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INTRODUCTION
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< This issue >

Craig Harris

A great deal of work has been taking place on developing the LEA WWW site. The LEA Gallery has evolved, and much of the exhibition of student works from the School of the Art Institute of Chicago has been installed. I would like to thank Jeff Kott for his technical support, and Dorothy Gordon, the SAIC course Graduate Teaching Assistant, for their help in producing this exhibition. We are working on supplementing the visual exhibition with sound/music examples early in May. Other work included in the former ftp-based gallery has been placed into the WWW gallery, including work of Mike Moser, Eduardo Kac, and others. MIT Press is installing another large disk on the file server, so we can expect the gallery and other components of LEA to grow in coming months.

Simon Penny provides us with a perspective on his book "Critical Issues in Electronic Media", being released shortly by SUNY Press. His introduction to the collection of essays by several authors and artists known to the LEA audience reveals the orientation for the book. The release dates are April 28 in paperback and May 5 in hardback.

Paul Hertz provides us with a perspective from a recent lecture entitled "Culture, Democracy, and Computer Media". Paul addresses issues that find their way into some of the other perspectives delivered in Leonardo Digital Reviews this month.

We get to wish a Happy Birthday with many happy returns to FineArt Forum. After eight years of evolution FineArt Forum is still going strong. If LEA readers are not receiving FineArt Forum yet, this is a great opportunity to get on the subscription list. Many notices received at LEA headquarters do not find their way into LEA because they are duplications of what appear in FineArt Forum. This is an important publication and World Wide Web site.

In January 1995 (LEA 3:1) we published a profile on the newly

launched Electronic Music Foundation. There was mention in the profile of the development of a thread of the foundation that would be oriented towards making compact discs of electronic music widely available. EMF now announces that this process, entitled eMUSIC is now launched. A brief announcement appears here in LEA 3:4, and an extensive listing of the compact discs that are currently available appears at the LEA WWW site.

I am sad to report the death of Swiss painter Max Bill. We republish a brief profile of Bill that was published in the hardcopy "Leonardo Almanac: International Resources in Art, Science and Technology".

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FEATURE ARTICLES
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< Critical Issues in Electronic Media >

Simon Penny (Editor)  
Email: penny+@andrew.cmu.edu  
Pittsburgh, Pennsylvania  
(this introduction reprinted with permission)

Introduction  
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It would be difficult to refute the suggestion that technological change has been the major force for cultural change for at least a century. As we move out of the first technological era, that of industrial production, into the era of the digital, a profound warping and rifting occurs across the cultural surface. This collection seeks to sketch the changing topology of culture as it enters electronic space. And to specifically addresses questions of art practice in that space. Electronic technology mediates our relations with the world. Although this book is outwardly a traditional object, it, like all others produced in the last decade, was electronically typeset, electronically designed and printed by computer controlled machinery. The texts have been formulated and edited on digital word processors and the contributors have communicated through Fax and Email networks. None of this technology existed a generation ago.

Since Sputnik, the planet has become wrapped in a blanket of electronic communications, the ~datasphere~, facilitated by satellite and fibre-optic links between computer ~nodes~. International satellite data communications and TV broadcast networks have completely re-organised the flows of information, inter and intra-state. As long ago as the LA Olympics, press photographs were shot on still video cameras, beamed via satellite to Japan to be distributed back over international press networks to appear in LA newspapers. This transformation has been so rapid and so total that few areas of western life are untouched by it.

The electronic mediascape is about to go through another resounding change of state. Telephone, computer networks, television and interactive gaming will be digital, and thus, connectable. The exponential growth of digital network communications has sent computer companies, cable TV companies, Networks and telephone companies all scrambling for a piece of the interactive TV action. The ~information superhighway~ looks poised to become a gargantuan virtual Mall. The pace of these

changes is itself causing cultural dislocation. Between the time this anthology was conceived and the time of publication, technologies which were major have become obsolete and others that two years ago were high end research tools have become consumer commodities. In 1990 at the SIGGRAPH conference and elsewhere, Virtual Reality came out of the research closet. Four years later, Sega released its domestic computer game VR interface. Cultural changes follow these technological changes. Who, in 1990, could have predicted that, under the influence of the rapid growth of the videogame industry, Hollywood would be imploding in 1993.

We have heard for 20 years that the electronic revolution will be as resounding as the industrial one. But we are only now moving beyond the techno-utopian rhetoric to understand the nature of this revolution, who benefits and who suffers. The entire global economic structure is going through a change of state. The state we have occupied for 150 years is the system of centralized industrial production which consumes raw materials supplied by (economic) colonies. The new and quite unfamiliar state is transnational commodity capitalism, enabled by instantaneous, space collapsing communication of electronic data, especially money. The goods which are produced in this system, and the channels by which the goods are marketed and controlled, are made possible by precisely the technologies that also make possible electronic media arts practice. Thus, a condition of esthetic distancing is untenable for practitioners in electronic media arts. The advent of consumer electronics and software complexifies both the esthetics and the politics of art production with electronic tools, by implicating artists as both producers and consumers of technological commodities. Systems of communication and structures of power have changed; yet the world views and critical systems that operate in many of our institutions are pre-electronic, often pre-industrial; the traditional art historical methodologies being a case in point. Prior to the (slow and ongoing) infiltration of postmodern theory and media theory, art history was without the tools to cope with multiplicity. How could such critical systems have any application to an aesthetic product that is created untouched by human hands, is distributed at lightspeed as electromagnetic fields or bounced off satellites outside the earth's atmosphere, to be decoded by electronic receiver units in a million homes simultaneously, only to evaporate one thirtieth of a second later? Scientistic critical systems seem also to have played out their usefulness in the cultural arena. Many aspects of twentieth century culture came under the influence of scientific fashion. In art, modernism followed a trajectory of reductivism. It has been argued that computer graphics is the last refuge of modernism, and certainly the ~art and technology movement~ of the late 60~s and 70~s subscribed to a scientistic approach. But the wave of new critical theory of the 80~s, particularly feminist and deconstructive theory, along with the acceptance of computer based ~inductive~ proofs and simulations, have weakened the claims of science as being objective and true, of being a ~master discourse~.

Neither the traditionally ~artistic~ nor the ~technological~ critical systems, nor a counterposing of the two, are adequate for our historical moment. Critical systems which have evolved to deal with specific disciplines immersed in older technologies will not be adequate to the new task. Art practise with electronic tools must necessarily be interdisciplinary, and from this interdisciplinary approach will emerge a variety

of relevant and useful critical tools.

