August, 1967

computers and automation

Computer Art Contest: First Prize

Sine Curve Man, 1967, by Charles Csuri, Artist, and James Shaffer, Programmer

computers and automation

AUGUST, 1967 Vol. 16, No. 8

The front cover shows the first prize in the 1967 Computer Art Contest. For more information and additional computer art, see page 8.

SPECIAL FEATURE: ANNUAL COMPUTER ART CONTEST

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Computer Art: Turning Point

This is the fifth year in which *Computers and Automation* has held a computer art contest, and the fifth August issue in which we have published examples of computer art.

This year we have had far more entries from far more people than ever before; and we think they show wider and more interesting variations. Recently, in fact, there have been a number of meetings and exhibits dealing with computer art. For example, in Montreal at the end of last autumn, an exhibit of computer art was held, under the auspices of the Computer Club of McGill University. What was remarkable was that more than 12,000 persons visited the exhibit; and it drew so much interest, comment, and newspaper notice, that another exhibit of computer art has been planned in Montreal for this autumn. We think a turning point in computer art has been reached.

We think there may be enough evidence now for making a good case for the following proposition:

- Art in the future will be as profoundly influenced by the computer as by any other medium for expression.

Take for example the medium of photography. Many magazines and many museums nowadays are devoted to art and exhibits through the medium of photography — black and white, and color. Just as many of the results of photography by good photographer artists are astonishingly beautiful, so many of the results of the computer applied to art will in the future be astonishingly beautiful.

There are several reasons why the computer will in the future have a profound influence on the production of art. One reason is this:

- If the artist wants to make a small change in some detail of his picture, he will be able to do it by means of the computer.

He may say to himself, "That eye is not turned quite right; I would like to turn it a little bit"; and the computer (on suitably programmed request) will turn it for him. Or he can say, "I wonder if that color would be better if it were a grayer purple"; and the computer will change the color for him. In general, instead of being largely limited to his first choice of color and his first choice of line, the artist will have, from the computer, 10,000 choices of color and line, displaying each revised picture on the "color TV" screen of the future, controlled by computer.

A second reason is this:

- If the artist wants to represent some visual concept in some part of his picture, he will be able to, referring to the computer's memory.

He may say to himself, "I wonder what were costumes in France in the late 1400's"; and the computer (on suitable request) will show him. And he can say, "I should like a suitable costume for a soldier of medium rank in the army of the Duke of Burgundy," and the computer will show him. The artist will be aided in his representation of visual ideas by the resources of an immense computerized library of visual information.

A third reason is this:

- The artist will be able to change the location (both relative and absolute) of any of the elements in his picture.

One of the pictures which we show in this issue of *Computers and Automation* demonstrates exactly this power: the lines that make up a face are distorted, stretched, and inclined, in many gradual successive stages. In the future the artist will have extraordinary power from the computer to move the elements of his picture as he wishes — as if he were drawing on a magic rubber sheet that could stretch or shrink in any way that he desired.

This kind of power is not limited to the visual field. It will apply in music for the musician — giving him variations of tones and melodies as he asks for them. It will apply in sculpture for the sculptor — giving him views of surfaces and forms that he wishes to chisel or mould. The power of the computer to supplement the artist will apply probably to almost every field of art.

Will the human being be superseded? No, for the same reason that the portrait photographer has not superseded the portrait painter. What will happen is that new powers will be given to the human artist, but the selections, the choices, will still be largely in his hands. The computer will provide one more extraordinary motorized instrument and medium for the human being as artist — but the decision about what is beautiful will continue to vary from one human being to another, from one society to another, from one culture to another.

Edmund C. Berkeley

Editor

ANNUAL COMPUTER ART CONTEST

SINE CURVE MAN, 1967
- Charles Csuri
James Shaffer

The first prize in our 1967 Computer Art Contest has been awarded to Charles Csuri, Professor in the School of Art, and James Shaffer, Programmer, Ohio State University, Columbus, Ohio. Their winning entry (which appears on the front cover of this issue) is entitled "Sine Curve Man, 1967".

According to the artists, this drawing was made in the following manner:

> "A picture of a man was placed in the memory of an IBM 7094. Mathematical strategies were then applied to the original data. The X value remained constant, and a sine curve function was placed upon the Y value. Given the X and Y coordinates for each point, the figure was plotted from X' = X, Y' = Y + C * SIN (X) where C is increased for each successive image."

Mr. Csuri and Mr. Shaffer submitted several more entries in the contest which are shown on the following pages.

The other computer art shown in this issue receives honorable mention. For some of the drawings, the explanation is obvious or can be inferred easily; for others, explanations are given.

We regret that there was not more space in this issue to publish more of the entries; we hope that some more can be published shortly.

In a number of cases, the computer and the peripheral equipment which produced the computer art have not been specified as we would like, because the information did not reach us by the close of the contest, July 2. We would, of course, like to publish the identification of the equipment that produced the art. Supplementary information of this kind should be sent to us for publication in a future issue of "Computers and Automation".

The responses to our Fifth Annual Computer Art Contest this year have been very great, and give evidence to the growing importance of the role of computers in the arts. For 1968 we plan our Sixth Annual Computer Art Contest, and we cordially invite contributions of computer art from our readers.

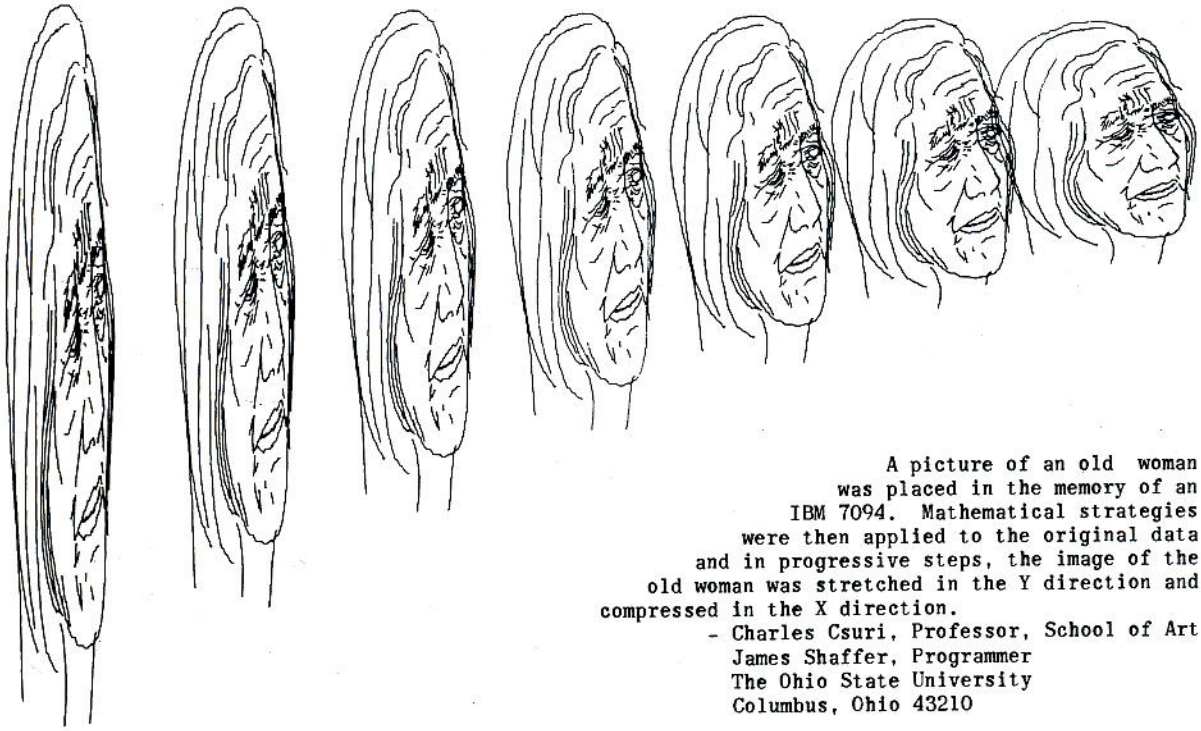
GIRL — AND GIRL SHOOK UP

A package of subroutines for manipulating arbitrary line drawings was used in preparing these drawings. They were plotted by a CalComp 565 plotter, offline from an IBM 7094/II.

