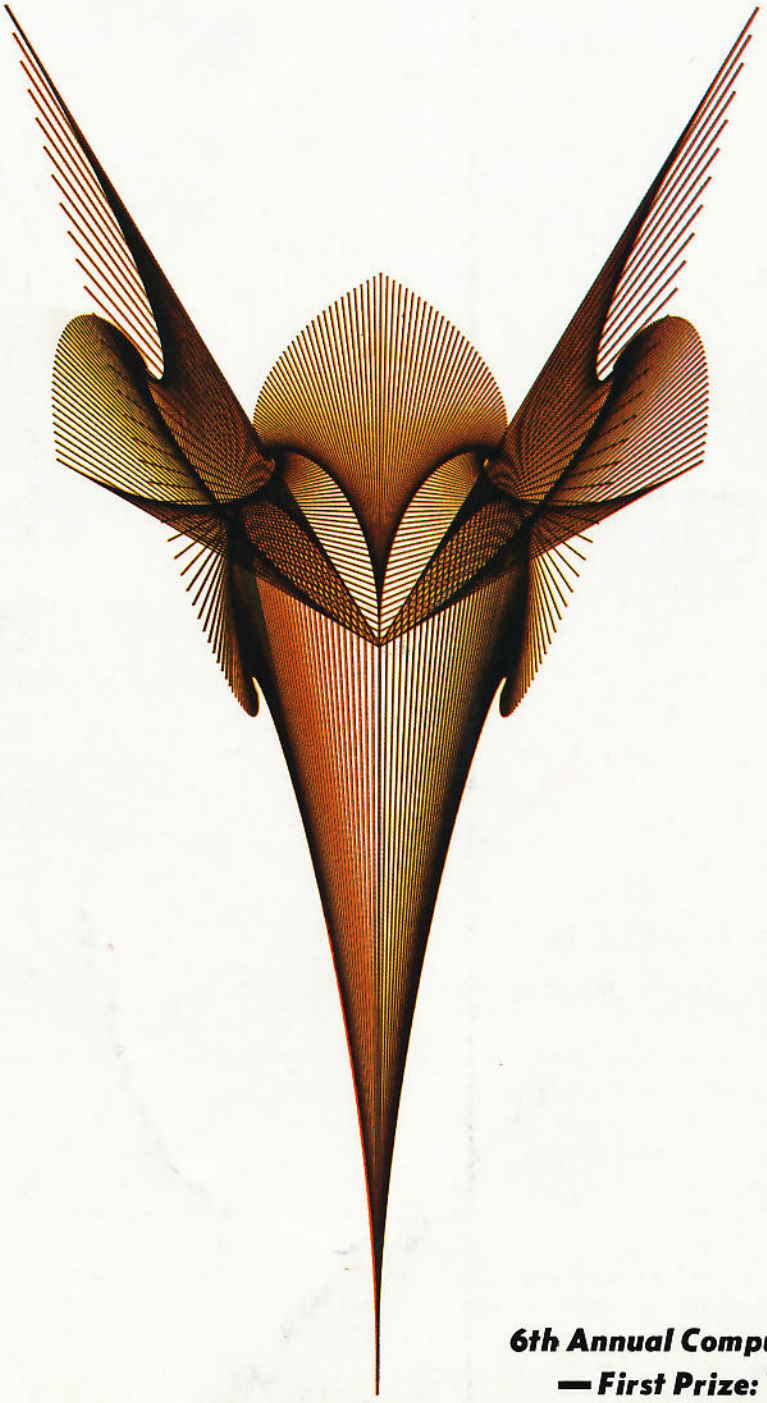
August, 1968

computers and automation



6th Annual Computer Art Contest
— First Prize: "Hummingbird"

computers and automation

August, 1968, Vol. 17, No. 8

The magazine of the design, applications, and implications of information processing systems.

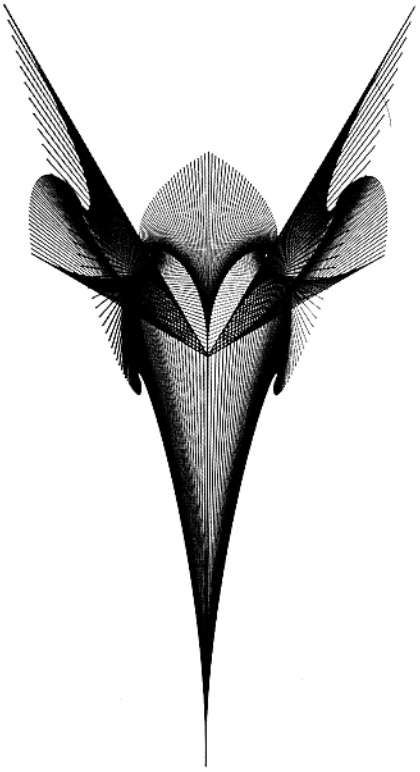
Special Feature: Sixth Annual Computer Art Contest

Regular Features

The front cover shows the entry which won first prize in the Sixth Annual Computer Art Contest of Computers and Automation — *"Hummingbird", by Kerry Strand and Gary Craigmile. A description of this picture, and other entries in the contest, are in the computer art section of this issue beginning on page 8.*

Departments

THE SIXTH ANNUAL COMPUTER ART CONTEST OF COMPUTERS AND AUTOMATION



HUMMINGBIRD
— Kerry Strand
Gary Craigmile

The first prize in our 1968 Computer Art Contest has been awarded to Kerry Strand and Gary Craigmile, both of California Computer Products, Inc., Anaheim, Calif. Their winning entry appears in color on the front of this issue, and is entitled "Hummingbird". It was designed and programmed by Mr. Strand; the color coordination and plotting techniques were executed by Mr. Craigmile.

The artists describe their work as follows:

> The "Hummingbird" is an extension of the "three bug problem". The basic design produced by the "three bug problem" is modified by drawing only two sides of the triangle. This pattern is then mathematically manipulated into the desired position. Three different line widths, each with a different color, were plotted overlaying each other.

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

The other computer art published 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. In a number of cases, the computer and the peripheral equipment which produced the computer art have not been specified as much as we would like because the information did not reach us by the close of the contest, July 5. We would, of course, like to identify the equipment that produced the art. Supplementary information of this kind should be sent to us for publication in a future issue.

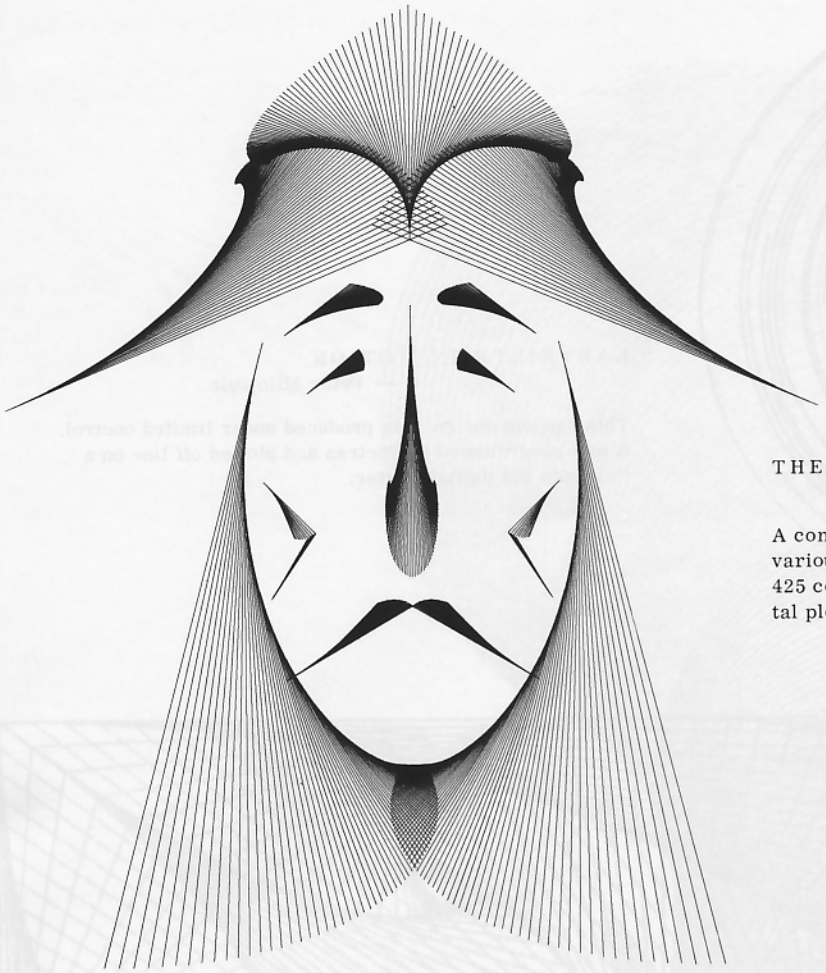
The responses to our Sixth Annual Computer Art Contest have been splendid. We are grateful to all those persons who sent us entries.

It is interesting to note the development in the computer art that we receive from year to year. As with computer technology itself, computer art is becoming more sophisticated, more creative, and more visually appealing. We now find a widespread use of color. We notice artists and professors, as well as technicians, working with the computer to learn more about design, color, and artistic techniques. We find groups being established to explore their mutual interests in computer art. One notable group is the Computer Technique Group (CTG) in Tokyo, Japan, which consists of eight individuals whose professions vary from architectural design to behavioral science to systems engineering.

For August 1969, we plan our Seventh Annual Computer Art Contest, and we cordially invite contributions of computer art from all our readers and others who are interested in computer art.

