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COMPUTER ARTS SOCIETY QUARTERLY JANUARY 1980

INTERNATIONAL SURVEY OF COMPUTER-ASSISTED ART

PART 1: [redacted]

COLETTE & CHARLES BANGERT
T. BATTEN
PETER BEYLS
DOMINIC BOREHAM
MARGARET CHISMAN
ROGER COQART
BERNARD DEMIO
CHRIS FRENCH
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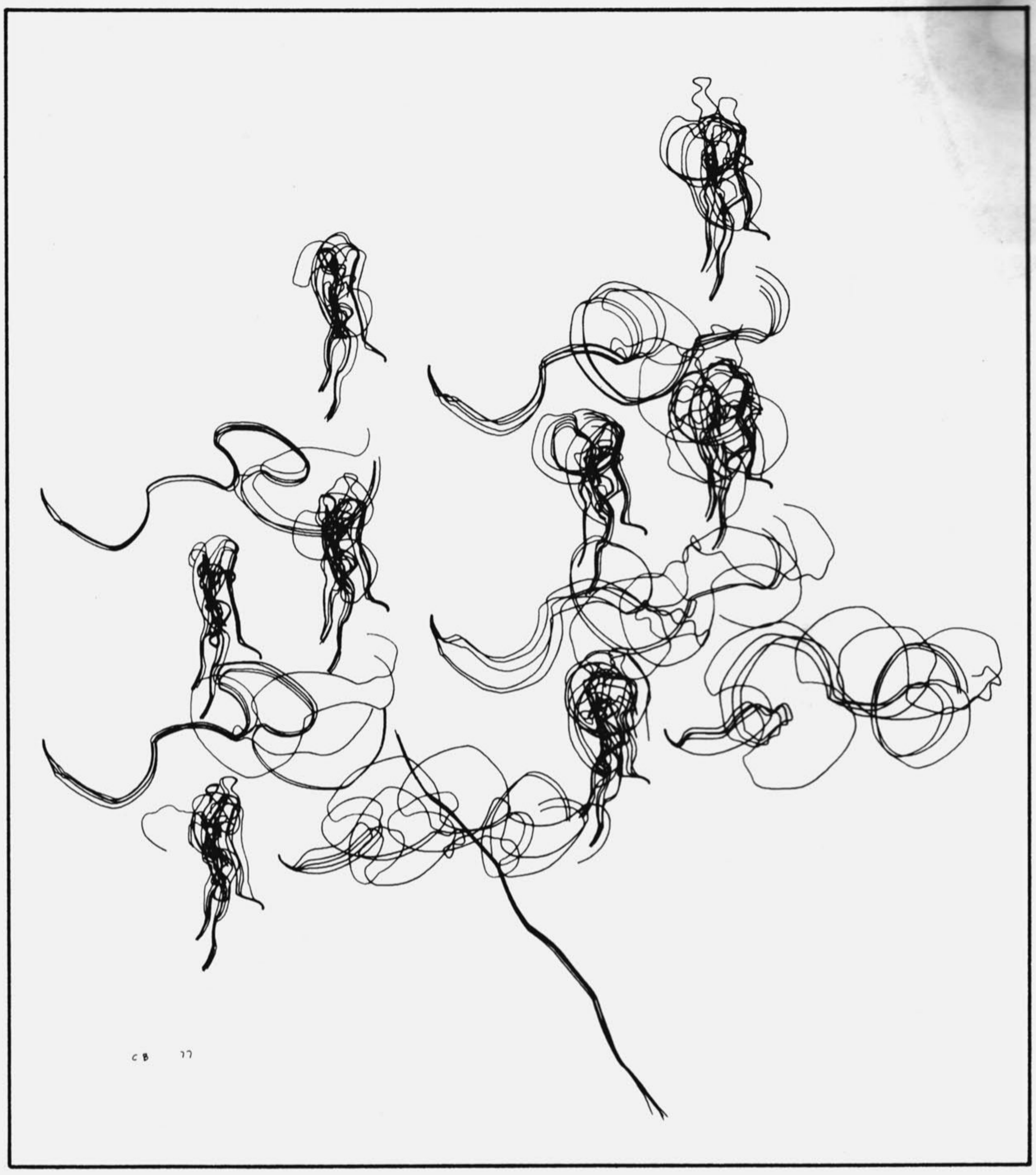
KEN KNOWLTON
AARON MARCUS
MANFRED MOHR
VERA MOLNAR
GRETA MONACH
TORSTEN RIDELL
BRIAN REFFIN SMITH
ALAN SUTCLIFFE
STAN VAN DER BEEK [redacted]

[redacted]



COLETTE AND CHARLES BANGERT

Above: "Structure Study: Blue, blue, red, brown, black", computer-plot, coloured inks on paper, 600 x 537 mm, 1977

Facing: "Structure Study: Yellow, red, brown, black", (detail) computer-plot, coloured inks on paper, 254 x 254 mm., 1977

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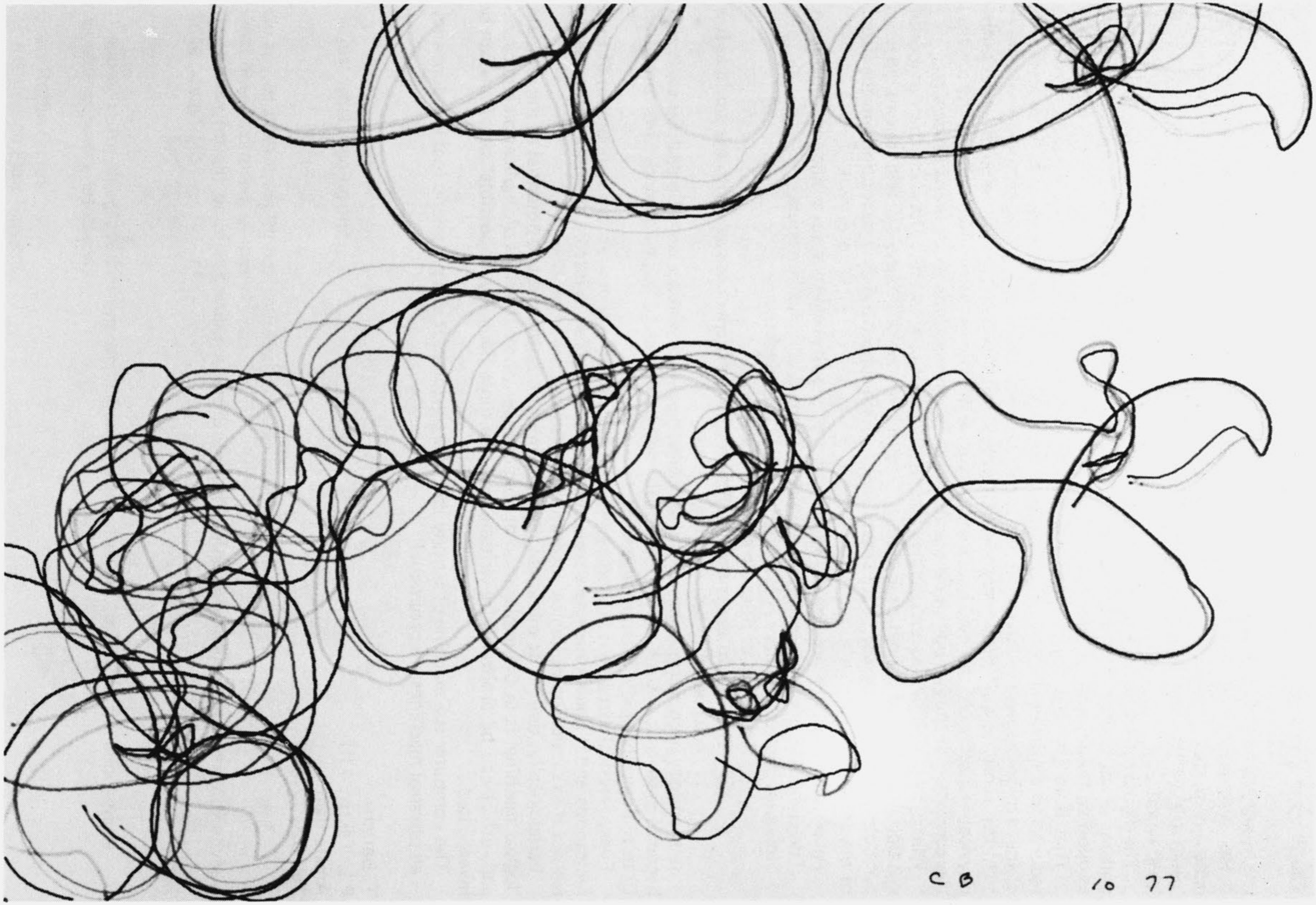
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T BATTEN

The Illogical Computer

A physical system is limited by physical laws.

