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Highlights of this issue include a conversation about CD-ROM Art with
the artists and developer who created the 'Die Veteranen' CD-ROM
profiled in last month's Leonardo Electronic Almanac, and a superb
collection of perspectives in this months Leonardo Digital Reviews.
The move to Minneapolis has been accomplished, and work on the LEA
WWW resources will pick up again.

< Joan Truckenbrod joins the LEA Editorial Advisory Board >
I am happy to welcome Joan Truckenbrod to the Leonardo
Electronic Almanac Editorial Advisory Board. Joan has been
active as an artist and educator in the media arts for many
years, and currently is the Chairperson of the Time Arts
Department at The School of the Art Institute of Chicago. We
can all look forward to her input as we continue to develop
LEA.

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< 'Die Veteranen' - a conversation about CD-ROM Art >

Die Veteranen
Stephan Eichhorn, Tjark Ihmels, KP Ludwig John, Michael Touma
c/o HGB/IDAS
Wachterstr. 11
04109 Leipzig, Germany
Tel: +49-341-2135 136
Fax: +49-341-2135 166
Email: 100116.617@compuserve.com

Craig Harris: CH
Stephan Eichhorn: SE
Tjark Ihmels: TI
KP Ludwig John: LJ
Michael Touma: MT

[Ed: In LEA 2:10 I published a profile of the CD-ROM 'Die
Veteranen', created by a group of three artists and a
multimedia developer. The following is a transcribed
conversation that I had with the group during the ACM
Multimedia '94 Conference.]

CH: One of the things that I am striving for in creating
Leonardo Electronic Almanac is to encourage people to use the
capabilities of the multimedia resources to write about and
illustrate their work - not just to display/present it, but to
provide insight into the source of their work. Why did they
make this work? What are they trying to say, and why did they
choose a particular medium to communicate their message? What

happened when they were implementing their ideas? How did their concepts transform? How did the technology either help or hinder them? I would like people to utilize LEA to carry on that kind of dialogue. In addition to benefiting the artists, these are discussions that I believe people who are developing technology need to hear. Otherwise development tends to take place absent of input from people who really stretch the systems. If some of the more innovative ideas that artists are producing become part of the resources which become available to everybody, then people would start to use the machines differently and some wonderful things will happen. So I am always looking for that kind of content, where people talk about how the technology is employed in service of the art work. That brings us to why we're having this discussion. I also hope that this conversation will stimulate others in the community to respond, so that we can establish an ongoing dialog on this topic.

MT: Each one of us on has his own reasons for working with CD-ROM technology. Tjark and I began work on a project together before we worked with Stephan and Ludwig. We were interested in the aesthetics of the image, coming from a painting background. We wanted to understand the meaning of an image today in our time - how to understand it in artistic terms.

Our second project was to use big illuminated billboards in Leipzig, and we put up our digital works using ink jet prints. This was also exploring the problem of aesthetics today.

So of course when Ludwig began talking about the CD-ROM, and Stephan began to work at the academy, we began to think about how we would create a new media work - what shape it would take and what form to give it. This is one of the most interesting things when you have a new medium. How do you present it, and what are the aesthetics? What are the forms of the new medium? What is the content? So I can say for my part that I am exploring the aesthetic of the image in itself and how it corresponds to my understanding.

The basic concern about using a medium is the aesthetic. In my case I felt that I could not move anymore in the traditional ways of expressing oneself as a painter. I could not express my thoughts, and that was why I began to work with the computer. There are two questions. The first one is the aesthetic, which means what form you use to express yourself. The second question is what format you use to present it. These are the questions that we always ask ourselves for our pictures. That is why we chose to work with the illuminated billboards to show our computer works. The light is one of the essential elements in the computer work. This is the same as with the multimedia work. In what format do you present it? And that is why we chose the CD-ROM, where you can really explore sounds, where you can really explore the form, you can explore the structure of the computer, and you can explore content. I think that everybody from his side tried to bring his own point of view to the CD-ROM. I only bring one small example to the project - to visualize it. I think that the video clip is one of most interesting aspects of the medium. I believe that it is an artistic medium. So I tried to create some video clips which for me are an alternative. I was trying to find a form in which I could transcend a story, with music, with text and with picture. This is a small example of how I came to work with the

CD-ROM.

CH: You say that you reached an expressive limit in your painting. What is it that you are trying to express that you feel was not possible in painting, but may be possible using a digital medium such as CD-ROM?

MT: One of the things was movement. I always have the notion when I walk in the city that there is a movement that I cannot transcend with painting, because even the simultaneous ways of expression by the Cubists is not enough. For example, I did many works in big shopping centers. There is no beginning; there is no end. You never know where the pencil stayed, and I was always fascinated. I did a hundred photos there, because I thought that I would make some photos and then I would paint it. But it never functioned. I went with video, and it never functioned. In the end I did some shopping center pictures, and I let them move. It's on the CD-ROM. I use still pictures. It changes, but it moves from picture to picture. So it is not a film, and it is not a static picture. It is something in between. For me this is the problematic issue that I had to solve - how to use movement with pictures.

CH: So with it not being like video or film, is the difference in the interactive nature of the presentation?

MT: For me the difference is the way of perception - how to perceive a picture, and to give a dimension of time without stretching it. What is the dimension of time? So if I take an image, and I put it in three ways - one into the other - and I also let it be a still image, but where people see a different thing in this image, this injects the notion of time. It is not like a movie with a beginning or an ending. What I want to create is a picture that always moves, not from a beginning to an ending. but only giving the notion of time. So if I take a portrait with two images, and I let one image come and one image go - all the time - I put in the dimension of time without destroying the image completely.

LJ: But you can do these things with video as well. For me the important thing with the CD-ROM is that there is no linear structure for offering your art work. So there are several ways to go, and different people can approach it in different ways. And there is also an increased power of the images that you can get by letting the spectator interact with it, making him physically part of the art process. I mean the spectator is always part of the art process, by getting the visual or acoustic information, and then creating his own art experience using his own associations. But in interactive work you can let that happen physically. So the spectator changes the experience by clicking, or in the case of our CD-ROM by using the microphone to add his own sound information to the system, changing the experience and the outcome of the whole thing. That is what I am interested in - the structure and the interactivity.