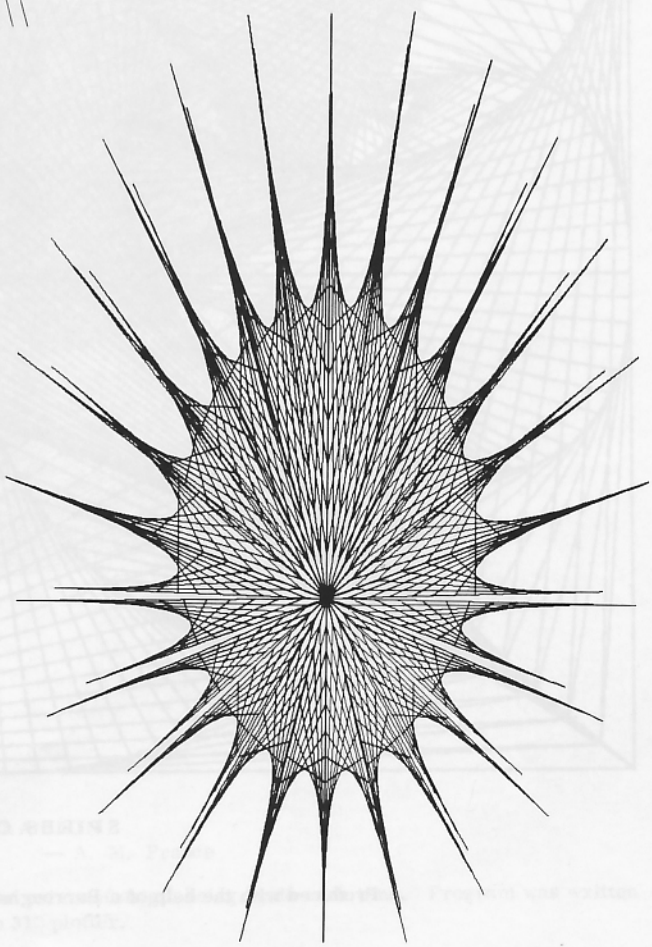
A complete alphabetical listing of the names and addresses of all persons whose art is published in this issue appears on page 27.

Sharry Langdale
Associate Editor



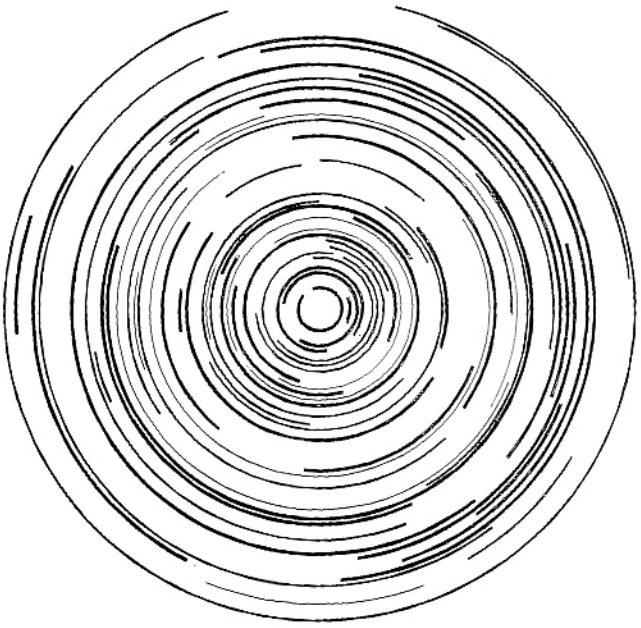
THE FISHERMAN
— Kerry Strand

A composite of one basic design repeated in various positions and shapes. Done on a GE 425 computer and a CalComp 760/502 incremental plotter with a step size of 0.01 inches.



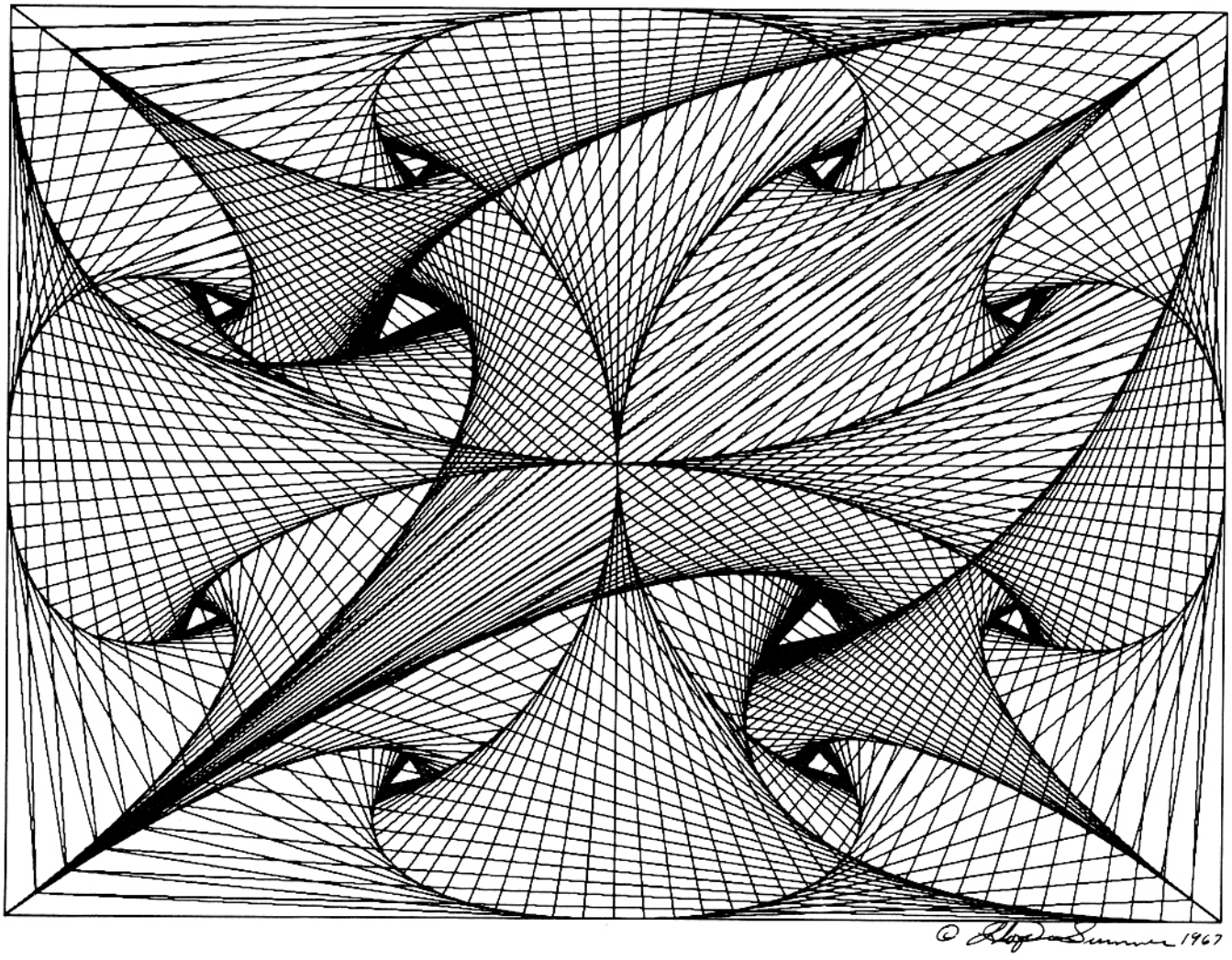
A SEA STAR
— Petar Milojevic

The three-point net technique is used to get a pleasing drawing through some elements for which computers are described as best performers. Programmed in Fortran, and plotted off line on a CalComp 565 digital plotter.



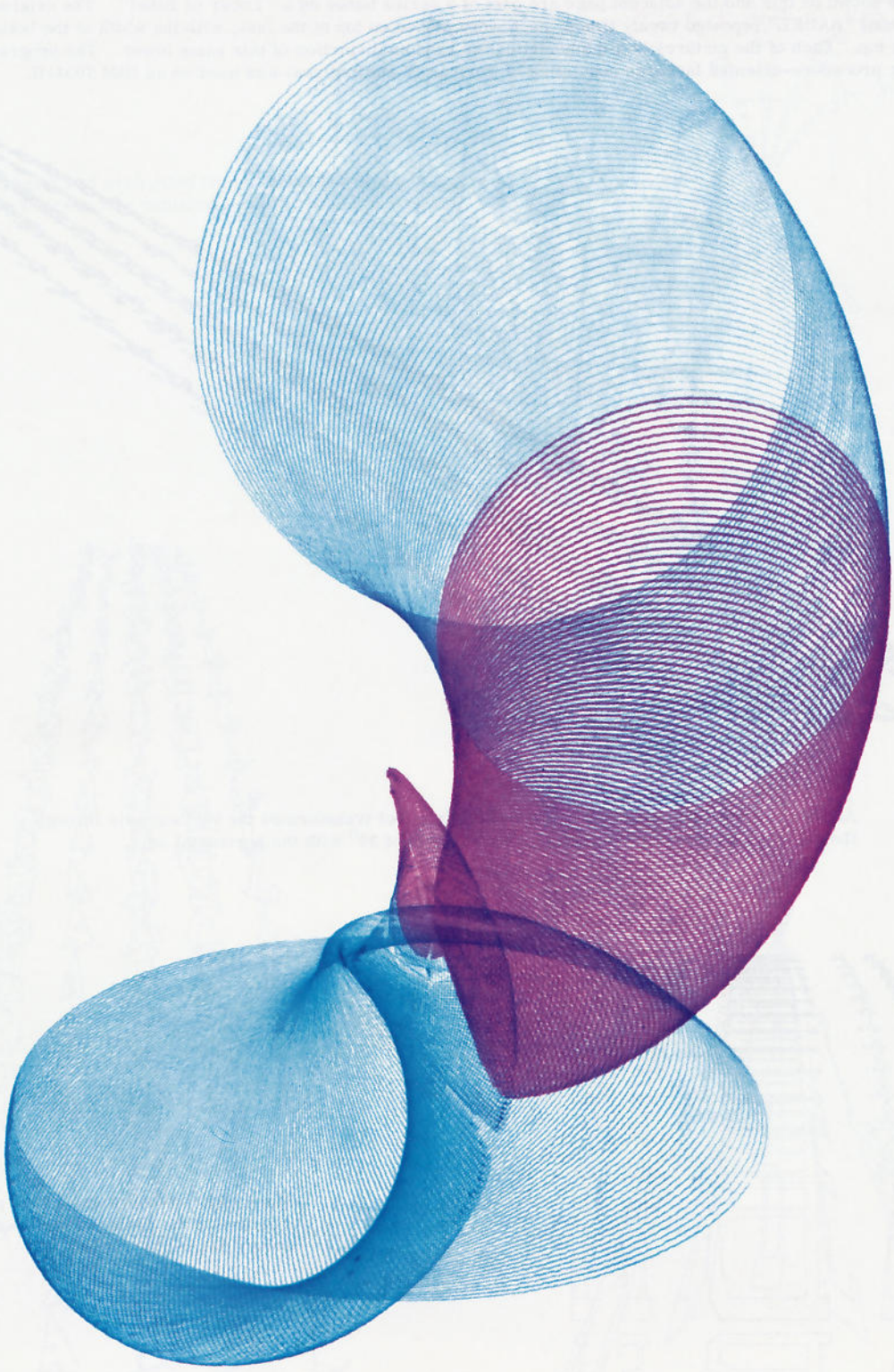
LABYRINTH IN MOTION
— Petar Milojevic

This random design was produced under limited control. It was programmed in Fortran and plotted off line on a CalComp 565 digital plotter.