However, an abstract (conceptual) system is freed of this restriction: Laws can be arbitrarily constructed, for example in a calculus, and the outcome of these laws (in the form of a 'geometry' defined by the axioms) may or may not have counterparts in the physical or mental 'real' world.

The digital computer, because of its basic physical simplicity (i.e. simplicity of the basic components – not in their inter-connections and organisation) makes it ideal for 'symbol' processing as opposed to 'physical' processing.

That is to say that the physical structure of the symbol (in this case the machine state) is reduced to a minimum of complexity (i.e. a binary string) – while the assigned 'interpretation' of that symbol appears to have no limits to its complexity.

In this sense, as a physical manifestation of a conceptual system, the computer becomes the physical realisation of the classical Greek dream, where the maximum simplicity of the physical representation of the symbol imposes a minimum of physical limitations on its processing.

Where these limitations occur, they are mostly confined to limitations on the number of symbols that can be stored/processed, the speed of access/processing, and the number of symbols that can be processed at the same time – there appear to be no restrictions on the 'logic' of the processing.

All physical machines are limited by the 'logic' of the physical laws governing their operation.

The computer, is therefore, like all physical machines, a 'logical' machine.

However, 'logical' can have at least two levels of interpretation;

(i) That a set of rules are consistently applied.

(ii) That the rules (or the outcome of the rules) are consistent with the world as it is considered to be.

It therefore becomes possible to speak of 'Logical Application' and 'Logical Rules'. It also becomes clear that a machine (or individual) may be operating 'logically' under interpretation (i) but 'illogically' under interpretation (ii).

Every physical machine is limited by physical laws, but the computer has a minumum of these limitations and it is an unnecessary restriction of the computer in its role of symbol processer to restrict it to simulation of 'logical' operations under interpretation (ii).

Paradoxically, due to its minimum physical limitations, the greatest potential of the ultimate 'logical machine' is in the exploration of illogicality – where the rules of implication and cause-and-effect can be arbitrarily re-written, and the most 'logically impossible' situations can be investigated.

The computer is a machine of fantasy and of art – to use it as a pragmatic tool is redundancy – all physical machines are pragmatic!

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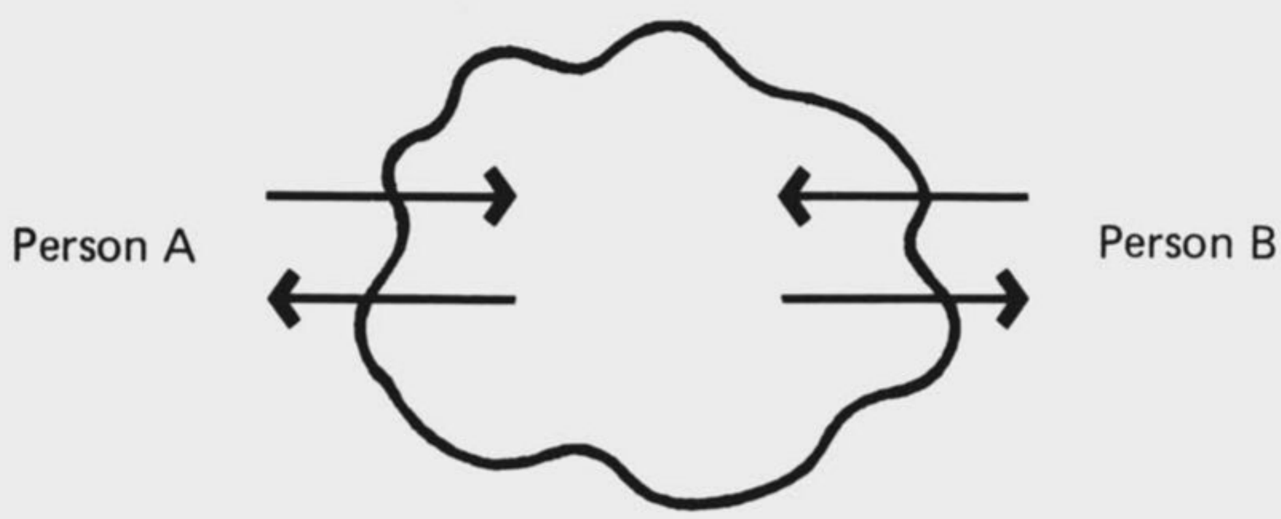
BRIAN REFFIN SMITH

SOMETHING SIMPLE

Many/most of the information processing activities we undertake (or might undertake in the future) raise (or "art?" can be made capable of raising) some fundamental questions such as:

1. What are we actually doing?
2. In what context?
3. To what end? (That is to say, why?)

A model of what is going on might look like this:



A and B give to and receive from some 'thing' that can be characterised for example as:

The sum of all knowledge
The state of the world
A description of . . . . ?
God
Experience
Time
Economy
Well-being
etc., etc.

So just what is going on?

Do any or all of these 'things' actually 'increase' in any way?
What does that mean, or imply?
Or is most (or all) of what persons A and B do just useless re-arrangement to keep the whole thing going?

(I apologise for the gross over-importance apparently attached to 'art' in the above piece – it sometimes seems necessary.)