This anthology is a response to these conditions. The new digital media promise new territories for artistic practice. But they demand a reconsideration of art production, and consumption. The new dimensions and capabilities of the new forms (interactivity, instantaneous multiple distribution, ephemerality) demand the generation of new esthetic and ethical models, new institutions and new conventions of consumption. In an electronic environment bathed in versions and appropriations of cultural icons and images, the entire question of intellectual property must be reconsidered. Pre-electronic cultural ideas like ~plagiarism~ and ~fakes~ and the value systems attached to them conflict with media designed specifically for precise rapid copying: videotape, photocopying and, par excellence, computer media. Digital technology, applied to texts, images and music, has spawned new genres of appropriative creative practice and have simultaneously thrown the copyright/intellectual property law into paroxysms of confusion. Desert Storm was a cultural/technological threshold, it threw into high relief many of the aspects of this new electronic terrain. At this moment art, dataspace, mass media and politics are sandwiched together into a new complex, whose site was neither the middle east, nor the living rooms of America nor deep in electronic space, but a combination of the three. Not simply that the consumer media was full of synthetic imagery, nor just because geography was fully collapsed, but also because the techno-utopian rhetoric of the previous generation was also collapsed. Desert Storm demonstrated that greater (electronic) connectivity does not necessarily result in greater world harmony, democracy and liberty.

It has been my goal in this collection to include authors of diverse training and experience. Represented are Australian, British, Canadian, Finnish, German authors, as well as several from the USA. Professionally, they come from varied backgrounds, including computer graphics, video, sound, drama and visual arts; media, cultural and literary theory and the social sciences. But all share a common concern with the cultural implications of current technological change and have strong interests in interdisciplinary creative practice. Each author in this collection takes a different focus. Some essays are specialized, some are wide ranging, some are pragmatic, some are more theoretical. Some consider the contemporary condition in its historical context while some look to the future from the vantage point of the present. These papers do not form a theoretically coherent group. The authors bring various theoretical systems to bear upon the issues they address. This divergence serves to indicate the breadth of interdisciplinary approaches that are informing the interpretation and use of these new media. Those writers who are artists grapple directly with these issues as they negotiate the use of new technologies in their work. I believe that this immediate connection of theory and practice affords these writings special relevance, and not simply to readers who may be practitioners. These papers are ~reports from the front~, they come long before the possibility and security of historical distance.

Critical Issues in Electronic Media is an attempt to discuss the techno-cultural context which makes electronic media artwork both possible and necessary. The original impetus for this volume was the recognition that theoretical writings in the field of electronic media art practice were sparse, while

neighbouring territories such as video, film, media theory and cultural studies were replete with such texts. It is hoped this collection offers, if not a guide, a network of markers for practitioners, theoreticians and students in this new territory. It is with pleasure and pride that I recommend each of these essays to the reader. As an added service to the researcher, I have compiled, with the assistance of the contributors, a selected bibliography of important texts in the field. This bibliography does not claim to be exhaustive, but each entry is regarded by at least one of the contributors as a valuable text.

I would like to thank Clay Morgan and Maureen Turim for guidance in the preparation of this anthology, and I would like to thank the contributors to the volume for going through this process with me. I would like to thank my wife, Maria Fernandez for endlessly challenging conversation on these topics. Some of my best ideas are hers. Finally, I would like to dedicate this publication to the memories of two thinkers who, each in his own way, have profoundly influenced my development in these areas, Brian O'Nolan (Flann O'Brien) and Felix Guattari.

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Reviews would be very welcome. Please feel free to forward this message and to notify your local bookseller. For inquiries regarding review copies and national and international distribution, please contact Judy Spevack at SUNY Press, Tel: 518 472-5017, or fax at 518 472-5038

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< Culture, Democracy, and Computer Media >

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All normal persons possess some degree of creative insight and the desire to express it. In some societies, there are no artists because everyone is an artist. Only in societies where culture has been reduced to a thing apart from daily life can people develop the conviction that they have no creative insight or ability, or that only certain persons (a few of whom encourage such thinking) are so gifted.

A society which has congealed its art into "cultural wealth" and rationalized it into a code of "cultural values" makes culture unattainable by the common person, and imposes a respect and worship of culture, or more precisely of those who are privileged to bask in its light. But culture is living matter, daily activity, and cannot be possessed. One may possess books, paintings, or season tickets, but culture is alive only in hearing, seeing, or understanding. Music in particular is, in the words of John Cage, "a celebration that we own nothing," receding as it strikes the shore of the ear. Living culture celebrates not the euphoria of possession but the joy of communication.

In our age, new technologies have made cultural products accessible to the multitude of people as never before. Mechanical reproduction permitted art to leave the museum, and music to leave the concert hall. Printing, photography, and audio recording made the objects of culture available to ordinary individuals. In the process, the value and mystery surrounding the original work of art -- what Walter Benjamin called its "aura" -- was diluted in a sea of similar images. Yet despite this apparent democratization, culture remains a sign of privilege. We have mass culture for the masses, and high culture for the cultured. Mass culture pushes quantity, while high culture extols quality. For both, the use of the cultural object as a sign of individual identity and status precedes its capacity to inform. The division of culture and the contradiction between culture as commodity and culture as communication is determined not by any differences in the intelligence or creative capacity of persons, but by the ownership of the technologies of production and distribution.

Electronic reproduction and networked communications now promise to push the contradictions of culture and society to new extremes. Digital electronic media don't merely reproduce, they clone. Every digital artwork is an original. The authenticity of images becomes so nebulous that photographs no longer constitute evidence: in the digital age, photography is a plastic medium. At the same time, media are proliferating faster than they can be regulated. Proposals to regulate the

Internet founder on the realization that, like multinational corporations, it no longer falls under the jurisdiction of any one country. This is not to say that freedom of expression finds a safe haven on the Internet, but rather that it begins to resemble, as Roger Malina noted in a recent issue of Leonardo, a "Fourth World," populated by a scant one per cent of the world's citizens, where national boundaries are increasingly porous or outright meaningless. Internet access may become as basic and cheap a service as telephone service, and provide a means of distribution of information that will affect society as profoundly as did the invention of the printing press.