CH: One of the things that I find particularly intriguing about your CD-ROM is that you move beyond the concept of CD-ROM as a venue for perusal through data. You actually have ways for the participant to transform the data as part of the art experience, such as allowing one to move pictures around the environment. Most of the multimedia CD-ROM works tend to

provide primarily an environment for perusing data, not changing it.

LJ: Yes, I think that this is one of the more interesting aspects of the CD-ROM, and the one with the most interesting possibilities. These are the issues that you have to think about when you start to work with this kind of medium. I have worked with interactive installation performances before, but there is something special about the CD-ROM. You have to figure out over a period of time what works having this multimedia system on screen. How would a user react to it, even if somebody bought the CD, and has it at home? First he sits in that private situation interacting with the CD-ROM. Second perhaps he may want to use it five or ten times or even more. Then you should think about that possibility, and not just let him explore every corner of your work, but to let things change. Then if he comes to that same place and clicks on that same thing, perhaps something else happens.

CH: So it isn't the same every time? That's very interesting.

LJ: We weren't able to do that through the entire structure, but there are points in there where you get something that you didn't get before. Or in some cases there is more information there than you can get out the first time. These are some of the thoughts that go into making a CD-ROM.

MT: I think that this is an important part of this new medium. This was discussed in one of the panel sessions today, the concept that the CD-ROM makes it possible for people to bring art work back into their home. I find this to be a basic point about the technology.

CH: Regarding the changing of the material on the CD-ROM, how did you work that out? Is there a collection of processes that one initiates during the course of coming into contact with the data? Is there a common library of routines or a processing system that all of you use, or is each work a distinct entity with its own mechanisms for manipulating the content? Stephan, did you do a lot of that design? How does that work?

SE: I have done a lot of technical work on it. This is a technical medium with a lot of constraints, because it is not very fast in access times and the data transfer rates are comparably slow. So there are a lot of things to be obeyed while we worked on it. I had to keep an eye on it and talk to the artists about not exceeding the technical limits. We had to have a lot of discussions about how to structure the work so that it could function. It has to function with people who don't have the artists beside them to explain how it works. There are a lot of things to be obeyed.

CH: In one of the pieces there was this cascading effect where you grabbed an image, and depending on how quickly you moved the mouse it would replicate differently following the flow of the trajectory created by the mouse movement. Is this an effect that is part of a library used in multiples pieces, or is it specific to that individual art work?

SE: That was a function of that specific piece. Many of these things were specially programmed for each work on the CD-ROM. In that case Tjark asked me how it could be done. He had an

idea of what it should look like, and I thought "OK, we have to find a solution for how to do it".

CH: How did you collaborate to get that accomplished?

TI: We work together. We discuss what the idea is and how it might work.

SE: It's a dynamic process. He talks about the ideas. I talk about the constraints and the possibilities. When he started he didn't know very much about what is even possible.

TI: I am an artist.

SE: He brings his ideas, and I do some tests as a function with some images. If that could work then he takes that part back and works with it in the piece.

CH: Stephan, were you helping then to create a library of functions that were called, or were you working with a commercial program to make the piece?

LJ: The overall CD-ROM is created in Macromind Director. Stephan was writing some external objects to extend the possibilities.

CH: So everybody was creating pieces in Director, and when your ideas moved beyond the basic system you worked together to figure out what was possible, and Stephan would help to create the external routines?

SE: Yes, although there was a lot that could be done using Director's built-in scripting language. With a lot of this I helped the artists to learn how to use it, and I showed them how to program it or how to optimize it to make it work better. It was really an interactive process.

CH: That's an interesting aspect of this kind of collaborative work, where groups of artists combine their energies, each artist creating their own work with their specific background and orientation, and the grouping of the works becomes a piece as a totality. It's like an evening of performances.

So Michael came from a painting background. What about the others?

TI: Well, it is difficult to answer that. In my first life I was a theologian. In my second life I worked with symmetry. In my third life I was a painter, and now I am a multimedia artist. I am a man, and I am looking in the world. And so I see the most important thing is the form. I am interested in finding a form for things that are moving, and for a system where other people can go in and can be active. That is the question. For me the problem with painting in this time is not the movement, as it is for Michael. The problem is that on one side you have the material world, and on the other side you have the un-material world. And I think that both things are one world. And I can't show the un-material world with material things, like a pen and paper. And on the other side, I can't show only the un-material world in an un-material computer. And so I think that in this cross-world between the material and the un-material, that is what I am interested in.

CH: So when you invite people to interact with the work on the CD-ROM, what do you think are the most important aspects of that interaction? It is obviously more than merely perusing the data on the disk, because you invite people to change things.

TI: Perhaps the main thing is the meaning of the game. I show my moving world, and I hope that people can see it. So I do things in a way that they can be active. I know that people won't just look at one picture; they will do something. So I put my pictures out in a way that they can do what they want. They haven't seen my picture. I think that it's not so philosophical, but I think that it is important.

CH: So you are suggesting that the focus for you is the intrigue - what you call the game - the interest of people playing with the material, finding out how they can change things.

TI: I think that this is good. In life people develop fantasies, and in art people say "what's that?". You can see graphical things in the shops and highways, like a circle, and people know what it is. If you do it on paper and hang it on the wall, they stand and say "what's that?". And so you can see on this side that people develop fantasy, because they are working by him or her self. I thought that this was something that I could work with.

LJ: For me it is also a question of perception. I started as a photographer, and I tried video as well. Then I discovered the computer as a tool to create images at first. And I was always dissatisfied with the power of the image itself, hanging on the wall, as something to grab the attention of the spectator as static two-dimensional images. So I discovered the possibility of letting somebody interact and getting them interactive with a system that I designed.