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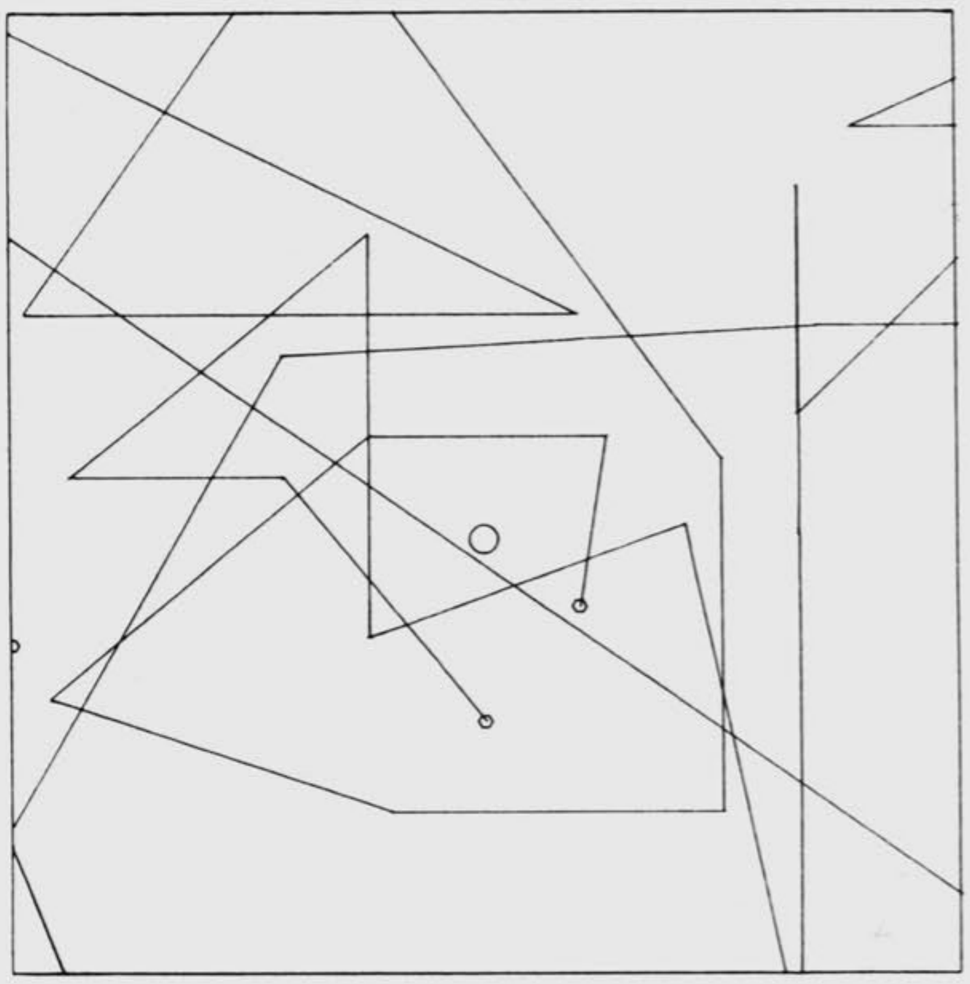
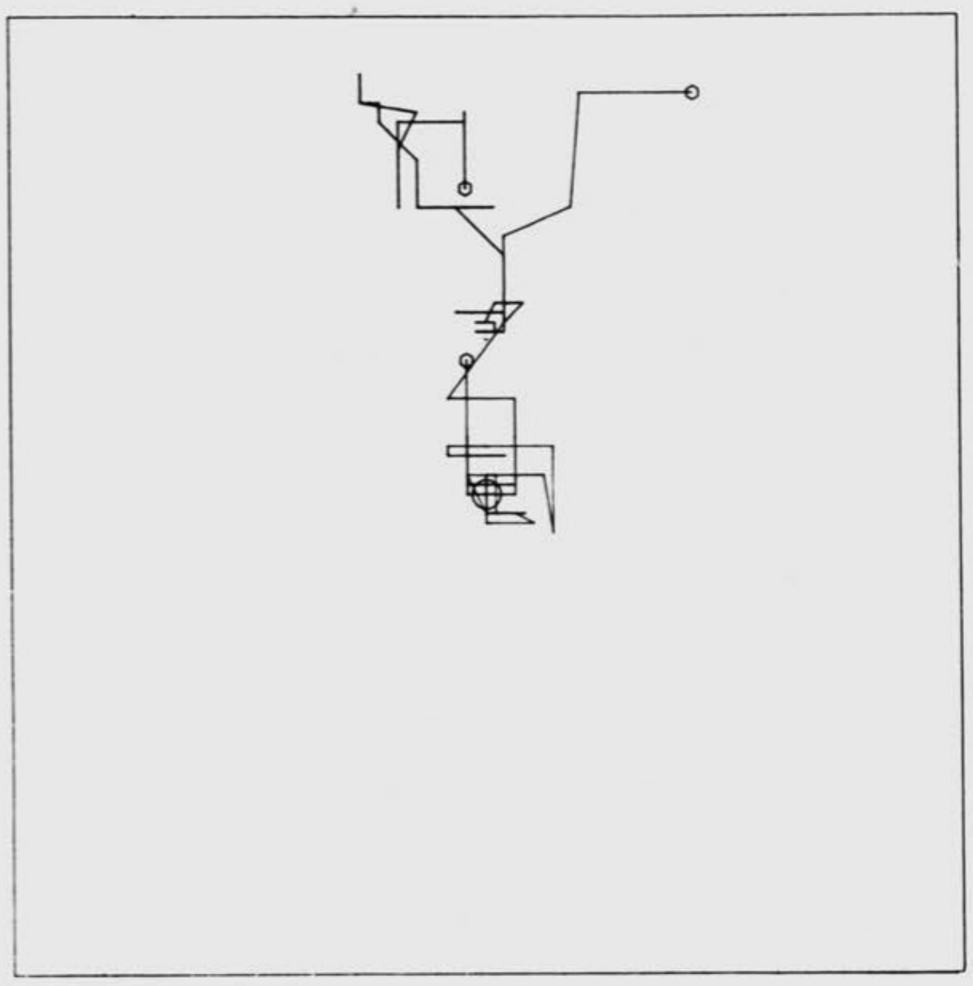
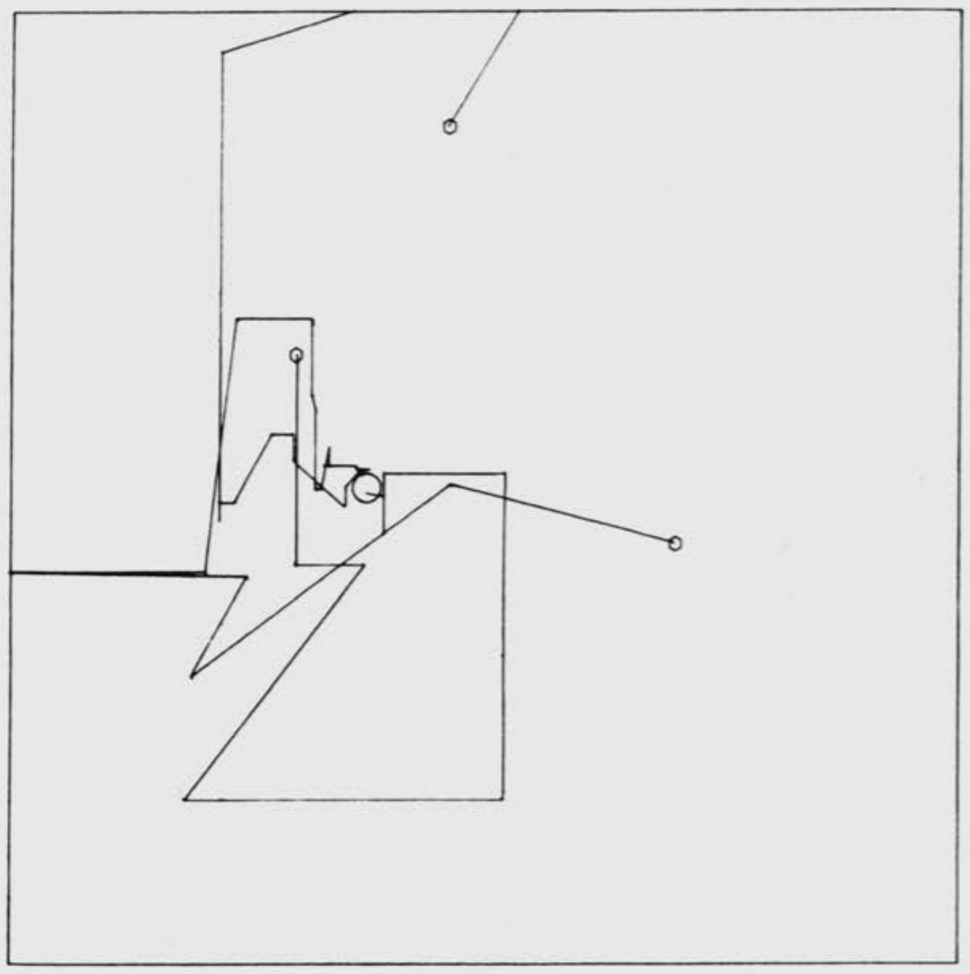
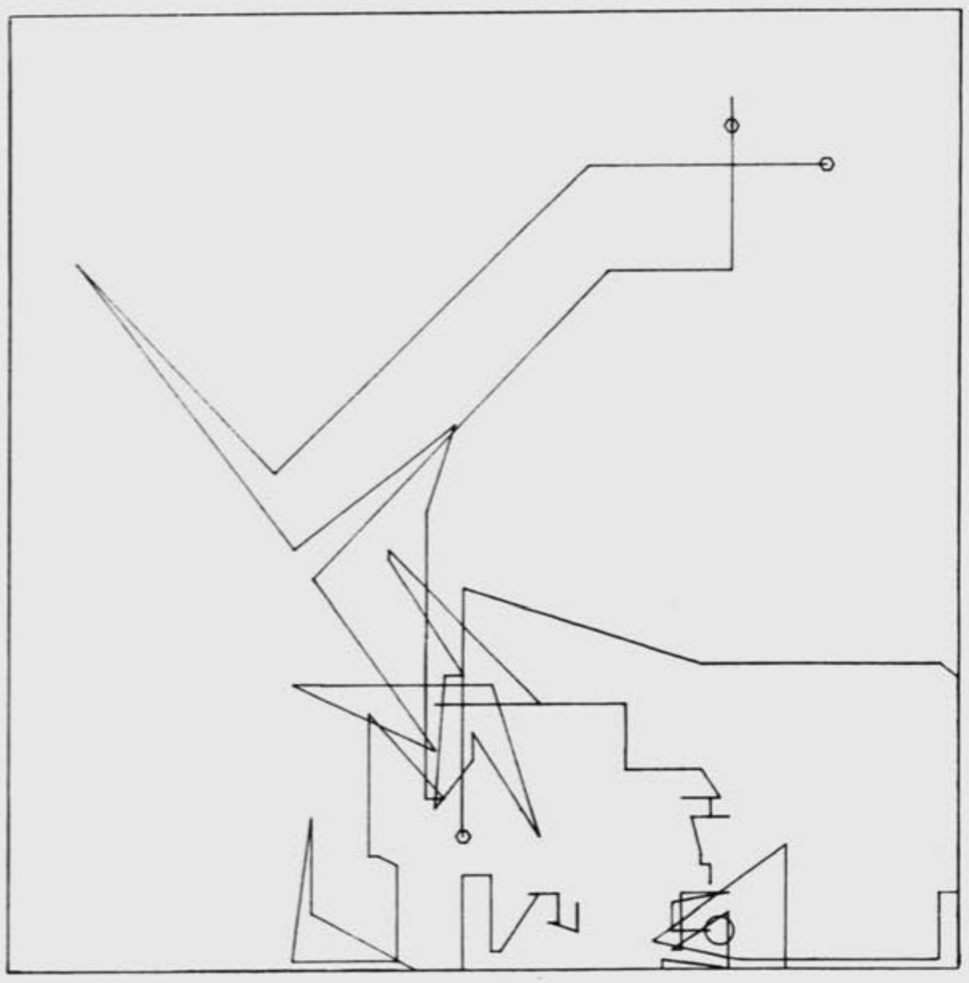