The means to produce digital information is already available to anyone for less than the price of an automobile. Conceivably, devices to exchange digital information may become as common as telephones. What would it have meant, in the 15th century, for every household to own a printing press? We may be approaching that sort of situation. While the means of mass distribution of media still remain locked up in corporations, new media have brought with them a host of new means of limited distribution, which now form a cottage industry in the global electronic village. As video technology emerged, so did new means of distribution. Fax machines have become a source of information powerful enough apparently to prevent a coup d'etat in Russia. CD-ROM may follow a similar path as consumer-grade CD-ROM writers emerge on the market, and small-scale publication and distribution of CDs becomes possible.

New digital media continue to emerge, and networks continue to grow and link up to each other. Artists experiment with the new technologies, as they have done historically. Virtual galleries have appeared on the World Wide Web, and works are produced in collaborations between persons who may never meet in physical space. Electronic art reveals with striking clarity that the stuff of culture is information. The networked distribution of digital media has the potential of completing the democratization of culture that began with mechanical reproduction, and of restoring the primacy of communication over commodity value. Whether this happens hangs in the balance today. The hacker's motto "information wants to be free" vies with the technocrat's response, "information is power." Neither side has control of the situation, though it is clear where the preponderance of power lies.

In a society so saturated with information that significance evaporates, and only conformity to the "feel" of the moment remains -- as is clearly the case with television and other mass media, where the skilled manipulation of symbols has largely replaced critical thinking -- new media may assume the role once played by the written word, of ordering information and making sense of the world. If this comes about, it will clearly not be the clockwork sense positive science set in motion in the Industrial Revolution, nor the dialectical sense critics such as Benjamin discerned for the first Technological Age, but a sense that rises from contradictions unique to our own age. The chaos at the heart of the new machine is not a chaos anyone has danced with before. Its sense will be new, its meaning unexpected.

We have the opportunity, working with computer media, to influence their meaning. Their language is not yet established and its interpretation remains fluid. Where the historical avant-garde wrestled with the formal language of art, we now



discover new territories to be explored, where the problems are no longer stylistic but social. How we make our work available becomes part of the work. We discover, hidden in the net of individual experience, an alphabet of signs that binds together personal distances and disparities. Out of this we make our art. We may discover, in the net of social experience and the network of new media, whole new languages for identity and community. Out of this we may hope to create, once again, a culture that binds together our collective distances and disparities.

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LEONARDO DIGITAL REVIEWS
April 1995

Editor: Roger Malina

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Review Panel (includes): Rudolf Arnheim, Simon Penny, Mason Wong, Stephen Wilson, Robert Coburn, Marc Battier, Thom Gillespie, Jason Vantomme, Geoff Gaines, Clifford Pickover, Barabara Lee, Sonya Rapoport, Richard Land, P. Klutchevskaya, Paul Hertz, Francesco Giomi, Bulat M. Galejev, Timothy Druckrey, Christopher Willard, Gerald Hartnett, Henry See, Kasey Asberry, Shawn Decker, Roger Malina, Rainer Voltz, Michele Emmer, Curtis Karnow, Jose Elguero

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< Editorial Comments >

Letter to the Editor re "Conflict of Interest"

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We received this email from a reviewer in the last issue of LDR where I raised a concern about the "cozy group" that reviews work by close colleagues, and urging our readers to enter the discussion.

Jason Vantomme  
Email: vantomme@ils.nwu.edu

I suppose I've never been in much of a position to compare "who knows who" in terms of reviewers vs. authors, but I certainly don't know Stephen Pope (re: review of The Well-Tempered Object, edited by Pope). I have corresponded with him via email concerning an article of mine to be published in the Computer Music Journal (for which he is editor), but other than that... Does that count as a "vested interest" in pleasing the author? Maybe. (As an aside, my paper was accepted for publication before the release of the review.)

This notion of "cozy group" is rather common in the music technology community as I see it from my perspective somewhere on the edge. I think it's been changing though, and believe me, I don't give good reviews just for the sake of pleasing the author/performer/composer. I just reviewed a CD released by a well-known composer/theorist, who I have met and interacted with, and I had no qualms about giving the disc an honest review. On the flip side, I have also given good reviews when such an opinion was not popular with much of the music tech world (who could potentially decide on a future job for myself). See my review of Tod Machover's CD "Flora" in CMJ

18.3, Fall '94.

The point is that I'm not looking to ditch myself out of a potential job (who would), but rather that I think the community is getting large enough that simply "pleasing your friends" is less and less the case. Why? Maybe because you might never meet the author/composer and have to defend your review? Perhaps, though I don't think so. I do hope that useful analysis and criticism of artistic and scientific work is replacing the "friendly reviewing" style. Thanks for asking these thoughtful questions.

[ Editor's Comment: One thing we are open to doing is publishing multiple reviews of the same publication. We also urge readers to bring material to be reviewed to our attention - otherwise we tend to review the material we receive for review, which tends to be from the "cozy group" or from bigger name publishers. ]

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< Comments on the Review of the book Digital Mantra by Holtzman as Reviewed by Henry See >  
For the review see  
<http://www-itpress.mit.edu/Leonardo/reviews/seemantras.html>

Paul Hertz  
Email: paul-hertz@nwu.edu

I must say I don't find Digital Mantras to be quite as egregious an example of functionalism and strong AI as Henry See does. Is this a religious difference?

I am glad he raises the issue of Holtzman's assertions about the nature of digital art, that one needs to work with the 1's and 0's. His remarks on the difference between natural language and compositional "languages" are also apropos, though I think he overemphasizes the individual production of these languages - they are also elaborated by social processes.

Under that lies the deeper issue of whether the impulse towards elaboration of a formal language based on the inherent qualities of the medium is still viable as a central justification for art-making. That's the stance of the defunct academic avant garde (shades of Clement Greenberg), but in a world where so many more vital questions remain to be settled, it carries little weight. I don't think Digital Mantras quite makes that assertion; rather, it points out that the full range of artistic expression within different media was liberated by linguistic experimentation. I find it a valuable resource for that reason, and have recommended it to my students.