Another factor necessary to get the experience is to find a way to attract the participant to the work. In a gallery you pass by an art work hanging on the wall, and you gravitate towards it or not. I feel confident that somebody would get something from my piece if they spent time with it. But I think these days that the level of getting somebody's attention is rising and rising because of the overall influence of image and sound that you get from everyday life - traffic, people, TV, and so on.

CH: It's like a saturation which numbs the senses.

LJ: Yes. And I try to use the tools that make it so noisy in that world to express myself. That is one important aspect why I choose interactive applications for my work.

MT: Let's try something else and reverse it. One important thing about the CD-ROM has to do with the intimacy of art. Every piece on our CD-ROM could be seen in open space. Take the case of a music CD, for example. You can play it on a stage, so you can ask why bother having a CD. The difference has to do with the intimacy, and I think that this is an important factor with the CD-ROM. We could create a venue in open space where people could come and activate things in open space with our CD-ROM. But when you work with a new medium I think that you

have to wonder about how to reach people, and I think that the CD-ROM offers new possibilities to reach people. You can put your work in an intimate way, and you can distribute it to the people, and maybe one day the artist in new media can be like a rock musician, and make a CD and put it on stage. One must think about it on many levels, and the new media breaks new ground for artists. Maybe we are only at the beginning. For me the point about intimacy is very important.

CH: I agree. That is an important point.

MT: Every one of us hears music. Where do we hear this music, if not using new media, including the music CD. And yet most of this music is actually stage music. So you need to ask why we don't just see it on stage. For me the answer is in the different ways to experience art, and the CD-ROM offers intimate ways to experience art. It is also a way to let an artist be somewhat independent by giving him a way to reach many people.

CH: You mean by not tying the artist to a gallery or a performance space.

MT: That's right. When he has an opportunity he can show work as a performance or in a gallery. But I think that one must see this issue more widely.

CH: This realm of interactivity has resulted in a great deal of discussion centering on issues of control and presentation, calling into question many former paradigms. In creating interactive works, the artist must direct attention to setting processes in motion, perhaps at the expense of the more direct control over time and direction that one has in the case of a traditional concert or theater work. I would be interested in hearing your perspectives on this issue.

LJ: That's right. The importance or goal of the artist shifts somewhat from creating an image or sound which is presented to creating a system. Sounds and images may be part of it, but there is an open system where influence comes in from the public. You have to carefully think about it, and the interface is an important part of it. It has to be self-evident, without a lot of explanation about it. You have to get the user to try it out and explore the space. So I think that there needs to be a lot of experience on the part of the artist to find out what can work, what is impossible, and what is important to make interactive works function.

CH: So what are your impressions about this issue of control. Do you struggle with that issue as an artist?

LJ: My point about that is that I don't think that you ever had control. Take a photograph, for example. People come to that photograph, they look at it and see completely different things. They come from different backgrounds, different childhoods, whatever. They see completely different things.

CH: So is your perspective that there is no loss of control, because there was no real control in the first place? In that scenario, then, it is a reinterpretation of the way it was already, with everybody coming to it from their own vantage point, and processing the information in their own way. The

artist provides a system to make that possible.

LJ: There is still an open part of the art process - the spectator, that is. It's just more obvious now.

TI: There are some mistakes here, if I understand it correctly. The problem with the control is in the whole history of art, and in every period it is the same. When you look at a picture and you see nothing there, there is no picture. A painter creates a system every time, and you must see something in it. The problem with what people do with the new media- they are not so new. We are just finding it interesting at this moment. I think in history the people have not had a problem with this communication. And we have problems with it, and that is why we are looking for new ways to show our works.

CH: And so you are suggesting that the source for using the new technology is that the system that was used before doesn't work any more - it doesn't apply for the concerns of artists or participants.

TI: I can accept that interpretation. My level of looking is such that when I go to the gallery I just click on the exit and go out to the street. So everything that I do is a reflection of me. And when I have a problem with pictures, what shall I do with pictures? An image is one of the international elements - pictures and music I think are universal communication. And computers as a communication system are two points of one thing.

LJ: For me art is always a reflection of social development. So it should relate to what is going on in the so-called "real world". If you are going to address a public, or you want to get in touch with the outer or "real world", you should look around and as Tjark said reflect how you yourself perceive the world and how you react to it. And given the influence of technology these days in everyday life - the stores, the bank, the money machine, etc. Many people now have a computer at home or have to deal with these kind of machines in some way. So there is an interesting development coming from that side, trying to shape relationships between human beings, influencing the whole society. I think that it is interesting for artists to react on that using the new technology to communicate their own content, putting that back into the world.

CH: So how does this form your view with respect to the control issue? Place it in contrast with something like the level of control characteristic of the mid-19th-century symphonic tradition in Europe, where the composer establishes many levels of structure and connectivity, extending over multiple movements during the course of a 45-minute linear work.

LJ: That's a nice story, but look at what is going on today on television. Think about all those people who have maybe 50 channels. You can find some channels that play long films, but who is watching a film from beginning to end on TV? Most people are zipping with their remote, clicking around all over the place. And there are advertisements in between. Perception changed, and artists should react to that.

CH: So is it purely a reaction to the state of the world, or is there an element of evaluation or commentary?

MT: That is a very interesting question. Before the computer was developed, there was Pablo Picasso. And when you see Picasso, you can see that he was already a computer painter. Because Picasso didn't do one picture; he began to do a series of pictures. They were all related to one picture, but he could never decide which one was the real picture. This was one of the tragedies of Picasso and it is part of his greatness. People would ask him which one was the real picture, and he would say "I don't know - you decide".