"Girl" was programmed as 700 points by Gordon Deecker. In "Girl Shook Up", each of the 700 points making up the picture was randomly displaced in the vertical direction. The displacement is normally distributed with mean of 0 inches, standard deviation of .3 inch, maximum displacement .3 inch up or down. Programmed by Michael Wharton.

- L. Mezei, Associate Professor of Computer Science
University of Toronto
Toronto, Ontario, Canada

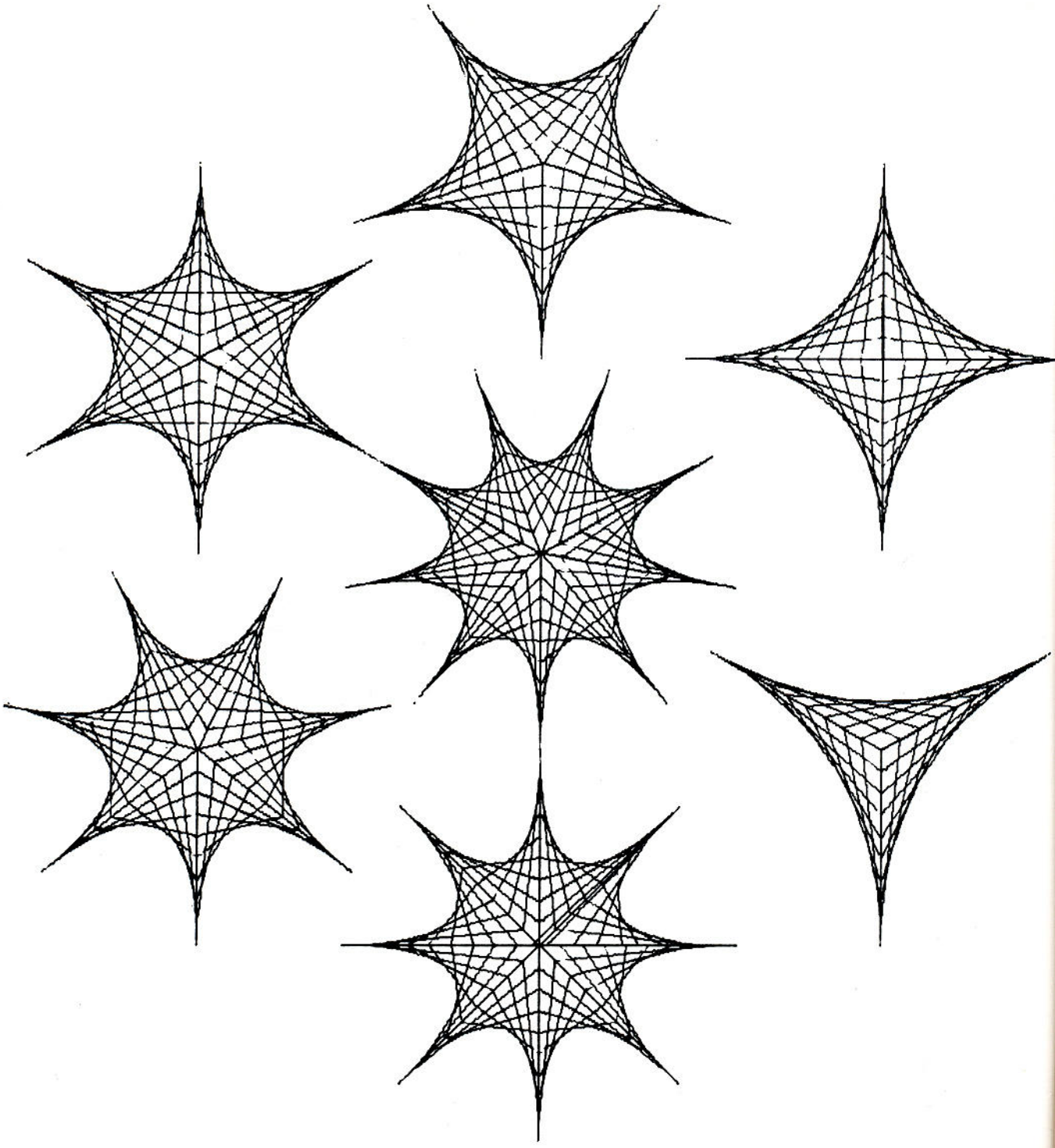
PICTURE OF AN OLD WOMAN



A picture of an old woman was placed in the memory of an IBM 7094. Mathematical strategies were then applied to the original data and in progressive steps, the image of the old woman was stretched in the Y direction and compressed in the X direction.

- Charles Csuri, Professor, School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210

SEEING STARS



"The most important element in this drawing is direction. Positioning is only predetermined with maximum and minimum sizes." Stars grow from the three-pointed star in the lower righthand corner to the nine-pointed star in the center of the picture.

- Petar Milojevic
McGill University
Montreal, Quebec, Canada

BOXES

The corner of each rectangle was generated by random numbers. The X dimension of the box was determined as 1.09 times the X coordinate. The Y demension is 1.09 times the Y coordinate. This resulted in a random spacing of the rectangles with a random pattern to their size.

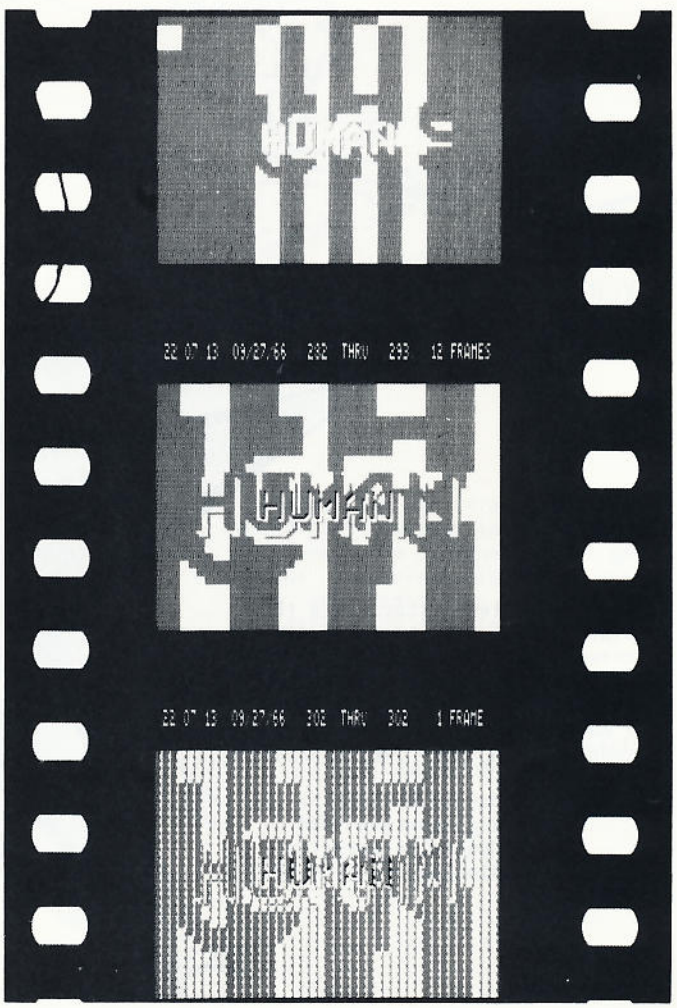
The design was made on an IBM 1620 with a 1627 plotter, and was programmed in FORTRAN

- Darel Eschbach, Jr.
The University of Toledo
Toledo, Ohio 43606

MAN AND HIS WORLD

Shown here are frames from a 16mm film entitled "Man and His World" made in connection with Expo 67. The film was produced by programming in a special macro-extended version of the BELFIX language (which in turn is written in macro FAP). The output in each instance is a 252-by-184 array of Charactron characters produced by the Stromberg-Carlson 4020. The resulting black-and-white film was subsequently printed through sequences and combinations of colored filters and a sound track added by traditional methods.

