a basic grounding in each of these topics. The editor's introduction to the book supplies the answer to the second question; his summarized history of OOT is informative despite being rather brief. The question to the last answer is related to the concern with the anthology's age. If a researcher were to read this text today, s/he would find that many of the musical applications are still in use and continue to grow.

Pope has titled Part II of the anthology "Music Representation and Processing Tools." This includes articles by C. Fry discussing his "Flavors Band" music specification language, Xavier Rodet and Pierre Cointe on the well-known FORMES environment, Pope on his Musical Object Development Environment (MODE) and David Jaffe and Lee Boynton on the NeXT Sound and MusicKit. This latter software is an excellent example of an OOT that continues to withstand the test of time, even despite losing its original hardware environment (i.e., the decision by NeXT Computer to forgo its hardware development and production and instead focus on its operating system).

Part III of "The Well-Tempered Object" discusses OOT as applied to musical composition systems and begins with a discussion of the Kyma/Platypus system by Carla Scaletti. Again, we find a

technology that has continued to grow in importance; a workshop on the Kyma system is being offered as a system by Carla Scaletti. Again, we find a technology that has continued to grow in importance; a workshop on the Kyma system is being offered as a part of the upcoming 1995 International Computer Music Conference. Rounding out the discussion of composition systems are an article by Henry Flurry on the multimedia production system called the Creation Station, and a paper by Glendon Diener on his TTrees score representation [2]. The last division of the anthology devotes its contents to the use of OOT in digital signal processing systems. Here the reader finds works by Kurt Hebel on the Javelina system and David Mellinger, Guy Garnett and Bernard Mont-Reynaud on a generalized, object-oriented signal processing environment.

While I believe that Stephen Pope fulfilled his job editing this anthology quite well, there are several points that might have been better addressed. The first of these would have seen a lengthier description concerning the roots of object-oriented technology. The second would place the summaries of each "part" at the beginning of each section instead of as an integrated whole at the beginning of the text. The relation of the section's articles to one another and their place in the research of the domain would also have been appreciated.

If you are a music technologist, you already know about "The Well-Tempered Object" and the long list of computer music research anthologies published by the MIT Press, A-R Editions and others. If you are not a music technologist, you will find that this anthology provides the articles you need in a complete set, without the effort of sifting through countless back-issues of the Computer Music Journal. Either way, "The Well-Tempered Object" is a useful reference addition to any musician (or engineer!) wishing to employ object-oriented techniques in their solution of musical problems.

Notes:

[1] Lieberman, who is now a researcher at the MIT Media Lab, is one of the leaders in developing a machine learning technique known as "programming-by-demonstration"; this is a "must see" new software technology for computer music researchers. See "Watch What I Do: Programming by Demonstration" edited by Alan Cypher and published by the MIT Press, 1993.

[2] This latter research grew into an exciting new approach to musical notation that is embodied in a piece of software known as "Nutation." See the Proceedings of the 1989 International Computer Music Conference published by the International Computer Music Association, San Francisco.

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< Book Review: Chemistry Imagined >

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CHEMISTRY IMAGINED: Reflections on Science by Roald Hoffmann  
Illustrated by Vivian Torrence  
Smithsonian Institution Press, 1993

Reviewed by Dr. Jose Elguero  
Institute of Medicinal Chemistry  
Spanish Research Council  
Madrid, Spain  
Email: Elguero@cc.csic.es

The book, CHEMISTRY IMAGINED: Reflections on Science by Roald Hoffmann, deserves a referee as good in chemistry as Prof.



Hoffmann, and as expert in art as Mrs. Torrence. That is not, by far, my case. And I doubt that there are many people with those attributes. I am an organic chemist with some sensitivity to beauty. And people like these are many. As a chemist I am used to plain statements: "I have enjoyed enormously the book" and I am sure it will be the same for many chemists and non-chemists. Chemistry is like a language and at the beginning of CHEMISTRY IMAGINED: Reflections on Science there is a short Chemistry/English dictionary. People don't need to be afraid of jargon and technicalities since Prof. Hoffmann has avoided these traps without losing an apex of rigor. The book can be read in the order in which it was written, as I myself have done, going forwards and backwards; but it is also worthwhile to read it following Torrences collages or one's own curiosity. For myself, I found two chapters, The Chemist and The Grail, particularly rewarding. Torrences collages are like puzzles: you need some effort to get all the information they hide. At first they are only pleasant, then, you discover more and more things as well as that they are finely attuned to Prof. Hoffmann's text. The comments by Lea Rosson DeLong, at the end of the book, provide some clues. Try with a simple one like "A Hands-on Approach" on page 97 and "Pasteur Life and Discoveries".

