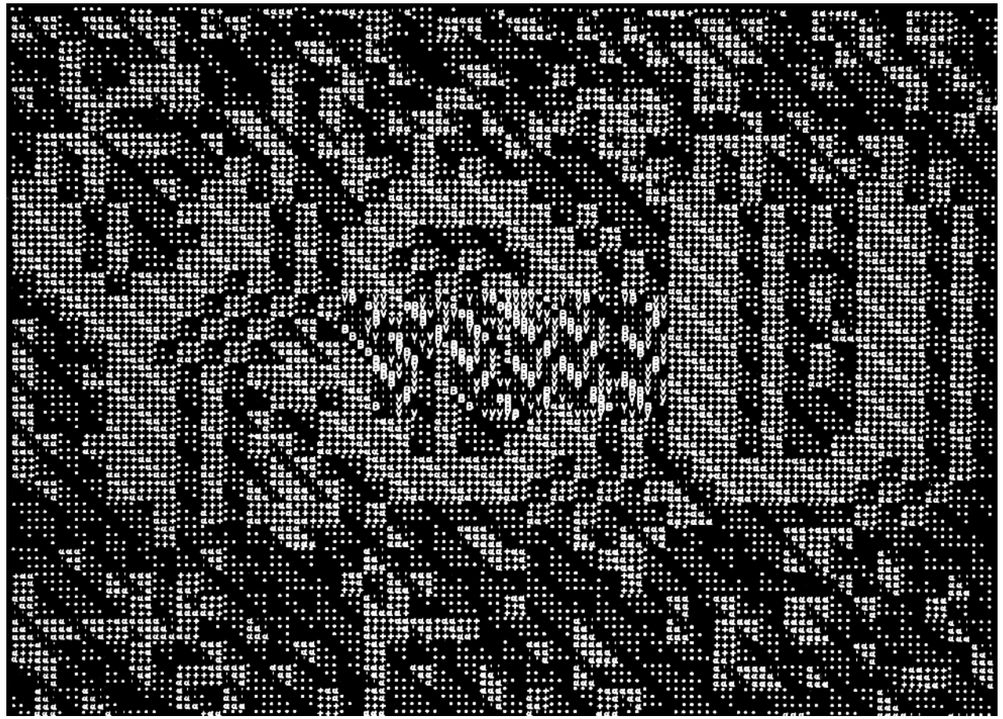
STAN VANDERBEEK

POEMFIELD NO.2 1966

POEMFIELDS

Poemfield No.1	Poemfield No.2
PoemField	similiar
GESTURES	LIKE
DO NOT	TO
MISTAKE	CLOCK
PLACE	TICK
YET.....	WE PICK
FINGER POINTING	LIFE
TAKES A WORD TO COMPLETE	OUT
SOME HOW	OR APART
WORDS	SEEMING
FILL	TO SEE
THE SPACE BETWEEN	SEPARATE
BETTER	THINGS
MEANING	TOGETHER
MOVES	SO
POSITION	YOU
LOVES	SAY
FINGER	IT
DIRECTS	WOULD
SPEECH	SEEM
THAT	LIFE LIKE
SILENCE	THIS
FALLING	LIVING
TOUCHES	BUT WE ALWAYS SUSPECT IT.



