The MIT Press

Leonardo

GATE WAY

In GATEWAY we report on significant events, including conferences and expositions; news of interesting developments in technology and science as they relate to the arts; news about people of interest to the Leonardo *audience, tutorial-level discussions of important technologies and science for the nonexpert. We welcome readers' suggestions for and contributions to future sections.*

ADVANCES IN BASIC AND APPLIED SCIENCES: THE ANNUAL IBM SUPERCOMPUTING COMPETITION, PARK CITY, UTAH, U.S.A., 24 APRIL 1991

A rich diversity of basic and applied supercomputing science—from the interior of human arteries to the collapse of black holes—typified this year's IBM Supercomputing Competition winners.

Winning papers represent advances in each of the five divisions in the 1990 competition: social sciences, humanities and the arts; physical sciences and mathematics; engineering; life and health sciences; and computer sciences: distributed and cooperative processing.

Some of the work could lead to fundamental rethinking of central concepts. For example, one paper that discussed a simulation of the collapse of nonspherical black holes suggests a flaw in Einstein's relativity theory.

Other papers point toward improvements in human life, health and even a new art form that combines music and computer graphics. A number of age-old concerns, such as "Is It Better to Be Born Rich or Smart?" and "An Approach to the Synthesis of Life", were also prize-winning topics of this supercomputing competition.

Three cash prizes were awarded in each division: (U.S.) $25,000 for first prize, $15,000 for second prize and $10,000 for third prize.

MODERN LAOKOÖN: ESTHETIC PROBLEMS OF SYNESTHESIA CONFERENCE, MOSCOW, USSR, 21–22 JANUARY 1991

This all-union conference, with this unusual name, was held at Moscow State University and was devoted to different kinds of interactions between the arts. Stressed were the interactions stipulated by synesthesia, the human ability to establish intersensual analogies. The conference was organized by the chair of esthetics of Moscow University, Alexander S. Migunov, and by myself, a senior official of the 'Prometheus' Students' Designing Office.

The papers were divided into three workshops: 'Synesthesia as an Esthetic Problem', 'Interactions in Art at the Level of Kinds and Genres' and 'New Arts and Technologies'. The attendance was mixed—artists, designers, musi-

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> *Listen to the technology and find out what it is telling you.*
> —Carver Mead

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cians, esthetists, psychologists and engineers.

The first workshop was devoted to the study of the functions of synesthesia in culture, in everyday language, and in poetry, music and painting. The lecturers stressed that synesthesia is a norm of human perception and thinking, but not a unique or anomalous (pathologic) state of mind, as some researchers believe. As a psychological phenomenon, it is a kind of intersensual association, formed on the basis of the likeness of either structure (gestalt) or emotional sense estimation of multimodal influences. Synesthesia is the substantial accessory of nonverbal thought, i.e. art in the experience of creation and perception.

The second workshop focused on the functions of synesthesia in the process of systems interactions in the arts, with primary consideration given to audio and visual functions. Particular attention was given to the 'controlling' functions of synesthesia in the synthesis of the arts, in the development of new synthetic forms such as light-music (musical kinetic art), computer ani-

IBM Supercomputing Competition ...

Social Sciences, Humanities and the Arts

First prize was awarded for "Driving Computer-Graphics Animation from a Musical Score", Wayne T. Lytle, Cornell National Supercomputer Facility, Ithaca, NY, U.S.A.

Second prize was awarded for "Uncertainty in Dynamic Macroeconomics: A Computational Challenge", Hans M. Amman, Department of Economics, University of Amsterdam, The Netherlands, and David A. Kendrick, University of Texas, Austin, TX, U.S.A.

Third prize was awarded for "Is It Better to Be Born Rich or Smart?: A Bioecological Analysis of the Contributions of IQ and Socioeconomic Status to Adult Income", Charles R. Henderson, Jr., and Stephen J. Ceci, Cornell University, Ithaca, NY, U.S.A.

MULTIMEDIA EXPO, NEW YORK, NY, U.S.A., 14–16 MAY 1991

One cannot underestimate the significance of recent advances in computer-related technologies. With multimedia, the real-time computer integration of video, text and sound, even non-computer-oriented people will soon gain access to a totally new world of meaningful 'information', whether in the form of a video game or an interactive electronic book. Corporations such as Microsoft, Sony, Apple, IBM and Intel, representing every industry from rock music to telecommunications and microchips, are eager to provide us with these new services and products.