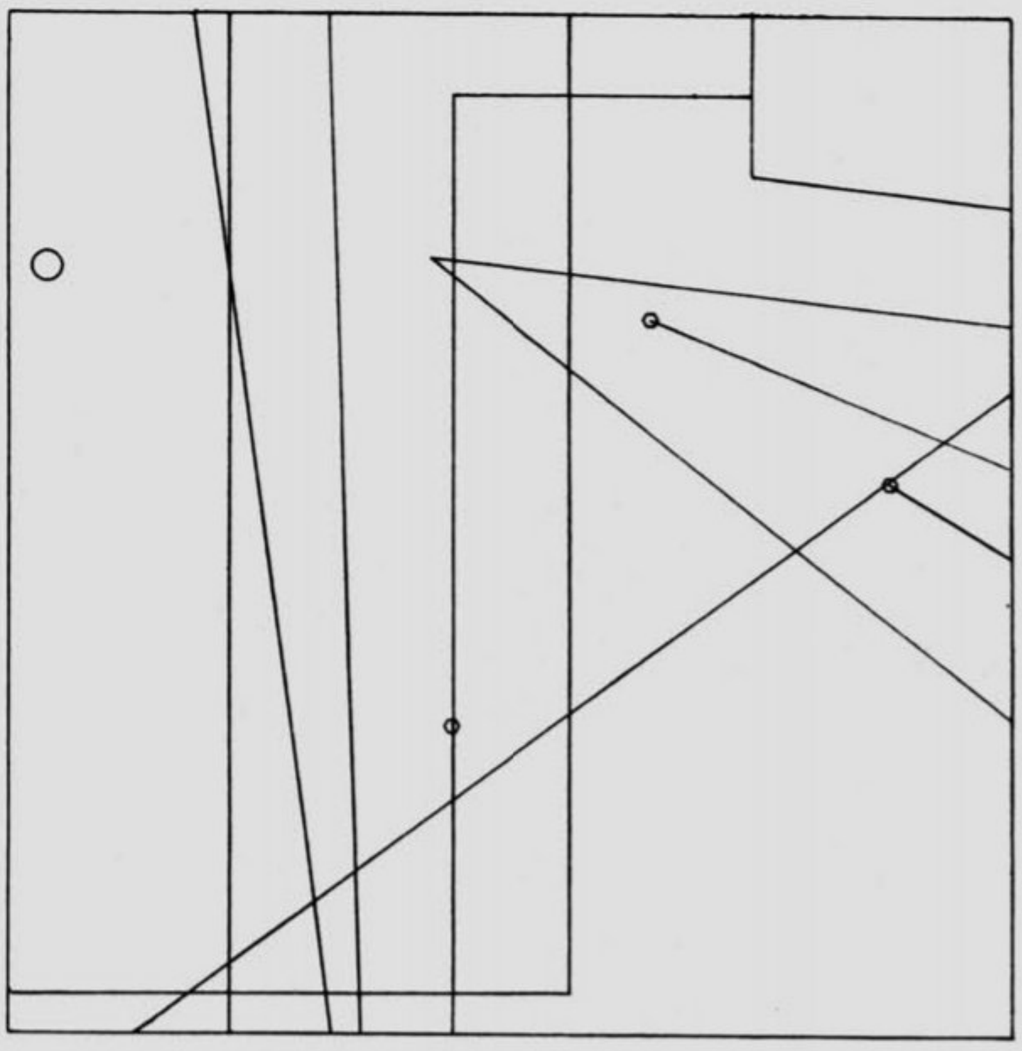
PETER BEYLS

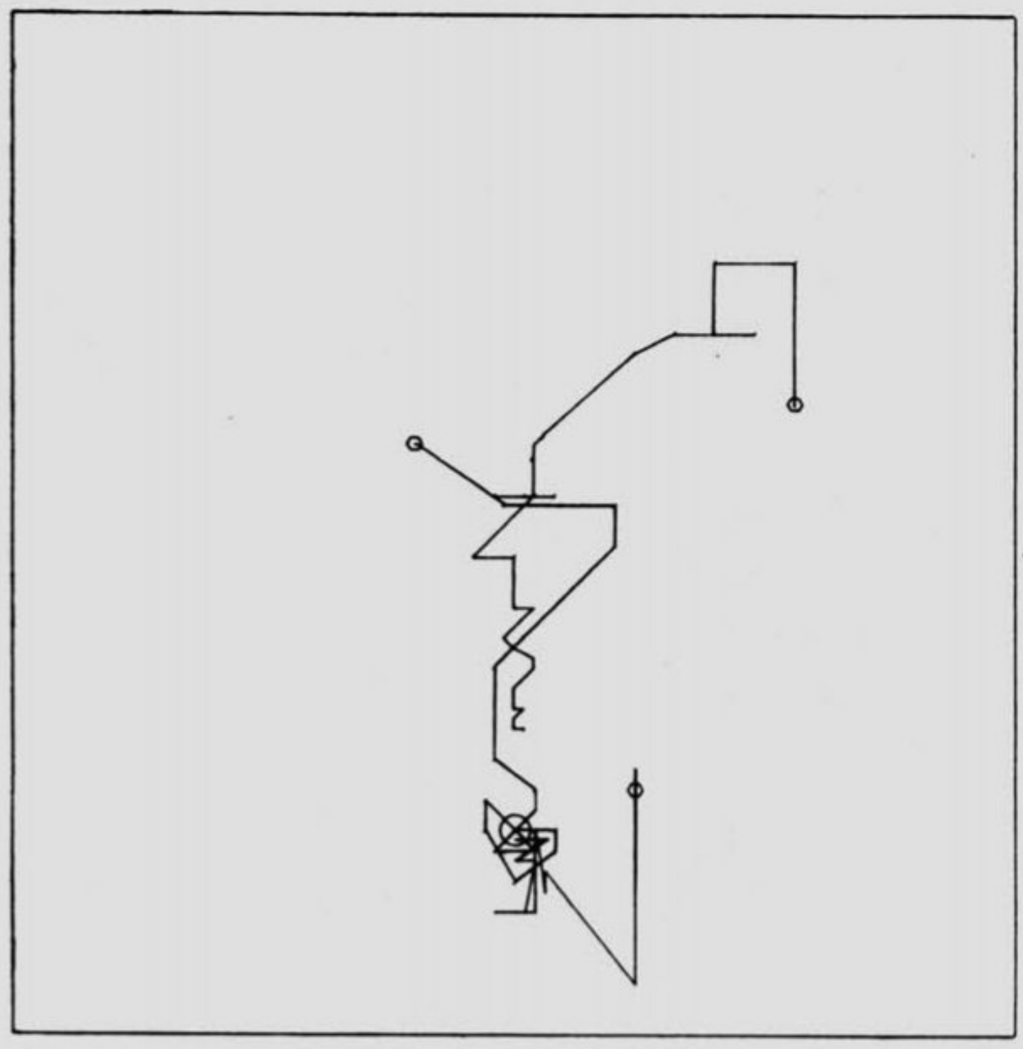
The accompanying set of drawings illustrate different kinds of behaviour within a simple task environment. The situation consists of solving a search problem in two dimensional space. The computer randomly generates n points, represented by polygons. The user inputs the coordinates of a (nth.+1) point, represented by a circle. The objective of the first set of points is to localize the second and trace the various search paths accordingly. A varying degree of "co-operation" among the n points is needed to solve the problem successfully. The program traces an activity, step by step, through successive interpretation of intermediate results.

