
*Working with computer imagery since 1980, Isaac Victor Kerlow has exhibited his artwork internationally and has published several books about visual creation with computers, including the 1994 edition of **Computer Graphics for Designers and Artists**. He is professor of art and founding chair of the Department of Computer Graphics and Interactive Multimedia at Pratt Institute in Brooklyn.*

Computers, Pyramids and Hearts

by Isaac Victor Kerlow

It is easy to understand why most adults shunned computers for so long, especially when we consider the over-optimistic and blindly adoring views of technology that many of us grew up with. The glorified calculators of the 1950s and 1960s were mechanical and uninspired. Most computers during the 1960s did not have interactive keyboards and monitors, let alone color, sophisticated input devices, and good quality output on paper. But computer graphics technology has evolved tremendously in the last decade. It has also gained an impressive array of flexible tools for dealing with many of printmaking's traditional issues such as color control, registration, and image fidelity.

I was surprised to find a strong conceptual similarity between traditional printmaking and computer image generation because both techniques are based on the idea of making multiple copies from a single matrix. I realized that traditional printmaking techniques use one or several printing plates, and computers use the numerical description of images as a matrix for producing multiple versions. It seemed natural to me that the results of a numerical matrix, the computer-generated image, could be transferred onto a printmaking matrix for creating new versions of the same image.

I started to combine computer-generated imagery and traditional printmaking techniques in the early 1980s, and quickly became fascinated with the creative possibilities — especially the computer's ability to offer interaction, to help create virtual imaginary worlds and to integrate print media with time-based media. I decided to experiment with ways to bring concepts learned in my traditional art education closer to the new computer-generated imagery. The computer graphics technology available to artists in those years, however, was still being developed. Many of my friends and I spent a lot of time wishing for improved computer equipment and programs just so we could use them for traditional work. Many projects and dreams never took off — or crashed — because of technological limitations.

Nevertheless, I continued to experiment with methods for recreating computer-generated images with a variety of printmaking techniques, including etching, engraving and silkscreen and, more recently, I have tried direct digital printing. Dye sublimation systems, which print cyan, magenta and yellow on pre-treated paper, give the most light-resistant colors. Computer-based techniques now offer new creative possibilities, for example, in the areas of photographic and computer-controlled image manipulation, color separation and transferring procedures. Many traditional printmaking procedures can be easily implemented today with off-the-shelf software and standard microcomputer systems.

In 1984 I presented a simple interactive installation called **Electronic Stella** at the Fundació Joan Miró in Barcelona. The installation was accompanied by a series of etchings, *Seven Pyramids in Black and White*, related to the imagery presented on the computer's screen. Two years later I presented a modified version of this installation and **Masks**, a new work, at the Museo de Arte Moderno in Mexico City. By today's standards both projects ran on slow computers, but the audience could navigate with a touch-sensitive tablet.

The idea for *Seven Pyramids in Black and White* came from sketches I made in my travels through the Mayan and Mixtec sites in southeast Mexico. Many things about these places are memorable: the longevity of the magnificent structures, their resilience to the expansive jungle that surrounds them, their

intricate and rhythmic geometric patterns. Even though I wanted to recreate in my work some of the historical aspects of the sites, I also wanted to make sure that my view of these places was rooted in my time and reality. I thought there was no better way to express the relationship between ancient and contemporary, nature and man-made, design and randomness, structure and erosion, than by combining techniques that inherently possess some of these qualities. So the series of etchings combined imagery hand-drawn (and etched) on the plate with images of computer-generated three-dimensional objects transferred to the plate photographically.

Using computers in this project allowed me to explore geometry in a way quite different from what I had done before. I was able to model a number of geometric patterns based on pre-Columbian architecture. With the aid of several computer programs, I could distort and erode these patterns, place textures and images on their "surfaces" and simulate lighting effects, adding a mysterious quality to what started as simple geometry. Having built complex objects that look hand-made in the "virtual" space of computer memory, I could collage or "composite" them with images from other sources within the computer system, including line drawings and images of shaded three-dimensional models.



At all times it has been clear to me that I am not attracted to computer technology because of its ability to create "perfect" or "pure" geometry. My interest in computers is to generate emotional works with a gestural, unpolished quality. In fact, several of the three-dimensional objects simulated with a computer for the *Seven Pyramids* series were modeled with a technique that starts with hand-drawn cross-sections of the objects; the results look like objects crudely carved out of wood, their contours composed of flat planes.