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< Book Review: Being Digital - Nicholas Negroponte >  
Alfred A. Knopf  
New York, 1995  
243pp, hb \$23.00

Reviewed by Tim Druckrey  
Email: druckery@interport.net

\_Quibble and Bits\_

\_In a sense, virtuality, at the mental level is something I think you'd find in most leadership over historical periods. But in addition, the thing I want to talk about today, and that I find fascinating, is that we are not at a new place. It

is just harder and harder to avoid the place we are.\_  
Newt Gingrich

As the AT&T ads poured over the broadcast networks last year it seemed unnervingly obvious that selling the present was insufficient. Instead the ads sold the future. \_Ever read a book from 2000 miles away? Ever had an assistant who lived inside your computer? ... YOU WILL.\_ The not so subtle inevitability of technology mediating virtually every facet of being has come to appear normal. In the mad rush to induce smart everything, culture finds itself between euphoria and exhaustion. One month's watershed technology is next month's techno-azotic fossil. And while the debate widens about the extent of bandwidth, the potential of compression, the speed of transfer, the so-called limitless access to data, the power of the network... (the list is endless), a pattern emerges. It is a pattern in which the future promises the fulfillment of the incomplete present. Finding a perspective amid the debates about technologies that will affect every, pardon the expression, fiber of life is no small task. Genetics, neurotechnology, biocomputing, stand aside multimedia, the world wide web, encryption, and wireless technologies as complex, and often atomistic, nuisances. Yet the implications of the 'being digital' are far from resolved. After all, this is still a very analog world.

The imposing title \_Being Digital\_ cannot but invoke such magisterial works such as Heidegger's \_Being and Time\_ or Sartre's \_Being and Nothingness\_. But the aspirations of Negroponte's writing offers so little in the way of deep reflection that the title seems bafflingly ironic. Indeed amid the repetitious and solipsistic whining that plagues much of the book there emerges less an effort to come to terms with momentous issues, than a series of platitudes that have everything to do with digital and little to do with being. Imagine the philosophical renaissance that will take place with such pithy observations as \_In being digital, I am me...\_ Roll over R. Descartes and tell Marv Minsky the news! Did you know that \_the medium is no longer the message?\_ \_Not since Marshall McLuhan's Understanding Media...\_ reads the dust jacket. Ouch. Negroponte is to McLuhan as bits are to atoms.

The past months have left a score of assessments of the effects of electronic culture. Special issues of Time (Hyperdemocracy and Welcome to Cyberspace), Newsweek (Technomania), Scientific American (The Computer in the 21st Century), New Perspectives Quarterly, Gender, Configurations, the list grows, proclaim the wonders and pitfalls of technoculture. This, amid daily flurries of data about Kevin Mitnick, Phiber - \_He used his computer like a magic carpet to cyberspace\_ (Joshua Quittner in Time Magazine)- Optik, the future of broadcast TV, the Telco's, Judge Green, advertisements on NBC for instant transcripts for the O.J. Simpson trial on the world wide web (that's O.J. Central, <http://www.pathfinder.com>, Time Inc's web initiative) make for an environment in which the intoxicated tone often seems a form of despair rather than one of anticipation.

\_Being Digital\_, essays reworked from Negroponte's Wired columns, ruminates on the quotidian mysteries of the digital age. Really, why is it that after 100 years we just cannot find a way to make a telephone handset that isn't utterly unsatisfactory. \_Afterall, why can't telephone designers understand that none of us want to dial telephones? We want to

reach people on the telephone!\_ (Perhaps some of those multimediated millions at the Media Lab should be allocated to this little ontological, but alas analog, problem.) Did we know that \_Technological imperatives-and only those imperatives-drove the development of television,\_ or that \_photography, on the other hand was invented by photographers. Television, I guess, was pure, it was then handed off to a body of creative talent, with different values, from a different intellectual subculture.\_ To assume that photography's development was not driven by technological imperatives, but by photographers trying to invent a medium in which they were already practitioners, is as patently ludicrous as it is historically myopic. \_Being Digital\_ is filled with this kind of tautology. But the sometimes reckless, and often rootless, logic of the arguments in \_Being Digital\_ reveals a more important problem. The opening section of the book invokes the shift from \_atoms to bits.\_ Loosely speaking atoms represent the past and bits the future. For Negroponte this change is \_irrevocable and unstoppable.\_ Another section outlines the notion of the \_post-information age... in which everything is made to order, and information is extremely personalized.\_ It is, indeed, in this arena that the fundamental lapses in \_Being Digital\_ emerge. Decidedly ahistorical, future oriented, and \_optimistic,\_ Being Digital is entangled in blissfully extolling the efficient pleasures of digital technology with too little regard for the transformation of knowledge that comes with it: \_Like a force of nature, the digital age cannot be denied or stopped.\_.....cont'd.

The remaining text for this review can found on the Leonardo Digital Reviews WWW site at URL:

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

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< Book Review: Building in the Garden: The Architecture of Joseph Allen Stein in India and California - Stephen White >  
Oxford Univ. Press, Oxford, U.K.  
1993. ISBN 0-19-562924-8.

Reviewed by Frank Davidson  
140 Walden Street  
Concord, MA 01742-3613, U.S.A.

As a long-time admirer of the protagonist of this remarkable biography, I welcome the ample, meticulous and craftsman-like work that will no doubt become a standard reference on Joseph Allen Stein and his immense, subtle influence. Building in the Garden, clearly, is in itself an achievement worth pondering: the book has an "architecture" of its own: it departs from the usual narrative sequence of "oeuvres de commemoration" in order to focus successively on the various facets of Stein's professional artifacts and philosophical orientation. Stephen White, rapidly earning his spurs as both a writer and an architect, has been careful not to get in the way of his model: frequent and lengthy quotations from Stein---and from contemporaries and teachers who helped shape his views--lead us inexorably from one set of insights to another, until we accept the reality of Stein's rare combination of talents as precursor, prophet and "realisateur". The Oxford University Press has produced a book that is beautiful, enticing and rewarding. In Stein's words, "The possibility of combining simplicity and science, industry and agriculture presents opportunity for true progress such as was long ago glimpsed by Gandhi." Respectful of the traditional patterns and crafts of

the country to which he moved in 1952, Stein succeeded in blending "the spirit of place" with the techniques and tones of modernity. India's "built environment" owes much to his symbiotic and perceptive pioneering: homes for people of different levels of income, factories, conference centers and completely novel agglomerations carried the architect from his evident passion for sensitive design of indoor-outdoor space to the larger issues of regional planning and, indeed, the effective harnessing of both science and art on behalf of an attractive, sustainable and encouraging future.

