the x axis, separation on the y axis and rotation existing between both simple textures. Each variable can be expressed numerically.

The juxtaposition of two simple textures produces a complex texture of the first grade. The procedure can be recursively applied in order to describe or generate complex textures of second, third or higher grades. For example, a second-grade complex texture is the combination of a first-grade complex texture with a simple texture (involving a total of three simple textures). A third-grade complex texture is the combination of two first-grade complex textures or the combination of a second-grade complex texture with a simple texture (involving a total of four simple textures), and so on.

Some immediate consequences of this system are that textures can be thoroughly classified with sound criteria, and that it is conceivable to think in terms of the development of a system for ordering textures, just as color systems have been proposed for the organization of colors. This systematization would provide artists and designers with a basis for managing principles of harmony in the use of textures.

References and Notes
3. This theory has been proposed by C. Jannello. An English account of it may be found in C. F. Cayer, "Architectural Design and Space Semiotics in Argentina," The Semiotic Web 1987, T. A. Sebeok and J. Uniker-Sebeok, eds. (Berlin: Mouton de Gruyter, 1988), pp. 399-419.

Binarisation Performances: Direct Intervention on the Digital Networks

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Theory

Experiments in digital transmission generally use the entire range of information-transfer techniques available in our era — involving both alternating and interactive exchange — without, however, revealing the specifics of the process.

In comparison, information transfer (IT) artistic action involves networks as channels of digital information, maintaining existing procedures of communication while applying a strategy of digital amplification using two variables: time and memory.

- The time variable defines the frequencies of sending images according to time periods of 2, 4, 8 and 16 units; it defines methods of display according to line-by-line increments. The passage of time is heightened during the period of transmission.
- The memory variable sends the digital content (0/1) of the transmitted fragments: the 0/1 elements that represent the structure of the fragment are sent as such through the lines of the network, and the message is then presented in binary form. The memory of the message is thus heightened during this time.

The type of network chosen may be local or long-distance; the layer of receipt of the binary fragments functions in the background in the communication software.

Practice

Following are analyses of two typical binarisation performances: Cultural Signs, created for the XLV Venice Biennale [1], and Memory of the Twentieth Century, which was part of Documenta IX [2].

Cultural Signs

The objective of this performance was to broadcast through the Integrated Services Digital Network (ISDN) a multimedia IT journal on the theme of cultural signs. The following question was posed to correspondents connected to the network: "Define the meal, the cloth, the feast and the means of communication which, in your opinion, best express your culture."

The network correspondents sent their messages by fax, mail or ISDN to the Binarisation Center in Paris. I converted the messages into binary code and transmitted them by ISDN line to Venice. The data were expressed in real time and integrated into the multimedia journal as they were binarised (see Fig. 2).

Memory of the Twentieth Century

The following question was posed to correspondents connected to the network: "Define the Man, the Woman, the Object and the Event which you feel best express the twentieth century in the human memory."

The journal was relayed by radio waves throughout the zone of Kassel and the state of Hessen (Frankfurt). Hookups were assured by satellite transmission on the cable networks of Germany, Switzerland, Austria, Italy, France, the Commonwealth of Independent States (CIS), Japan, Canada and the United States.

Binary messages were transmitted over a field of interactive communication called the "Piazza Virtuale." The interactive-television experiment produced at Kassel by Van Gogh TV al-
followed the correspondents who were connected to the network at a given time to enter directly into the broadcast via six modes: ISDN, vocal, modem, touchtone, videophone and fax.

The television screen was virtually divided into three zones: the upper part included the zones for videophone, fax and modem; the lower zone showed the image of the text messages.

**Conclusion**

In these performances, voices, music and sounds were mixed together simultaneously with the images in what were essentially playful communication spaces. The challenge was to construct a language of interactive communication and to define a specific syntax at the edge of intelligibility and cacophony.

The transmission of binary messages on the virtual "piazzettas" (little places) has permitted us to unite different modes of communication through different means of access, such as modem, ISDN, videophone and voice. The voice is used to define the rules of the game, the binarisation to calculate the results of the performance and to stimulate the association of ideas.