SPIRES OF CONTRIBUTION
— Lloyd Sumner

Produced with the help of a Burroughs B5500 computer and a CalComp 565 plotter.



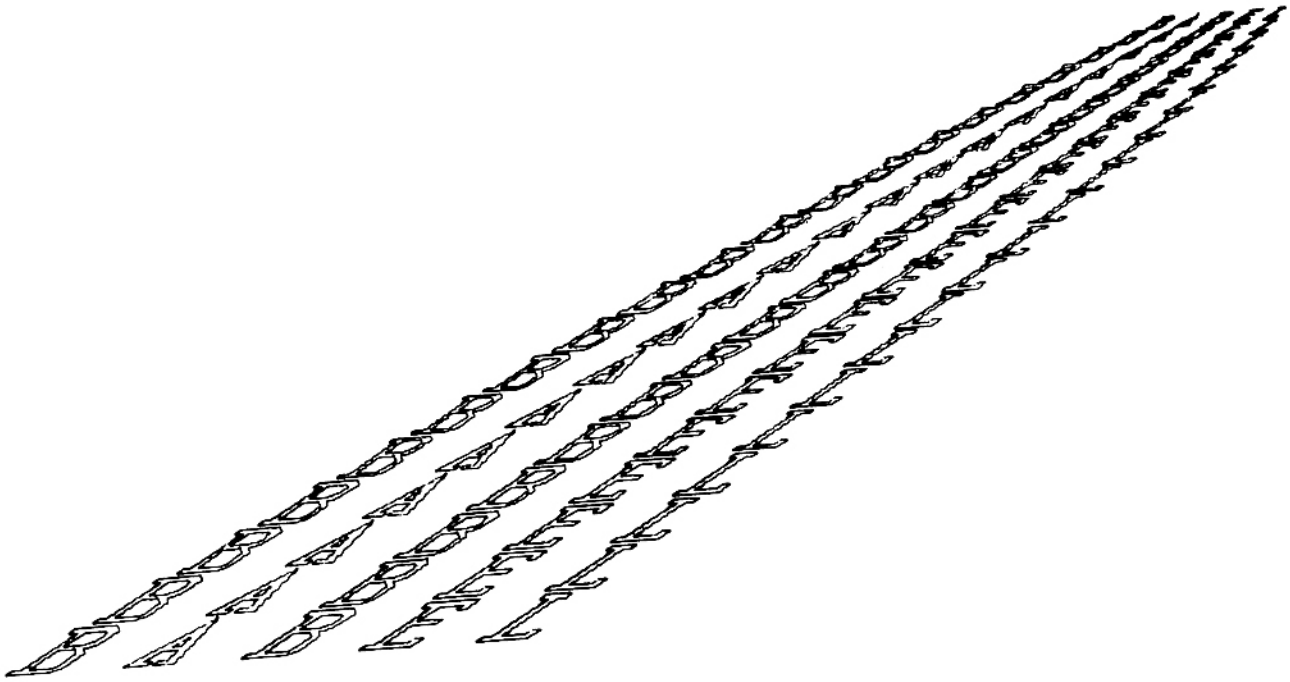
INSPIRALATION
— A. M. France

Repeated ellipses were drawn, with small changes to axis lengths and points of origin being made each time. Program was written in Fortran and executed on an I. C. T. 1905 computer and a CalComp 31" plotter.

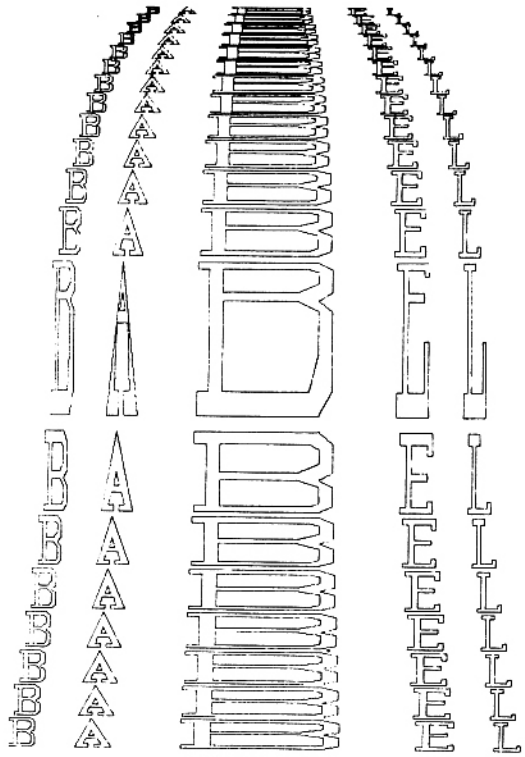
TOWER OF BABEL

— Leslei Mezei, Artist, and David Payne, Programmer

The five pictures shown on this and the adjacent page are part of a series based on a "Tower of Babel". The original tower was made up of the word "BABEL" repeated twenty times, each word placed on top of the last, with the width at the bottom being four times that at the top. Each of the pictures is a mathematical or random distortion of this same tower. The programming language Sparta (a graphic procedure-oriented language consisting of Fortran IV subroutines) was used on an IBM 7094-II.

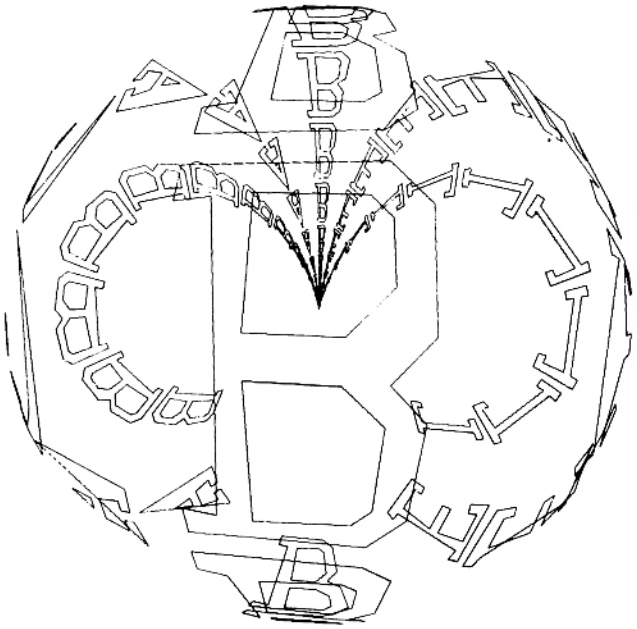


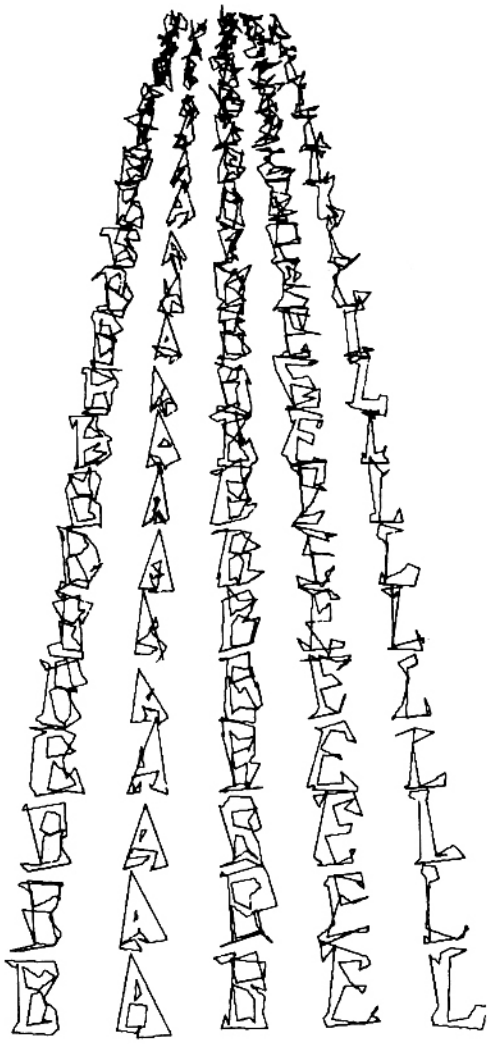
An oblique transformation was applied which in effect transformed the vertical axis through the center of the tower into a line making an angle of 30° with the horizontal axis.