The seminars at the expo covered such diverse topics as multimedia communications and networking, desktop video, and interactive
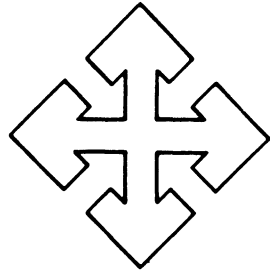
Multimedia Expo ...

media design. Of particular interest were two seminars on 'virtual reality'. The first, conducted by Laurin Herr of Pacific Interface, presented this topic in a historical context and was primarily concerned with providing definitions for the uninitiated. The second seminar on this topic, 'Cyberspace: Virtual Reality Simulation', included artist and *Leonardo* contributor Myron Krueger. These seminars, like many others about virtual reality, evangelized a vision of a 'virtual' future. Concerning multimedia, one can expect a fusion of current media and, with this, a new social fabric.

With this in mind, the lack of women at the expo was interesting. With the coming of the millennium, more and more of our society, from the private sector to the military, will become increasingly dependent on and affected by information technologies, from videophones to banking machines. Will we continue the current hierarchical system of women as secondary agents? Or will we listen to the message of our new computer networks and computers: that age, race and gender do not play any role in the development of creative thinking?

<div align="right">WILLIAM C. CASTELL</div>

CENTER FOR EXPERIMENTS IN ART, INFORMATION AND TECHNOLOGY (CEAIT), CALIFORNIA INSTITUTE OF THE ARTS, VALENCIA, CA, U.S.A.

This newly formed center is devoted to research and development in interactive technology applied to performance, publishing and real-time information manipulation in all of the arts. At present, a series of public demonstrations and

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mation, 'sound-and-light' performances and electronic art.

The third workshop was rather a novelty for the academic audience of Moscow University. Artists and engineers shared their experiences with kinetic and conceptual art, video art, electronic music and optical theater. Subordination of technology to esthetics was stressed most because the new synthetic art forms must be based on common, human experience for an audience to be able to catch synesthetic associations.

A collection of conference papers will be published. The conference recommended support for the SKB 'Prometei' to create a special audio-visual institute in Kazan, USSR (with the assistance of our foreign colleagues). I also informed the participants of the need for articles in the upcoming special issue of *Leonardo* about the USSR.

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Application-Based VR Theory
1. *Provides a better interface between computers and people.*
2. *Allows for more effective access, manipulation and organization of 'dataspace'.*
3. *Allows for the simulation and visualization of ideas, facts and situations that are either too expensive, complex or dangerous to perform directly in the material world.*
4. *Creates more effective interpersonal communication.*

VIRTUAL REALITY: DOORWAY OF PERCEPTION

vir•tu•al. *adj.* Existing or resulting in essence or effect though not in actual fact or form.

re•al•i•ty. *n.* The sum of all that is real, absolute and unchangeable.

vir•tu•al re•al•i•ty. *n.* An interactive, full-color, three-dimensional sound and motion environment created by computer and controlled interactively by the user.

A close look at these definitions reveals the paradoxical nature of this new technology and helps explain why it escapes easy definition. Perhaps some 'geographical analysis' can help. Where does virtual reality 'happen'? An easier question to address might be the following: where does a phone call take place? Is it within the headset or in the phone cable? Where are television, radio and satellite waves? There is a 'place' where virtual reality happens, called data- or cyberspace. Virtual reality is not unlike the development and application of perspective during the Italian Renaissance. It is a doorway to a new perception of reality, one in which information is the key element. (Timothy Leary believes that America has

CEAIT...

performances is taking place at the California Institute of the Arts, Valencia, and also at the Electronic Cafe, Santa Monica, CA. These events are designed to increase public awareness of new applications for and implications of interactive technology in the arts and culture.

Plans for the center include an ongoing foundation program, research, educational programs and working conferences focusing on development issues (for such areas as interactive publishing) and performance issues (for music, dance, theater, animation and so forth). In addition, the center will sponsor collaborative group residencies for artists, public presentations of artistic work and demonstrations of results from development projects, collaborations on interactive technology with industry groups, and further projects on information dissemination, education and artistic database access.

Further information will be forthcoming as plans develop. Interested readers may contact the Center for Experiments in Art, Information and Technology, California Institute of the Arts, School of Music, 24700 McBean Parkway, Valencia, CA 91355, U.S.A.

ROGER F. MALINA

LES ARTISTES ET LA LUMIERE

This international exposition, Les Artistes et la Lumiere (Artists and Light), was presented by the Centre National Art and Technologie (CNAT) and opened with record attendance on 9 March 1991 in Reims, France. On display were artworks by 18 featured artists from around the world, which highlighted the use of neon, lasers, holograms and LEDs. This exhibition was on view at Le Manege Museum, which, at 900 sq m, is the largest of its kind in the Champagne-
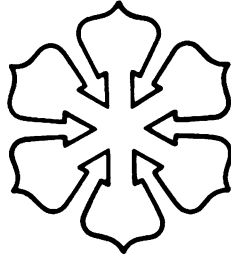
Les Artistes et la Lumiere ...