The interventions of 12, 15, and 18 September 1992 at Documenta IX have allowed us to set up several criteria for interactive multimedia communication: (1) the preeminence of the voice and of speech as a unifying principle in multiple communications, (2) the necessity of broadcasting a single message at a given moment, (3) allowance for the association and rebonding of ideas as forms of communication, (4) the priority of light and rapid digital activities.

Nevertheless, symbolic actions remain a fundamental necessity. While maintaining a modest and lucid awareness of the real impact of their actions, artists can still knowingly play a part in the processes of fostering awareness, consciousness and ethical responsibility. The mass communication systems spreading throughout our societies can become decisive means of diffusing the symbolism that artists create, providing the possibility of acting directly in this new space of modernity that is the space of information. The meta-communicative contents of messages, when registered in this space, bring to it their aesthetic, artistic, critical, ethical or even spiritual and playful signs. The trail that was once traced on the walls of caves by hand is now drawn out on the tissue of information!

If the madness of human beings can lead us to electronic war, why not suppose that human wisdom will also lead us to take the modern paths of communication to spread electronic particles of love and peace? More importantly than providing decoration or expressing oneself freely or within a restrictive formalism, the function of the artist in the future must be on the level of ethical responsibility.

**Notes**

1. *The Watchtowers of Peace* took place from 28 May through 3 June 1993, during European Culture Month in Graz, Austria.
2. The Aesthetic of Communication movement was launched by Mario Costa and Fred Forrest in 1985.

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**LES MIRADORS DE LA PAIX**

(The Watchtowers of Peace)

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The Watchtowers of Peace—an event organized at the former Yugoslavian border of Austria—allowed for world-wide participation in a telecommunications demonstration [1]. The "watchtowers" were three 8-m-high metallic structures installed at the top of a pass in the mountains above Slovenia. Powerful loudspeakers were mounted on each of these three sound sculptures. The natural landscape gave a poetic dimension to the project although it was not landscape art. Rather, this work came out of the Aesthetic of Communication movement [2], and its primary purpose was to underline the concept of relation.

Connected to the international telephone network, The Watchtowers of Peace could be called from all over the world. An invitation was extended to anyone wishing to participate through a live and real-time telephone call to cover the territories facing war with messages of peace, positive waves and energies. Simultaneously, the calls were processed by a computer as they came in and were converted into electronic signals (a metaphor for the collective energies) to be sent on the network whenever a 30-sec period passed without an incoming call.

The physical range of the loudspeakers was limited to approximately 30 km. The shape of the mountains in the area acted as an echo chamber in which the amplified sounds of the calls reverberated. Beyond this local situation, the calls were transmitted to Yugoslavia and to European countries by microwave relay. The event reached various radio stations (among them Radio France International [RFI]), which, through FM and short waves, cover the whole planet. It was also transmitted to "Right to Speak" radio, which is installed on a boat off the Yugoslavian coast, and from there it reached listeners in Sarajevo, Zagreb and Belgrade. Listeners were invited to telephone "Le Monde de l'Art," an international gallery in Paris, where their calls were amplified for the audience. The calls were stored in a sound database used by other radio stations like Radio Nova and RFM.

Thus, an interactive communication system integrating various layers and networks was built. Printed media played a role upstream and downstream of the process, introducing the symbolic inside the information space. In this kind of work it is important to recall that the independent activities of artists do not, unfortunately, have the power to modify real crisis situations whose outcomes depend primarily upon political, military, economic or even social decisions.

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**COMPUTER-GENERATED UNIVERSAL MANDALAS**

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Art is not only for enjoyment; it has a more important function in helping the evolution of consciousness. Esoteric Buddhism developed methods of meditation that make use of the mandala. The mandala is a visual means for assisting self-integration and transcendence.

People in today's hectic modern world need the elevating qualities of the mandala. For this reason, I have attempted through the use of the computer to achieve this goal by creating what I term the "Universal Mandala" (Fig. 3).