PoemField #3

PO

POE

POEM

FIE

FIELD

POEMMMM

FIELD NO. 3

POEMFIELD NO. 3

NO. 3

A MAP OF IDEAS

A

VOICE

WRONG

A WHEEL

WRONG

A WHEEL

BUT NOT REALLY

A HAND

REALLY

MEMORY IS A TIGHT ROPE

A FIRE

AIEEEEE

CRYING IS AN EDGE

NOT OVER

LOOKING

BUT A CUTTING EDGE

REALLY

THE DARK IS A QUESTION

I BELIEVE YOU

NAKED

IS LIKE

TOMORROW

NAKED IS

LIKE TOMORROW

YOU ASK

YOURSELF

ABOUT IT

A LAUGH

IS PROGRESS

REALLY

SI

LENCE

SILENCE

AN

ATTEMPT

PoemField #4

OLD

OR ORORR OR

POP POP POP

FOR FOR

FORM FORM FORM

FILM FILM

NO,

POEMFIELD 4

FALLING WORDS

AS LEAVES

FALLING

SPEACH REACH

ON AND OFF

LIFE FORMS

WORDS

YES AND

YES AND NO

GONOGO

GOING

ON

GONE

ONE

ON

NO

GO

NO

GO

NO

GO

NO

OOOOOO GO NO GO

Poem field #5

fall

FALLING

ALL

FALLING

FOR FALLING

OR ALL FOR

FAR

FOR

FAR

MAN

FOR MANS KIND

FALL

MANS PLAN

WAITS

WAITING

WITS

WITNESS

MAN

FITS

WITNESS

WIT

INTO OTHER WIT

AS IF WIT KNOTS WIT

WHILE WAITING

OR

WHILE FALLING

FREE

FREE FALL

POEMFIELD #2

LOVES
OR
LOVES
OF
THERE
IS

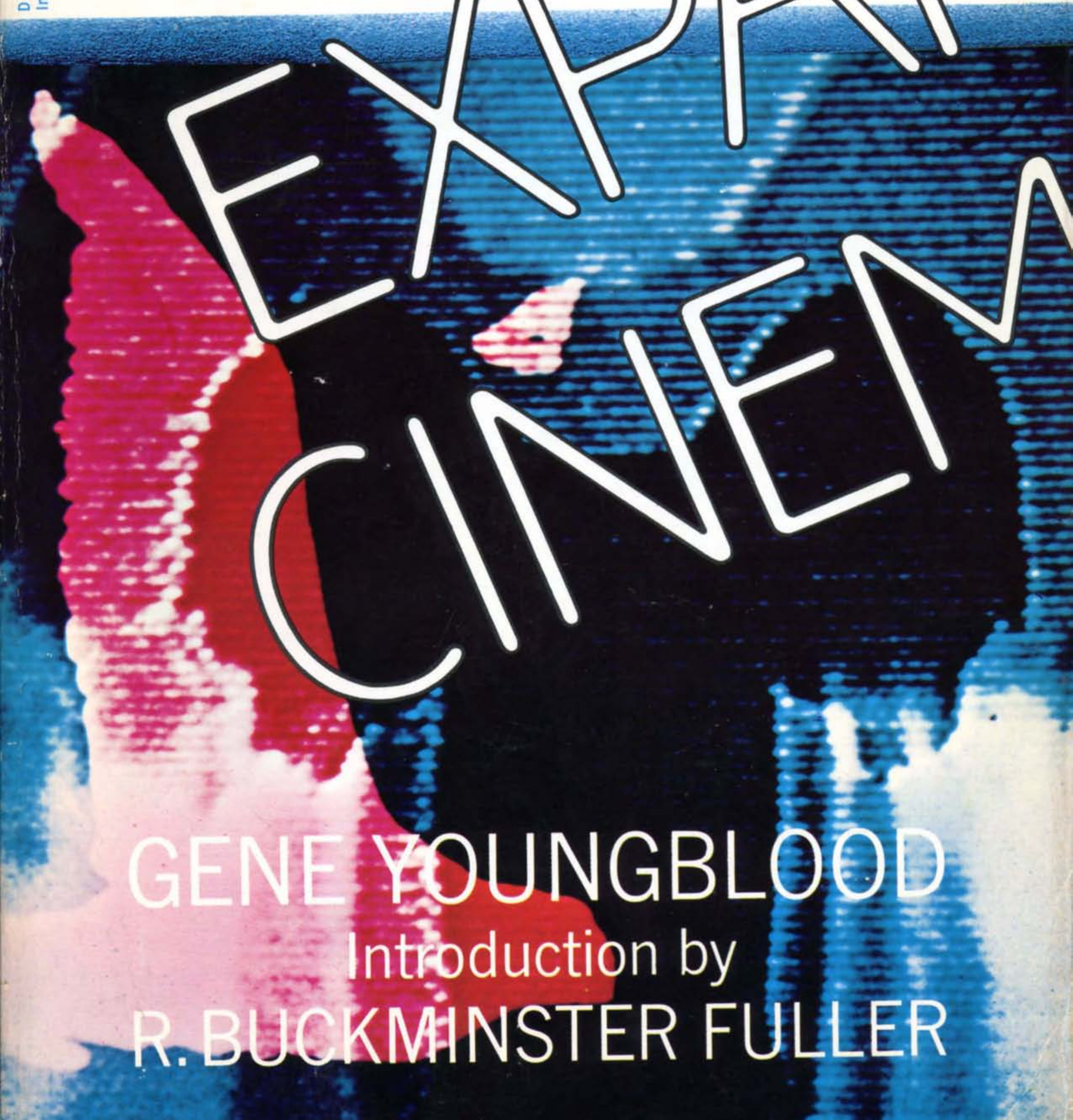
NO

WAY TO

PEACE
PEACE
IS
THE WAY
NO MORE
WAR

D 263 A Dutton Paperback Original $4
In Canada $5.95

EXPAN
CINEM



GENE YOUNGBLOOD

Introduction by
R. BUCKMINSTER FULLER

operation is a circle, a set of points. And as far as I'm concerned it's a wave form just as legitimate as the sine wave. So you could run this form back into the same particular operator and tell the computer to use this form—not the sine or cosine, but this form it has just described. The same recursive form applies to the other operations. For instance, you could take projections of projections, use an object as an element to shade a surface and so on.

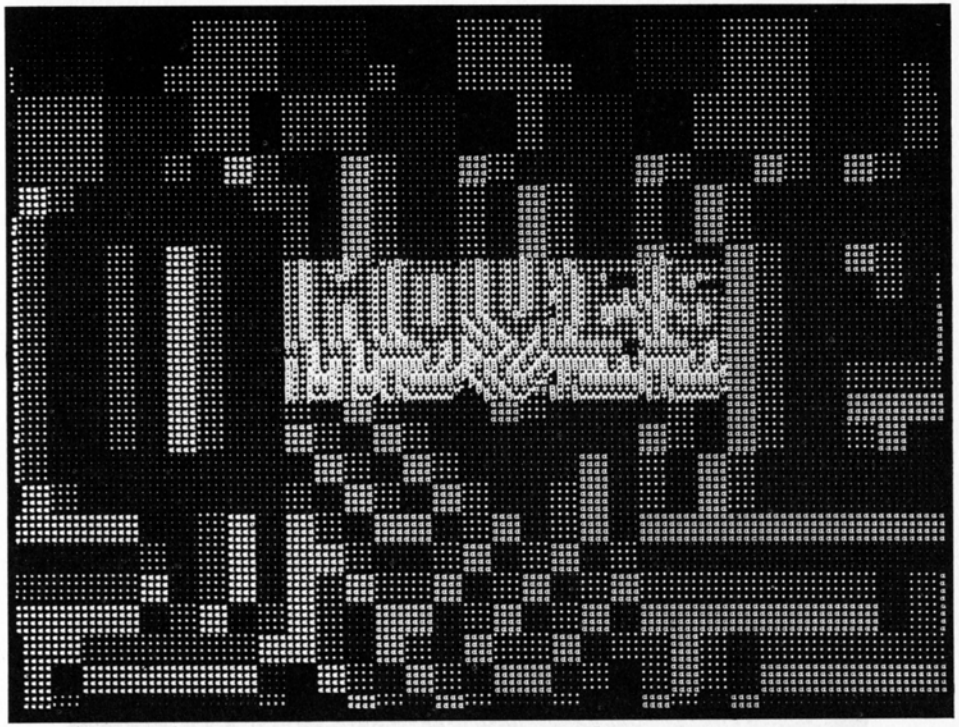
Stan VanDerBeek: Mosaics of the Mind

"We're just fooling around on the outer edges of our own sensibilities. The new technologies will open higher levels of psychic communication and neurological referencing."

For the last five years Stan VanDerBeek has been working simultaneously with live-action and animated films, single and multiple-projection formats, intermedia events, video experiments, and computer graphics. Clearly a Renaissance Man, VanDerBeek has been a vital force in the convergence of art and technology, displaying a visionary's insight into the cultural and psychological implications of the Paleocybernetic Age.

VanDerBeek has produced approximately ten computer films in collaboration with Kenneth Knowlton of Bell Telephone Laboratories in New Jersey. They are descriptively titled *Poem Fields, One* through *Eight,* plus *Collisdeoscope* and a tenth film unfinished as of this writing. The term *Poem Field* indicates the visual effect of the mosaic picture system called Beflix (derived from "Bell Flicks") written by Knowlton. A high-level set of macro-instructions was first written in Fortran. The particular translation or definition of this language for each film is then determined by the subroutine system of mosaic composition called Beflix. A new set of Beflix punch cards is fed into the Fortran-primed computer (an IBM 7094 interfaced with an SC-4020 microfilm plotter) for each new movie desired.