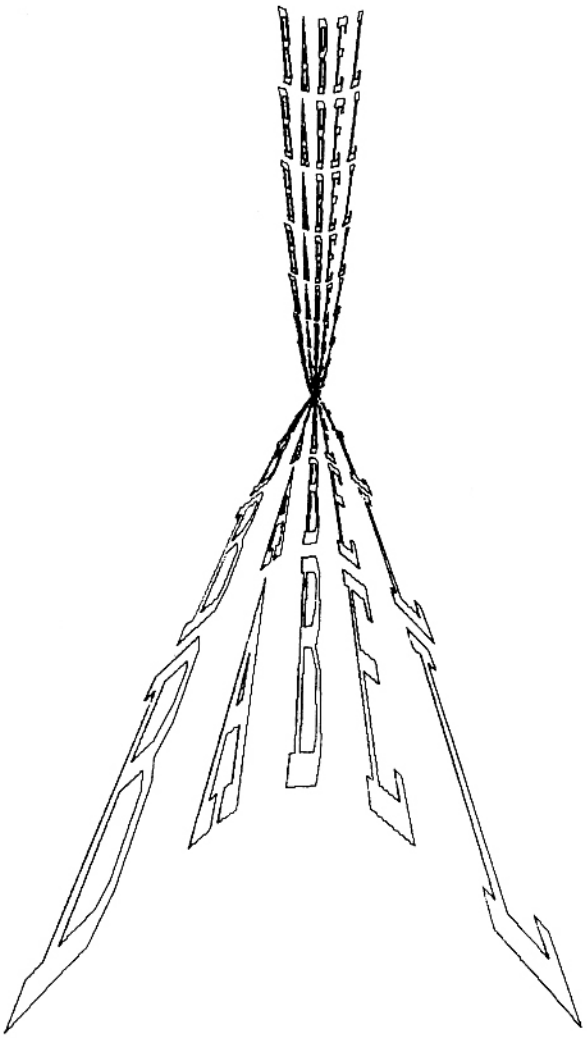
The x and y coordinates of each point (relative to the center of the tower) were replaced by $\sqrt{x}$ and $\sqrt{y}$.

The distance r of each point from a point 1/5 of the way up the tower was replaced by re^{-r}.





Each point of the tower was displaced both horizontally and vertically by a random amount. The random displacement was obtained from a Gaussian distribution with a mean of zero and a standard deviation of 0.05. The maximum displacement allowed was 0.2 inches.



The distance r of each point from the center was replaced by re^{r}.

IDEALIZED BRUSH STROKES

— Dr. Evan Harris Walker

The idea behind this picture is that by studying mathematically the compositional elements employed by the great artists, one might discover artistic principles; and with the aid of a computer, these principles could be tested by using them to generate new examples of art. As a starting point, completely random arrangements of rectangles (idealized brush strokes) were examined. This picture makes use of several concepts that have been developed to produce organization in pattern and color.

The program was written in Fortran for an IBM 7040. The pattern of each sub-element is printed out to scale (using sixteen 9" square blocks of printout) together with the color designation in terms of the Munsell standard color notation. The printing is produced on canvas using acrylic paint.

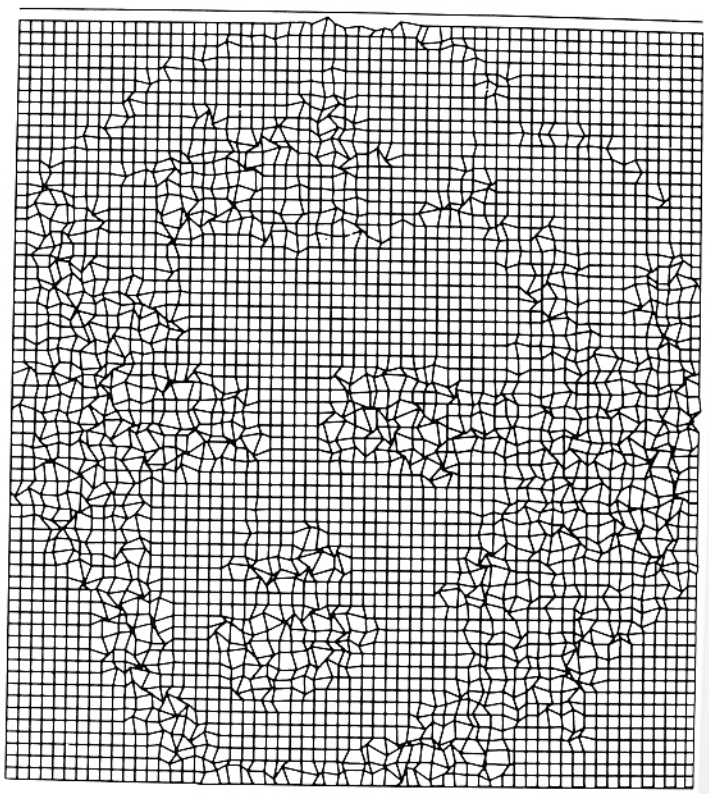
PLEXUS
— Designed and programmed by Kerry Strand and Larry Jenkins
Color coordination and plotting techniques by Gary Craigmile

This is an example of the application of parametric equations. To generate the basic shape, T goes through one cycle of the cosine curve, from 0 to 2PI. The X-coordinate is then proportional to COS(5T) and the Y-coordinate is proportional to COS(11T). Three different line widths, each with a different color, were plotted overlaying each other.

STAR KENNEDY

— Designed by Masao Komura
Programmed by Haruki Tsuchiya

A pattern deformation system was applied to a photograph of John F. Kennedy. Stars of random size were put on the point of data from the photo. An IBM 7090 computer and CalComp 563 plotter were used.



MONROE IN THE NET

— Haruki Tsuchiya

A pattern deformation system was applied to a photograph of James Monroe. The canvas was first set as a net ready for deformation. The data from the photo actuated each element of the net by random number. An IBM 7090 computer and CalComp 563 plotter were used.

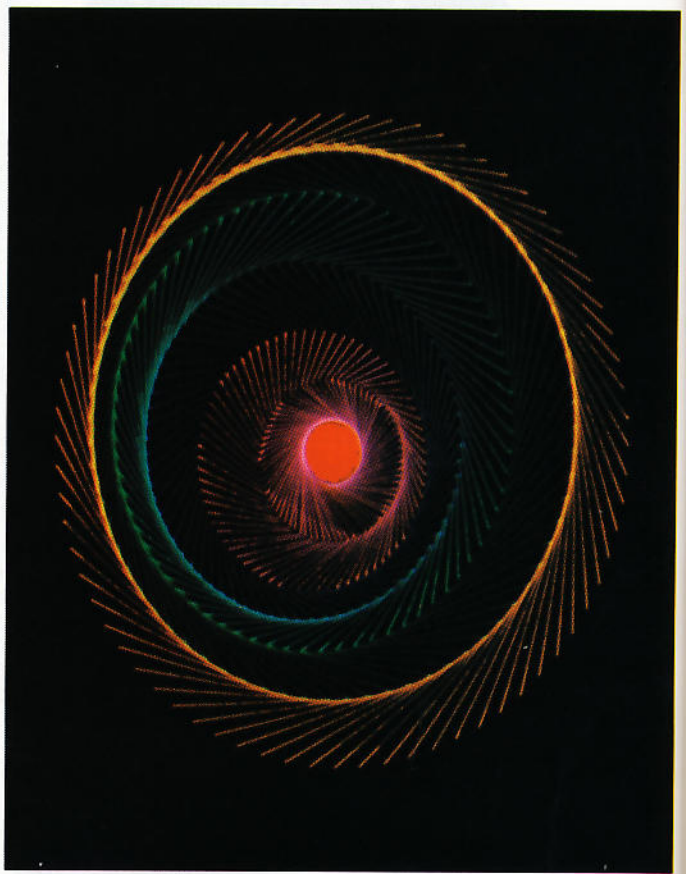
RETURN TO SQUARE
— Designed by Masao Komura
Programmed by Kunio Yamanaka

This is a computer metamorphosis. A square is metamorphosed into a profile of a woman, and then returned to a square again. The profile is input data. The process of metamorphosis is visualized as a movement; and metamorphosis itself is presented as an object. An IBM 7090 computer and CalComp 563 plotter were used.

ABRAHAM LINCOLN
— Michael H. Craven

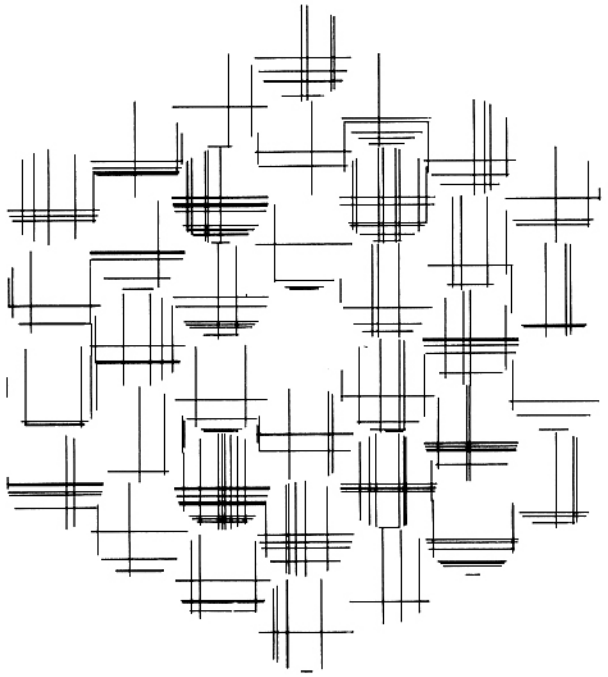
This picture was first digitized by hand, then programmed in 1200 APT statements. One subroutine calculated the tool motion to black in any rectangle when the four sides were defined. A second subroutine assisted in calculating the tool motion for the shadowing made up of .005" lines .02" apart. The picture was drawn directly onto mylar film using a beam of light of varying size.