- Stanley Vanderbeek
Kenneth Knowlton
Bell Telephone Laboratories
Murray Hill, N.J. 07971

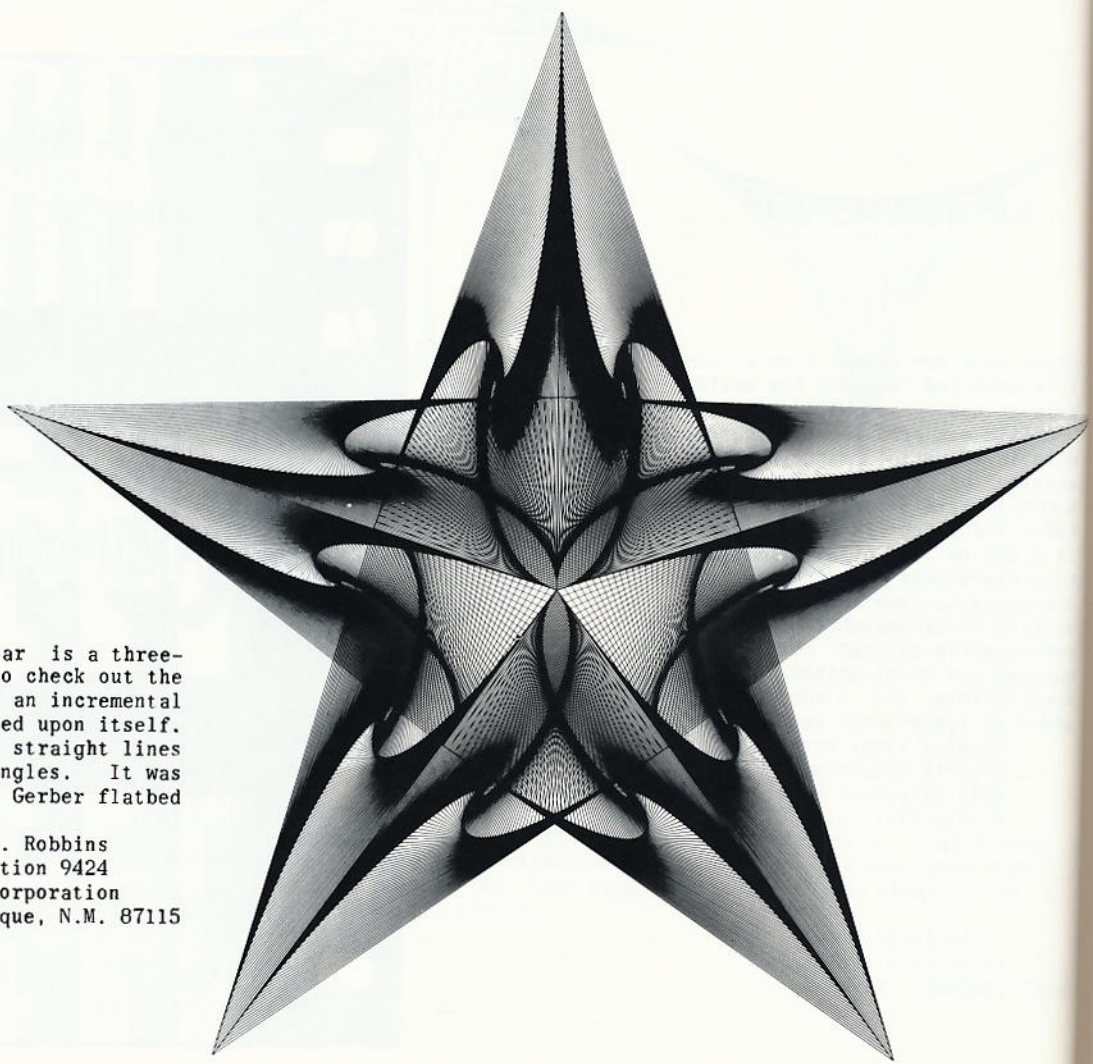


CHAOS TO ORDER

Each line of the bird was distributed at random. The computer drew the chaotic version first, and in progressive stages brought the bird back together.

- Charles Csuri, Professor, School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210

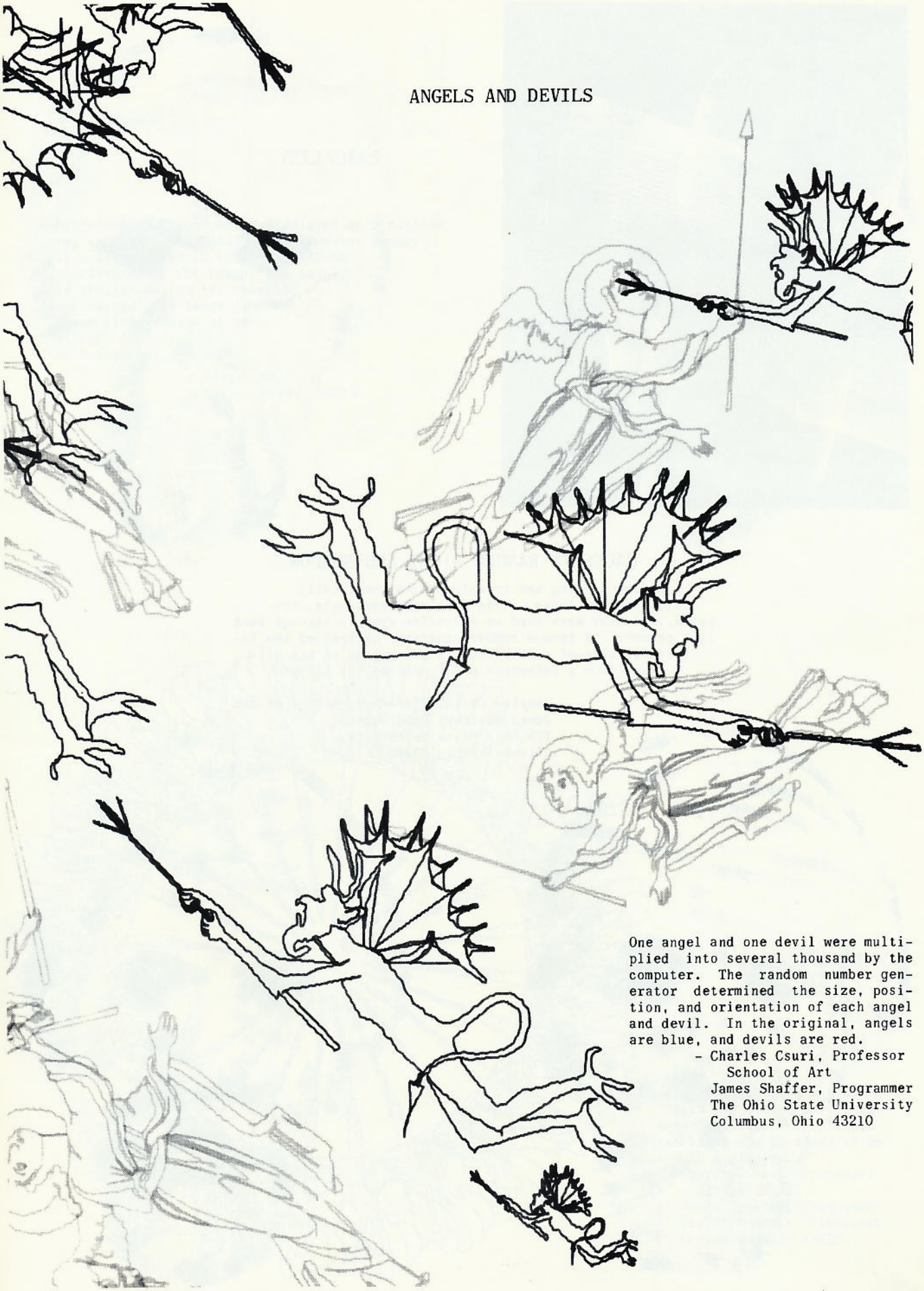
VERIFYING STAR



This five-pointed star is a three-pointed star, used to check out the incremental step on an incremental plotter, superimposed upon itself. The design has many straight lines at many different angles. It was produced on a large Gerber flatbed plotter.