Dali had said that he was a great painter because he didn't make many pictures, but every one is art. Picasso made a thousand pictures and didn't know which is good and which is bad. So I think that the issue of decision is a problematic one for the modern artist. My thought is that it is because the ethic and the morals of today are in such a problem situation. Everyone has his own morals. We don't have a moral like the time of Michelangelo. OK, they killed, they stole. But they had something that they called a collective moral. They had something that they called God, that they called the church. Every community had it. Modern man has lost it. And I think that losing it, and not having any basis for determining what is good and what is bad, this brings the modern artist to the notion that he cannot tell you what is truth. I can only tell you ten thoughts, and maybe one of these thoughts is real to you. Then in chaos theory they tell us that there is no one notion that we could call the true notion. There are possibilities. It can be this way, or it can be another way. So you will see in science and in art the issues which more and more define the psychology of today's human being. In this way maybe we are reflecting this situation.

LJ: And so I think that it is unrealistic to believe that artists could change behaviour or perception. Sure they have to acknowledge what is going on, and try to deal with that. But I think that there is no agreement between any people that they are now going to work in this or that direction and now try to change behaviour so that people will stop zipping any more or something. I just try to explain that I do not try to educate the world, but to reflect on what is going on and try to transport my thoughts.

TI: This is all too complicated for me. Back to the question of control. For me there are only two questions. At first, is life art? And second, will you do a form? If life is art, then smoke, drink coffee, and look at what is going on. If you are looking for a form, then you are going nowhere without control. And in that sense, I think that we are the veterans. And the next generation said "let the beat control your body". I can't say that it is a philosophy that I understand. But I think that there is a problem in that a culture will control every time. I think that this is so. I think that is the important question. Without that, "life is art", and that's OK. But for me it's a problem. I think one point of our CD-ROM is that we're four persons, every week for three hours we get together and speak about these problems. Nobody will read it in the CD-ROM, but I think that everyone can see that there is a problem, and here are four guys looking for a way in this problem. And so I say that is the question of control. It is not a dictate. Maybe I make an open system, and how open is my own decision. At the end, in every art is control. But without it is nothing.

MT: The moment that the artist gives you a system, he provides
you with a beginning and an end, and he already put in some
laws. And to partake in the piece you have to live with those
laws, and the artist controls you.

CH: That's my point.

LJ: But there is no difference with an image hanging on the
wall. There are also restrictions there.

CH: And so we come to the focus of my question. I am trying to
flush out similarities and differences with respect to the
systems that artists build using new technology, as compared
with previous technologies. Let us stop here, and carry on the
discussion on-line.
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< Conference Review: International Conference on Color
Education (Art/Science Forum) >
Helsinki, Finland, 16 - 19 August 1994.

Reviewed by Christopher Willard
(Email: cawch@cunyvm.cuny.edu)

Color education, while currently holding a tenuous position
both within and outside of academic environments, recently
held center stage at the International Conference on Colour
Education in Helsinki. The conference demonstrated the
breadth of approaches to color in the work of contemporary
educators and artists. Issues included the following: the
language of color, color order systems, color in architecture,
color as light, color in design, and color as artistic work.
Papers presented at the conference reasserted the fact that an
understanding of color remains critical to both the creation
and critique of art forms.

The wide scope of issues discussed centered around one
underlying theme: the problem of teaching color beyond the
methodologies and models suggested by Josef Albers and
Johannes Itten. Common among the participants was a desire to
move color education away from the accepted bases of

application. Those I spoke with offered various opinions, including a need to incorporate the ideas of Postmodernism; a desire to create a more multi-cultural approach; and a realization of the limitations of existing methodologies. Color education was often seen as separate and unnecessary to studio practice; the strengths and weaknesses of the conference may be viewed against this position.

The conference achieved its intent to review the state of current color education, as well as its examination of the position of established theories of color in the visual arts. The topics covered were not only wide-ranging, but also provided clear groundwork for further research, particularly in the following areas: the deliberate creation in painting of a filmic color appearance; psychological studies regarding pleasantness of hues; and the use of the computer as an integral conceptual tool. The conference also tended to highlight the European adherence to the Natural Color System as opposed to the American adherence to the C.I.E. System -- though this issue was never explicitly stated. Further, Europeans at the conference raised the issue of color order systems in relation to color ordering and artistic work -- a bond not commonly seen in the States. Strong opinions emerged on the subject of the controversial tendency of organizations to promote their own color order systems or atlases; while still unresolved, these arguments (some begun in Budapest at the AIC conference last year) did serve to demonstrate the interest the European community holds in such matters.

Not all presentations were received calmly. Some papers were attacked as having formulated rules solely on the basis of empirical observations and unverifiable conditions. A lengthy work on afterimages was harshly critiqued for a lack of color specification, strict lighting conditions, specified viewing distance, and other issues considered to be of critical importance to the perception of color. Similarly, global semantic notions of color meaning were critiqued. For example the statement that an individual has been "fired on gray paper" carries a societal meaning in Finland. Evidently the issue goes beyond the loss of one's job, when the notice of termination is printed on gray paper. The key figures in the field of color education were also reviewed, Albers for his confusion of transparency with film color, and Itten for suggesting his primaries could produce full saturation secondaries.

The content and variety of the conference sessions suggested rudimentary but important ways of re-evaluating color, for contemporary educators and artists alike. In moving beyond Albers and Itten, many advances have recently occurred: color science, human color vision, neurophysiology, psychophysics and psychology, methods of quantification, and digital media. But in some of these areas, the conference was lacking: for example, while digital media was shown to provide a design tool for some artists, the higher potentials and limitations of such media were not discussed in the same context. Similarly, most papers remained couched in an empirical perceptual ideology reminiscent of the color language of the early to mid-20th century. There was also a general lack of knowledge of the historical foundations of bases of certain artistic groups, as well as a lack of understanding of current connections between human color vision processing and the perception of color.

Yet overall, the conference reaffirmed the abilities of color
to provide multifarious links between areas of scientific and
artistic research. Those interested in obtaining copies of
papers should contact the UIAH. A volume of selected
presentations will also be published in December.
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<   Book Review: Visions of the Future: Art, Technology, and
Computing in the Twenty-First Century >
edited by Clifford A. Pickover, St. Martin's Press, New York,
1992, ISBN 0-312-08481-1.

