

Santa Barbara

News & Review

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Woody Allen's sober new film
draws mixed reactions



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The Great Deception

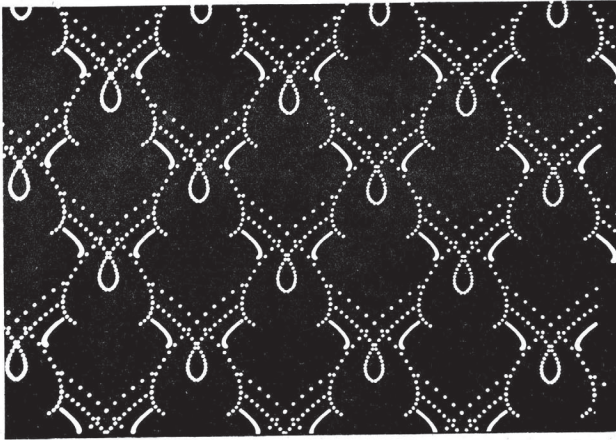
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The Artist and the Computer

By Martin Perlman
SPECIAL TO THE N&R

"3/78 (OBJECTS AND TRANSFORMATIONS)":

A line of points shifts into a galaxy of dancing lights against a space-black background. Joining into geometric shapes—pulsating squares within squares, or a series of concentric circles—the white points lock into position only to break into motion. Suddenly, yet smoothly, a sequence of squares has become a seemingly random mass of points, darting in Brownian motion. Gradually the points converge into recognizable shapes—only to disperse again. A flute's smooth, resonant notes periodically accompany the mesmerizing visuals, which also dance to silence....

★ ★ ★

ALTHOUGH LARRY CUBA'S parents are proud of their accomplished son, his father has told him it's not too late to go into another (saner) line of work. Perhaps if Cuba had known the number of problems and frustrations that lay ahead, he might have opted to become an architect upon graduation from college in 1972. But that would have been a shame—for Cuba has turned out to be one of the country's best experimental computer animators.

Larry Cuba, 30, uses computers as "super-draftsmen" to produce rhythmic, lyrical films whose full effect cannot be captured by words. He's at the forefront of a new form of expression which actually puts him in a nether world. Many persons have a difficult time categorizing what Cuba is doing, finding a context for this original work.

For example, is Cuba producing art or cinema or scientific experiments? (Of course these terms need not and should not be self-exclusive.) A skeptical answer can provide a convenient way to exclude Cuba's work from public presentation. His films are not accepted as Art by certain artistic circles because, as Cuba says, "They aren't paintings or sculpture." Nor are these experimental films given wide exposure at cinemas: "They're not Hollywood entertainment—they're not dramatic features."

There is one outlet for presentation; the competitive but stimulating arena of experimental cinema, which has accepted Cuba's work. His computer animations have won numerous awards at film festivals across the country—particularly his newest creation, *Two Space* (1978), which won the top animation prize at this year's Athens (Ohio) International Film Festival.

C The Electric Paintbrush CUBA IS EAGER to clear up misconceptions people have about computer animation. "There are lots of ways an artist can use a computer," he says. "There are as many ways as artists."

Cuba's technique involves "programs with computer languages, so that the images are based on a mathematical structure." A program, by the way, is an ordered sequence of instructions given to a machine for processing data. These programs serve as Cuba's paintbrush.

It shouldn't be disillusioning to learn that Cuba's exquisite compositions depend on mathematical formulas. As he points out, art and arithmetical proportions have a long, connected history. Musicians, of course, depend on mathematical relationships. And Renaissance painters used mathematical skills to perfect perspective drawing. But whether or not we are drawn to cube roots or binomial equations, we can still appreciate Cuba's films for their forms and rhythms.

Why is Cuba so interested in computer programs (also called "software")? Larry has done a lot of thinking about the nature of making images from a program "and all of the problems which that entailed as a new form of creative expression.

"The program itself," he says, "is a tool you use to create the images—it's a linguistic tool rather than a physical one. The more I thought about how to create programs, the more I wanted to focus on that, rather than on older techniques—like optical printing."

Used by experimental film-makers, an optical printer rephotographs previously shot footage and allows various

transformations. Cuba used the device to add color to his initial film, *First Fig* (1974), because the images originally appeared in black and white on the system's cathode ray tube (a kind of computer display, like a television screen).

Cuba's latest works, *3/78 (Objects and Transformations)* and *Two Space* remain in the original black and white. Something of a purist, Cuba feels that black and white emphasizes the essence of forms in motion. It also puts him in the tradition of constructivist work (the Russian geometrical, Op-Art and other kinds of abstract art) and still photography.