*La instalación **Corazón roto** explora los paralelismos que existen entre los corazones rotos de los amantes y los corazones rotos de los guerreros. El hablar sobre corazones rotos, tanto a nivel social como individual, implica una sutil distinción entre tonos de telenovela y drama real. Toda historia siempre tiene dos versiones, especialmente cuando se trata de corazones rotos. Trátese de una nación o de un individuo cuyos corazones han sido rotos, usualmente encontramos verdad y mentira caminando de la mano, aceptación y rechazo lado a lado. Ataque y defensa, ganador y perdedor, justo y equivocado.*

Isaac Victor Kerlow, *Pyramid in Black and White Number Seven*, 1985. Etching and photo-etching from a computer-assisted matrix, edition 30, 20 x 16".

They broke your heart
that surprising morning attack
the afternoon of shattered
adolescence
in the wet valleys
the dry mountains
over the tormented deserts
under snowed steppes
the crumbling of the daily routine
the great war
jaguar heart taken by surprise
sublimated metal
hot sugar
torso and shattered crystal
heart of burnt tropical forest
sliced agave
melted of steam suffocated in ice
splintered by caressing dry of kisses
crossed by the arrow that you
cannot see

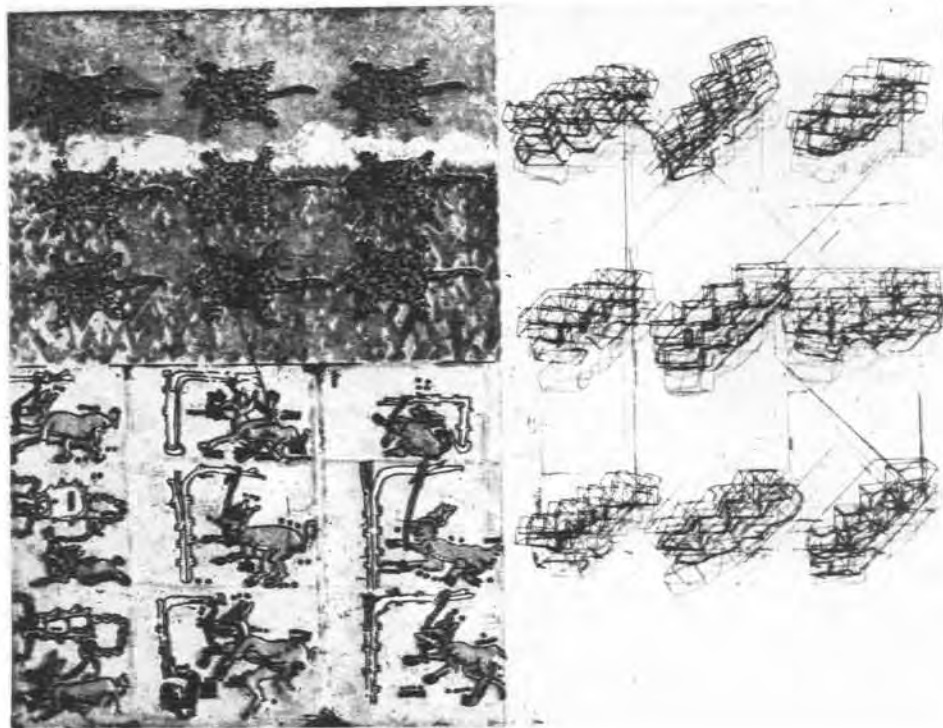
The goddess of the broken heart
died for her sins

those who break hearts
wells of sorrow
those who break hearts
volcanoes of emotion

"Ciruela rota mamey partido"
[line from a children's song:
Broken plum, cut mamey-fruit]
Do you want me to open my heart
to you?
With what object?

Isaac Victor Kerlow, **Freedom and Imprisonment**, 1986. Color etching and drypoint from a computer-assisted matrix, edition 20, 19 x 26¼".

One experiment at the time used a computer's pen plotter to draw directly on copper plates. The ability to draw the computer image directly onto the plate was certainly exciting. The effectiveness of transferring a computer-generated image onto a plate by mechanical means depends to a large degree on the precision of the computer-controlled output tool. But the most interesting part was a surprise that led to unexpected visual results. The plotter was designed to make a felt-tip pen glide over paper. I replaced the pen with a steel needle that could scratch through the hard ground and into the plate, like a drypoint. When the plotter had to drag a steel needle over a copper surface, the needle, quite naturally, kept getting stuck in the softer metal. The plotter would pull harder and suddenly the needle would jump out of its groove and skip ahead, trying to keep up with the drawing task. This technical "flaw" created lines with a beautiful quality in the final print, *Freedom and Imprisonment*. It would never have occurred to me to create that line quality if I had just drawn the plate by hand, yet it perfectly echoes the concept expressed.