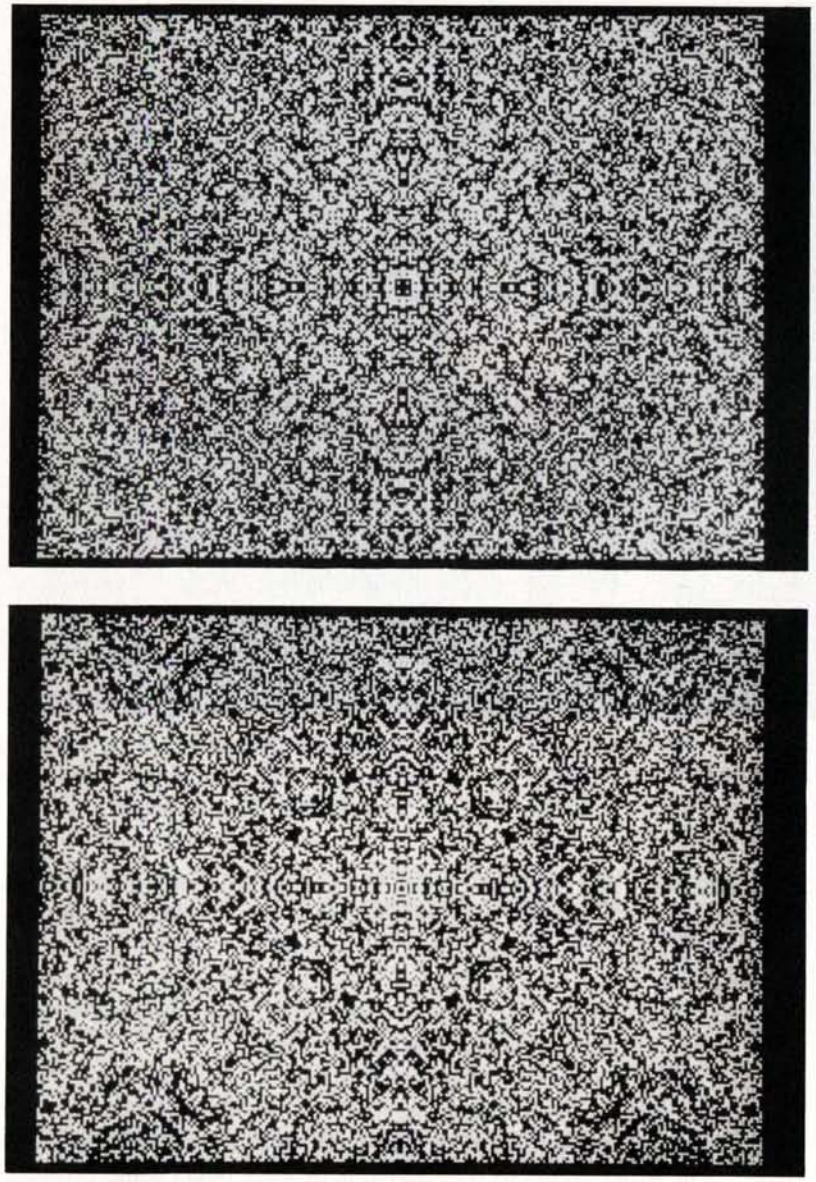
Whereas most other digital computer films are characterized by linear trajectile figures moving dynamically in simulated three-dimensional space, the VanDerBeek-Knowlton *Poem Fields* are complex, syncretistic two-dimensional tapestries of geometrical configurations in mosaic patterns. "The mind is a computer," says



Computer interpretation of the word "movies," from a film by Stan VanDerBeek and Kenneth C. Knowlton.

VanDerBeek, "not railroad tracks. Human intelligence functions on the order of a hundred-thousand decisions per second." It appears this brain capacity was a prime motive in the production of the *Poem Fields,* whose micro-patterns seem to permutate in a constant process of metamorphosis which could very likely include a hundred-thousand minuscule changes each second.

"The present state of design of graphics display systems," VanDerBeek explains, "is to integrate small points of light turned on or off at high speeds. A picture is 'resolved' from the mosaic points of light." The artist seems to feel that this process bears some physiognomic similarities to human perception. "The eye," he notes, "is a mosaic of rods and cones."



Variations of the Beflix technique of mosaic image-making, from computer films by Stan VanDerBeek and Kenneth C. Knowlton.

The early *Poem Fields* were investigations of calligraphic relationships between dogs and alphabetic characters integrated into fields of geometrical patterns constantly evolving into new forms. The most famous of these is *Man and His World* (1967), a title piece for an exhibit at Expo '67.

Variations on the mosaic field became more complex with successive experiments, until simulated three-dimensional depth was achieved in the form of infinitely-repeated modular units in perspective. It is immediately obvious that these films would be prohibitively tedious and time-consuming to do through conventional animation techniques. "Because of their high speeds of calculation and display," writes Knowlton, "the computer and automatic film recorder make feasible the production of some kinds of films that previously would have been far too expensive or difficult. In addition, the speed, ease, and economy of computer animation permit the moviemaker to take several tries at a scene—producing a whole family of film clips—from which he chooses the most appealing result, a luxury never before possible."[27]

The more recent Beflix films have abandoned the original calligraphic patterns for highly complex Rorschach constellations of stunning beauty. They actually began with a film produced by two other scientists at Bell Telephone, B. Julesz and C. Bosche, for use in experiments with human vision and perception. This involved semirandom generation of graphic "noise," whose patterns were reflected several times to produce intricate mandala grids resembling Persian carpets and snowflake crystals.

"We're now working with variations on the Beflix system that involves secondary systems," VanDerBeek explained. "It goes through two levels: first Beflix, then computerizing and quantizing that level. It's something similar to what Ken Knowlton and Leon Harmon did with pictures-within-pictures. We're trying to do that cinematically."

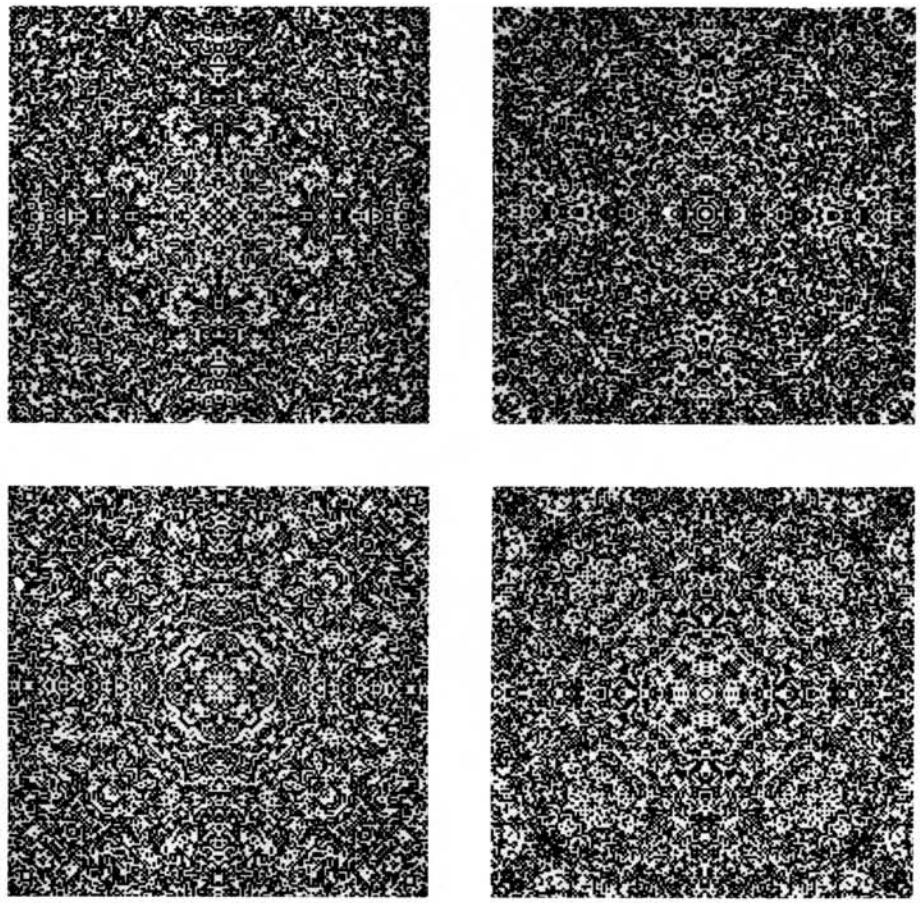
The *Poem Fields* are filmed in black-and-white, with color added later through a special optical process that permits color gradations and increments almost as complex as the forms themselves.