Beyond his prodigious work schedule, Stein remained an alert and responsible observer whose coups d'oeil affected professions other than his own---ultimately shaping international opinion and environmental policy. Flying back and forth across the Himalaya because of his professional commitments in Kuala Lumpur, Stein was perhaps the first individual to note the progressive deforestation of mountain slopes in Nepal, India and China. Stein reported on this troubling evolution to Clare Sterling, the American writer based in Italy, and an unexpected outcome was her article in the Atlantic Monthly (which, in its way, had an impact comparable to the late Benton Mackaye's 1922 article in Architecture, which originally proposed the Appalachian Trail). Shortly after Sterling's essay was published, John E. Fobes, Deputy Director of UNESCO, joined with Klaus Lampe to organize the first United Nations Conference on Mountain Environments (1973). Lampe was at the time a high official in the Agency for Technical Cooperation in the Third World (Federal Republic of Germany), and the conference was in fact hosted by the West German government, in Munich.....cont'd.

The remainder of this review can be found on the Leonardo Digital Reviews WWW site at URL:

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

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< Book Review: The Quark and the Jaguar

- Murray Gell-Mann >

W.H. Freeman and Co

NY., USA, 1994

\$23.95. ISBN 0-7167-2581-9

Reviewed by Roger F. Malina  
Email: mason@mitpress.mit.edu

This book is written by Murray Gell-Mann, a Nobel prize winner in physics for his work in the theory of sub-atomic particles, and also a prime mover in the Santa Fe Institute - an interdisciplinary postgraduate research institute which has become a seminal research center for work ranging from applications of new mathematical approaches to economic modeling, artificial life and the stuff of cultural and other evolution.

Roughly half the book is dedicated to explications of topics and ideas in sub-atomic physics, a field where Gell-Mann played a major role in this century. He is well placed to discuss which ideas and concepts have proved to be fundamental to the evolving understanding of the structure of matter, and the search for theoretical understanding and the establishing of "laws" that describe this structure. It is a delight to hear discussions of these topics from "the horse's mouth" rather than as filtered and re-contextualised by science writers and popularisers.

The rest of the book is dedicated to discussions of topics which in the large have been the focus of discussion at the Santa Fe Institute - the central topic being the study of how complex structures emerge from simple ones, through the interplay of low level rules and adaptation to external environments and their changes. The topics of artificial life, complexity theory etc. have been the subject of popularisation works (including ones dealing primarily with the context of the Santa Fe Institute). Although one gets to learn Gell-Mann's musings on these topics, the reader would get a better picture from the other available books. The book is embedded in, and infused with, discussions and thoughts about the threat to biodiversity and specific species on the earth ("the jaguar"). Gell-Mann through his career has had an enduring interest and passion for these topics, and as a player in the MacArthur Foundation has been in a position to encourage action and the mobilisation of resources and attention.

I enjoyed the book, and obtained insights into the thinking and work of the author. The book is however frustrating - the level of knowledge needed for the reader to understand the discussion ranges from expert to novice (with no warning). It fails to deliver on the promise of the title - the connections between fundamental physics and the complexity of life forms appear to be the idiosyncrasies and travels of the author. In a number of places Gell-Mann discusses and debates the nature of scientific inquiry ( he is an anti-Kuhnian ), and the different way that science has to be carried out when considering the nature of the quark, or convincing leaders of the value of biodiversity. This is perhaps the most important aspect of the book. Science and scientists are changing their methods and approaches as science seeks to tackle topics of the evolution of life and complexity - topics that do not lend themselves to the reductionist approaches that proved so successful in particle physics. This book is a map of one scientist's road.

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< Book Review: Culture, Technology & Creativity in the  
Late Twentieth Century - Philip Hayward, Editor >  
John Libbey & Company (undated), received October 1994.

Reviewed by Curtis E.A. Karnow

This volume collects essays from a variety of British authors, directed to the relationship between advanced technology and the arts, primarily the visual arts. Film - and its sound and special visual effects- is a special focus. (I cannot help but note that in the introduction editor Hayward explains the goal of the project by citing Leonardo da Vinci and our own journal "Leonardo" as precursor commentators on the effect of technology on the arts.)

There is a nice balance here. We have pieces from artists such as recording engineers, directors, musicians, on the one hand; and from the commentators we have substantial asides on the hyperreal and Baudrillard, a survey of the 1960s Art & Technology movement, and a concluding piece citing self-aware superintelligent globalNets [ sic], cyberspace, Mandelbrot and all the rest. We have pompously absurd items ("the knowledge seeking subject stands before the paradox of the world - which is to be before all that is in and out of sight, contemplating the terror of the unknown, of the unknowable reality or the terror of the loss of the unreality of real representations." This is found somewhere under the subtitle "The Chronopolitical

Nexus" in Tony Fry's contribution, "Art Byting the Dust"). And on the other side of cogency, we have pieces on digital technologies in music making (Aland Durant, "A New Day For Music?") that explores the crisis of authorship, copyright and integrity that digitization brings to the arts, as well as Andy Darley's "From Abstraction to Simulation: Notes on the History of Computer Imaging." This latter item provides both a brief history of recent (since the 1950s) developments in digital film imagery, and a concise comment on the role of the entertainment industry in what used to be purely a technical process.

The salient concern here is the perceived battle between content, or art, on the one hand, and the technology on the other. To be sure, the latter is used to make the former, but these essays are infused with a dark doubt. There is a concern here not simply that the use of high technology will be too visible, overshadowing the artistic content (as if the special effects in Star Wars eviscerated notice of the plot, characters, references to old myths and like); but far more strongly many of these writers suspect that the technology may destroy the content:

We see Ultratech is a very global idea because there is no language, there is no plot, there are no characters,... It's all just sound and light, TV taken down to its essence.

Philip Hayward, "Industrial Light and Magic," quoting Jonathan Klien, "Cool Art of Wild MTV idents," Invasion (March 1988). With this apprehension, we see a cousin: that artistic sensibilities and talent are replaced by technological prowess:

With the advent of electronic media, the material is abolished to all intents and purposes. Technique is no longer the ability to manipulate material, but the ability abolished to all intents and purposes. Technique is no longer the ability to manipulate material, but the ability to manipulate technology.