Black and white offers other advantages. In *Two Space* the patterns of moving, symmetrical shapes produce visual treats—afterimages in color and the illusion of "figure-ground reversal," where the black background suddenly dominates the white shapes serving as the general field. M.C. Escher employed the technique, and it's even found on modern wallpaper.

But Cuba adds the magic of motion; he experiments with our perceptions of movement, a relatively unexplored phenomenon. "What I'm dealing with, the images themselves, are not as much of a concern to me, as individual frames, as they are as moving images.

"I don't feel that any isolated frame is very important, or tells you very much

about the film. I don't put very much effort into making a single frame interesting by itself. All the thought is put into the movements, the rhythm, the timing, as a basis for the films."

LARRY HAS COME *Another World* a long way since his first contact with experimental animation during his undergraduate days at Washington University in St. Louis. At that time, he says, "I had the typical image of film, which is as a dramatic medium—Hollywood features."

Seeing experimental films like Jordan Belson's *Allures* (a "psychedelic" film made five years before the word existed) Cuba realized "there was another world, another use of the medium I had had no contact with."

His curiosity aroused, Cuba found a book, *Expanded Cinema*, by George Youngblood. This included information about John Whitney, Sr., the acknowledged originator of computer animation. (Whitney also developed the slit-scan effect later used in the Star Gate sequence at the end of *2001: A Space Odyssey*.)

Cuba had survived an introductory computer course, but found the applications—how to program payrolls and determine grade point average—"rather dull."

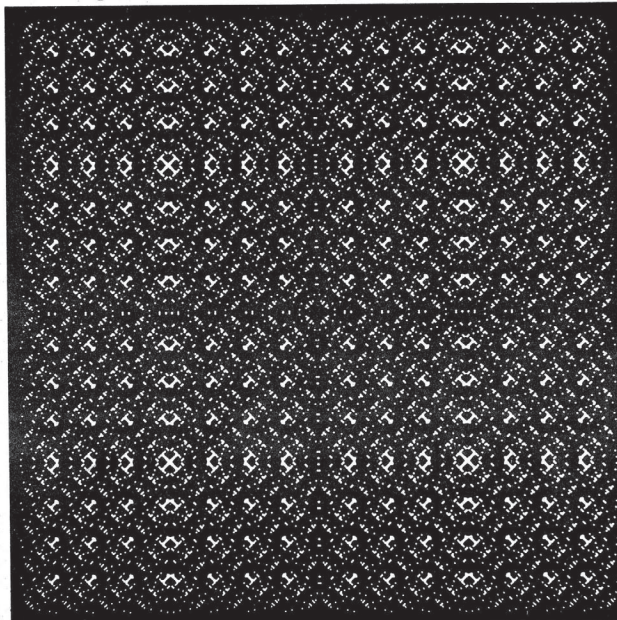
"But the idea of using computers for the purpose of Art really grabbed me," he says. In 1972 he headed west in search of a film school and Whitney, "with whom I eventually worked, programming his film *Arabesque*."

Enrolling at CalArts, Cuba proceeded to teach himself computer animation by working on what would become *First Fig*. Among a host of challenges (learning a computer language, sharpening his mathematical skills, perfecting survival techniques on L.A. freeways), Cuba's major problem was to obtain the use of a computer. He charmed his way into gaining time at a research facility in Pasadena where he programmed in *Fortran*, a computer language not especially conducive to making graphics or to inspiring the artistic spirit.

"There was this problem of running the program at night, on the weekends, when time was cheapest. Then the film would be ready by Wednesday, and I could drive from CalArts (north of LA) down to Pasadena to pick up the film, and then have to drive up to Pacific Palisades to Whitney's house to look at it. By the weekend I had re-programmed and it was ready for the next run. At one piece of film per week I wasn't getting enough feedback to really produce the film I wanted to."

The problem is called "an elongated feedback cycle." As an analogy, imagine a music composer playing the notes, say, on a piano and waiting a week to see how the

continued on next page



Scenes from the Larry Cuba film *Two Space*: The metamorphosis of the plane.



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Computer Art

continued from previous page

Watching *First Fig*, you'd never guess that the sublime movement of geometric shapes in space was assembled in such a piecemeal fashion.

The award winning film actually is an experiment.

Cuba: "You can describe structurally the process in which the image is generated. In other words, you can tell the computer, 'Take 20 cubes and make each one slightly larger than the rest. Rotate the inside one and have all the outside ones copy it in a follow-the-leader fashion.' This verbal description is encoded in a program; the computer executes the process and draws the images. Then you see the results."