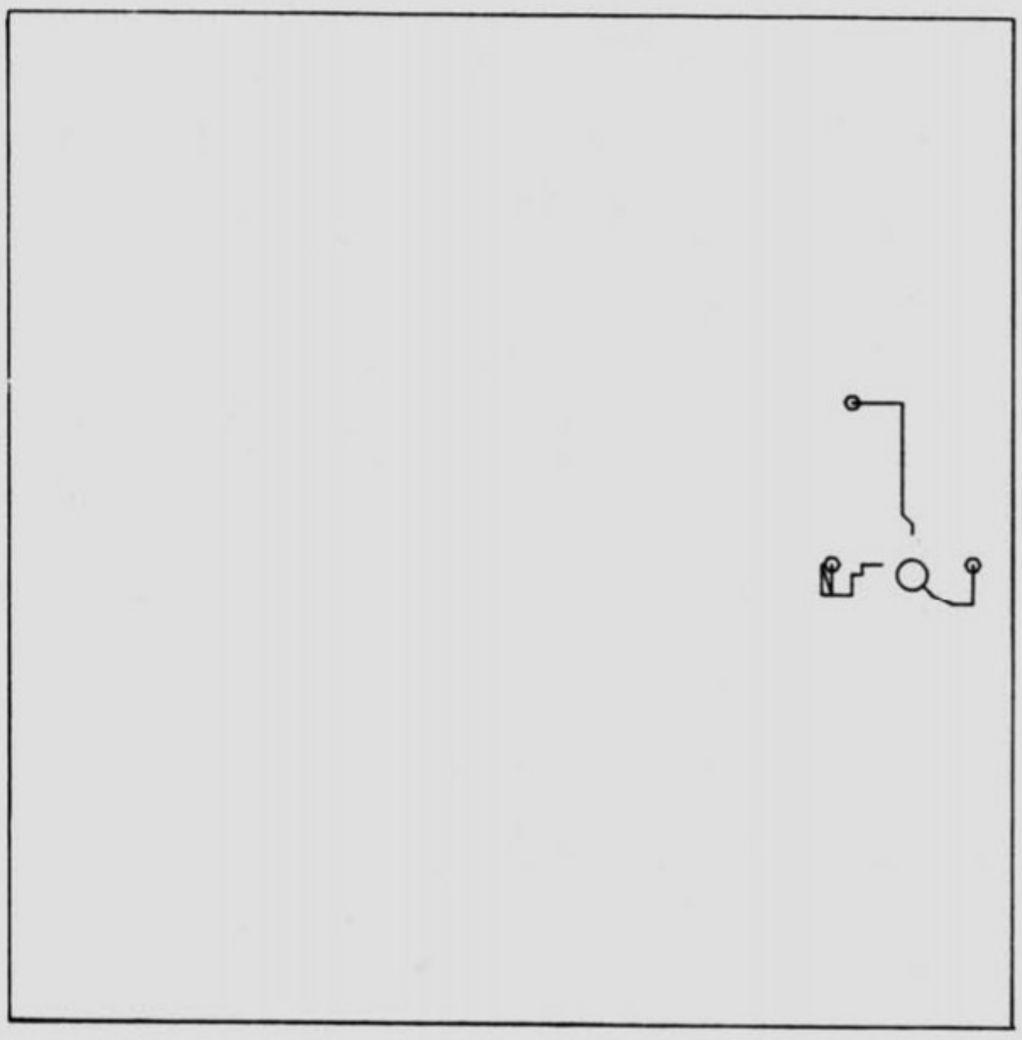
In later versions, this program generates extra points or eliminates others when two or more search paths interfere with each other.

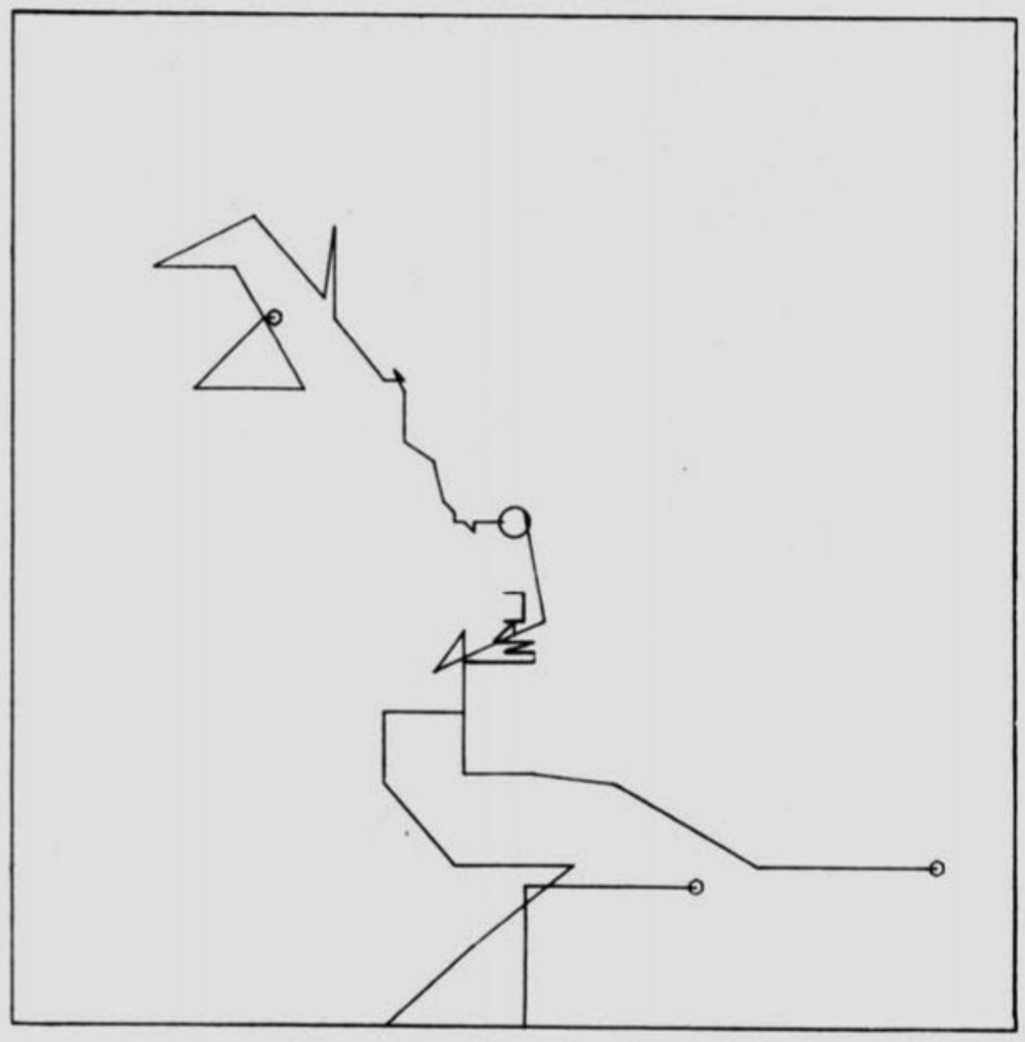
The central idea of "activity" is twofold. Firstly, the development of the program itself involves the reaction of a mathematical model towards the environment in which it has to operate.

Secondly, the actual man-machine conversation, the continuous interaction between artist









and computer, places the user in direct confrontation with the formulation and formalization of his own creative thinking. The meaning and significance of the computer as a medium is brought out through this important feature.

Furthermore, this formulation of an explorational attitude is a natural ingredient of any open, experimental situation. It should be pointed out however, that this experimental attitude is in no way restricted to an artistic context exclusively. It is a non-isolated element within a wider socio-cultural action field; a primary exponent when dealing with the events of daily life.