Reviewed by Paul Hertz
(E-mail: paul-hertz@nwu.edu)

In the ancient Greek myth, the character of the Old Man of
the Sea shifts from bearded lion to leopard, boar, flowing
water, or towering tree to elude Menelaos, who would seize
him to extort a prophecy. Similarly, computing devices
continually assume new forms, defying our attempts to discern
their future -- which is our own. As yet, no one has provided
humanity's first "meta-tool" with adequate prophecy software
(discounting astrology applications). We shall have to rely
on snapshots of the present, extrapolated to the future, to
form some idea of the shape of computing yet to come.

To this end, Clifford Pickover has brought together a
diverse and provocative group of essays, written by familiars
of the protean machine. Topics range from virtual reality to
artificial life, from war games to golf simulation. The sum
of the visions conjures up not a single image, but a
scattered mosaic suspended in many possible futures. Indeed,
it is a mark of the speed of technological change that some
"predictions" have already come to pass in the time between
the writing and publication of this book. Other visions
describe more distant or hypothetical futures. A few point to
underlying philosophical or ethical issues.

As might be expected in a book edited by Pickover, whose own
work has involved the representation of multivariate data,
several essays predict that new techniques of visualization
will affect many areas, from weather prediction to materials
science and the simulation of evolution. In a carefully
reasoned investigation of "Computers and Human Communication,"
Davis Albert Foulger uses a 3D representation of the vectors
of "media space" to suggest areas where new technologies are
likely to find a niche. D.G. East writes of the application
of spatial modeling and image processing to archaeological
research, arriving at the forlorn conclusion that computers
may be the only way to preserve our archaeological heritage.
Perhaps the most radical of the "technological" essays is
Hans Moravec's "The Universal Robot," which calls into
question the very direction of evolutionary trends, perhaps
bringing humankind to the verge of a radically different
parental responsibility.

Other essays focus on the applications of computers to
learning and art. Essays on virtual museums, and computers
so cheap and small tomorrow's students will forget them on
the breakfast table, suggest an enthusiastic endorsement of
instructional technology, tempered only by current computational
limits and inadequate interface design. Several artists describe

their work. Stewart Dickson aptly demonstrates the alchemical
power of computing to transmute flat images and sculpture.
Peter Hettich suggests, primarily by example of reproductions
of his work, that computers may provide artists with a powerful
tool for manipulating spatial perception and cognition.

If there is any drawback to this jam session of technomancers,
it lies in the uniformly sanguine outlook most of them seem to
espouse. The essays may inform or amaze us, but rarely do they
disturb us, or question the social insertion of the technologies
of the future. Admittedly, this is not the purpose of the book--
and perhaps we have barely begun to discern the fundamental social
issues that will emerge from future computing. Nevertheless, one
is thankful for the audacity of Hans Moravec's vision precisely
because it points to unique ethical dilemmas, that will be
inseparable from the nature of the technology, and not just the
product of human moral frailty. Paul Brown, too, provides a
refreshing pessimism and sarcastic wit in tackling the once and
future role of the arts, though he is willing to pump up our
expectations in a good cause. The truth is, we all like to be
amazed, and "Visions of the Future" succeeds admirably in evoking
the amazing possibilities of computing.
****
< Book Review: Embodied Mind: Cognitive Science and Human
Experience >
Francisco J Varela, Evan Thompson, Eleanor Rosch
MIT press 1993

Reviewed by Simon Penny
(Email: penny+@andrew.cmu.edu)

"Let us emphasize that the overriding aim of our book is
pragmatic. We do not intend to build some grand unified
theory either scientific or philosophical of the mind body
relation. Nor do we intend to write a treatise of
comparative scholarship. Our concern is to open a space of
possibilities in which the circulation between cognitive
science and human experience can be fully appreciated and to
foster the transformative possibilities of human experience
in a scientific culture." (xviii)

So saying, the authors of Embodied Mind state their basic
premise that Cognitive Science has come to an impasse due
to the inability of cognitive scientists to reconcile the
results of cognitive science research with their own lived
experience. Specifically, the authors recount various
examples of cognitive science research which make untenable
the notion of a unified self. They pair the discussion of
this research with quotations revealing the inability or
unwillingness of these same researchers to accept the
implications of their research. The authors argue that this
reconciliation is critical to the future development of
Cognitive Science, that clinging to a notion of the self-
inviolable by the entire discipline is an impediment to
further development. Further, they argue that a notion of
the inviolable self and of an objective external reality
are flip sides of the same argument. Thus nothing less than
the foundations of the scientific method are here brought
into question. In order to effect such a reconciliation,
nothing less than a thorough-going rebuilding of the
philosophical foundations of the discipline, a purge, is
required.

In order to support their position, a synopsis of the
discipline is offered. Conventional cognitive science is
assessed as fitting largely within the tradition of
"cognitivism" and is thus closely linked with the
discipline of Artificial Intelligence: "the central tool
and guiding metaphor of cognitivism is the digital
computer ...a computation is an operation performed or
carried out on symbols, that is, on elements that
represent what they stand for. ...cognitivism consists in
the hypothesis that cognition-human cognition included-is
the manipulation of symbols after the fashion of the
digital computer. In other words, cognition is mental
representation: the mind is thought to operate by
manipulating symbols that represent features of the world
or represent the world as being a certain way."(7-8) The
authors questions the assumption that cognition is
fundamentally representation. Such an assumption entails
further assumptions: that the qualities of the outside
world are fixed and "objective"; that we recover these
properties by internally representing them; and that
there is a separate subjective "I" that does these things.
"These three assumptions amount to a strong, often tacit
and unquestioned, commitment to realism or objectivism/
subjectivism about ...how we come to know the world" (9)
In response, the authors maintain that the organism and
its environment co-evolve, that any organism, particularly
the human organism, actively shapes its environment. They
refer to this as "structural coupling". So here too, the
clear distinction between self and objective world becomes
untenable.