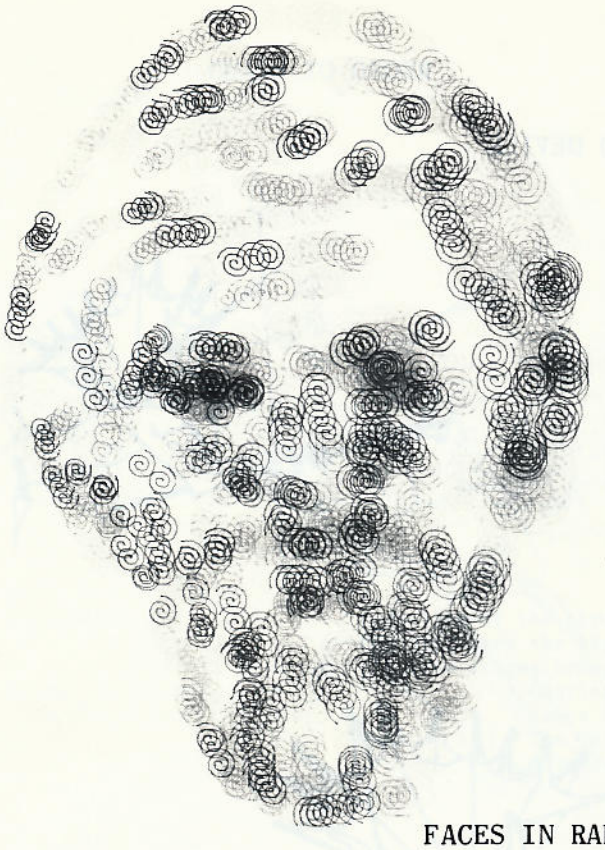
- Donald K. Robbins
Organization 9424
Sandia Corporation
Albuquerque, N.M. 87115

ANGELS AND DEVILS



One angel and one devil were multiplied into several thousand by the computer. The random number generator determined the size, position, and orientation of each angel and devil. In the original, angels are blue, and devils are red.

- Charles Csuri, Professor
School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210

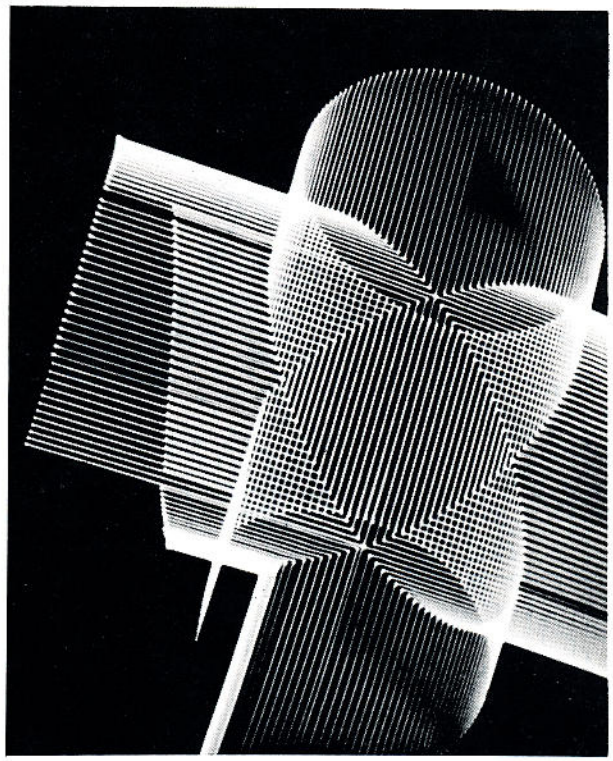


FACES IN RANDOM LIGHT AND SHADOW

A line drawing was transformed mathematically into a shaded image. Then a spiral, rectangle, triangle, and star were used as character symbols through each line segment. A random number generator determined the intensity; size of each symbol is a function of its distance from a reference point outside the picture.

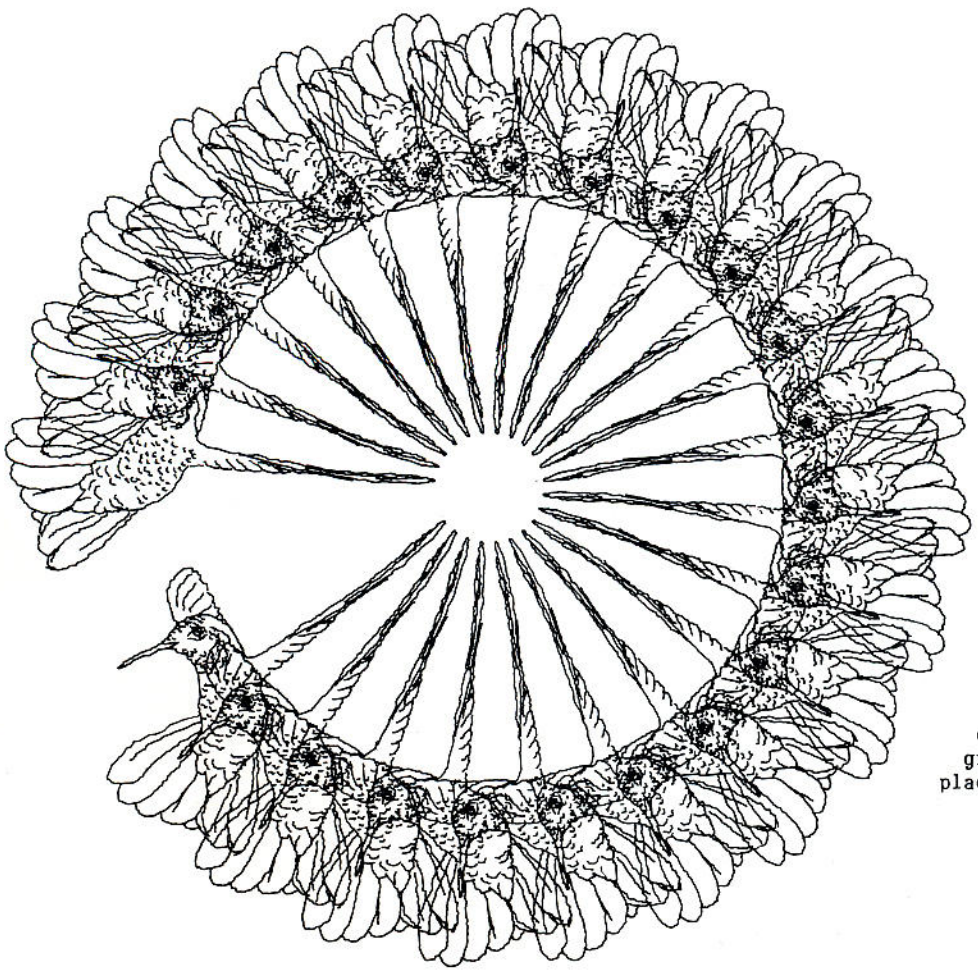
- Charles Csuri, Professor, School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210

CYLINDERS



Picture of an image being displayed on a cathode ray tube. In the Ambilog 200 computer memory is a description in three-dimensional coordinates of the image. The image is similar to two intersecting cylinders. The image is drawn line-by-line at an overall frame rate of 40 frames per second.