Jeremy Welsh, "Power, Access and Ingenuity." Many of these writers and artists are sensitive to the Siren of the New Toy: the flashing lights, the stunning sound; fabulous images. But we should remember the play on technique and technology that art has always enjoyed. Haydn showed us sound, pulling musical jokes out of a serious score; painters have pushed color, shape, and the very technology of canvas into our faces, just as playwrights from Shakespeare and before have contrived to announce their medium as such. Media have always enjoyed self reference, the sideways flip from surface decoration to the harmonics of meaning. It's an activity that necessarily shoves the media, and technology of performance, up in front of the content; at least for a bit.

Are the new technologies of pure digital sound, virtual reality, enormous screens and computerized performances so vastly more overpowering that artistic talent will vaporize, like a candle gleam before the exploding light of a nuclear device? Will the surface scan of these computer screens blast away the references to life, to the mundane, that "art" has usually encompassed? Of course radical changes in technology provide new metaphors, new ways of thinking about the world, humans, nature, and the links between these. See e.g. J. David Bolter, *Turning's Man* (University of North Carolina Press

1984). And so new art is inevitably generated by these changes.

But some of the contributors to this volume suspect that computer technology may not be taking us to new art, but to no art. They note that computer technology powerfully tends towards the self-referential, and (in a rapture, the ecstasy of narcissism) that technology obliterates the real world. In this way, technology dispenses with "meaning" in the sense of making or illuminating a link to "truth" to the world, human life, and so on. In that digital Hell, the body is turned "into nothing more than another station in the mesh of communicative networks." Andrew Murphie, "Negotiating Presence."

Perhaps only for the susceptible. We are, for now, fascinated; but only for now. People likely looked at the output of the printing press in Gutenberg's time as technology before they read the manuscript for content; and folks remarked the fact of the new "talkies'" sound films before they simply heard the movie as a complete audio-visual work. It was true for the sound of the first 'phone voice. As I've suggested elsewhere (Review, "The Electronic Word: Democracy, Technology, and the Arts," 16 Hastings Communications And Entertainment Law Journal 501 (1994)), the graphite mark of the first pencil probably fascinated its first users, who exulted in its soft thick penumbral medium. The articles in this collection reveal us as early initiates, those to whom the power of digitization is first given. They have an infectious enthusiasm for, and a lingering distrust of, the new works of technology. In retrospect a decade from now (and nostalgia aside), I hope we will not be too distracted by the-then ancient technology.

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< Reviewer's Bio: Jason Vantomme >  
Email: vantomme@ils.nwu.edu

Jason Vantomme began formal music studies at the Faculty of Music, McGill University in 1988. During the next four years, he studied composition and music technology with Bruce Pennycook as well as flute with Carolyn Christie. In 1992 he graduated from McGill with a Bachelor of Music (Honours) in Music Technology and began his Master of Arts in the same field, which he completed in the summer of 1994. His graduate thesis focused on the development of a rhythm-based intelligent score following system for live performance; a condensed version of this paper will appear in an upcoming issue of the Computer Music Journal (MIT Press). His compositions have been performed across Canada and his research has been presented at various international conferences. Mr. Vantomme is currently a programmer/analyst at the Institute for the Learning Sciences, Northwestern University in Evanston, Illinois.

[ Editor: Reviewer's Bio is a new feature of Leonardo Digital Reviews, look for a new one in each issue. ]

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< In Memoriam: Leonardo Honorary Editor Joseph Needham >  
Roger Malina  
Email: mason@mitpress.mit.edu

Leonardo Honorary Editor Joseph Needham died recently in England. A founding editor of Leonardo, it was he who suggested the name "Leonardo" for a journal which sought to give primacy to the artist's voice- for the artist as researcher in an interdisciplinary world where art, science and technology ought



to be interwoven threads of a single cultural fabric.

Needham is probably best known for his magnum opus "Science and Civilization in China" - a gigantic multivolume work which brings together through historical research and comprehensive analysis the development of Chinese mathematics, physics, geography, astronomy, chemistry, biology, agriculture, medicine - indeed all the threads that led to Chinese civilisation.

Needham was originally a biochemist and worked on the bio-chemistry of embryonic development. His work "Chemical Embryology" in 1931 surveyed morphogenetic changes, concluding that such changes were chemically controlled and that the complex changes during development can only be derived through an understanding of structural chemistry. In 1942 he was invited to head the British Scientific Mission to China where he spent four years traveling and visiting researchers. In 1946 he became head of the Department of Natural Sciences at UNESCO in Paris. He was elected Master of Caius College, Cambridge, England in 1966. He received the Einstein Gold Medal of UNESCO and China's Order of the Brilliant Star.

Needham was a passionate man of wide learning. The Daily Telegraph Obituary lists several publications that indicate this: "Celestial Lancets, A History and Rationale of Acupuncture and Moxa", "Molly Dancing in East Anglia", "Korean Astronomical Instruments and Clocks", "The Skeptical Biologist", "Order and Life". Needham was a friend and supporter of Leonardo, and a large figure in the history of intellectual development of the 20th century.

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< END OF LEONARDO DIGITAL REVIEWS APRIL 1995 >

ANNOUNCEMENTS

< New York Artists Mount an Alternative Biennial Exhibition on the World Wide Web >

Paul Warren  
Email: pwnr@interport.net  
Tel: 212.780-3440

Five New York City artists have launched an exhibition on the Internet's World Wide Web which puts forward an alternative aesthetic for new art. Unlike much recent contemporary art, the works in this exhibition all make use of historical imagery. Many of the artworks, including a large scale installation, were created by using computer imaging programs. The exhibition challenges contemporary art's ability to communicate meaningful ideas because of the current rejection of historical significance.

The range of media is as wide as can be imagined. Two of the exhibition's artists, Paul Warren and Catsua Watanabe, create their artworks exclusively with computers, while two other artists, Vincent Romaniello and John Wellington, use painting techniques which date back to the 15th century. Amy Ernst, who

is the granddaughter of the surrealist master, Max Ernst, uses a painterly collage technique which she has termed Renaissance Surrealism that draws heavily upon the tradition of surrealism.

The artists decided to put the exhibition on the World Wide Web because their aesthetic approach is not being considered by current visual art critics. "We wanted to show other new ways of looking at art besides those presented by the current Whitney Biennial," states exhibition organizer Paul Warren.