Thus the authors of Embodied Mind directly challenge the
basic premises of Artificial Intelligence and Cognitive
Science as it has been practiced over the last twenty
years. There is much in common in their position with the
long standing refutations of the premises of AI of Hubert
Dreyfus (see What Computers Still Can't Do, MIT Press 1992)
and with that of Terry Winograd and Fernando Flores in
their work Computers and Cognition. All three works
(particularly Embodied Mind and What Computers Still can't
Do) are informed by phenomenology, and refute the relevance
of the AI paradigm to human cognition.

Varela, Thompson and Rosch discuss alternatives to
cognitivism. They summarize the emergence/connectionism
approach, which critiques symbol processing as the
appropriate vehicle for representations, (but doesn't
critique representation itself): "For connectionism, a
representation consists in the correspondence between...
an emergent global state and properties of the world; it
is not a function of symbols." (8) The authors then assert
a more radical alternative, critiquing the notion of
representation: "...we explicitly call into question the
assumption-prevalent throughout cognitive science-that
cognition consists of the representation of a world
that is independent of our cognitive and perceptual
capacities by a cognitive system that exists independent
of the world." (xx)

As an alternative, the authors propose an approach to the
study of cognition which they call Enaction, is to re-orient

cognitive science from cognitivism and representation to cognition as embodied action: an ongoing self-organising and groundless lived process, based on the idea that "cognition has no ultimate foundation or ground beyond its history of embodiment." (xx) The authors refer to this history of embodiment as an "emergent" phenomenon, and thus link their enterprise with the contemporary study of complexity theory, emergent order and self-organising systems. This is an appropriate connection, as these studies are also fueled by a disenchantment with similar aspects of the Artificial Intelligence paradigm and the engineering world-view.

The use of the terminology of emergence would seem to place this work in a close relationship with the study of Artificial Life. But there is an interesting and clear difference between the two positions on the subject of evolution. The AL community seems to embrace an unproblematized emulation of Darwinian selection, and thus opens the possibility for the reification of all sorts of C19th Social Darwinist notions. In addition, certain aspects of the community seem all too willing to adopt the DNA-as-algorithm dictum, which is open to similar critiques as the authors of Embodied Mind level at cognitivism: that the analogy with the digital computer may be inappropriate. In contrast, the authors of Embodied Mind offer a rather liberating notion of "evolution as natural drift" as a component of their theory. The core of this notion is the movement from a position that "evolution forbids anything that is not survivable" to "evolution admits anything that can survive" opening the evolutionary field to mutations which do not impair survivability, and thus allows the possibility of seeing evolution as "bricolage", that species exist not because they fulfill some ideal design but simply because they are possible. "There are therefore reasons to ask whether the very program of studying evolution as trait fitness optimization is not fundamentally flawed"(189). And later: "Baldly stated, representationism in cognitive science is the precise homologue of adaptationism in evolutionary theory, for optimality plays the same central role on each domain"(194)

The stance of rejection of the possibility of objectivity and simultaneous rejection of the stability of the cognizing subject is timely, and resonates with post-structural critical theory of the last twenty years in the humanities (a tradition that the authors make only scant reference to). Their position also resonates with critiques of the scientific method, from Paul Feyerabend to the Endo-physics of Otto R'ssler et al. By associating themselves with these various schools of thought, and with the phenomenologically informed critiques of AI, the authors make it plain that they are interested in placing their discussion not only within the confines of the discipline of cognitive science, but within the broader debate on the scientific method and the tradition of the enlightenment.

Noting that in the US and in cognitive science in the US, phenomenology has remained a relatively uninfluential philosophical school, the authors cite the fundamental intuition of "double embodiment" of Merleau-Ponty. "For Merleau-Ponty as for us, embodiment has this double sense: it encompasses both the body as a lived, experiential structure and the body as the context or milieu of cognitive mechanisms."(xvi)

They call for a "radically new approach to the implementation
of Merleau-Ponty's vision." (xvii) It is here that the
authors pull a rather surprising trump card which becomes a
central theme of the book. They assert; the work of
Merleau-Ponty, Heidegger, Husserl and Nietzche
notwithstanding; that although the western philosophical is
largely bereft of tools to deal with the issue of the
insubstantial nature of the self, there exists a long
tradition of experientially based philosophy of cognition
in certain aspects of Buddhist thought (the Madhyamika
tradition), which has been developed and refined for many
centuries.

It is in the Madhyamika tradition that the authors find both
an experiential dimension of study which complements and
redeems cognitive science from being lost in abstraction,
and a system of thought that finds no need of objective
ground, indeed counsels against the clinging to or grasping
of such ground as fallacious. There ensues an introduction
to the notions of groundlessness and of the nonunified or
decentered self in the Buddhist tradition, and the
explication of a system for enlightened living based on
this notion of groundlessness and egolessness in the same
tradition. They find in this system support for their
program of Enactive cognitive science.

The expansive reach of this work is breathtaking. The book
swings between a focused and specialized examination of the
discipline of cognitive science and a philosophical
discussion which steps beyond the limits of the western
tradition by placing the entire tradition in relation to
the idea of groundlessness as discussed in Buddhist
teachings. There is a certain thrill in the audaciousness
of this position. Their approach implicitly takes cognitive
science researchers to task in a double way, it critiques
the philosophical basis of their methodology within
cognitive science, and it critiques their inability
to incorporate the results of their research in their lived
lives.

Over the years there have been numerous attempts at a
holistic reconciliation of science with spiritual traditions,
both Eastern and Western, typified by the works of such
authors as Fritjof Capra and Paul Davies. These works clearly
address a felt need of an entire generation. Although
tempting, it would be a mistake to see Embodied Mind as
fitting neatly into this category. Embodied mind is not
working on the level of poetic associations. Like the
Buddhist tradition it sources, it is ruggedly, steadfastly
pragmatic.
****
< Exhibition Catalog Review: Aligi Sassu, Pinturas 1927-1990 >
Catalog from an exhibit of paintings at the Centro de Arte y
Comunicacion, Buenos Aires, Argentina, August 24 -
September 24, 1992. With texts by Fabio Magalhaes,
Giulio Carlo Argan, and Werner Spies.