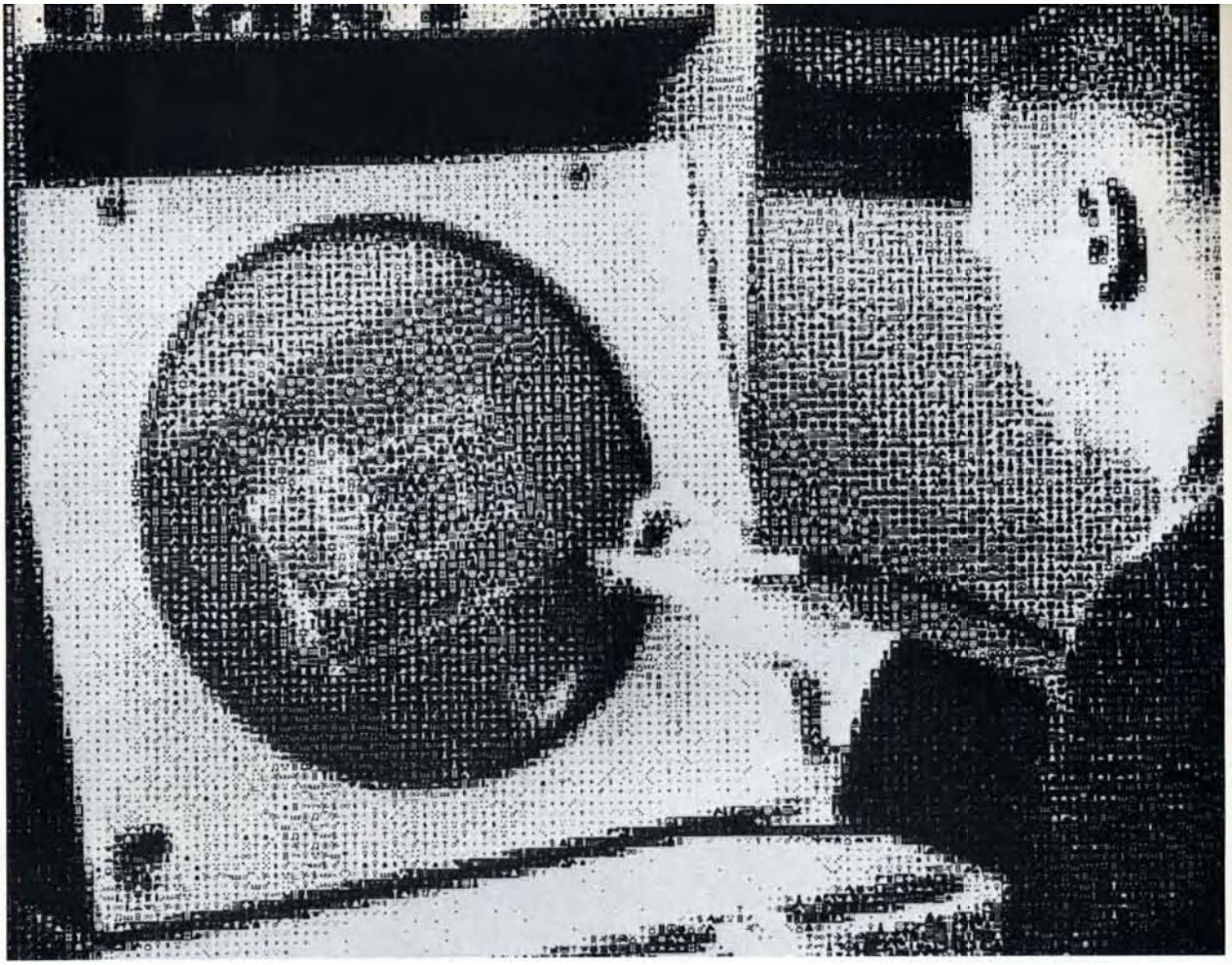
[27] Kenneth C. Knowlton, "Computer Animated Movies," *Cybernetic Serendipity,* a special issue of *Studio International,* ed. Jasia Reichardt (London, September, 1968), pp. 67–68.


MULTIPLE INTERACTION

Image After Image
Stan VanDerBeek

Computers and video are two new systems for graphic art developed in the last ten years. My first work in computers began in 1966 with some experiments with a computer language called "Beflix." This program, developed by Ken Knowlton, produced a mosaic image in motion. Computers and video offer possibilities to the artist to work in "real time" or in a form of image conception that can only be called "mental movies," that is, thinking about images in motion in the mind's eye. The artist-technician must translate his visual ideas into a code that can be put on punched cards, into a computer, from the computer onto a form of video tape, and from tape to a graphic display system (which is a complex form of video) that displays the image to a movie camera that records the image to make it ready to be presented back to the mind's eye. All of this technical reality sounds complex but will get more available and simple, and develop the image/future for portable electronic books, murals, and three-d environments that respond to the human's mind order of association (approximately 100,000 decisions per second), leaving the artist to consider that video and computers are the new basic image language system for interactive medias. Man to machine . . . man as machine . . . machine/man . . . memory and time sharing . . . logic gates . . . real time . . . art into life . . . life into art . . . light . . . motion . . .time . . . motion pictures as a time machine. . . .





NEW TALENT— THE COMPUTER

The computer—with man as creative director—has revealed a remarkable talent for the graphic arts. Capable of tremendous speeds combined with total accuracy, it has opened up exciting new fields for esthetic discoveries

Stan VanDerBeek

The computer (as a graphic tool) is relatively new in the current rush of technology. In America, widespread use of the computer dates approximately from 1955, when a line of commercial units first became available.

In 1963 computers began to develop possibilities for making graphics. An electric microfilm recorder was introduced; it can plot points and draw lines a million times faster than a human draftsman. This machine and the electronic computer which controls it thus make feasible various kinds of graphic movies which heretofore would have been prohibitively intricate, time-consuming and expensive.