Warren also stated, "But we're not a 'Salon Des Refuses.' We're not trying to attack anyone. We're part of an emerging aesthetic that can be found in many current artforms. You can find it in new music, theater, opera, interior design and dance. It's everywhere except visual art. So the point of the project is to place this new aesthetic into consideration."

There are twenty-five artworks in the exhibition, as well as an introductory essay titled "Art Is A Language," which will be available in translation in several languages. The exhibition, which is titled The 1995 Alternative Virtual Biennial, is being sponsored by Interport Communications, which is a computer web server for the New York area. The exhibition was produced by NeoRenaissance, which is an alternative art organization. Additional computer support was provided by Datagram, Inc.

The organizers are promoting the exhibition in several unique ways, including a nationwide poster campaign at major universities. Shield Press of New York City, Air-Tech Ltd. and Eideti.com are assisting with promotional support.

The exhibition runs from April through June and may be found at URL:

<http://www.interport.net/avb>.

The organizers recommend using a Netscape 1.1b3 browser with Times Roman font.

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< New Langton Arts offers Grants and Workshops to Artists >

Rebecca Szeto, RIARP Coordinator

New Langton Arts

1246 Folsom St.

San Francisco, CA 94103

Tel: (415) 626-5416

Fax: (415) 255-1453

New Langton Arts is pleased to announce our participation in this 10th year of the Regional Initiative Artists' Project Regranting Program (RIARP). In October, 1995, this program will award 12-20 grants that will range from \$1,500 - \$,000. These awards will be made to individual or collaborative artists whose work explores or extends artistic disciplines and/or cultural conventions, whether single-disciplinary or interdisciplinary. RIARP supports new projects in performance, visual or media art which push the boundaries of contemporary art and challenge traditional formats. New Langton Arts encourages artists of all backgrounds to apply as these awards will reflect the cultural and aesthetic diversity of this region. RIARP is open to all artists who are residents of California and Hawaii. The application deadline is May 12, 1995.

Applicants are encouraged to attend workshops in which the program and application procedures will be discussed. Workshops

are being presented in Northern and Southern California, and in Hawaii. In Hawaii contact:

Jim Jenson  
Director at Contemporary Art Museum  
2411 Makiki Hts. Drive  
Honolulu, Hawaii 96822-2545  
Tel: (808) 526-1322

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< eMUSIC Launched >

Julie Panke  
Electronic Music Foundation  
116 North Lake Avenue  
Albany, NY 12206, USA  
Tel: (518) 434-4110  
Fax: (518) 434-0308  
Email: eMusc@aol.com

ALBANY, New York. eMUSICx - a new compact disc sales program of Electronic Music Foundation (EMF) - begins worldwide operations today. Through eMUSIC, serious music lovers worldwide will now have access to any and all compact discs of experimental, exceptional, and/or electronic music -- including hard-to-find CDs, and discs published by small companies or independent composers. The recordings are being marketed via international computer networks and direct mail. Joel Chadabe, President of EMF, said: "Our goal is to find and contact everyone in the world who has an interest in experimental and electronic music, and to make CDs available to them through mailed and electronic catalogs." EMF was launched in September 1994 to disseminate information and materials related to the history and current development of electronic music.

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< Patheticism - a conference at Trinity College Dublin >

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A conference to be held at Trinity College Dublin seeks participants from various disciplines to theorize the irony-free zone as a necessary consequence of the attenuation of the autonomous subject.

patheticism

\*attempts to synthesize disparate accounts of pathos and the pathetic.

\*indicates a desire to move beyond the bounds of irony via an unapologetic occupancy of a position which is from the outset acknowledged to be untenable.

\*is the post-camp valorization of mediocrity and self-deprecation, the slacker ethos of paralysis, the democracy of failure, and any other excesses of hyper-individual introspection (from any era).

Possible topics:

the Greek concept of pathos, the Quixotic novel, pathetic narrators (Sterne, Dostoevsky, Nabokov), pathetic characters

(Bartleby, Svejck, Murphy), the pathetic as anti-sublime, indie rock and/or fanzine culture, pathetic fallacies, melancholia, the revenge of the object, the abject pathetic, impoverished or residual artworks (Annette Messenger, Mike Kelley, Joseph Beuys), Morrissey, Hamlet complexes, straight queers, etc.

Event Dates: 18 & 19 Aug 1995

Send 350 word abstracts by 10 May 1995.

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< The New and Improved Computer Music Journal  
World-Wide Web Page >

Stephen Travis Pope, Editor  
Computer Music Journal  
Tel: (+1-510) 644-3881  
Email: stp@CNMAT.Berkeley.edu  
URL: <http://www-mitpress.mit.edu/Computer-Music-Journal/CMJ.html>

Highlights:

- o WWW pages with detailed data related to the 1995 and 1996 ICMCs
- o New CMJ article texts (including the ZIPI spec.) and tables-of-contents
- o Program notes for the CMJ Volume 19 CD (due out any day now!)
- o Many links to music-related pages elsewhere on the Web
- o CMJ Sound Archives (coming real soon!)

The Computer Music Journal Sound File Archives

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This directory has a collection of sound files in a wide variety of formats (just about every one known to human-kind). There are also several short musical examples. The README file explains what's available (URL = <http://www-mitpress.mit.edu/Computer-Music-Journal/Sound/README>). Note that these sound files are intended to demonstrate various file formats, not to serve as a digital sound database. See the new extended reference list for a list of Internet sound and music archives. There is also a new code directory with C-language code to read/write many common sound file header formats (courtesy of Bill Schottstaedt, who also contributed many of the example sound files).

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< Disklavier Discovery >

Robert Willey  
Email: [bobw@carla.ucsd.edu](mailto:bobw@carla.ucsd.edu)  
Tel: (619) 534-4383  
URL: <http://crca-www.ucsd.edu/bobw/bob-homepage.html>

An archive of compositions for computer-controlled piano is being assembled at the Center for Research in Computing and the Arts, University of California, San Diego. Pieces can be up- or down-loaded from the anonymous ftp site: [wendy.ucsd.edu](http://wendy.ucsd.edu) in the pub/midi/disklavier directory. A front end on the world wide web is at the URL:

<http://crca-www.ucsd.edu/bobw/disklavier.html>

Compositions are stored as MIDI files. Works that cannot be represented fully this way can be excerpted, or information given on whom to contact for needed software, scores, or performers.