CHRISTMAS WREATH — COMPUTER STYLE
— Maughan S. Mason



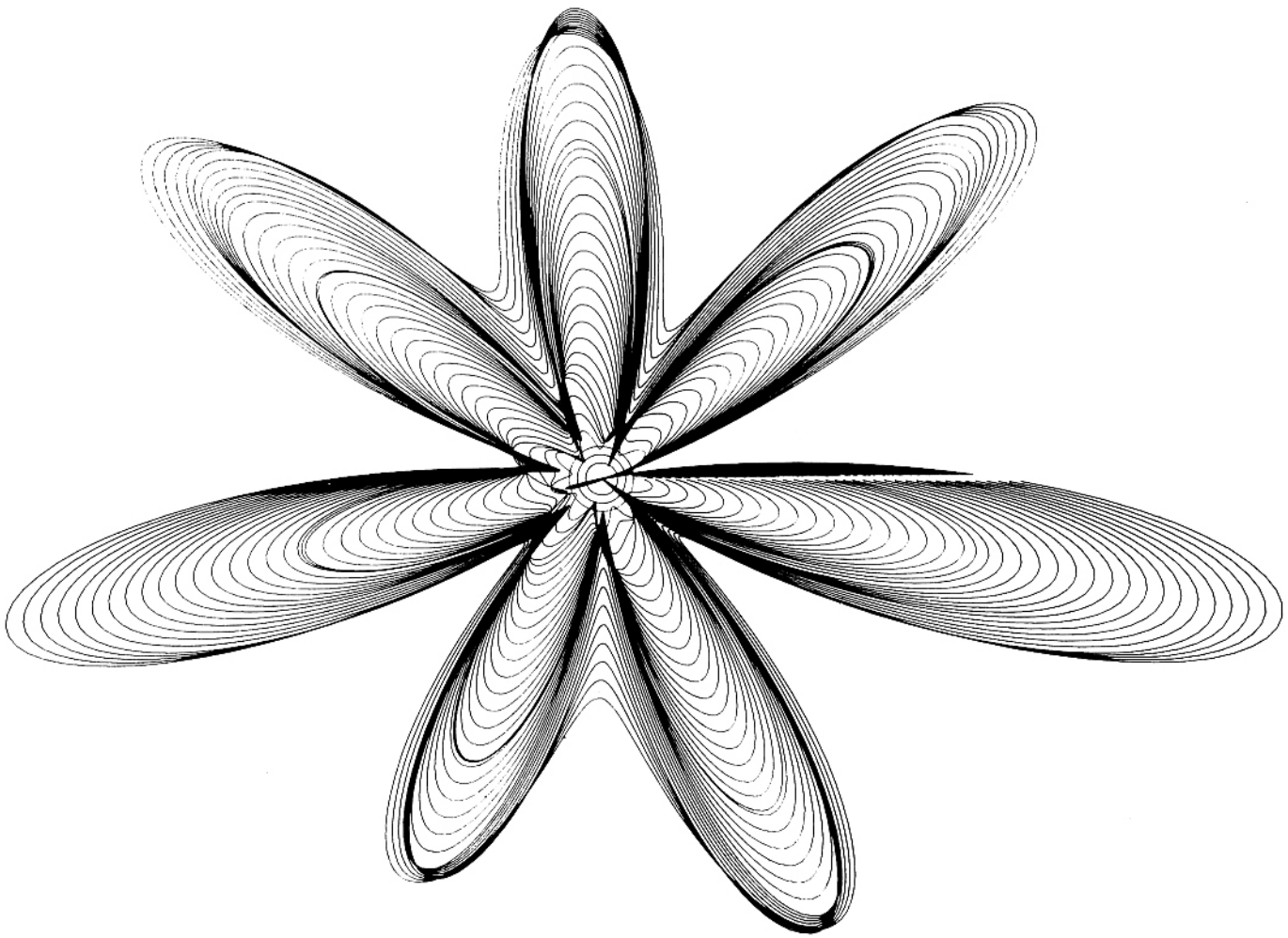
WHIRLPOOL
— (Mrs.) Leigh Hendricks

This design resulted from a programming bug in a polar equation using a Fortran program. Initially the coordinates were exposed on black and white film from a CRT (S-C 4020). For the picture shown here, a 35 mm slide was exposed directly on color film on an S-C 4020 which has been modified for color work.



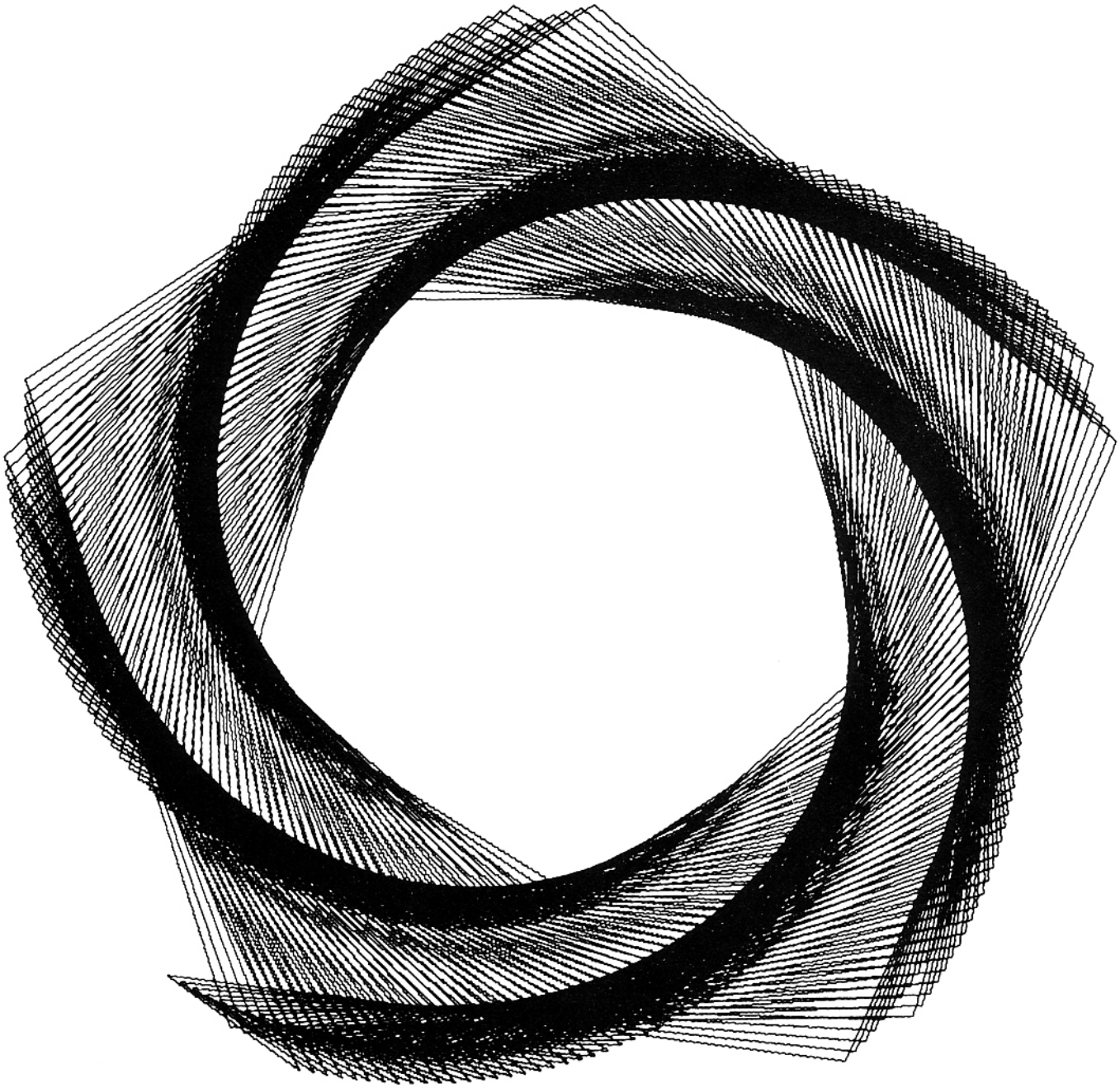
PEEK-A-BOO CIRCLES
— Petar Milojevic

A drawing with random elements exhibiting visual illusions. It was programmed in Fortran and plotted off line on a CalComp 565 digital plotter.



TRAGEDY OF SEVEN
— Haruki Tsuchiya

This is a mathematical pattern including computer improvisation by random number. The computer program indicates only the rough process of the painting; in this case, to plot 50 closed curves which grow mainly in seven directions. Under this condition, the computer calls a random number and increases or decreases the radius of the closed curves by the value of the random number repeatedly. An IBM 7090 computer and CalComp 563 plotter were used.