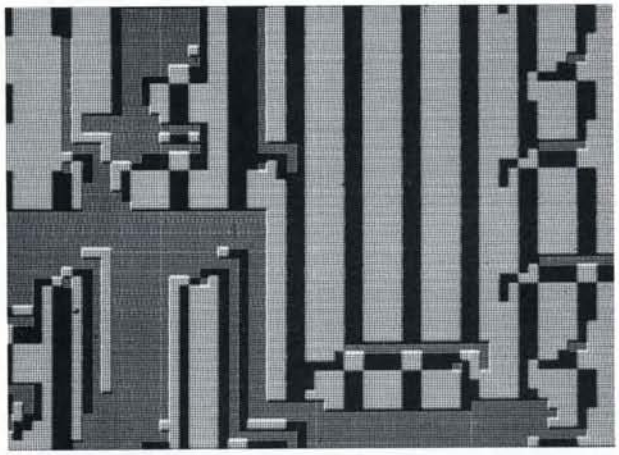
The microfilm recorder consists essentially of a display tube and a camera. It understands only simple instructions such as those for advancing the film, displaying a spot or alphabetic character at specified coordinates or drawing a straight line from one point to another. Though this repertoire is simple, the machine can compose complicated pictures—or series of pictures—from a large number of basic elements: it can draw ten thousand to one hundred thousand points, lines or characters per second.

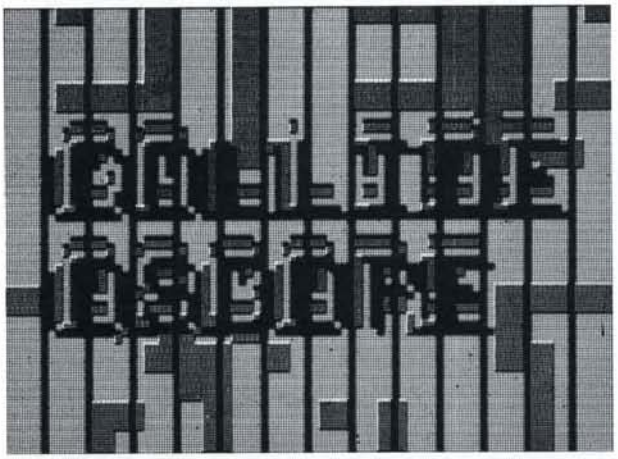
This film-exposing device is therefore fast enough to turn out, in a matter of seconds, a television-quality image consisting of a fine mosaic of closely spaced spots, or to produce simple line-drawings at rates of several frames per second.

As a technically oriented film-artist, I realized the possibilities of the computer as a new graphic tool for film-making in 1964 and began my exploration of this medium. I have since made nine computer-generated films. To produce these films the following procedure was used: an IBM 7094 computer was loaded with a set of sub-routines (instructions) which perform the operations for computizing the movie system called "Beflix" devised by Ken Knowlton of Bell Telephone Laboratories. The movie computer program is then written, in this special language, and put on punched cards; the punched cards are then fed into the computer; the computer tabulates and accepts the instructions on the cards, calculating the explicit details of each implied picture of the movie and putting the results of this calculation on tape. To visualize this: imagine a mosaic-like screen with 252 x 184 points of light;

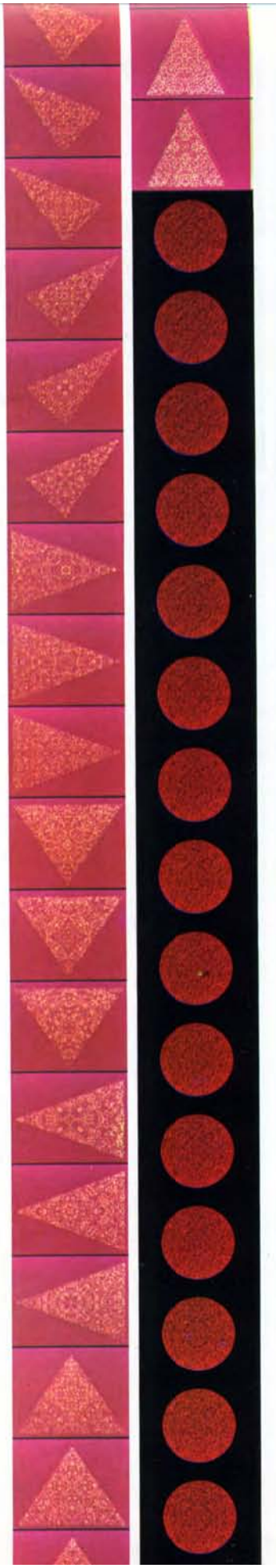
Stan VanDerBeek, *experimental filmmaker, is investigating the possibilities of computers in art while serving as artist-fellow at the Center for Advanced Visual Studies, MIT, and artist-in-residence at WGBH–TV, Boston.*