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Gent, 19 Sept 1979

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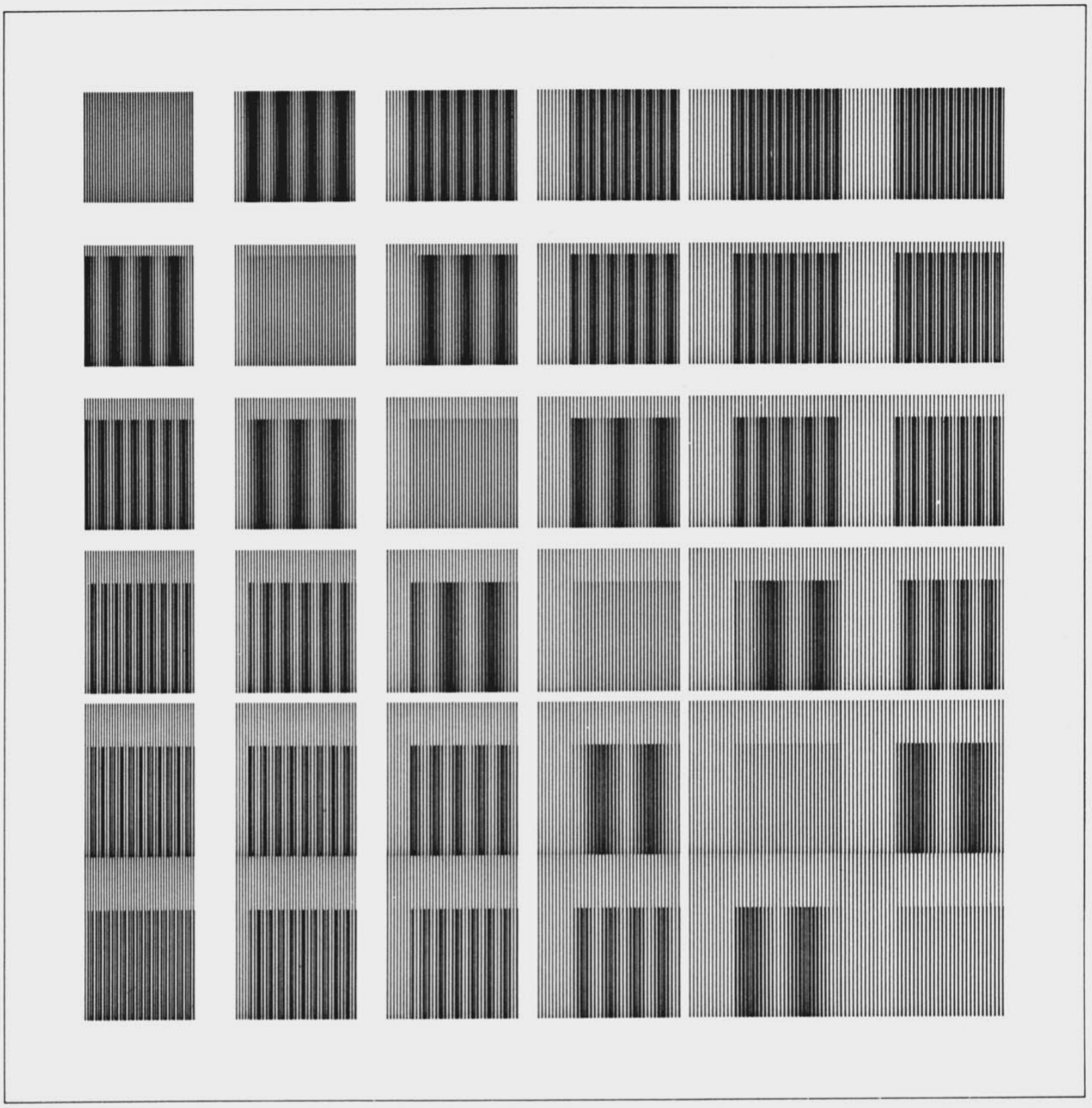
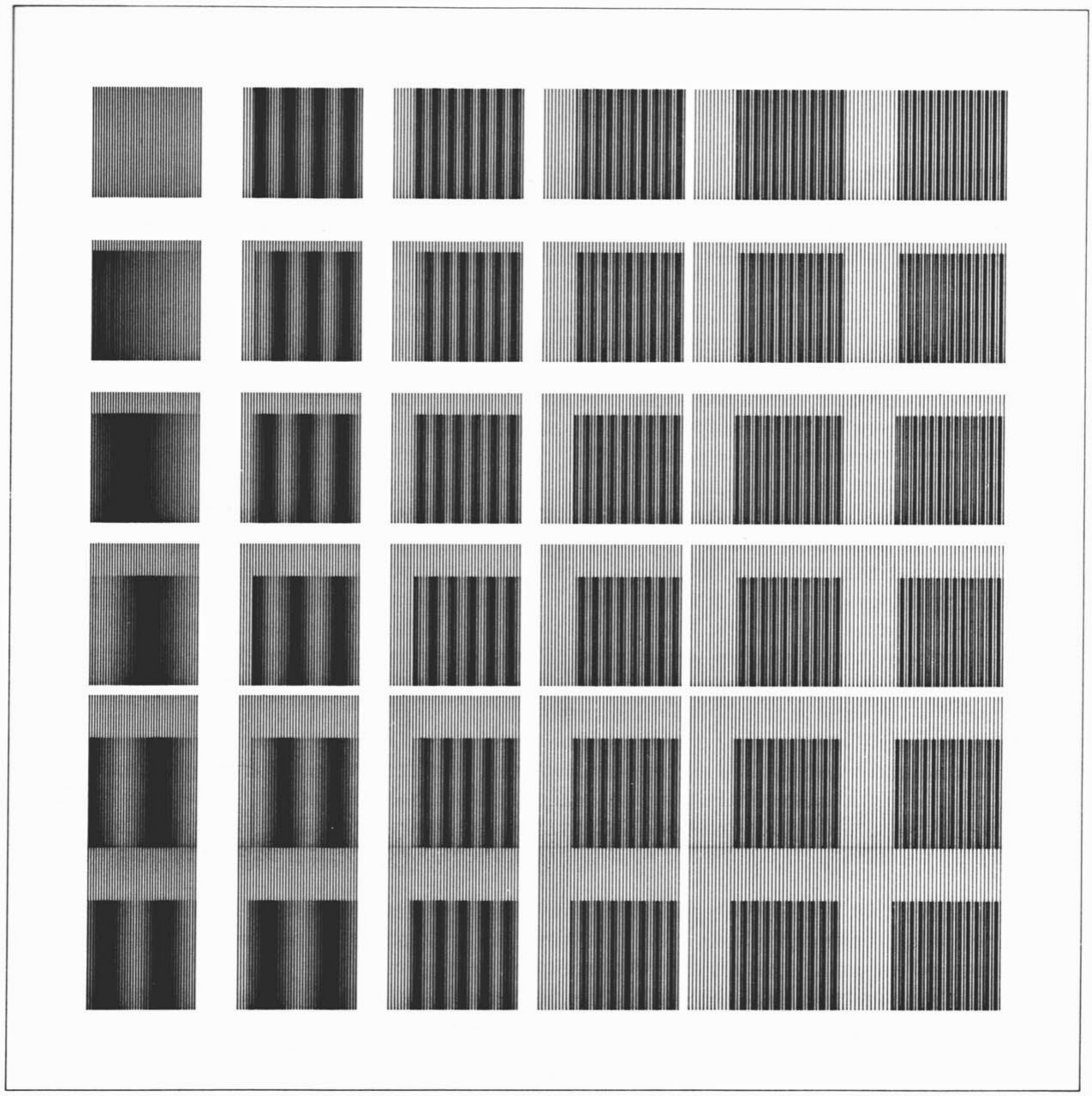


IM21 Computer-assisted drawing 1978 391 mm x 391 mm

DOMINIC BOREHAM

The two drawings shown here are from the INTERFERENCE MATRIX (IM) series, which is concerned with the combination of two separate sets of information. The drawings are composed of two superimposed matrices, the first of which consists of 36 "squares" of parallel lines. The interval between the lines is incremented by O.1 mm in each successive row, and the number of lines in each figure is proportionately decreased to retain the square format. The second matrix is similar to the first, except that intervals increase by O.1mm in each successive column. In addition, the number of lines remains constant, which results in the figure "spreading" in the horizontal plane. This is balanced in the vertical plane by a proportionate increase in the height of the figures in each successive row. When two superimposed figures have the same incrementation value, there are no interference patterns, since the two sets of lines are "in phase", even though the number of lines may differ in the two figures.



IM36 Computer-assisted drawing 1978 391 mm x 391 mm

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MARGARET CHISMAN

The Dreaming Forest

We can never experience reality — the total cosmic soup of the universe — at first hand. We abstract from it what our senses can deal with, and perceive it at one degree removed. The artistic mode is yet a further level of abstraction. It represents the experience or vision of the artist in symbolic form. "Symbolic thinking . . . is constantial with human existence; it comes before language and discursive reason. The symbol reveals certain aspects of reality—the deepest aspects — which defy any other means of knowledge". (Images and Symbols, Mircea Eliade).

Most arts need tools, or are enhanced by other arts which need tools. A tool we can define as an inanimate extension of a bodily function, and all tools were of this nature up to the time of the computer. The abacus and the mechanical calculator, although pre-dating the computer, are confined to non-art, i.e. purely functional activities. The computer for artistic creation is in the tradition of tools, but it has a new quality; it provides us with the opportunity to extend the function of the brain as a whole.

It has been said that symbols, analogies, similes and metaphors are attempts made by the right lobe of the brain to help the left lobe. The phenomenal success of the scientific mode in our manipulation of the cosmic soup indicates that it is part of a positive feedback loop; its success developes the left lobe, which then largely overcomes the right lobe. Thus the checks and balances between the lobes become distorted. The right lobe is derogated to the periphery of life and the left lobe acts as if it were supreme.

Pre-historic man was pre-eminently a symbolic thinker. This was his way of coming to terms with a hostile and mysterious environment. However the dominance of the right lobe reached the end of its effectiveness before the Renaissance; the primacy of the left lobe is now beginning to wane. Global problems of over-population, famines, wars, terrorism, intractable unemployment are all increasing. It is time for a new development; a synthesis is needed between the two lobes.