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< CD Review: "Places, Times & People" >

< CD Review: "Elsewheres" >

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Reviewed by Curtis E.A. Karnow  
Email: karnow@cup.portal.com

David Borden, "Places, Times & People"  
1994 Cuneiform Records

Borden uses his electronic keyboard in most of these pieces like a musical instrument. These days, that is odd. Sometimes it's a violin, sometimes brass, but most often Borden uses it as an electronic keyboard, repetitive hints of Philip Glass, the circular sounds of early Terry Riley, and through most of it all a sweet, rhythmic soft pouncing on the keys, ranging from piano, harpsichord and harp to a lowly growling timbre not seen in wood, a rhythmic constancy, a gentle sort of sound that I may have heard once maybe twenty years ago when I was in California, then. The first piece here has the date 1978 in its title.... Borden unabashedly likes his people, friends, Leon Kirchner his teacher at Harvard, and country places west of Ithaca, New York. He writes with slow expansions here, massaging the slight variation and melodic repetition, as if he were reluctant to take his eyes off his loved ones, the fields of snows and old barns, away from the still black waters of the American North East. This stuff is too thin and sticky, I thought when I went through it at first - too sentimental, and I can get the real thing somewhere else. But I played it again, not to listen to, exactly, but to hear it, somewhere, like a landscape.

Hal Rammel, "Elsewheres"  
1994 Penumbra Music

Hal has an electroacoustic sound palate he invented in 1991. He holds it in his left hand, almost like an Old Master holding a paint palate, and sort of plucks and rubs and blips and bloops with his right hand. It's all fed to an amplifier. A thousand variations emerge from this simple thing, most of the them

recognizably stringy, the stringy quality that is found not just in plucked gut, but in the low slow screeching of a raw rubbed string, all the way to glassy water sounds and leaves rusting in the silent jungle. It's a far range, and from the album picture and the drunken, weaving, tubular sounds in one of the pieces, I think Rammel twists thin metal spikes in and around the strings, performing acupuncture on a clump of rubber bands. When Rammel says "elsewhere" he means away from the machine and into the "inexhaustible detail of the natural world." The sounds of this live recorded, unmixed and unedited CD hearken to jungles, water; the interior of old trees. A few of these pieces have that depth of endless detail, but many others are irritating on the surface, a flat sequence of squeaky twisty whistles and jagged metal saw sounds; teeth on steel and glass. I bow to the inventor, but I wish that someone who can integrate these ad lib episodes would take over.

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< Book Review: Data Trash >

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Data Trash; the Theory of the Virtual Class, Arthur Kroeker and A Weinstein, Saint Martin Press, NY, 1994. ISBN 0-312-12211-x

Reviewed by Thom Gillespie  
E-Mail: thom@indiana.edu

I picked Data Trash up at a book sale. Everything 25% off. I might have bought it anyway since it was only \$16.95 (US) but 25% off was the clincher. I also picked it up because of the title: Data Trash. Hmm, what could that be? The sub.sub.title is "smelling the virtual flowers and counting the road-kill on the digital superhighway." The credits describe Kroeker as 'Nietzsche for the technocratic 90's', 'our remorseless Adorno', and Marshall McLuhan for the 1990's' -- not bad company. I had just finished Rim: a novel of Virtual Reality by Bescher and Interface by Stephen Bury. I loved Verner Vinge's True Names and reread the Three Stigmata of Palmer Eldritch by Dick at least once a year. Something called Data Trash sounded just right for my library. The essence of this book is on page 158 in the Data Trash Glossary: we are data trash and it's good. The 'we' he refers to is the left over meat puppets minding the gameBoy/joystick/mouse/etc back at the console. This is standard McLuhan: "The young Narcissus mistook his own reflection in the water for another person. This extension of himself by mirror numbed his perceptions until he became the servomechanism of his own extended or repeated image... he had adapted to his extension of himself and had become a closed system the selection of a single sense for intense stimulus, or of a single extended isolated, or "amputated" sense in technology, is in part the reason for the numbing effect that technology as such has on its makers and users...Any invention or technology is an extension or self-amputation of our physical bodies and such extensions also demand new ratios or new equilibriums among the other organs and extensions of the body...To listen to radio or to read the printed page is to accept these extension of ourselves into our personal system and to undergo the "closure" or displacement of perception that follows automatically." [ Understanding Media -- The Gadget Lover ] KroekerWeinstein like McLuhan is just saying once more: WATCH OUT FOR THOSE EXTENSIONS!