Ardenne region of France. The adjacent Le Cirque, a restored circus building built before the turn of the century, was used as the reception hall and the site of several conferences on 'Light'. The following were artists in the exhibition:

Bill Bell, United States; Alain Le Boucher, France; Jürgen and Nora Claus, Germany; George Dyens, Canada; Piero Fogliati, Italy; Frederic Forest, France; Pascal Gauchet, France; Roger Glab, France; Frederic Grandpre, France; Karl Hauser, United States; Pierre-Alain Hubert, France; Liliane Lijn, United Kingdom; Toma Naegerl, France; Christian Schiess, United Kingdom/United States (Fig. 1); Jeffery Shaw, The Netherlands; Alejandro and Moira Sina, United States; Douglas Tyler, United States; Michael Wenyon and Susan Gamble, Japan/United Kingdom.

The first neon sign was introduced by George Claude in Paris in 1910, and interest in neon and light in France continues today. The

Virtual Reality ...

been living in a form of virtual reality ever since the inception of television.)

The actual hardware for virtual reality has been around for many years; recent events involve the integration of different media through the computer. The hardware functions as a filter through which a user perceives information and navigates through dataspace. Head-mounted display devices and complex body-oriented input devices, such as 'eyephones' and 'datagloves', are currently the essential tools for information navigation in that they provide the user with analog perceptive ability with regard to the computers. Voice recognition, fulfilling futurists' predictions,

Fig. 1. Christian Schiess, *Turbo-Flora*, kinetic neon sculpture, 370 × 145 × 145 cm, 1991. This work, part of an international exhibition celebrating light through LEDs, neon, lasers and holograms, was presented at Artistes et la Lumiere (Artists and Light) by the Centre National Art and Technologie, Maison de la Culture, France.

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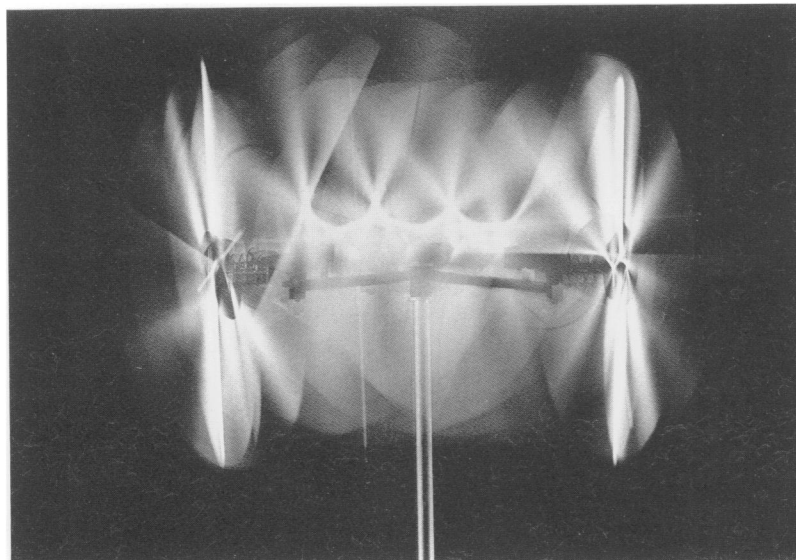
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will add unimaginable abilities for the navigation of datascapes. Virtual reality represents a perceptual shift on our behalf toward the 'worlds' we are creating with computers.

In the medieval age, land was the basis of power; in the industrial age, control resided in the creation and organization of material goods; now, virtual reality is indicative of the shift to a world dominated by the importance of information.

WILLIAM C. CASTELL

Les Artistes et la Lumiere ...

co-sponsors of the exhibition, the Electricity Foundation of France and the French Ministry of Research and Technology, hope that this interest will continue to grow in the future.

CHRISTIAN SCHIESS

It is a common observation that around 1950, a concert of popular music might be offered by 40 musicians who arrived at the concert hall in two band buses, with their acoustic instruments. Now, a typical concert of popular music involves 4 musicians, who arrive at the concert hall with one or two moving vans full of equipment that must be powered by electricity. Popular music has been transformed from an artistic activity with a very high ratio of labor use to energy use (low labor productivity) to one with a very high ratio of energy use (high labor productivity). The explanation is in a change in the relative supply to demand trends for labor and energy, which is now undergoing a historical reversal. That is, by 2020 we will have returned to a condition of expensive energy and cheap labor, and concerts of popular music with 40 musicians playing acoustic instruments.

—Kenneth E. F. Watt