Reviewed by Paul Hertz
(E-mail: paul-hertz@nwu.edu)

THIS REVIEW HAS BEEN POSTED ON THE LDR WWW SITE:
http://www-mitpress.mit.edu/Leonardo/ldr.html

THE FULL TEXT OF THE REVIEW WILL RUN IN THE NEXT
ISSUE OF LDR.
****
< Book Review: Les Riches Heures de l'Alphabet >
by Henri Chopin and Paul Zumthor, Editions
Traversieres, 1992, 202 pp. ISBN: 2-903551-10-3. 240 FF.

Reviewed by Marc Battier
(E-mail: bam@ircam.fr)

THIS REVIEW HAS BEEN POSTED ON THE LDR WWW SITE:
http://www-mitpress.mit.edu/Leonardo/ldr.html
THE FULL TEXT OF THE REVIEW WILL RUN IN THE NEXT
ISSUE OF LDR.
****
< World Wide Web Site Review: Mathart.com >
URL: http://www.wri.com/~mathart

Reviewed by Kasey Asberry
(Email: kasberry@mercury.sfsu.edu)

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Third Interdisciplinary Symmetry Congress and Exhibition,
Washington, D.C. (Old Town Alexandria)
Information: Gyorgy Darvas, Symmetrion - The Institute for
Advanced Symmetry Studies, P.O. Box 4, Budapest, H-1361
Hungary; tel: +36-1-131-8326; fax: +36-1-131-3161;
e-mail: h492dar@ella.hu; Denes Nagy, Institute of Applied
Physics, University of Tsukuba, Tsukuba Science City,
Japan 305; tel: +81-298-53-6786; fax: +81-298-53-5205;
e-mail: nagy@kafka.bk. tsukuba.ac.jp.

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LEONARDO ALMANAC:  International Resources in Art, Science
and Technology, Ed C Harris,  MIT Press ISBN 0-262-58125-6
journals-orders@mit.edu
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AUTHORS AND READERS - IF YOU DISAGREE OR WANT TO ADD TO ONE
OF THE REVIEWS - WE WELCOME EMAIL TO THE EDITOR TO
davinci@uclink.berkeley.edu
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<  END LEONARDO DIGITAL REVIEW          NOVEMBER 1994  >
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                   |   ANNOUNCEMENTS   |
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< Chimera - a Forthcoming Event >
22nd -27th February, 1995, Sydney, Australia.

Neil Berecry or Adrian Hall
SYNAPSE
P.O. Box 913
Rozelle, N.S.W. 2039, AUSTRALIA.
Tel/Fax: +61 43 74 1276
Email: adrian.hall@unsw.edu.au

A five day programme of speculative engagements with
interdisciplinary art and artists' initiatives, and a
celebration of their energy and diversity. A series of
stimulating and lively opportunities to examine agendas for
positive change which are non-gallery based, and other ways in
which contemporary artists are contributing.

Chimera will include interdisciplinary art events, commissioned
art works, an international symposium to critically examine
issues relating to new areas of practice and new media, a show-
case of recent and in-progress artist's projects, information
on artist-run organisations that are significant in the
development of this field, and examples of the function of new
technology in this area. More than this, the social exchange,
seminars, talks and discussions around these events in Sydney
will overlap with the communications taking place around the
world through fax, electronic mail and real-time video
exchange.
****
< League of Composers/ISCM -
    1995 National Composers Competition >

Jason Uechi, Executive Director
National Composers Competition
League/ISCM
c/o American Music Center
30 West 26th Street #1001
New York, NY 10010
Email:jnu1@columbia.edu

The League of Composers/ISCM (US section) is pleased
to announce its 1995 National Composers Competition.
This year a winning work will receive a performance on
our New York Concert Series, and will be submitted to the
ISCM's World Music Days as an official US entry.

The competition is open to any composer of US citizenship,

except Board Members of the League/ISCM. Any instrumentation
up to five players is acceptable (including solo and
electronic or electro/acoustic works). There is a
registration fee of $20.

Deadline is January 31, 1995 for the receipt of scores and
tapes.
****
<   League of Composers/ISCM -
     Call for Proposals from Performers >

Jason Uechi, Executive Director
League/ISCM
c/o American Music Center
30 West 26th Street #1001
New York, NY 10010
Email:jnu1@columbia.edu

The League of Composers/ISCM (US section) invites performers
(soloists and chamber ensembles) to submit proposals for a
League/ISCM sponsored concert during its 1995-95 season.
Sponsorship includes the rental of one of New York's prime
recital halls, publicity, and recording of the concert, but
does not include payment for the performers. Proposals should
include: a letter to the Programming committee, a proposed
program (which may include alternate versions as well as
electronic components), biographical information on the
performer(s), and a sound recording of the performer(s)
preferably including something from the proposed program.
Proposals may include scores of the works, press kit material,
etc.

Proposals that are sent with a return mailer SASE will be
returned, other materials will be donated to the AMC's library.
****
<   Institute for Advanced Technology in the Humanities >

URL: http://jefferson.village.virginia.edu/home.html

This server houses some of the most interesting work going on
in that sweet space where art and technology overlap. Enjoy
works in progress, research papers and reports on innovative
applications of technology in the areas of the arts and
humanities. There are searchable indices of literary and
reference works on the Web. There are also links to
publications on humanity applications.
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<   Leonardo World Wide Web site opens for visitors >

URL: http://www-mitpress.mit.edu/Leonardo/home.html

Leonardo (the International Society for the Arts Sciences and
Technology) announces that its World Wide Web site welcomes
visitors (with hard hats). The site is under construction and
visitors are encouraged to collaborate in building the city. A
threshold has been built, and buildings containing the archives
of the Leonardo Electronic Almanac and reviews from the
Leonardo Digial Reviews. Keep your eye on this site.
More will be happening in the coming months.
****
<   The Creative Work Fund >

Frances Phillips
The Walter and Elise Haas Fund
One Lombard Street, Suite 305
San Francisco, CA 94111 USA
Tel: (415) 398-4474

The Creative Work Fund is a funding initiative that supports the
creation of new work by artists through grants to arts and other
community organizations for collaborative projects. Artists'' work
must be central to the proposed collaborations. Grants will range
from $10,000 to $35,000. The Creative Work Fund is a two-year pilot
program of the Walter and Elise Haas Fund, the Columbia Foundation,
the Miriam and Peter Haas Fund, and the Evelyn and Walter Haas, Jr.
Fund.