Probably the biggest difference between McLuhan and KroekerWeinstein is that McLuhan was a much better writer.

KrokerWeinstein write as if English is not their mother tongue. There is a lot of sub textual post structural semiotic attempts at textual sound bites, for example: "The information highway is paved with (our) flesh." "Resequence the ruling rhetoric of particular political communities according to the global ideology of technological liberalism..." "This greenhouse for the clonal body is where culture plantings are snipped from samples around the electronic net..." It took me almost 3 months to finish Data Trash because the best I could do was 2 pages at a sitting which is fine because KrokerWeinstein seem to write in 2 page blocks for the most part. Data Trash sat by the loo in my house and I'd read as the spirit or body moved me. I guess I kept expecting something profound but it didn't really come. I usually mark books as I read them. I like to underline passages for future reference, expecting something profound. But it didn't really come. This book is unmarked but I'm not sure this means there is nothing there or if it means that I haven't found that something yet. My gut feeling is that what KrokerWeinstein is trying to say was probably said far more eloquently by Howard Beal in the movie Network just before they blew out his brains live on the tube. If you morph Beal and KrokerWeinstein you might get: "... Because this is no longer a nation of independent individuals....It's a nation of some 200 odd million transistorized, deodorized, whiter than white, steel belted bodies, totally unnecessary as human beings and as replaceable as piston rods"... we are data trash and it is good!!

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< END LEONARDO DIGITAL REVIEWS March 1995 >  
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| ANNOUNCEMENTS |  
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< Media Artists: Show Work in Mexico City >  
Michael Kassner/Joshua Okon  
La Panaderia  
Ozuluama 14  
Col Condesa  
Mexico, DF 06100  
Tel: (525) 286-7777  
Fax: (525) 286-1800  
Email: panadero@laneta.apc.org  
Subject: Show your videos in Mexico City

We are seeking work for future shows at La Panaderia, in Mexico City, an exciting new independent art space focusing on provocative, politically oriented, and experimental work in all media. There is an art gallery, classroom, and film/video screening room that can seat 100 people. Some grant money may be available for artists/videomakers who wish to teach 1-2 month workshops. If you would like to present your work to an enthusiastic audience in Mexico City, please send written project proposals; transparencies; video in (NTSC) 8mm, Hi-8, 3/4", or VHS formats; CD-ROM or Macintosh HD floppy disk (for Quicktime and interactive media).

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< Utopia/Dystopia: the Third Annual Conference on Feminist Activism and Art >

April 7-9 at Center for the Arts Theater and the San Francisco Museum of Modern Art

Center for the Arts

701 Mission Street at Third  
San Francisco, CA 94103  
Ticket Tel: (415) 978-2787

For complete panel descriptions, send e-mail with this header  
send UTOPIA  
e-mail to:  
zoey@futon.sfsu.edu  
messages with that header will not be read, but you will  
receive an e-mailed description of all the panels, and other  
conference info.

SF Camerawork and The LAB present UTOPIA/DYSTOPIA: The Third  
Annual Conference on Feminist Activism and Art, a three day  
event featuring panel discussions, performances, and video  
screenings by more than 30 women artists, activists, and  
writers from across the country. The conference will focus on  
the evolution of community through art rooted in social  
consciousness, public television and new technological networks  
of communication. Participants will envision both ideal and  
dystopian scenarios for the empowerment of female culture in  
the new millennium. Speakers and performers represent a wide  
range of women working in different spheres of the community  
from Tzines to public access television to internet arts  
activist projects. International acclaimed performance artist  
Rachel Rosenthal will be the featured performer.

Also in conjunction with the conference, The LAB and SF  
Camerawork present The Technology Program, a series of  
interactive explorations that will extend throughout 1995. It  
features a high tech/low tech networking system for cultural  
activist which will be formed during the conference, and a  
world wide web site on the internet (on view March 21) located  
at URL:  
<http://www.igc.apc.org/femactart/>

For the past three years SF Camerawork and The LAB's annual  
Conference on Feminist Activism and Art has provided a forum  
for feminists, activists, and artists to address issues of  
shared concern, exchange ideas and information, and form new  
diverse community networks. This year's conference will  
specifically focus on the processes by which communities are  
formed, with respect to both traditional and new community  
networks sustained through interactive technology. For  
information on past conferences, call The LAB or SF Camerawork,  
and refer to Critical Condition: Women on the Edge of Violence  
(City Lights Press, edited by Amy Scholder), an anthology which  
documents the first conference.