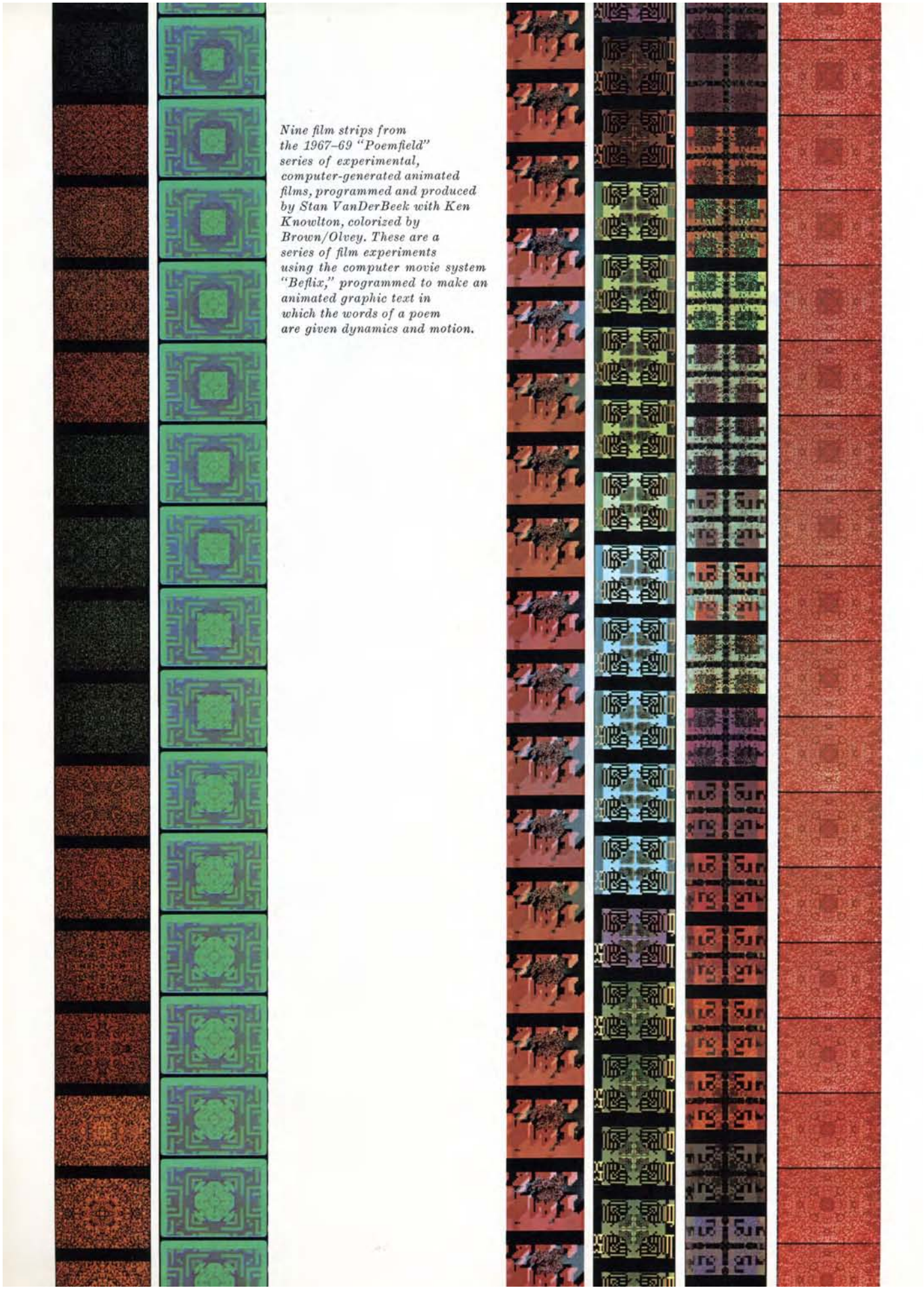
A photo of Carl Christensen, sitting at the Bell Telephone Laboratories' Graphic II console, has been fed into the computer, and the visual information reappears here as translated into symbols representing the light and dark areas in the photo. Harmon/Knowlton, 1967.



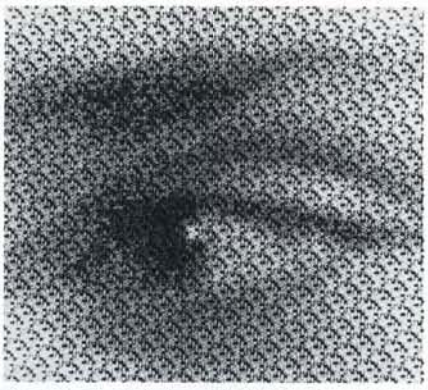


Right: Frames from "Collideoscope," the computer-generated movie programmed and produced by S. VanDerBeek, assisted by K. Knowlton and C. Bosche, in 1966. The two black-and-white frames above show an intermediate stage in the production of the film. The overall pattern and texture of all of VanDerBeek's computer films comes from the grid of 252 x 184 points that is on the face of the graphic display tube. These 46,368 points that comprise each frame of the movie are not just each a dot of light but are actually characters from the typewriter keyboard mode, and each point can be instantly changed to any of approximately 30 different characters or symbols found on the typewriter. The tube of the graphic display device is called a "charactertron tube"; by instructions in the program, part or all of the 46,368 points can be changed, offering the possibility of larger letter forms or images to be composed of other smaller letters, or words within words. It was this double level that inspired the "Poemfield" series (reproduced next page), in which VanDerBeek is experimenting with printed poetry in cinematic time—graphic letters of the poem appear and disappear in the surface texture of smaller letter forms.

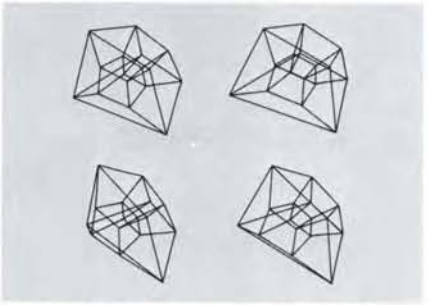




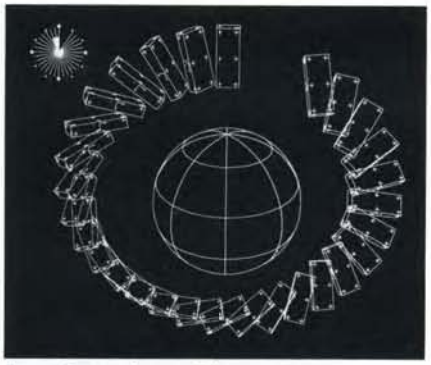
Nine film strips from the 1967–69 "Poemfield" series of experimental, computer-generated animated films, programmed and produced by Stan VanDerBeek with Ken Knowlton, colorized by Brown/Olvey. These are a series of film experiments using the computer movie system "Beflix," programmed to make an animated graphic text in which the words of a poem are given dynamics and motion.



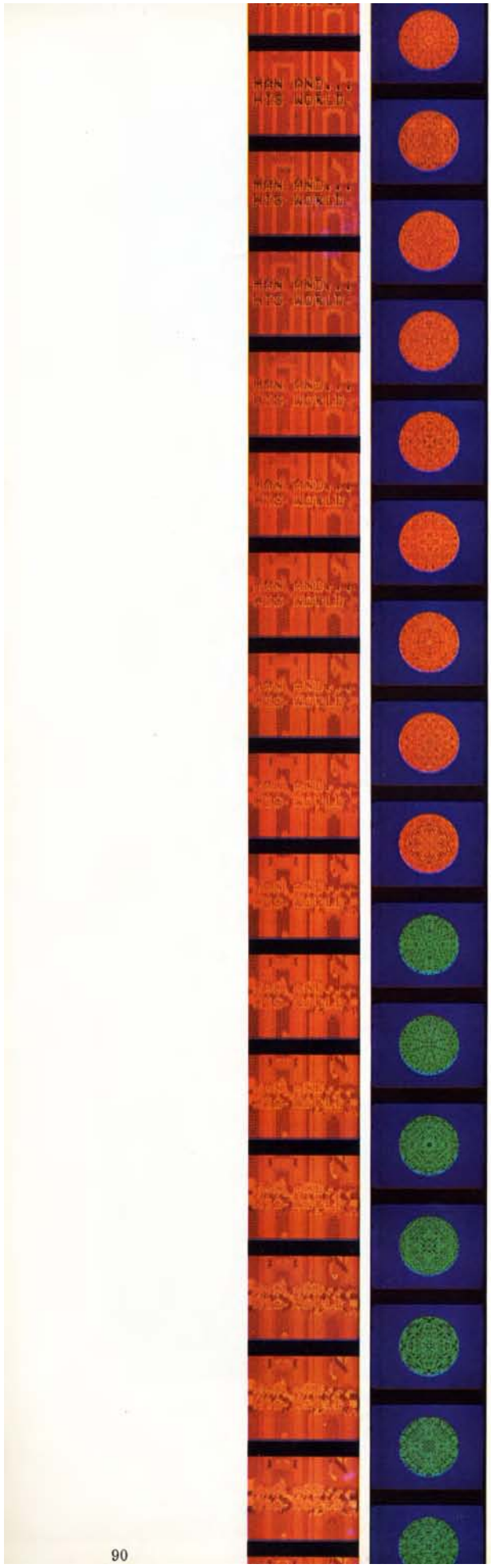
Gradations of dark and light have been assigned number values that can be assimilated by the computer. The computer version, produced at Bell Telephone Laboratories, uses dark and light letters spelling out "one picture is worth a thousand words" to re-create the image of an eye.