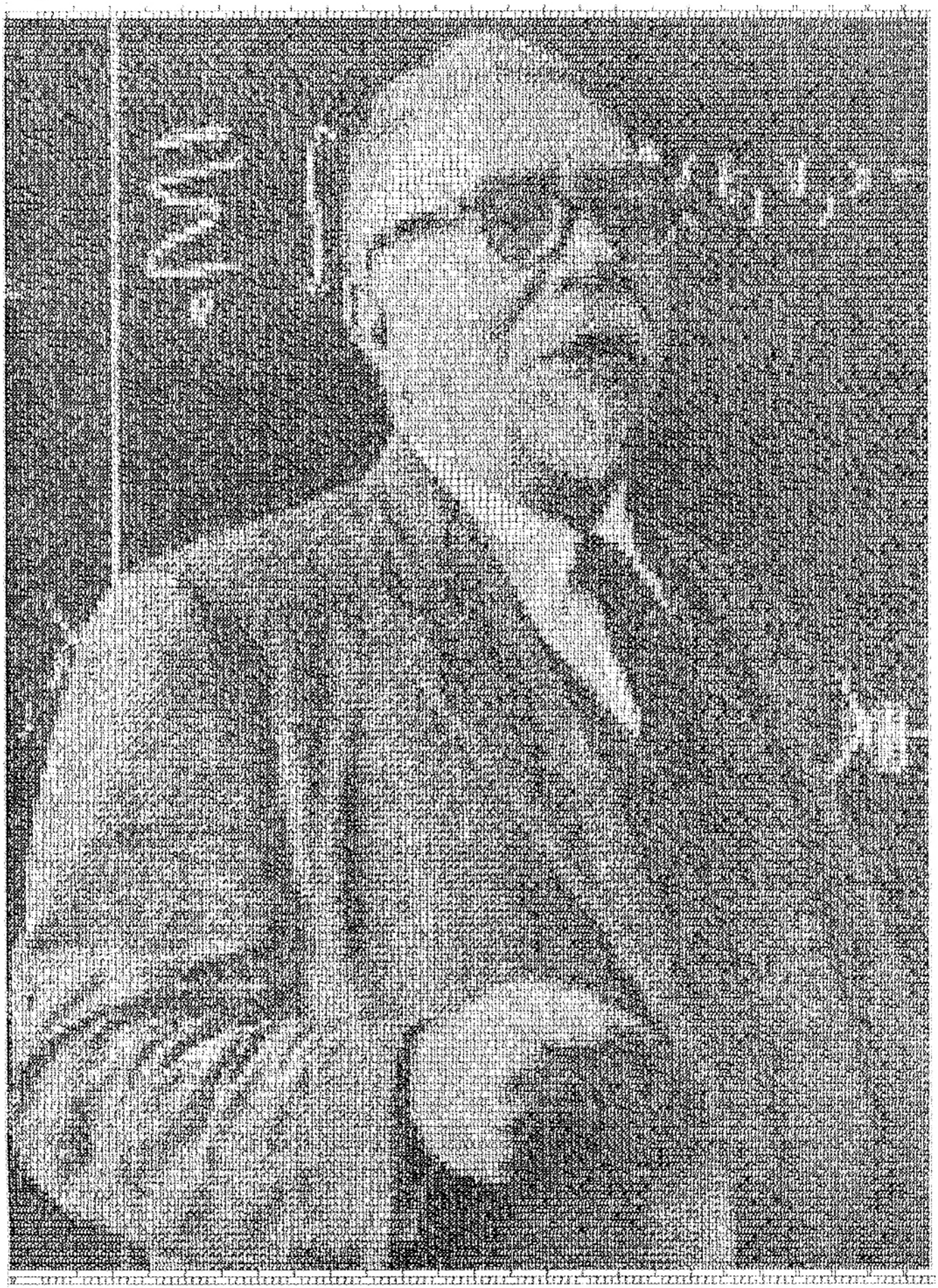


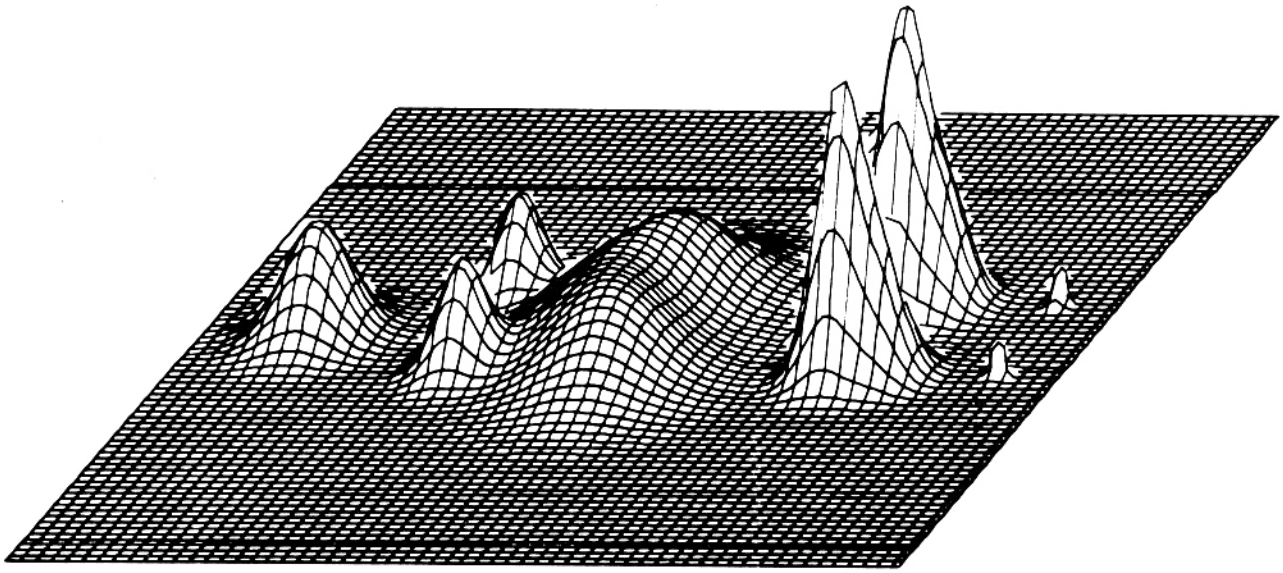
RING MOTIF
— Petar Milojevic

This drawing is done without lifting the pen from the first to the last point. It was programmed in Fortran and plotted off line on a CalComp 565 digital plotter.

CYBERNUMERICS
— H. Philip Peterson

Preprocessing for this digigram of Prof. Norbert Wiener involves correcting the Gamma curve of the film to the "Gamma" of the shaded number set for plotting. A histogram of the scanned numbers (NS) is computed and the low (L) and high (H) ends of the distribution are detected. The number plotted (NP) is calculated in one version as follows: NP(I, J)=(NS(I, J)*(99/H-L). The computer can easily simulate unnatural Gamma curves that no photographer's chemicals can implement.

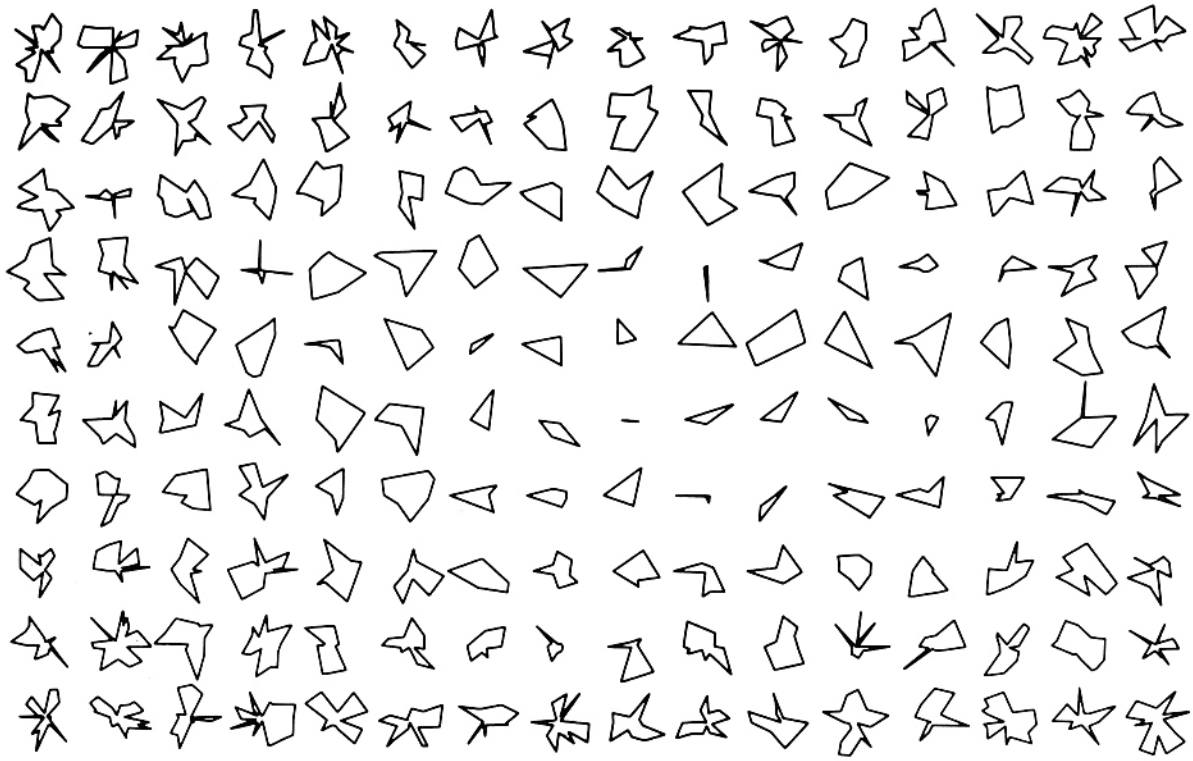




THE SUN BATHER

— Paul H. Sobel

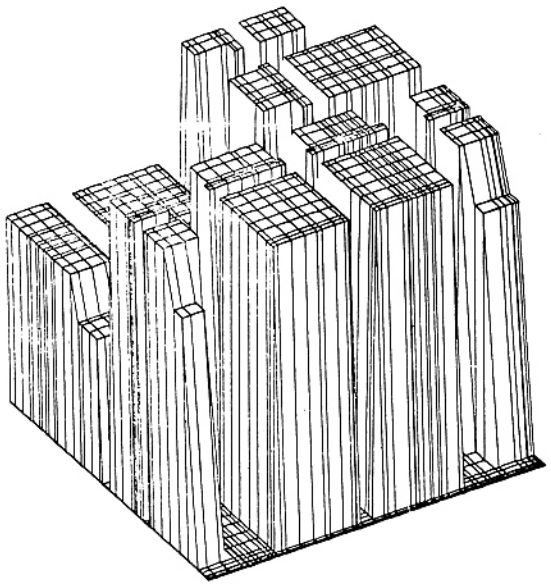
Using a Fortran program on an IBM 7094, a tape was generated for off-line use on an SC 4020, which made the plot. The plotting subroutine interpreted a matrix as the dependent height variable. An angle of 40 degrees was specified, and hidden lines were tested for and removed. The figure is generated by sums of Gaussian functions.