Cuba emphasizes that he doesn't know exactly how the images will look. "The whole purpose is to discover something that you normally don't get a chance to see."

This same exploratory principle has been applied to his other animations.

Experiments with

GRASS
WITH *FIRST FIG* making the film festival circuit, and an MFA from CalArts, Cuba, always on the lookout for a computer to meet his needs (each of his films was programmed on a different system, each with its own strengths and weaknesses), journeyed to Chicago. There, he experimented with GRASS (Graphic Symbiosis System) developed by University of Illinois Professor Tom deFanti.

Here was a language designed primarily for graphic images. And they appeared on the viewing screen before your eyes. The user didn't have to run test films because the computer could draw in 'real time.' That means it could produce an image (equivalent to a frame of film), erase it, and draw another so fast (24 frames a second) that it created the illusion of movement.

To further please the animator, GRASS could change the design of the images as they appeared through the mere turning of dials. Was Cuba ecstatic? Yes and no.

"It sounded like it was just what I was looking for, and that's what I thought. But

you never know with these things till you use them. They always look great when you see them demonstrated, but when you really try to apply them to what you've been doing — then you hit their limitations. And there are *always* limitations."

GRASS's control structure is oriented toward manipulation with dials rather than through programming — which is characteristic of Cuba's approach. The dials proved a hindrance because they restricted the amount of change Cuba could produce in each frame. Ironically, when he had used Fortran (remember its slow turnaround time?) he had enjoyed more control, the ability to modify all the variable frame by frame.

The GRASS system was good, but not suitable for the demanding artist's particular needs. He returned to Los Angeles and did some commercial work for Abel and Associates, programming what would become the first of those flashing zooms and scans that are now commonplace in TV commercials and station identifications.

A few months later, fame beckoned. Cuba was invited to submit a bid for an animated sequence in the science-fiction film called *Star Wars*. He won the contract and returned in early '76 to Chicago to work on the GRASS system. The sequence, the second computer animation in a feature film, is a simulation of a computer diagram of the *Death Star* which the rebel pilots watch during their briefing session.

Cuba worked three months to produce two-minute sequence which, he admits, was not state-of-the-art computer graphics. He could have designed an animation that looked more photographic than the diagrammatic one that appeared in the film. But it was Lucas's preference to simulate what Cuba calls a "computerish" look.

By 1977 Cuba, back in LA, was using the programming language RAP at Information International Inc. (III). Cuba's greater personal control over the production steps (programming, plotting, filming) gave him a better turnaround time than with his first film. RAP also enabled him to perform more complex mathematical experiments than

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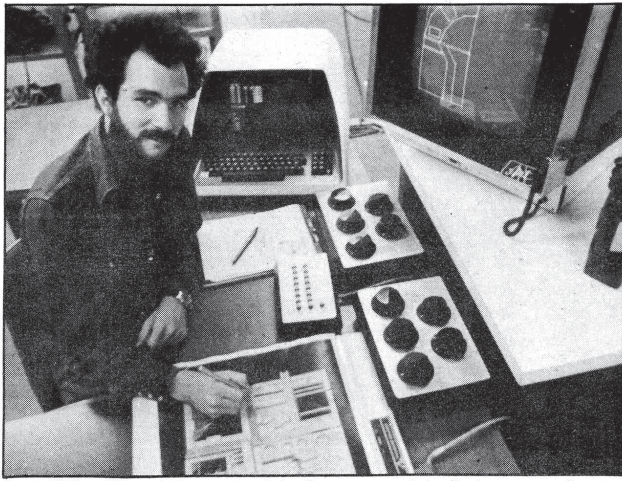


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Larry Cuba: "The whole purpose is to discover something that you normally don't get a chance to see."

GRASS did.

Again he generated a mass of film with which to explore the effects of motion. These probes would later become the basis of *Two Space*. But when access to the system became unavailable (a too-frequent occurrence in Cuba's trade), he accepted an appointment as a Reserach Associate with the Art Department of the University of Illinois at (where else?) Chicago Circle. Not a believer in determinism, Cuba refuses to speculate on the influence of destiny in the forging of this LA-Chicago axis.

I Artists and Mathematics IN THE FALL of '77 he moved to Chicago.

"While there I produced the film *3/78* (*Objects and Transformations*), again using DeFanti's GRASS. The language had been modified and improved to handle the *Star Wars* assignment. Now Cuba could control the images through dials, as before, but also through programs — something new for this system.