Here a mathematical construction is represented with two stereo pairs from a computer-generated film by A. M. Noll. These are views of a four-dimensional hypercube projected mathematically down onto three dimensions and then twice projected to two dimensions—onto slightly different picture planes for the left and the right eye. To view the 3D effect, place a sheet of paper on edge between the stereo pair; position your head so that each eye sees only one image, and, with a bit of adjustment, the images should seem to converge and appear three-dimensional.

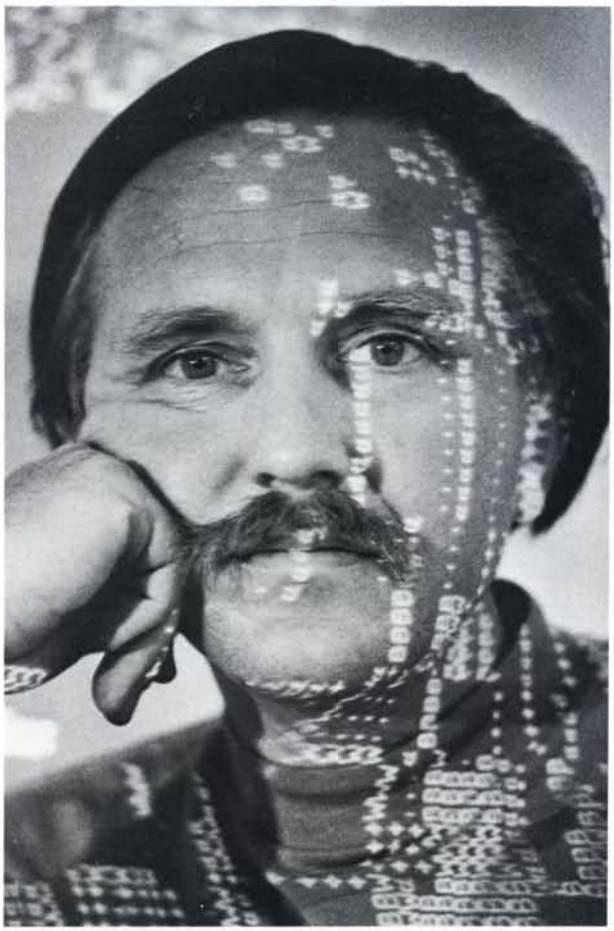


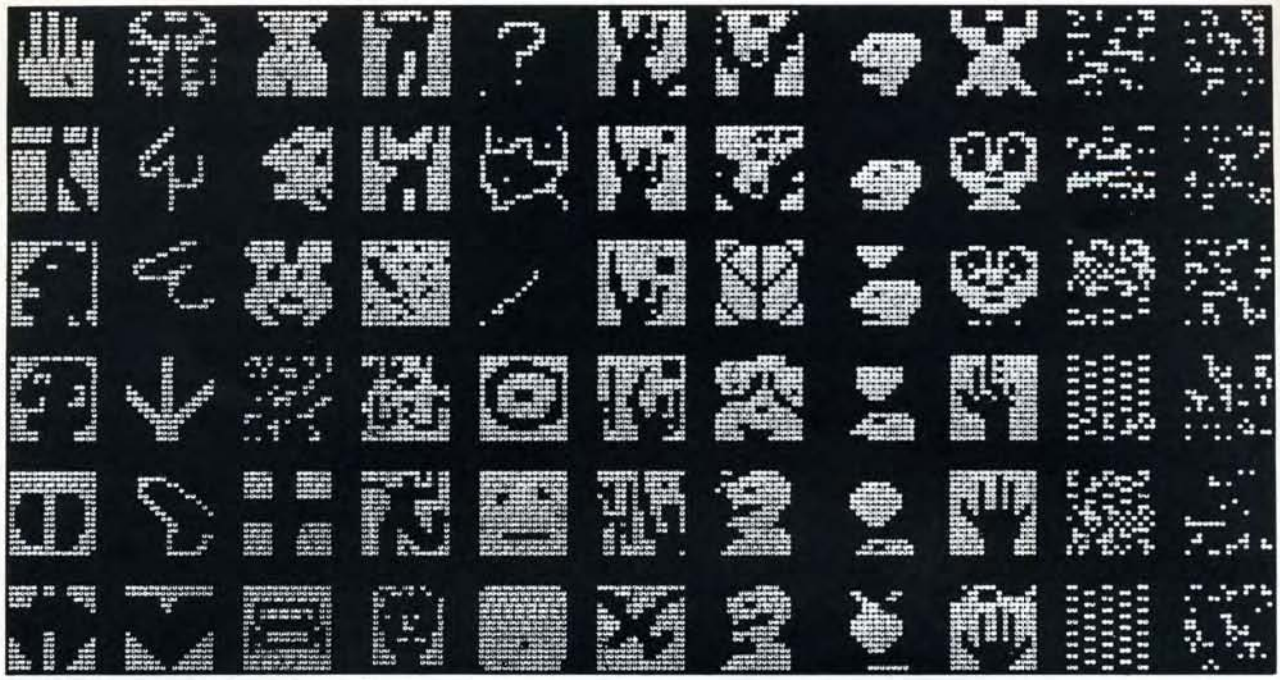
Several superimposed frames from a computer-generated film made in 1963 by E. Zajac at Bell Telephone Laboratories show the result of a simulation of the motion of a communications satellite controlled by a hypothetical orientating system then under study.



Film clips from a computer-generated animated film by Stan VanDerBeek and Ken Knowlton; made in 1967 as an entry in the competition for Expo '67, it was titled "Man and His World." The original film material was produced using the "Beflix" movie language in black and white, and the color was added by optical printing.

Photograph of Stan VanDerBeek by Ken Feil.