- Adage Inc.
Boston, Mass. 02215

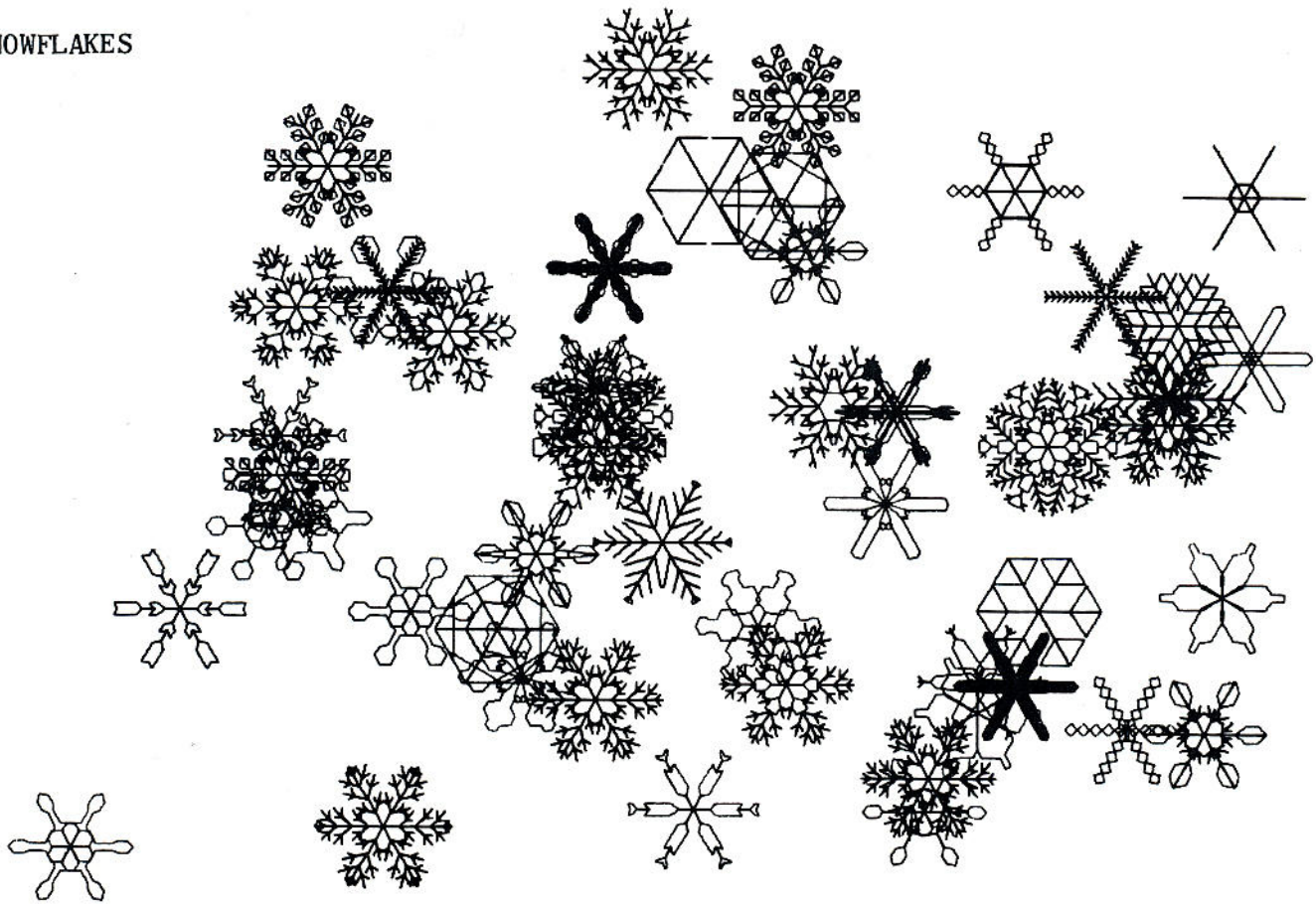


BIRD IN A CIRCLE

The drawing of a humming bird was placed on a polar coordinate system. The program calls for 22 birds to be placed in a circle.

- Charles Csuri, Professor
School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210

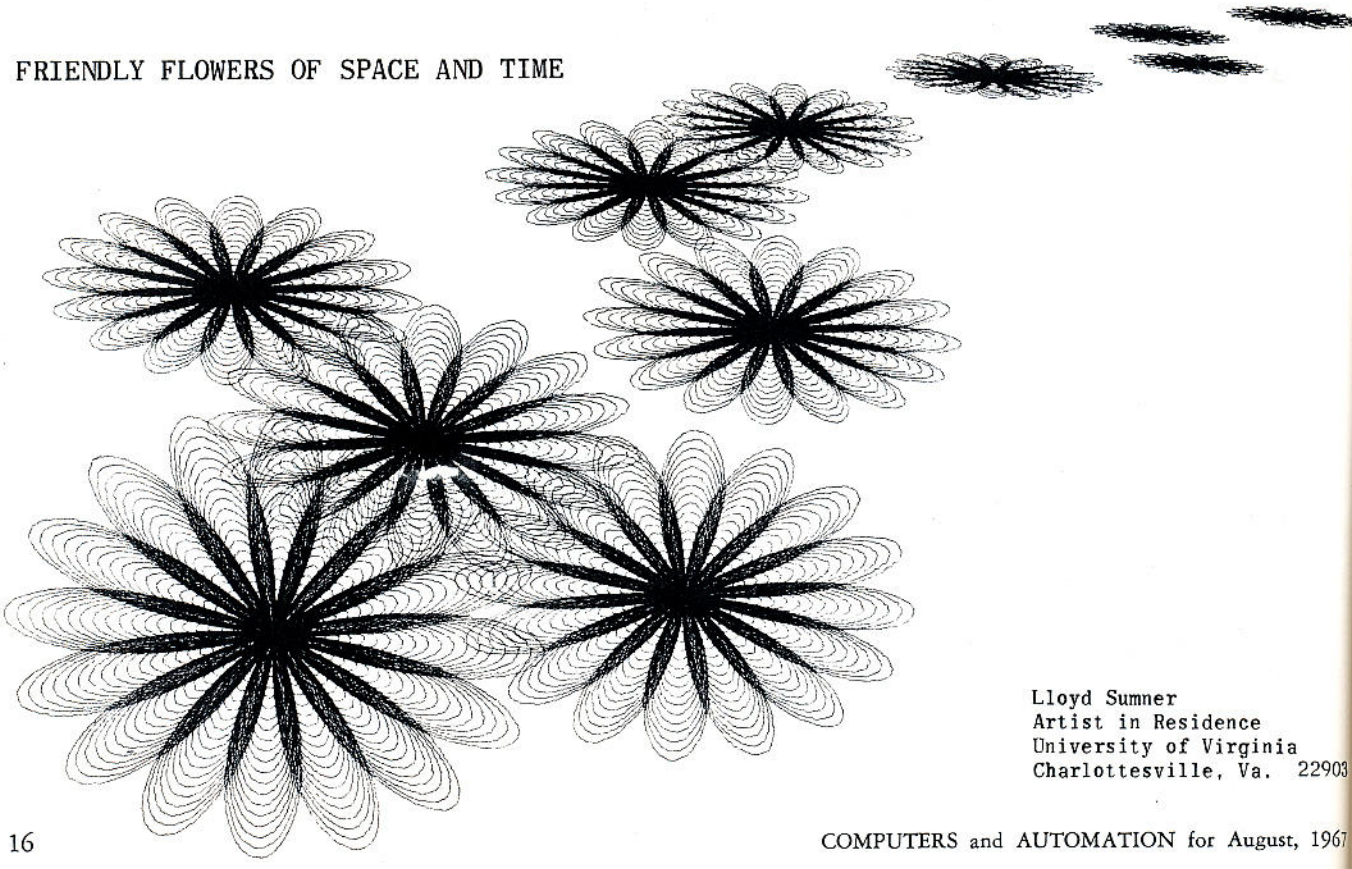
SNOWFLAKES



"Snowflakes" and "Friendly Flowers of Space and Time" were programmed in extended ALGOL, read into a Burroughs B5500, and plotted on a CalComp 565 plotter.