GRASS was still basically designed for a non-programming artist. And Cuba likes to point out how computer language designers assume that artists and mathematics are incompatible. Therefore, they design languages which do not incorporate mathematical modes.

Cuba holds this approach implies a false notion about what an artist can or cannot do.

Even though GRASS was not strongly mathematically oriented, Cuba used it to take 16 'objects', each consisting of one hundred points of light, and have them perform a series of precisely choreographed rhythmic transformations — all based on mathematical principles. The result is *3/78* (the date signifies its date of completion), "an exercise in the visual perception of motion and musical structure."

Preferring a sound track that would advise but not control the visual element, Cuba invited Kazu Matsui to play the *shakuhachi*, a Japanese bamboo flute. Matsui watched the film and then improvised to the work's rhythms.

3/78 has been exhibited widely and has been well-received within the experimental film world, winning awards at the Bellevue (Washington), Sinking Creek (Nashville), and Athens (Ohio) International Film Festivals.

Returning yet again to California, Cuba picked up where he left off with *Two Space*. Unable to regain access to RAP, he took his previously generated film and culled from it the more effective and consistent sections.

Cuba: "*Two Space* is based on the symmetry of the *plane* — the title being a

contraction of 'two-dimensional space' which is the plane." (A plane has the characteristics of length and width) "The plane has certain symmetry properties which are defined mathematically in the field called Group Theory; a 'group' being a kind of pattern. There are 17 symmetry groups, 17 kinds of patterns that you can create from a single figure.

"If you take a figure which might be animating; for example, a curve flying around — there are 17 different ways in which you can 'tile' an infinite plane. For example, you can repeat and just move it over, or repeat it and reflect it, or repeat it and rotate it. It's these sorts of transformations that you perform on the figure which determine the particular pattern.

"It turns out that the Islamic artists who decorated their temples with tile patterns discovered, as mathematicians, all 17 symmetry groups."

In *The Ascent of Man* J. Bronowski discusses the theories behind the Islamic culture's symmetrical designs. In his discussion Bronowski makes a comment that Cuba has memorized: "The artist and the mathematician in Arab civilization have become one."

Cuba's achievement take us beyond static 'tiles,' into the realm of motion. His symmetry figures dance. The effect is one of spiritual beauty which is further heightened in *Two Space* by the soundtrack's mesmerizing percussion music, a Javanese gamelan composition.

The Outer Limits

THE SYSTEMS USED for each of Cuba's films have involved his hitting a limitation and wanting to go beyond it to a more flexible system. Currently, as a computer graphics consultant to the Rand Corporation, he continues to search for that elusive 'better' system. Toward that end he has resolved to create his own language which will enable him to "experiment more freely and without the constraints imposed by other systems."

"From my past experience with computer systems," says Cuba, "I have formulated the design of my ideal animation language." He acknowledges he might need a computer scientist to help write this language, but "when

finished, it would allow me to work independently of engineers and continue my research."

Cuba's work is a synthesis of art and technology; as the systems improve (the machines are becoming faster and cheaper), so, too, will his art grow and develop.

Looking further into the '80s Cuba sees the personal computer becoming accessible to everyone, not just engineers and hobbyists. "Because of the home computer, computer graphics will evolve into a popular medium of expression not simply reserved for the artist."

Like photography, which evolved from an esoteric (and cumbersome) medium in the 1800's into what Cuba calls "a kind of universal literacy," so too will personal computers "transform the way we do just about everything" — including Art.

The relative inaccessibility of Cuba's films is also about to change for the better. With the spread of video and other developing technologies (discs, cable, satellite) Cuba's and other experimental film-makers' works will be introduced to wider audiences than the loyal but small groups at film festivals.

Larry Cuba rises above all our attempts at categorizing. Call him what you will — Artist, film-maker, computer animator, researcher. It doesn't matter what labels we apply to this perceptual creator. Interestingly, Cuba himself claims he is still dealing with basics, still doing the groundwork on these perception-of-motion experiments. I have a suspicion, though, that once we all get the chance to create our own computer animations, we'll really begin to appreciate the skill and talent of this man for whom art and mathematics are one.



Experimental cinema is hard to come by in Santa Barbara, but tentative plans call for a screening of *Two Space* with other experimental films at UCSB, winter quarter.

3/78 (*Objects and Transformations*) will be shown Dec. 2 at 8:00pm, Melnitz Auditorium, UCLA, as part of a program entitled Absolute Animation. Call (213) 825-4142 for details.

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