These patterns, generated on a 16 x 16" grid, consist of a multitude of picture-symbols that were "drawn" on the face of a cathode tube with a "light pen." The symbols—intended as pictures within a picture—are designed to provide a range of light and dark areas.

each point of light can be turned on or off from instructions on the program. Pictures can be thought of as an array of spots of different shades of gray. The computer keeps a complete "map" of the picture as the spots are turned on and off. The programmer instructs the system to "draw" lines, arcs, lettering. He can also invoke operations on entire areas with instructions for copying, shifting, transliterating, zooming, and dissolving and filling areas. The coded tape is then put into another machine that reads the tape and instructs a graphic display device (a Stromberg-Carlson 4020), which is a sophisticated cathode-tube system similar to a TV picture tube. Each point of light turns on/off according to the computerized instructions on the tape. A camera over the tube, also instructed when to take a picture by information from the computer, then records on film that particular movie frame. After much trial and error—during which time the computer informs you that you have not written your instructions properly—you have a black-and-white movie. This is edited in traditional movie techniques, and color is added by a special color-printing process developed by artists Bob Brown and Frank Olvey.

Movie-making was for long the most revolutionary art form of our time. Now television touches the nerve-ends of all the world; the visual revolution sits in just about every living room across America. The image revolution that movies represented has now been overhauled by the television evolution, and is approaching the next visual stage—to computer graphics to computer controls of environment to a new cybernetic "movie art."

For the artist the new media of movies, TV, computers, cybernetics, are tools that have curved the perspectives of vision, curving both outward and inward. The revolution of ideas and the ecology of the senses began in 1900 (movies were "invented" about the same time as psychoanalysis). Trace the path of ideas of painting over the past sixty years: the breakup of nineteenth-century ideals, step by step; the objet d'art to nonobjective art; cubism—simultaneous perception; futurism—motion and man-machine metaphysics; dadaism—anti-art, pro-life; surrealism—the dream as the center of the mental universe; action painting—synthetic time-motion; happenings—two-dimensional painting comes off the wall; op art—illusion as retinal "reality"; pop art—"reality" as reminder of reality; minimal art—illusion of reduction; conceptual art—the elements of illusion.

In other words, we have been moving closer to a "mental" state of art/life. Now we move into the area of computers, an extension of the mind with a tool technically as responsive as ourselves. In the developing mental art/life, to "think" about the work is the process of doing the work.

An abstract notation system for making movies and image storage and retrieval systems opens a door for a kind of mental attitude of movie-making: the artist is no longer restricted to the exact execution of the form; so long as he is clear in his mind as to what he wants, eventually he can realize his movie or work on some computer, somewhere.

What shall this black box, this memory system of the world, this meta-physical printing press do for us? Compare the computer to driving a fast sports car; it is difficult to control; although the irony is that at higher speeds less effort is needed to alter and change directions. However, more skill—a complex man/machine understanding—is required.

The future of computers in art will be fantastic, as amplifiers of human imagination and responses, of kinetic environments programmed to each of our interests; in short, computers will shape the overall ecology of America.

It's not very far from the Gutenberg press of movable bits of type to the logic "bits" of the computer. No doubt computers will be as common as telephones in our lives; art schools in the near future will teach programming as one of the new psycho-skills of the new technician-artist-citizen.

RE: LOOK COMPUTERIZED GRAPHICS "Light Brings us News of the Universe"

1. The mind is a computer--not railroad tracks
2. Human intelligence functions on the order of 100,000 decisions p/second.
3. Computers have reached the speed of human computation in 1967 (using 1955 as the approximate starting point of working computers) *
4. Conception involves pre-conception
5. To objectify something is to realize it.
6. To visualize something is to symbolize it; A symbol of something <u>is</u> "somethin-"
7. "Oh, I 'see' what you mean" is what you say when you sing "Oh say can you see"
8. The eye itself is now considered a miniaturized computer predetermining information before getting to the brain.
9. At a distance of 5 inches the eye perceives forms .001 inches in size.
10. Computerized graphics now permits visual artists to work in complex <u>image storage</u> systems, a new training is immediately called for to train artists in the new disciplines of images in motion, and in sequence. An "image-memory," i.e., image-sequence-consequence or visual velocity-reference-inference and <u>re-call</u> (re-look). The <u>writing</u> of pictures that will make pictures in motion, in

* APPROXIMATELY 100,000 DECISION/SECOND

coded text form, means a new notation system to store images by, an advantage musical composition has had for centuries. In other words, motion pictures can be written, stored indefinitely (in punched paper form or tape form) and brought "to life" later. Motion pictures can be conceived (written) in airplanes. The computerized graphic display system can draw 10,000 to 1000,000 points, lines or characters per second.

It presently costs about $500 a minute of film.

½ of this cost is programming effort

1/3 to computer time

1/6 to optical printing and sound track

The present state of design of graphics display systems. Integrate small points of light turned on or off at high speeds a picture is "resolved" from the mosaic points of light. The eye is a mosaic of nerve ends (rods and cones)

Cameras can take pictures at speeds to 600,000 frames/second. Images can be recognized at speeds of 1/400th of a second.

Consider Seurat's "Pointillism"

TV's grid Half-tone newsprint

The two essential qualities of image in computer-graphics are line and tone, both at this time are generated by points of light on a display tube, thus curves are "approximate" and

not very effective. "Tones" are 4 shades of white to black.

A system using a light pen is a potential composite of hand graphics and machine--it is still awkward to use; but its importance is in the future.

Man-Made dialogue

Inter-face - the putting together of man and machine.

The resemblance of man/machine--man/machine/interview

The art of the machine

The machine for art.

The mind is a "form" maker, if you can conceive it you can "build" it.

Massachusetts Institute of Technology Center for Advanced Visual Studies 40 Massachusetts Avenue Cambridge, Massachusetts 02139

I have been working in computer image making ƒ0ƒ/ sinee I966 studying the tool/computer, studying myself and imaginizing about the future....

It is perfectly clear that the computer will revolutionize... is that evolutionize visual logic....stop to consider it took approximately 400 years from the invention of the Gutenberg press to the realization of the paper back book in the local drug store....it took aproximately 40 years from the invention of television to now be in almost every home in America....it has been about 4 years since computer graphics have become an evident form in A merica, I noted with interest that at the latest Computer Conference in Boston (May I969) I estimated I/3 of all the hardware exhibited in an enormus show room was devoted to image storage/retrieval or generation.....an early state of the art at best....we shall reach the state of the $50 computer within 5 years...and this shall be a computer that can make images, and be responsive to us...mam/mamhmmam/hmmam man/inter/machine. The mind is a form maker...if you can conceive it you can build it..

the image computer will be as commonplace as the 8mm camera....

we enter the age of the "homemovies of computers"....

I am presently an artist-fellow-imageist (artist in residence..) at the Center for Advanced Visual Studies..of M.I.T.

I came here to enlarge my understanding of the unfolding technology of the times...

There are many attitudes that must be explored in the problem/role of the artist/citizen...in the flow of new tools and the ecology of amam/man/ mam/eamth earth/man/art...