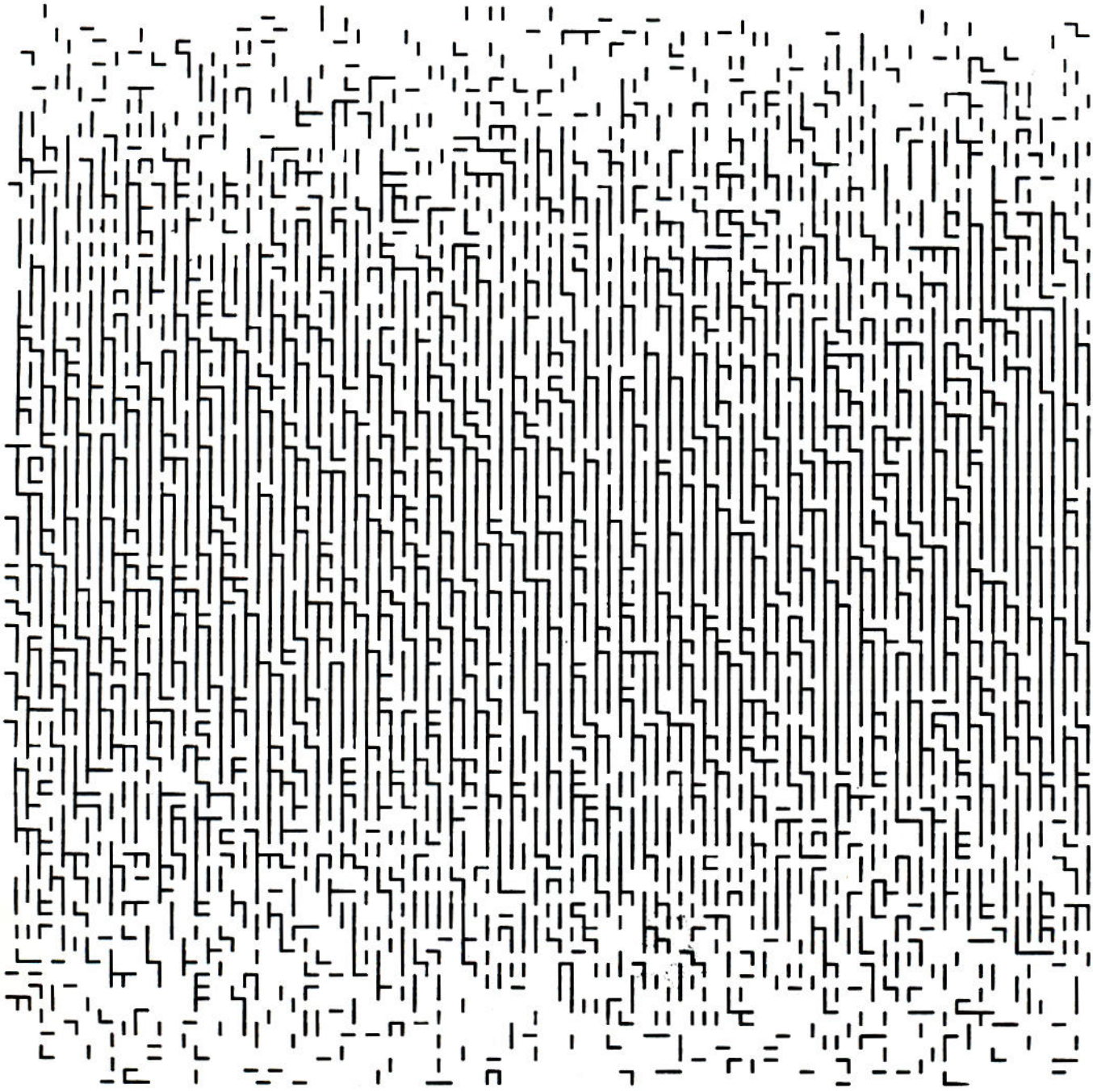
The snowflake crystal as it appears in nature is hexagonal, delicate, and has twelve degrees of symmetry. By calculating the coordinates of the points for one-half of one branch of the snowflake and making the proper reflections and rotations, intricate snowflake designs were approximated, and randomly placed.

FRIENDLY FLOWERS OF SPACE AND TIME



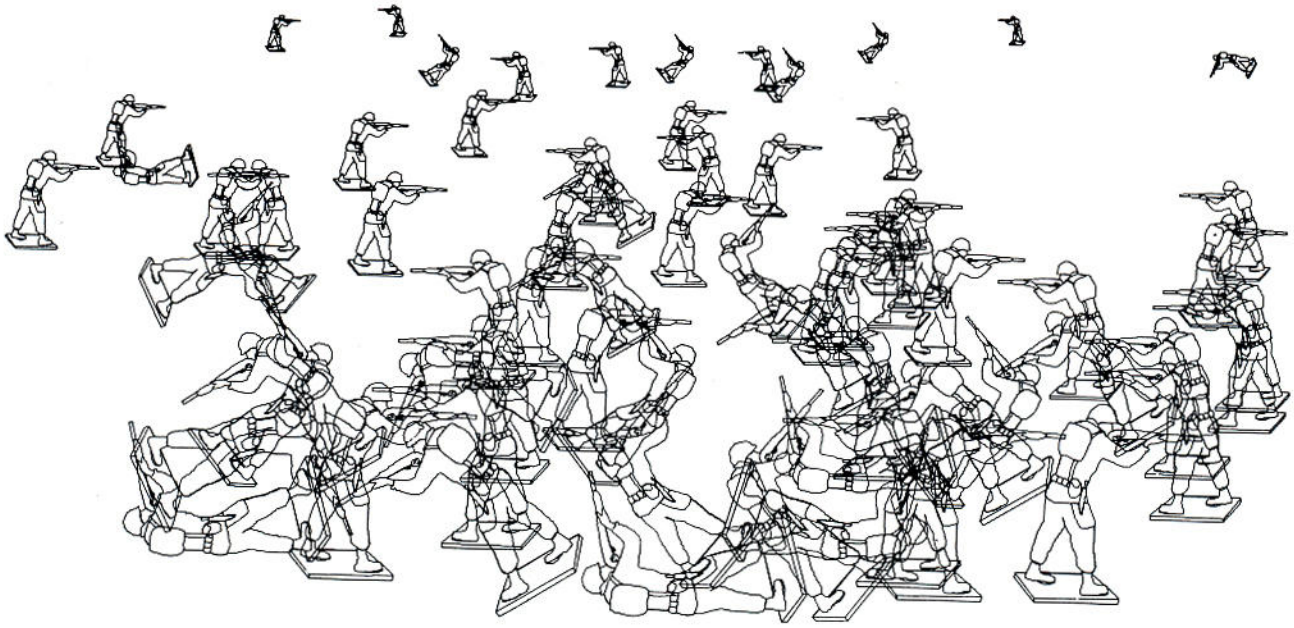
Lloyd Sumner
Artist in Residence
University of Virginia
Charlottesville, Va. 22903

LABYRINTH



– Frieder Nake
Herdweg 57
Stuttgart, Germany

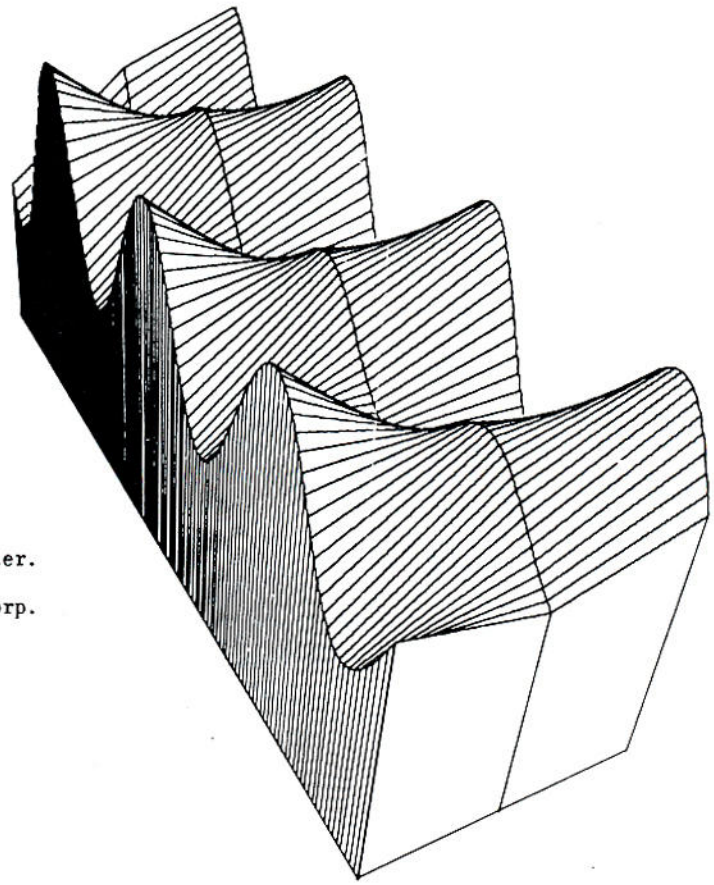
RANDOM WAR, 1967



A computer program which generates random numbers is called a pseudo-random number generator. Such a program determined the distribution and the position of soldiers on the battlefield. The program places each soldier into perspective. Names were assigned to each soldier. A random number generator also decided who is to die and who is to be wounded. A picture 30" x 100" (a portion shown here) in color of the battle was produced by the computer and gave the following information: (1) Total number of dead on each side; (2) Total number of wounded on each side; (3) Number of dead and wounded in each of 40 sectors of the battlefield; and (4) Identification of the dead and wounded in alphabetical order.