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| PUBLICATIONS |

< MIT's PRESENCE 3:3 Has Won a PSP Award >

A special issue on the Application of Virtual Reality and  
Telerobotic Technology to Disabled Persons has Won a major  
publishing award. Recently praised by the \_\_The Times Higher  
Education Supplement\_\_ as a journal that "pursues its subjects  
in a scientifically rigorous manner," MIT Press's PRESENCE:  
TELEOPERATORS AND VIRTUAL ENVIRONMENTS has now won a  
prestigious Professional and Scholarly Publishing (PSP) Award.  
The Association of American Publishers's PSP Division annually  
presents such awards to excellent and innovative books and

journals produced by its professional and scholarly publisher-members.

PRESENCE's Volume 3, Number 3, Summer 1994, specifically won the distinction of "Best Single Issue of a Journal" published in 1994. As indicated in the "Editorial Notes" of 3:3, PRESENCE's editors prepared this special, award-winning edition because they "regard the task of applying virtual [reality] environment and telerobotic technology to [persons with] disabilities both very worthwhile and very challenging . . . ." The editors also "invite all individuals working in this area to consider [PRESENCE] as a vehicle for publishing their results." Of the special issue's 7 scholarly articles, all but one originate from papers presented at the 1993 Virtual Reality and Persons with Disabilities conference.

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| JOB ANNOUNCEMENTS |  
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< Interactive Arts Position - Gwent College of Higher Education >

Application form and further details from:  
Personnel Dept.  
Gwent College of Higher Education, Caerleon Campus  
PO Box 179  
Newport NP6 1YG Wales, UK  
Tel: +44 (0) 1633 432080 (Ansaphone after hours)  
Fax: +44 (0) 1633 432006

Senior Lecturer in Interactive Arts

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We are seeking applications from candidates with a sound practical knowledge of the development of new interfaces and their application in multi-media, hypermedia and "intelligent" environments. Candidates should be able to combine a first degree in a relevant discipline (ideally also a postgraduate degree) with recent experience of teaching in Higher Education. Evidence of professional practice and research into interactivity in art and design is essential. Knowledge of a relevant programming language and electronics would be an advantage.

Salary range UK pounds 19,845 to 26,223 p.a.

Closing date: 10 April 1995

Interview travel expenses will only be considered from UK entry points

We are an Equal Opportunity Employer  
A University of Wales Associate College  
"providing accessible and relevant learning"  
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< Preliminary Position Posting - Alabama State University >  
(Formal announcement to follow pending final approval)

Steven M. Miller, Coordinator/Instructor of Music Media  
Tel: (334) 293-4279  
Fax: (334) 293-4901  
Email: smill@wsnet.com

Dr. George Hess, Asst. Professor of Music Theory and Technology

Tel: (334) 293-4207  
Email: georgehjr@aol.com

Dr. Thomas Hager, Dean - School of Music  
Tel: (334) 293-4341

Alabama State University School of Music  
PO Box 271  
Montgomery AL 36101-0271

Staff Assistant in the Music Media Emphasis Area  
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Alabama State University is requesting applications for a staff assistant in the Music Media Emphasis Area. The person selected will manage the daily operations of the computer & listening labs; recording of music in the recording studio, recital and rehearsal halls; and assist in the maintenance and installation of recording equipment, computers, related equipment and resource materials in the School of Music.

Qualifications: Bachelor's Degree in Recording Industry Technology or related field with 3-5 years professional experience (or equivalent in education & experience) and a strong background in at least several of the following: the theory of recording techniques; computer applications in music instruction; mixed platform computer networks (ethernet & tcp/ip); audio recording & production; video/multimedia production; and MIDI/computer music. A working knowledge of sound reinforcement, equipment troubleshooting, and maintenance is required.

Closing Date: Until Filled  
Starting Date: projected July 15, 1995  
Starting Salary Range: competitive

Each applicant must have a completed Alabama State University job application, three (3) letters of reference, transcript(s), and a resume on file in the Personnel Office. Contact the Personnel Office directly at the address below for application materials.