MARCH OF POLYGONS

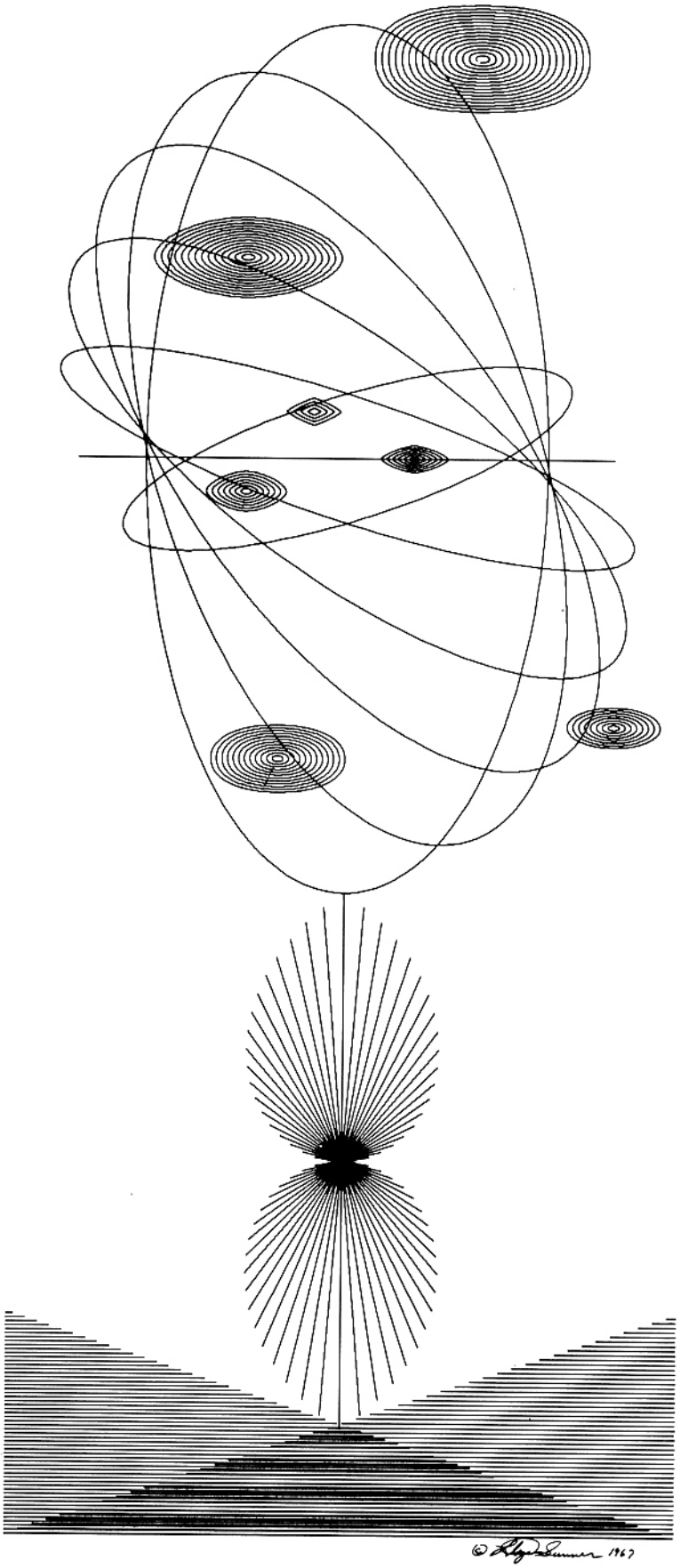
— Haruki Tsuchiya

This is a mathematical pattern which includes computer improvisation by random numbers. Each polygon is determined according to: (1) number of vertexes from the position; and (2) distribution of vertexes from the random number. An IBM 7090 computer and CalComp 563 plotter were used.



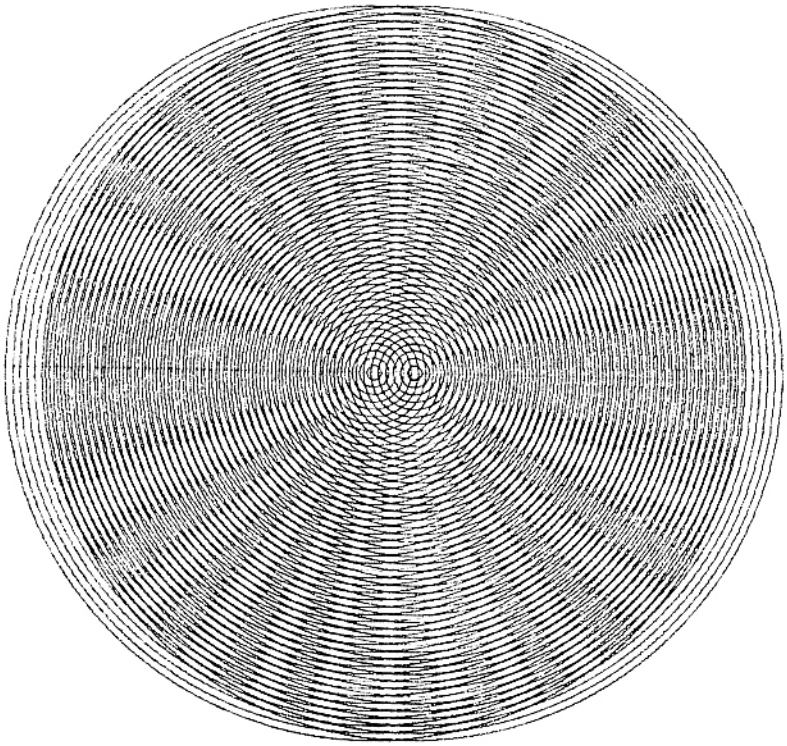
SLICED NUCLEAR REACTOR
— D. J. DiLeonardo

A perspective of the fuel material distribution in a slice through a nuclear reactor. Drawn on a CDC Model 280 Microfilm Recorder using contour and perspective routines run on a CDC-6600 computer.



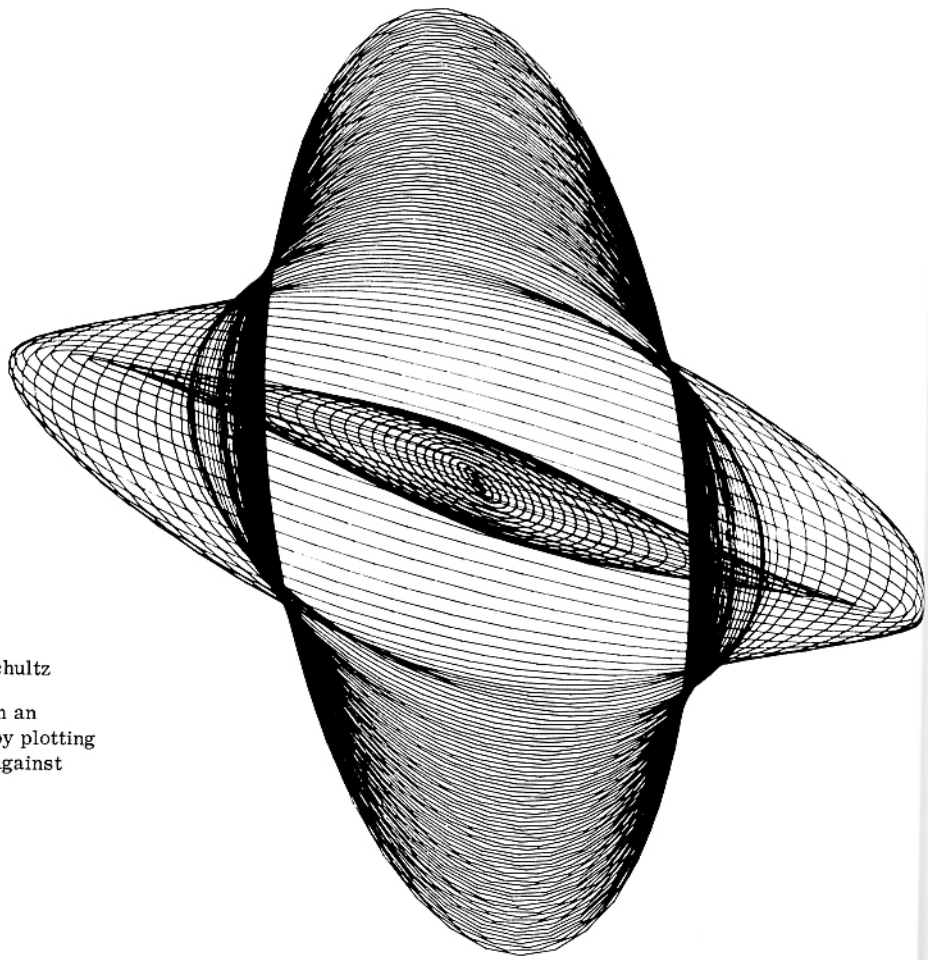
THE ORBIT TREE
— Lloyd Sumner

Produced with the help of a Burroughs B5500 computer and a CalComp 565 plotter.



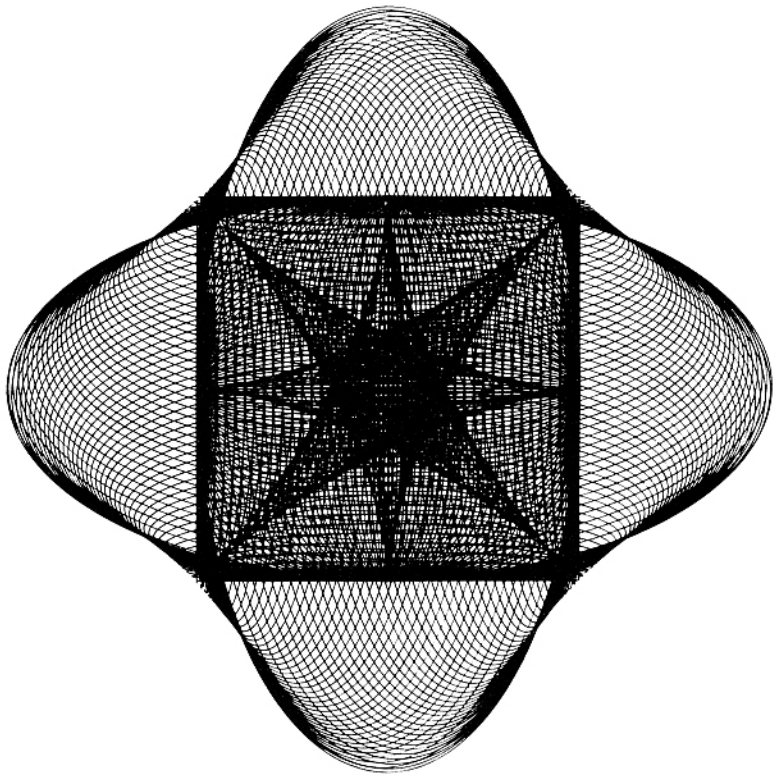
CONCENTRIC CIRCLES
— Lawrence Nolan

This plot shows two families of concentric circles, producing a moire' or nodal pattern, such as would be caused by two point wave sources in a ripple tank. The plot was produced by a Fortran IV program using an IBM 360/50 computer and a CalComp 750 off-line magnetic tape unit with a CalComp 566 plotter.