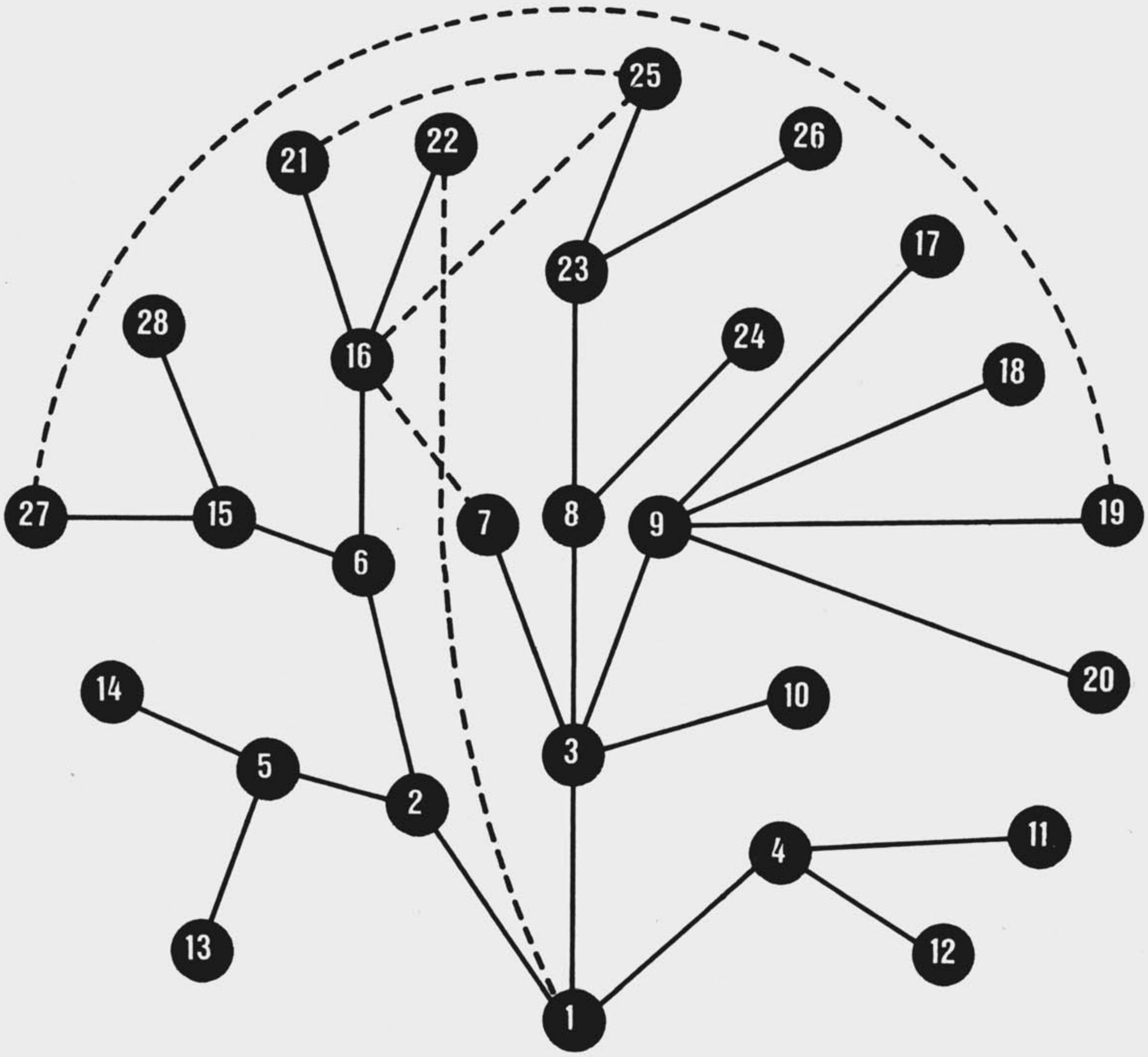
It is possible that a new synergistic leap awaits our species if we can bring the lobes together as a functioning, balanced whole. New qualities, yet undreamed of, may emerge. Computer art may be one of the paths towards this revolutionary development.

In an endeavour to extend the use of the computer for artistic purposes, I am working on an "association generator", which is called "The Dreaming Forest". During the process of dreaming, the moving spot of attention — attenuated during sleep and therefore more difficult to recall — travels down pathways in which more gates are open than when we are awake. So associations suppressed or forgotten during the day become available. Every experience we have had — and words are experience — is connected up with other experience or words in a complex network. I am exploring the possibility of producing a "train of thought" that starts with any noun selected by the user from a list provided. The path followed will depend on the next associated noun selected by means of a random number generator. The computer will be programmed not to follow the same association twice, so should it return to a noun already used it must choose from those remaining unused. When it reaches a word with no more associations available it will stop.

The associations should not be entirely idiosyncratic but have some social validity. The list provided for the programme will contain more than my own experience. It will also include such elements as homonyms and names of famous people (where these are the same as nouns), as this is the way our thought processes work. Of course, in practice, our brains react to each new stimulus with another tree-like structure and our heads contain a kind of ephemeral forest.

The list provided will seem inherently dendritic but certain cross connections (rather like hanging creepers!) are appropriate and I have included these. The process quickly becomes complex, and a manual approach using a card index laborious. When I was composing computer poetry, I could produce, unaided, lists of words from which the random number generator could select. In the production of a list for the association generator I need a computer to help me even with the selection. So this is a new use of the computer as a brain-tool for creativity.

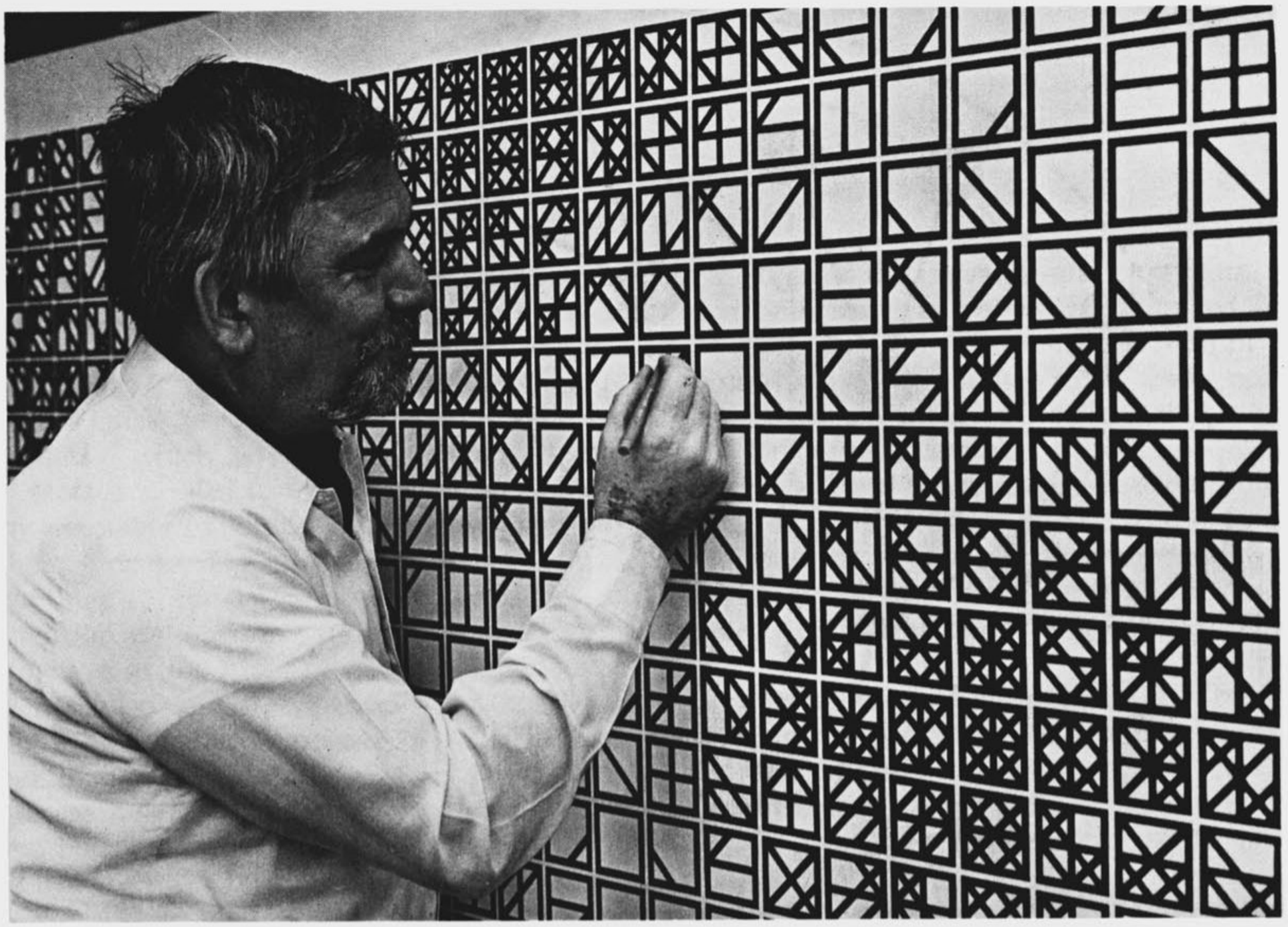
The sketch below gives a diagrammatic idea of the first few steps, starting, appropriately enough with "acorn". Each word is numbered and the words available to be selected for



1. Acorn 2 3 4 22
2. Cup 1 5 6
3. Tree 1 7 8 9 10
4. Rout 1 11 12
5. Trophy 2 13 14
6. Chalice 2 15 16
7. Bark 3 16
8. Palm 3 23 24
9. Wood 3 17 18 19 20
10. Cross 3
11. Rabble 4
12. Herd 4
13. Garland 5
14. Conquest 5
15. Wine 6 27 28
16. Schooner 6 7 21 22 25
17. Fire 9
18. Brush 9
19. Grain 9 27
20. Carving 9
21. Wreck 16 25
22. Mast 1 16
23. Beach 8 25 26
24. Toffee 8
25. Sea 16 21 23
26. Shells 23
27. Bread 15 19
28. Wilderness 15

association are listed after it. Cross connections are shown by dotted lines. For the final list, words will be selected that are suitable for cross connections as this will make associations much richer. As a start, there will be about 300 words. This is very small compared with a reasonable vocabulary of, say, 25,000 words, but can be increased at a later date.