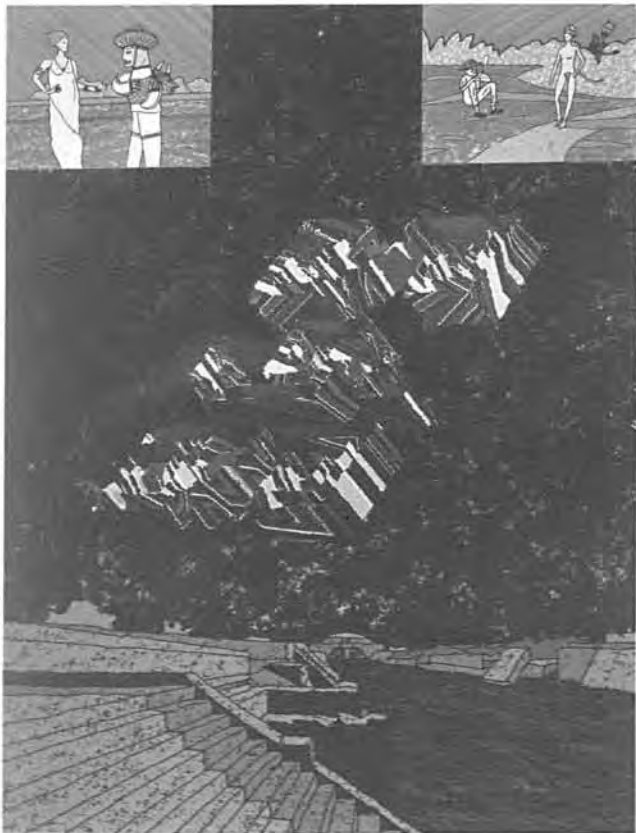
A few years ago, I embarked on a large project, **Broken Heart**, that combines digital prints with a more sophisticated interactive installation. The first version of **Broken Heart** was presented as part of a cultural festival in Mexico City that commemorated the 500th anniversary of "el encuentro de los dos mundos" (The Encounter between Two Worlds).

The **Broken Heart** installation explores the parallels between the broken hearts of lovers and the broken hearts of warriors. Talking about broken hearts at the individual and social levels implies walking a fine line between soap opera and real drama. There are always two versions of the story, especially when it comes to broken hearts. Whether the heart of a nation or the heart of an individual has been broken, we usually encounter truth and deception walking hand in hand, acceptance and denial side by side. Attack and defense, winner and loser, right and wrong.

At the heart of the installation, an interactive computer program allows the audience to select from a variety of images and sound options. I wrote the interactive texts which were recorded by friends and professional actors. Around the interactive system are several computer-generated images printed with a combination of traditional printmaking and digital printing techniques. Several clay and metal objects related to the topic are scattered throughout the exhibition space.

The images in **Broken Heart** were created with computer graphics techniques. The general process consisted of simulating three-dimensional textured models of all the objects represented in the images, for example a crystal heart and a human torso, broken letter forms, torn fruit. The images applied as a texture on most of the objects simulated with the computer came from my photographs of torn fruit. The interactive system responds to selections made by the audience with animated sequences displayed on the computer screen and texts recited through the computer's speakers.

Because of their temporary character and their relative technical complexity, interactive installations have been commonly disdained by the traditional art world. Nevertheless, interactive installations offer new alternatives for expression and aesthetic enjoyment. Computer-based interactive installations represent a bridge between the traditional forms of the visual arts and literature, performance and music. ■



*Te rompieron el corazón
 àquella sorpresiva mañana de ataque
 la tarde de adolescencia quebrada
 en los húmedos valles
 las cordilleras secas
 sobre los desiertos atormentados
 bajo las estepas nevadas
 el derrumbe de la rutina cotidiana
 la gran guerra
 corazón de jaguar sorprendido
 de metal sublimado
 azúcar caliente
 torso y cristal estrellado
 corazón de selva quemada
 maguey rebanado
 fundido de vapor asfixiado en hielo
 astillado de caricias seco de besos
 atravesado por la flecha que no
 puedes ver*

*La diosa del corazón roto
 murió por sus pecados*

*los que rompen corazones
 pozos de sufrimiento
 las que rompen corazones
 volcanes de emoción*

*Ciruela rota mamey partido
 ¿Quieres que te abra mi corazón?
 ¿Con qué objeto?*

Isaac Victor Kerlow, **The City of Gods**, 1986. Color screenprint from a computer-assisted matrix, edition 100, 31½ x 23½".

Isaac Victor Kerlow, **The First Broken C**, 1992. From the **Broken Heart** series. Color digital print (dye sublimation), edition 2, 11 x 11".