A series of concerts "New Music for Disklavier and Synthesizer"

is being made from the collection, along with Disklavier disks. There is still space on the concerts scheduled for April and May, at UC San Diego and CCRMA/Stanford University. Please contact me if you have a piece for the collection, or would like more information.

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< World Wide Web Site at the Center for the Arts  
at Yerba Buena Gardens in San Francisco >

David Perry  
Tel: (415) 978-2710, ext. 132  
Email: yerbabuena@aol.com  
URL: <http://www.hia.com/hia/yerbabuena>

Center for the Arts at Yerba Buena Gardens has installed its own site on the Internet's World Wide Web, providing an unprecedented on-line guide to the Center's facilities, upcoming events, performances and exhibitions. The site was created by the HIA/Virtual Village, a local provider of web design services and internet connectivity for commercial and non-profit organizations. "The Web is the place for the digital congniscenti," said Center Communications Director David Perry. "Center for the Arts intends to be there, to grow with this revolutionary new medium as it evolves into the future."

The HIA Virtual Village can be found at URL:  
<http://www.hia.com/hia>.

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PUBLICATIONS
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< FineArt Forum - eighth birthday issue >  
Paul Brown  
Editor, FineArt Forum - Art + Technology NetNews  
Email: [p.brown@ins.gu.edu.au](mailto:p.brown@ins.gu.edu.au)

FineArt Forum, the internet news service for art and technology which relocated from the USA to Australia in late 1994 celebrated it's eighth birthday issue in April. Now based at Griffith University in Queensland FineArt Forum is edited by Paul Brown, a 21 year veteran of computer-based art, multimedia and computer imaging. Each issue offers a monthly email digest and there's also a WWW site with mirrors in Australia and the USA and soon-to-be-announced mirrors in Europe and Singapore. A typical issue will include between 40 and 80 announcements of interest to the art and technology and general media community. The WWW site includes an Art Resource Directory moderated by Jane Patterson which is one of the most comprehensive catalogues of WWW/internet-based art services currently available.

To subscribe send an email to:

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FineArt Forum is a free service provided by the Art, Science and Technology Network (ASTN, France) and Griffith University in association with Mississippi State University (USA).

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Regular		Discount
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LEONARDO is published five times per year in February, April, June, August, and October. LEONARDO MUSIC JOURNAL is published annually in December.

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JOB ANNOUNCEMENTS
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< Director of Programs - University of Michigan  
Integrated Technology Instruction Center >

Director of Programs  
Integrated Technology Instruction Center  
The University of Michigan  
Ann Arbor, MI USA

The University of Michigan anticipates completion of the Integrated Technology Instruction Center (ITIC) by January 1, 1996, and seeks to appoint a Director of Programs to take office during the 1995 calendar year. The Integrated Technology Instruction Center, a major 225,000 square-foot building on the North Campus of the University, is a place not only to house collections of information resources that are found in a traditional library, but also a facility to provide technology for users to create artistic expressions and produce scientific knowledge in the physical and simulated worlds.

ITIC is envisioned as a force for change within the University of Michigan by promoting the development of new ideas,

methodologies, and modes of producing and imparting knowledge through advances in technology. It will serve as a physical center and gathering space for faculty and students to explore the advanced technology systems to enhance and understand our culture, science, and society.

The responsibility of the Director of Programs will include planning, developing, managing, supporting, and disseminating results of programs and projects. The Director will articulate the ITIC mission and communicate advancement of the enterprises to the internal and external communities. He or she will work closely on a team with the Director of ITIC Libraries and Director of Information Technology and Facilities, and will report to the Dean for Academic Outreach.

Expected Qualifications of the Director

- + Demonstrated ability or a strong potential to provide a leadership in an interdisciplinary academic work place by:
  - articulating a clear vision,
  - enabling and encouraging cross-disciplinary collaborative efforts serving academics and students,
  - advocating and protecting experimental, risk-taking endeavors for innovative teaching, learning, and research, and
  - creating a cooperative and supportive work environment.
- + Experience with digital-multimedia information systems, and the creation and access environment.
- + Demonstrated ability and commitment to engaging in public relations and fund raising.
- + Commitment to building partnerships with external organizations to support projects.
- + Capacity to create and lead a service-oriented organization.
- + Ability to serve as an effective spokesperson to represent ITIC and its mission.
- + Understanding of and flexibility to capitalize on a rapidly changing technological and entrepreneurial environment.
- + Qualification for faculty or professional appointment in one of the schools or colleges of the University of Michigan.
- + Direct experience in creative, artistic performance, computer research, and/or interdisciplinary work desirable.

SALARY: Salary will be commensurate with experience and qualifications.

Submit nominations or a letter of application, curriculum vitae, and a list of references to:

Douglas E. Van Houweling  
Dean of Academic Outreach  
5074 Fleming Administrative Building  
The University of Michigan  
Ann Arbor, Michigan 48109-1340

Applications received by May 10, 1995 will receive first consideration.

The University of Michigan is a non-discriminatory, affirmative action employer. Women and minorities are strongly encouraged to apply.

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| OBITUARY |

< Max Bill dies >

Jakob Bill reports that his father Max Bill died on December 19, 1994. Max Bill was a Swiss painter and sculptor who received the "Frank J. Malina-'Leonardo' Award" in 1987. Bill studied at the Zurich School of Arts and Crafts and, later, at the Bauhaus. His art was a form of Constructivism that relies on mathematical formulae to build up components from which the work is constructed. He joined the association of modern Swiss artists, Allianz, and in 1941 founded the "Allianz Press". In addition to publishing and teaching, Bill focused on product design. The expression of Bauhaus Functionalism was central to his art. In 1947, he founded the Institute for Progressive Culture and mounted a series of exhibitions that culminated in 1951 in an important retrospective exhibition of his work by the Sao Paulo Museum. That same year, Bill developed a "university" for design techniques from his appointed position as Rector of a Hochschule fur Gestaltung (Institute for Design) at Ulm. His influence has been recognized worldwide - in Brazil he was awarded the Grand Prix for sculpture at the Sao Paulo Biennale of 1951, and, in Italy, the Grand Prix for the Swiss Pavilion at the Milan Triennale in 1951. He has held more than 200 one-man exhibitions of his work.

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| ACKNOWLEDGMENTS |

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

| LEA
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| CONVENTIONS |

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.

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===== < End of Leonardo Electronic Almanac 3(4) > =====  
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