OUTPUT VS. INPUT
— Bob Schultz

This design was generated on an IBM 360/50 and an SC 4020 by plotting the output of a digital filter against its input.

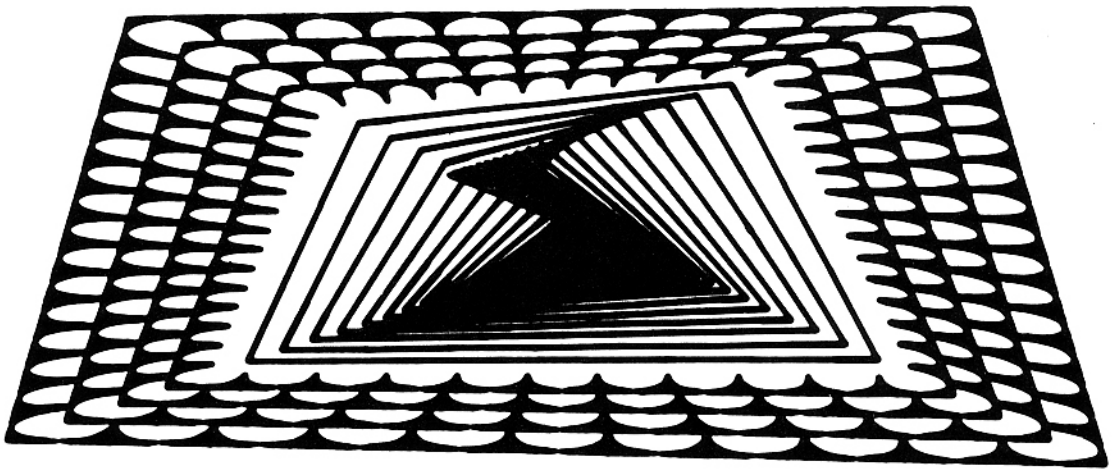


LINDY STAR
— L. David Anderson

A composite of one basic design which is repeated in various positions and shapes to produce the final drawing. Computer used was a GE 425, with a CalComp 770/702 incremental plotter with a step size of 0.002 inches.

DEFORMATION OF SHARAKU
— Idea by Haruki Tsuchiya, Program by Koji Fujino,
Data by Kamoto Ohtake

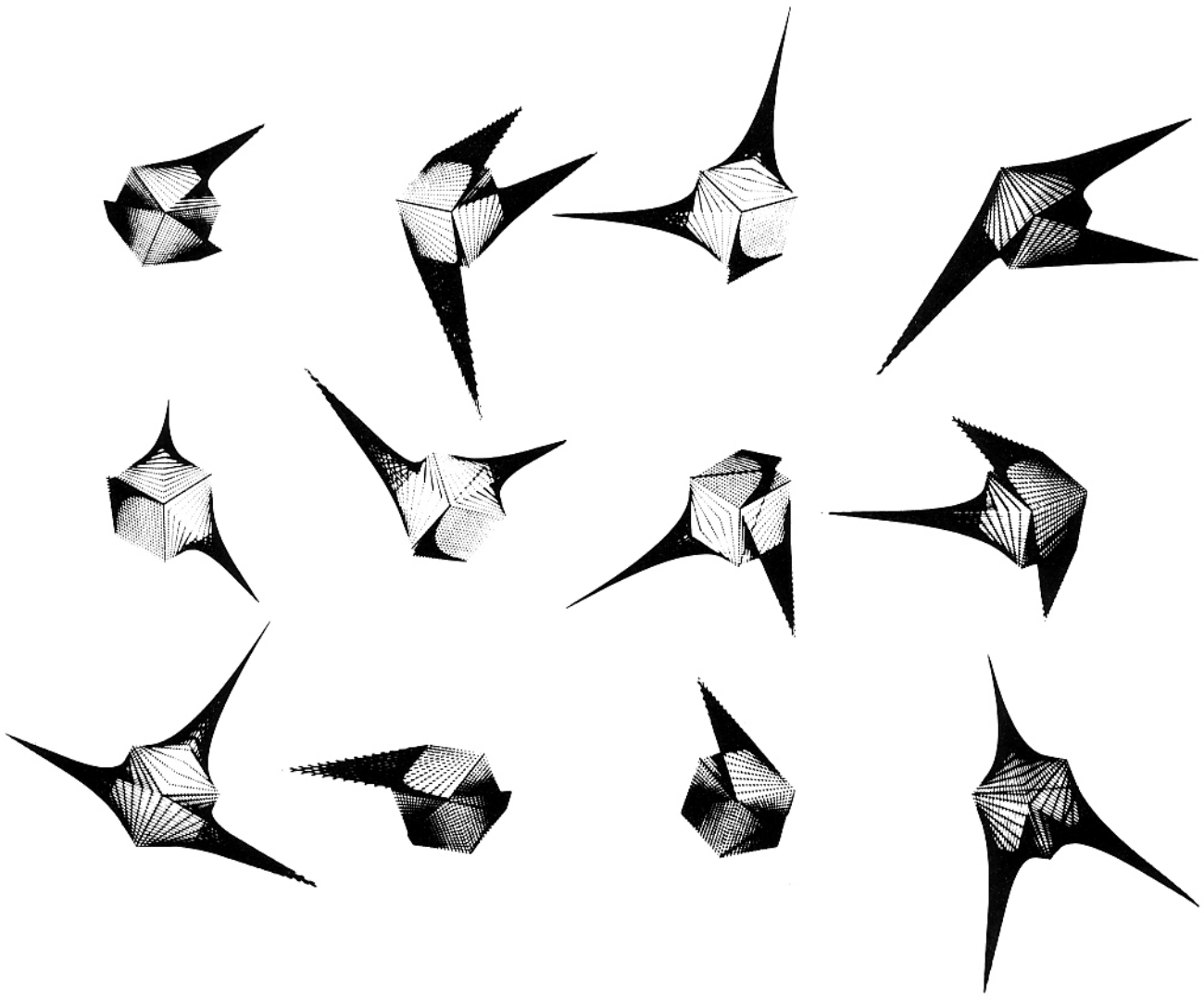
A pattern deformation system was applied to a Ukiyoe of Sharaku. Five kinds of purely mathematical exchanges of coordinates are shown.



OP ART COMPUTERIZED

— Donald Robbins

Here an op art picture by Jeffry Steele (which appeared in Time magazine in 1961) was turned into a subroutine in an investigation of some perspective properties, without actually going through the perspective transformation. Arguments to the subroutine consisted of the length and height, the number of spikes per side, the number of bands, the interior rotation, etc.



UPHEAVAL COLLECTION

— Idea by Masao Komura, Program by Kunio Yamanaka

This is a mathematical pattern including computer improvisation by random numbers. Four rhombics upheaved into random directio at random distances are gathered to represent a cube. An IBM 7090 computer and CalComp 563 plotter were used.

COMPUTER ARTISTS IN THIS ISSUE

The following is a list of persons whose art is published in this issue as part of the Sixth Annual Computer Art Contest of Computers and Automation.

Anderson, L. David, California Computer Products, Inc., 305 N. Muller St., Anaheim, Calif. 92803
Craigmile, Gary, California Computer Products, Inc., 305 N. Muller St., Anaheim, Calif. 92803
Craven, Michael H., 718 N. State, Apt. #4, Kent, Wash. 98031
DiLeonardo, D. J., Westinghouse Electric Corp., Bettis Atomic Power Laboratory, Box 79, West Mifflin, Pa. 15122
France, Alan M., International Computers and Tabulators, Ltd., Bridge House, Putney, London, SW 15, England
Fujino, Koji, Computer Technique Group, 7-26, 4chome, Kitasuna, Koto-ku, Tokyo, Japan
Hasegawa, Takeshi, Computer Technique Group, 7-26, 4chome, Kitasuna, Koto-ku, Tokyo, Japan
Hendricks, Mrs. Leigh, Sandia Corp., Sandia Base, Albuquerque, N. Mex. 87115
Jenkins, Larry, California Computer Products, Inc., 305 N. Muller St., Anaheim, Calif. 92803
Kakizaki, Junichiro, Computer Technique Group, 7-26, 4chome, Kitasuna, Koto-ku, Tokyo, Japan
Komura, Masao, Computer Technique Group, 7-26, 4chome, Kitasuna, Koto-ku, Tokyo, Japan
Mason, Maughan S., 18910 Cyril Place, Saratoga, Calif. 95070
Mezei, Leslie, Associate Professor, Dept. of Computer Science, University of Toronto, Toronto, Canada
Milojevic, Petar, McGill University Computing Center, Montreal, Quebec, Canada
Niwa, Fujio, Computer Technique Group, 7-26, 4chome, Kitasuna, Koto-ku, Tokyo, Japan
Nolan, Lawrence, 2620 Delmar, Granite City, Ill. 62040
Ohtake, Makoto, Computer Technique Group, 7-26, 4chome, Kitasuna, Koto-ku, Tokyo, Japan
Payne, David, Institute of Computer Science, University of Toronto, Toronto, Canada
Peterson, H. Philip, Control Data Corp., Northwest Industrial Park, Third Ave., Burlington, Mass. 01804
Robbins, Donald, Div. 9424, Sandia Corp., Sandia Base, Albuquerque, N. Mex. 87115
Schultz, Bob, Polytechnic Institute of Brooklyn, Dept. of Electrical Engineering, 333 Jay St., Brooklyn, N. Y. 11201
Sobel, Paul H., Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, Calif. 91103
Strand, Kerry, California Computer Products, Inc., 305 N. Muller St., Anaheim, Calif. 92803
Sumner, Lloyd, Computer Creations, P. O. Box 1842, Charlottesville, Va. 22903
Tsuchiya, Haruki, Computer Technique Group, 7-26, 4chome, Kitasuna, Koto-ku, Tokyo, Japan
Walker, Dr. Evan Harris, National Aeronautics and Space Administration, Electronics Research Center, 575 Technology Square, Cambridge, Mass. 02139
Yamanaka, Kunio, Computer Technique Group, 7-26, 4chome, Kitasuna, Koto-ku, Tokyo, Japan