- Charles Csuri, Professor, School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210

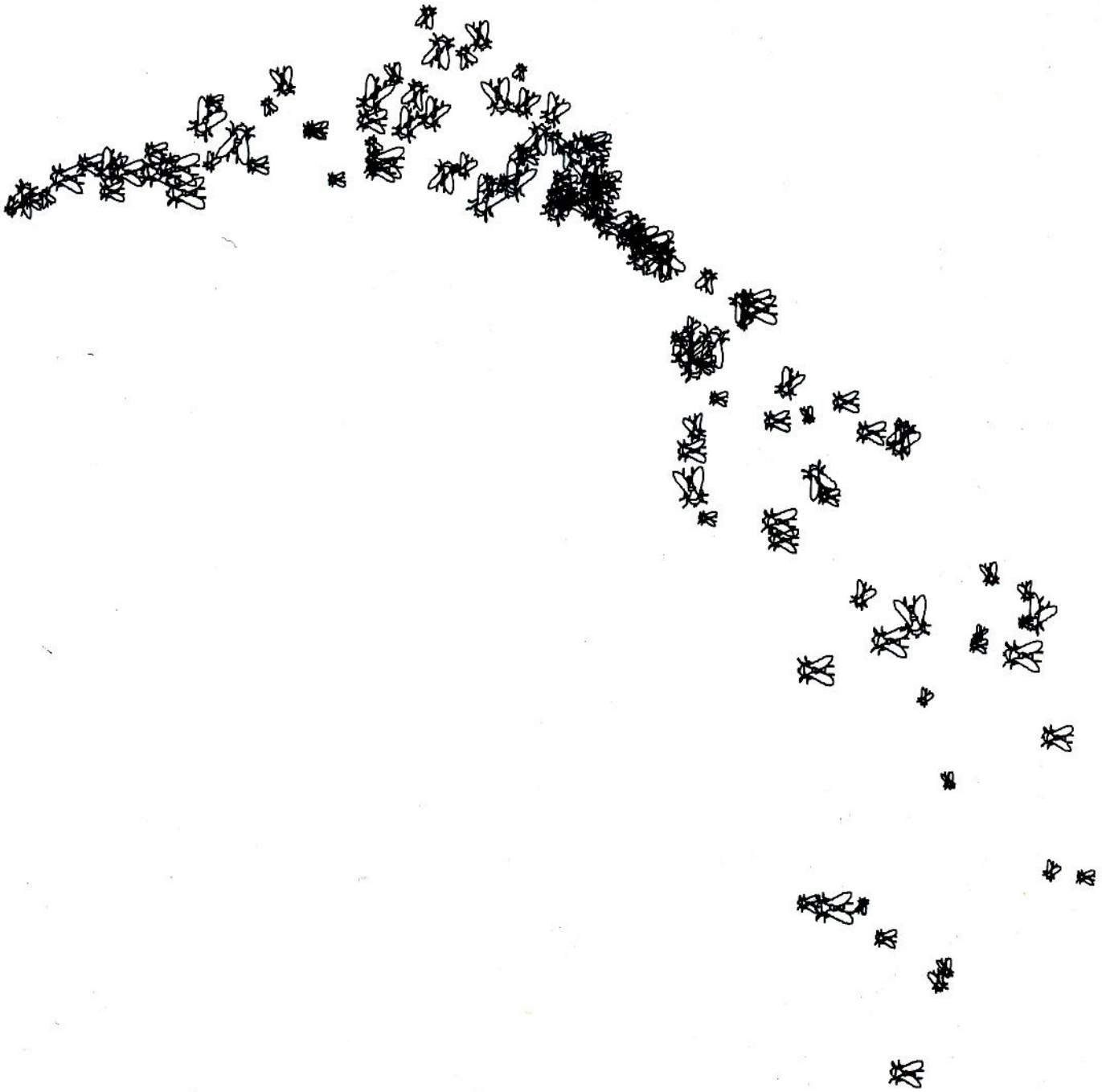
POWER OSCILLATION PERSPECTIVE



A perspective view of the power oscillation at a particular location in a nuclear reactor during a xenon transient. Drawn on a CalComp plotter by a FORTRAN program on the Philco 2000 computer.

- D. J. DiLeonardo
Westinghouse Electric Corp.
West Mifflin, Pa. 15122

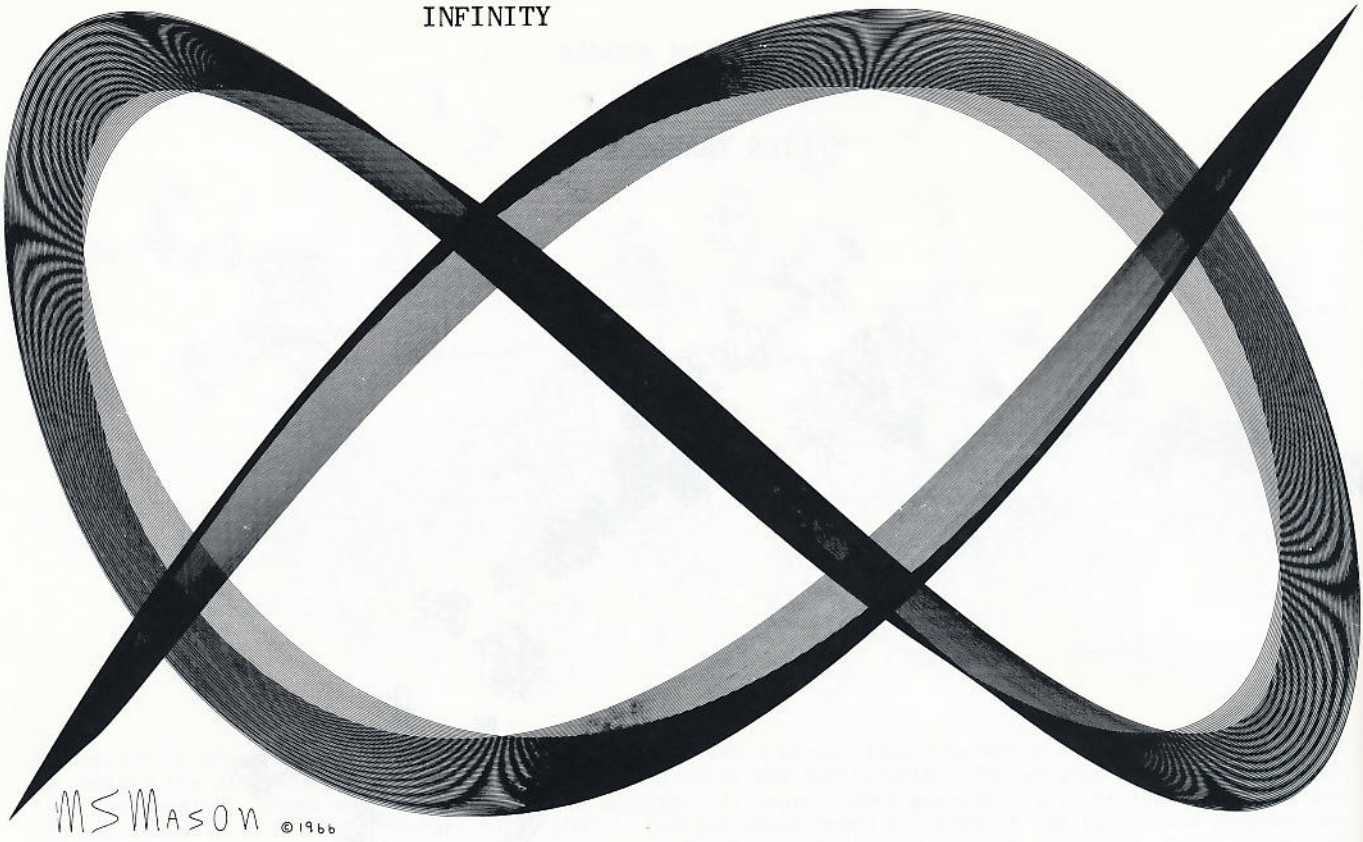
FLIES TRANSFORMED



"The distribution was based upon a combination of random numbers placed inside a region such as a triangle and then a transformation was made to another region such as a half circle. This was a problem in conformal mapping."