Alabama State University is an Equal Opportunity/Affirmative Action Employer  
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< Positions in Music and Multimedia at McGill University >

Bruce Pennycook  
Email: brp@sound.music.mcgill.ca

Assistant or Associate Professor in Music, Media, and Technology  
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The Faculty of Music, McGill University, invites applications for a tenure-track position at the Assistant or Associate Professor level in the newly established Graduate Program in Music, Media, and Technology. The Faculty is looking for an expert in visual arts with a strong interest and involvement in music. A completed Ph.D. in film, visual studies, or video communication is required, as well as a strong research record in audio-visual interaction, and proven excellence as a teacher. The candidate will teach, do research and production in video and electronic media involving music within a team of audio and multimedia experts, closely supervise

research of students at Masters and Ph.D. levels, and actively participate in the development of the program. Salary negotiable (current Assistant Professor base: \$40,980). The position is subject to budgetary approval.

Applications, including an up-to-date C.V. and three letters of recommendation, should be directed to

Professor Bo Alphonse, Chair  
Department of Theory  
Faculty of Music, McGill University  
555 Sherbrooke Street West  
Montreal, Quebec  
H3A 1E3

Effective date of appointment: September 1, 1995. Applications will be accepted until March 31, or until the position is filled. In accordance with Canadian immigration requirements, this advertisement is directed in the first place to Canadian citizens and permanent residents. McGill University is committed to equity in employment.

Manager of Technical Support in Sound Recording  
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The Faculty of Music, McGill University, invites applications for a position as Manager of Technical (Studio) Support and Development in the Graduate Program in Sound Recording (M.Mus., D.Mus.) within the framework of the newly established Music, Media and Technology Program.

Qualifications: Professional Engineer with Bachelors or Masters of Electrical Engineering and solid practical experience in professional audio and video industry in the areas of studio design, systems development, construction, audio/video communications technology, digital and analog systems integration, and management of technical personnel. Proven successful track of technical achievements is required. Management skills and ability to work effectively in a university environment are essential. Terms: Initial appointment is for a period of one year with the possibility of subsequent renewal. Salary according to scales and qualifications. The position is subject to budgetary approval. Job Description: The Manager will be responsible for the technical development, operation and management of studio facilities containing sophisticated audio and video equipment with a large component of computer based hardware and software. The job will include constant updating of the technical capabilities of studios, development of long term integration of facilities, conducting research into new technical solutions, designing and supervising construction of studios and equipment, managing a small team of technicians, and providing technical assistance in research projects where technical facilities are required. Some teaching of technical topics may be required. The Manager will report to the Director of the Graduate Program and will consult on all major development issues with him/her.

Applications, including an up-to-date C.V. and three letters of recommendation, should be directed to

Professor Bo Alphonse, Chair  
Department of Theory  
Faculty of Music, McGill University  
555 Sherbrooke Street West

Montreal, Quebec  
H3A 1E3

Effective date of appointment: August 1, 1995. Applications will be accepted until March 31, or until the position is filled. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents. McGill University is committed to equity in employment.

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ACKNOWLEDGMENTS
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Leonardo/ISAST gratefully acknowledges Interval Research Corporation for support of Leonardo Electronic Almanac.

LEA FORMAT CONVENTIONS
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The following describes the format or markup conventions used in creating Leonardo Electronic Almanac. The function of these conventions is to facilitate perusal through the text, and to make it easier to create conversion programs to various text readers.

- =====: Section Heading Delineation - 62-character sequence
- \*\*\*\*=: Item Delineation within Section - 62-character sequence
- : Separator for subsections within items.
- < : Begin Item Title - search for the character "<" followed by two spaces
- >: End Item Title - search for two spaces followed by ">"
- |\_ or \_|: This sequence takes you to the next SECTION TITLE. Item titles and author/contributor names appear exactly the same in the Table of Contents and at the location of the actual item. Section names appear in all capital letters, and appear with all letters in sequence with no spaces (PROFILES, REVIEWS, etc.).

The preferred placement and format for address headers at the top of each item, preferably organized in the following way:

- Contact Person
- Organization
- Street Address
- City, State, Postal Code and Country
- Tel:
- Fax:
- Email:
- URL:



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| LEA |  
| WORLD WIDE WEB |  
| AND |  
| FTP |  
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The LEA archives, including the Leonardo Electronic Gallery, has been moved over to the World Wide Web site, which is now accessible using the following URL:

<http://www-mitpress.mit.edu/LEA/home.html>

The following are the specifics about ftp access for Leonardo Electronic Almanac:

```
ftp mitpress.mit.edu  
login: anonymous  
password: your_email_address  
cd pub/Leonardo/Leonardo-Elec-Almanac
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