In spring 1995 performing artists are eligible to team up with arts
or community organizations to develop collaborative projects.
Performing artists working on interdisciplinary projects also are
eligible. Applicant artists and organizations must be based in San
Francisco or Alameda counties. Letters of inquiry and full proposals
will only be accepted from 501(c)(3) organizations, but all documents
should be prepared jointly by the artists and the sponsoring
organizations. Artists are encouraged to contact organizations and
initiate projects.

Sponsoring organizations and artists jointly submit a brief letter of
inquiry that will be considered in a preliminary screening. All
letters of inquiry should include full name, address and telephone
number of the artist and the contact person at the collaborating
organization, plus a brief (2-page limit) version of the artist's
resume. Do not send slides or other supporting documentation. If a
project is selected, the Fund will request a full proposal and
documentation of the artist's work. A panel of artists, arts and
community organization representatives will review the proposals and
make final grant recommendations.

Letter of Inquiry deadline: February 3, 1995
Proposal deadline: April 21, 1995
Grant announcements: May 1995
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                   |  PUBLICATIONS   |
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< 1993 and 1994 SIGGRAPH Visual Proceedings >

The MIT Press
55 Hayward Street
Cambridge, MA 02142-1399 USA
Tel: (617) 253-2889
Fax: (617) 258-6779
Email: journals-orders@mit.edu

The SIGGRAPH Art Show and Associated exhibits continue to
showcase important work in the media arts field. Leonardo/ISAST
was proud to publish the 1989 and 1990 SIGGRAPH Art Show
catalogues, and is now happy to make the 1993 and 1994 SIGGRAPH
Visual Proceedings available to a wider audience. Contact The
MIT Press for details.

SIGGRAPH has recently established an Art Task Force, under
SIGGRAPH Executive Committee Member Bonnie Mitchell. We urge

all interested individuals to contact her to help develop plans
to address the concerns of artists exhibiting at SIGGRAPH, and
to maintain the excellent standards in the annual show.

Visual Proceedings 1993 highlights include:

Designing Technology

Contributed Work: From Alice to Ocean: Alone Across the
Outback, by Rick Smolan
Essay: The Design Process for Information Products, by
Aaron Marcus
Interview: RitaSue Siegel

Electronic Theater

Evening Show: ABC System
Small Animation Theater: The Adventures of Korky, the Corkscrew
International Animation Theater: Ars Electronica

Machine Culture: The Virtual Frontier

Machine Culture Committee
Edge of Intention
The Fence: Coactive Aesthetics

Tomorrow's Realities

ALIVE: An Artificial Life Interactive Video Environment, by
Pattie Maes
B*arbies Virtual Playhouse, by Henry See
Books of Change: Meditations on Metamorphosis, by
Timothy Binkley

Visual Proceedings 1994 highlights include:

Electronic Theater

Ajax 'Beyond', by Jane White
Capturing Weldon Pond, by Scott Dyer
Card Trick, by Robert Herrick Russ

Art and Design Show

Fish #9, 1993, by Frances Valesco
New Life Forms, 1993, by Bonnie Kane
End of the Street, 1993, by Anna Z. Ursya

SIGkids

This event creates a mini conference for kids, featuring
personal technologies, multimedia, scientific visualization,
and virtual reality. SIGkids focuses on exploration of the
Internet and multimedia while creating links between industry
and the classroom, just as education is exploring these new
possibilities. Artwork is created by kids.

The Bridge

The Bridge is a unique section shared by SIGkids and The Edge.
It comprises two types of exhibits: Those designed for kids,
and those designed by kids.

The Edge

ARCHiTECTURE by SUPREME PARTiCLES
She Loves It, She Loves It NOT: Women and Technology, by
Christine Tamblyn in collaboration with Marjorie Franklin and
Paul Tompkins.

VROOM

Simulation of a Grinding Process in Virtual Reality, by Mike
Papka and Steve Cohen
Knotted Spheres in the Fourth Dimension, by Robert A. Cross and
Andrew J. Hanson

[Ed: LEA readers may recall that Henry See's "B*arbies
Virtual Playhouse" was published in LEA 2:1, and abstracts from
The Edge were published in LEA 2:7. These issues are still
available on the MIT Press file server if anybody would like to
sample the content of the SIGGRAPH Visual Proceedings.]
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|   ACKNOWLEDGMENTS  |
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Leonardo/ISAST gratefully acknowledges Interval Research Corporation
and Thom Blum/Muscle Fish Audio Multimedia Software, for their
support of Leonardo Electronic Almanac.

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|       LEA        |
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|   CONVENTIONS    |
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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 - full line character sequence
*****: Item Delineation within Section - full line character sequence
<: Item Title - search for the character "<" followed by two spaces
|_ 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 with this issue will
appear with all letters in sequence with no spaces (PROFILES,
REVIEWS, etc.).

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|     ACCESS       |
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login: anonymous
password: your_email_address
cd pub/Leonardo/Leonardo-Elec-Almanac
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This is an evolving system. Check the README file for the most
current information about the contents in the system, and for the
most current information about all of the ftp services. Submission
Guidelines and Past issues are available via ftp.

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|  SUBSCRIPTION  |
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Editorial Address:
 Leonardo Electronic Almanac
 718 6th Street SE
 Minneapolis, MN 55414
 Tel: (612) 362-9390
 Email: craig@well.sf.ca.us

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========== < End of Leonardo Electronic Almanac 2(11) >
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