- Charles Csuri, Professor, School of Art
James Shaffer, Programmer
The Ohio State University
Columbus, Ohio 43210

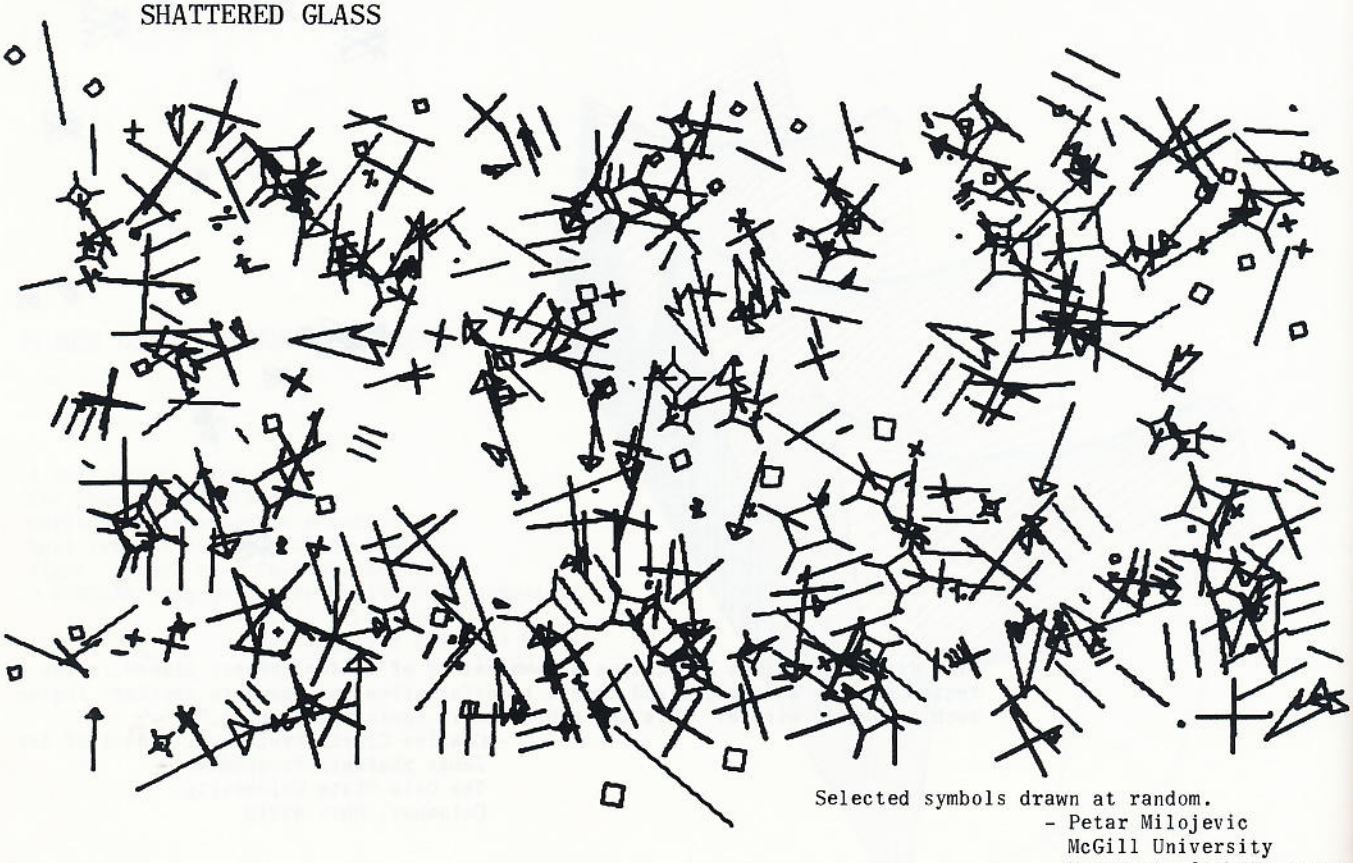
INFINITY



The sign of infinity, drawn by computer plus man.

- M. S. Mason
4008 Dobbs Drive S.E.
Huntsville, Ala. 35802

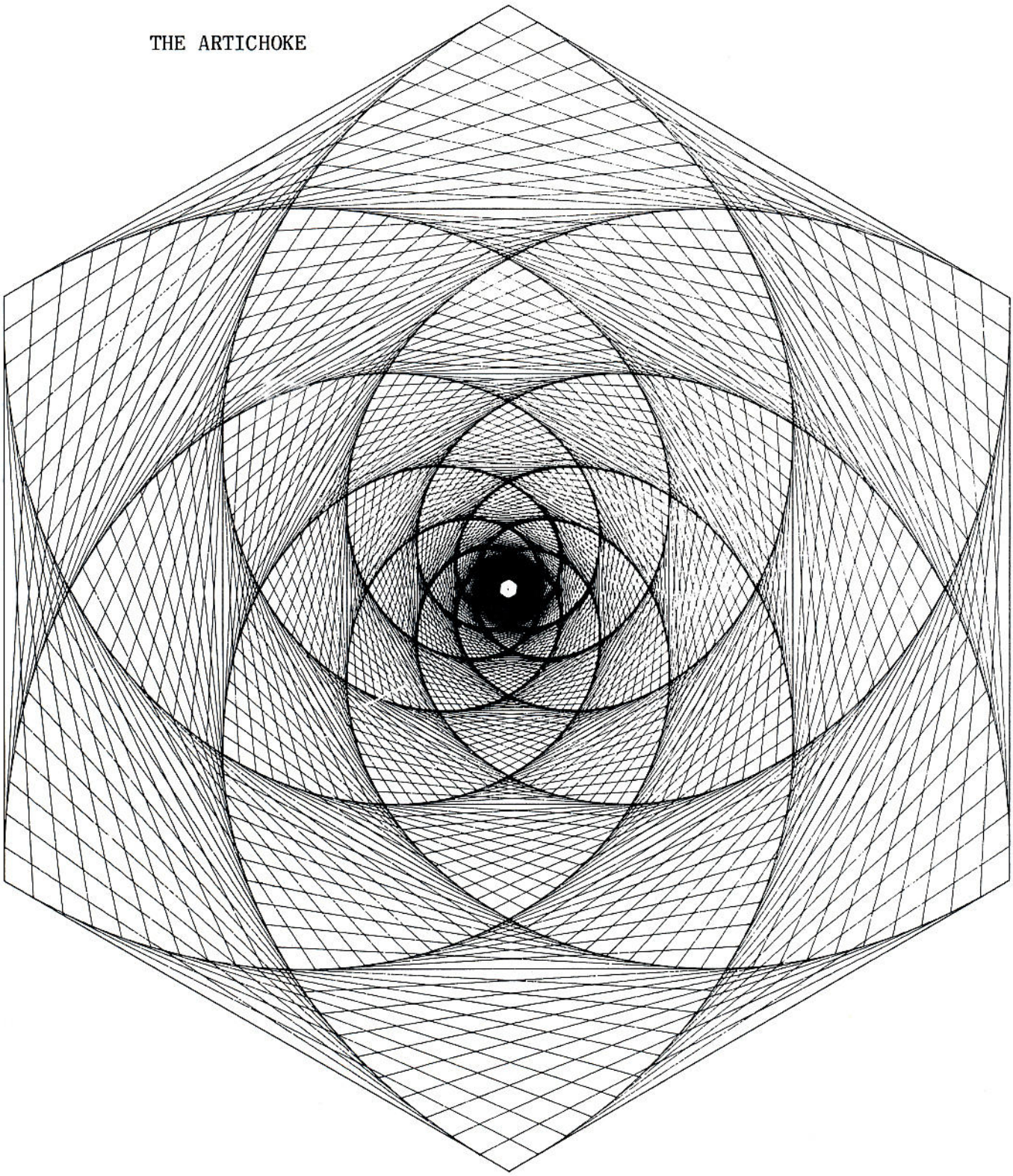
SHATTERED GLASS



Selected symbols drawn at random.

- Petar Milojevic
McGill University
Montreal, Quebec, Canada

THE ARTICHOKE



A hexagon is rotated clockwise and counter-clockwise while being reduced in size.

- Craig Sullivan
California Computer Products Inc.
Anaheim, Calif. 92803