Margaret Chisman



ROGER COQART

Roger Coqart was born in Wilsele, Belgium, in 1931.

From 1956 he committed himself to creative photography and adhered to the movement of "Subjective Photography" of which Dr. Otto Steinert was the leading figure. This way of approaching subject matter lead him, from 1964 onwards, to his first systematic photographic studies of erosion phenomena in rock faces; changes in form and structure which can be reduced to apparently random destruction processes. Logically this lead him to the photographic study of structures which are generated by reverse processes, that is, through apparently random building processes like, for example, the crystallization of some chemical substances.

From 1973 he studied growth structures of geometric elements generated with the use of a digital computer. Since then his aesthetic work has been almost exclusively in the medium of computer graphics, with an occasional incursion into photography and videography.

Roger Coqart writes: "Throughout the history of art, new technological resources and devices have been absorbed into the various art media of their time. One of the most significant instruments of our time is the computer, which has been used in diverse ways for the creation of works of art during the past dozen years. In my case the computer is used as a means to create geometric constructions in which a few elements are arranged in a statistically valid manner (1), in order to obtain a great variety of objective examples of growth structures.

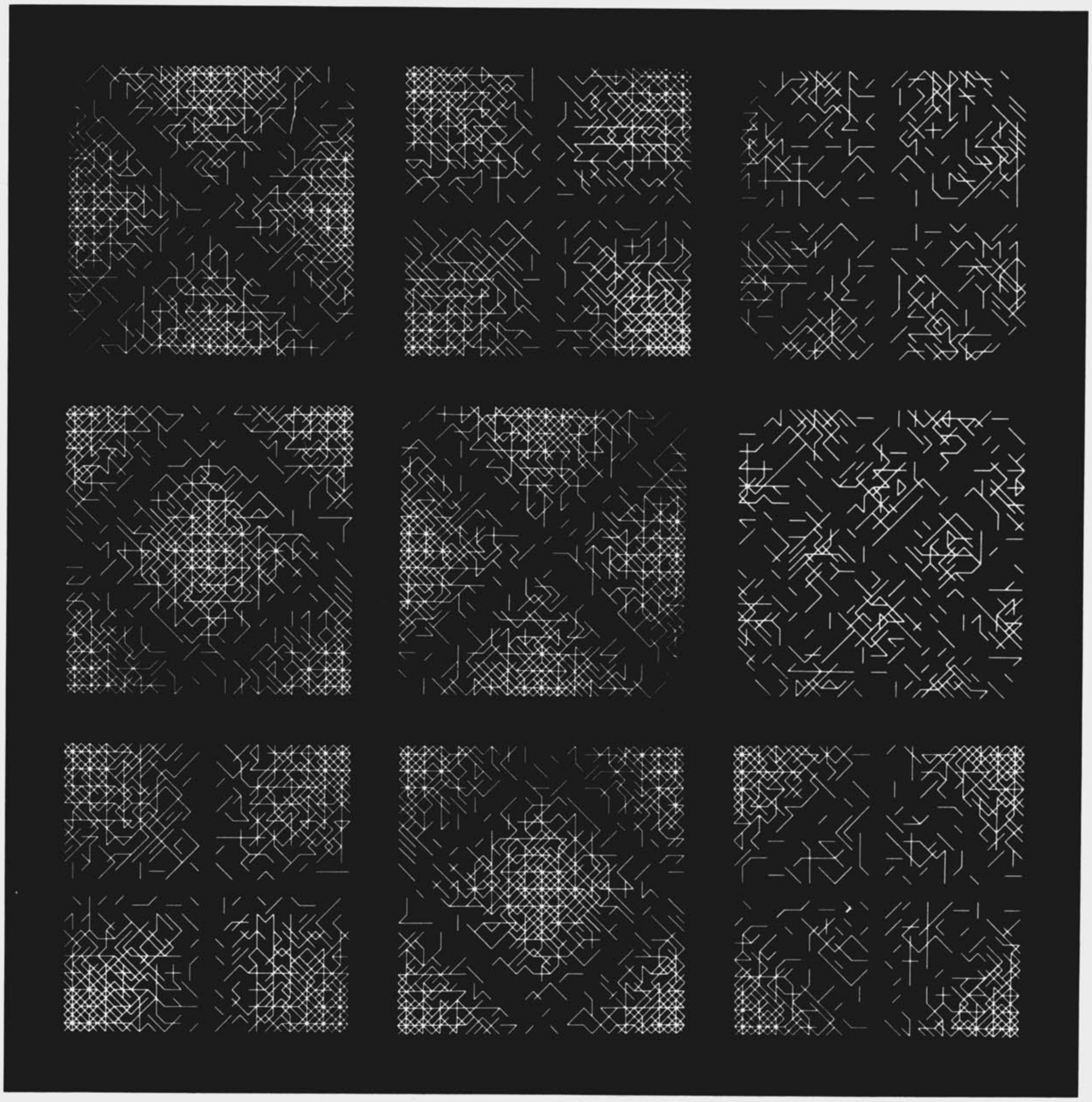
Since the beginning of my commitment to computer graphics I have been using grid structures (2,3) which are reproduced in their original dimensions by using photographic or photo-mechanical techniques, or which, in larger works (4,5) are transposed onto canvas or plexiglas by conventional painting techniques.

The act of manual painting is very important to me because it acts as a sort of outlet in contrast to my other activities and to the outside world and also to the incredible speed by which the computer works.

The outsize dimensions of my paintings also permit a better viewing of the grid structure.

The characteristic response when viewing grid structures is scanning, which is an anxious kind of viewing containing an element of unsatisfied search, since it implies a restless refusal to focus on details and an attempt to grasp the characteristics of the whole display.

On the other hand, the enjoyment of grids, so often linked to religion, mysticism and magic,



Roger Coqart: Logic Constructions, reversed computer drawings, 1979, 170 x 170 mm

requires an indifference to self-assertion, which is uncongenial to most people in the Occident.

These considerations are not stated to claim that the grid or grid structures lead to the ultimate in aesthetic pleasure, but merely to share my interests and satisfactions derived from this type of work during the last few years''.

NOTES

1) *Sciences et Techniques* – Magazine of the 'Université du Travail de Charleroi' – Jan. 1977 – *Art et Informatique* by Dirk Basyn.
2) *Leonardo* – vol. 11, May 1978 – *Computer Graphics: Grid Structures* by Roger Coqart.
3) *Angewandte Informatik* – Oct. 1978 – *Computergraphik-Galerie: Roger Coqart* by Dr. Herbert W. Franke.
4) *Computer Graphics and Art* – Aug. 1976 – Graphics Applications: Paintings by Roger Coqart.
5) *Computers and People* – Aug. 1978 – 16th Annual Computer Arts Exposition.

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BERNARD DEMIO

In his creative approach the artist uses a mini-computer in the following manner: (see diagram)

First Stage:
Starting from a basic idea, the artist does some preparatory conceptual work in the form of drawings, rough sketches, and various other attempts. He defines the constraints of his creative work and that which he wants to express or omit. (For example the definition of the initial generating forms).

Second Stage:
Setting up the formal computer language for these forms, the colours and the controls for the envisaged composition. Eventually returning to certain elements defined during the first stage.

Third Stage:
Artist/mini-computer dialogue. Given a work program adapted or chosen by the artist (program of forms or colours, in low or high resolution), the computer will establish the relation between the data of the composition defined during the first stage, and this work program.

The program will process the data and suggest combinations to the artist.

As a function of his investigations, the artist will be able to explore one path of testing rather than another.

In exploring a path, the artist will have new ideas which he may or may not reintroduce as data. He will think of new composition controls which will enable him to quickly put into effect his ideas. He will then be able to decide whether he will keep the results of his testing path.

If he is not satisfied, he will pass on to the exploration of another testing path.

At the end of the processing/dialogue, he will thus have for his investigations one or two possibilities corresponding to his creative controls defined in the first stage : or modified along the way.

Fourth Stage:
A synthesis by the artist of the different possibilities issuing from the 3rd stage, and the choice of one possibility or the continuation of the investigation.

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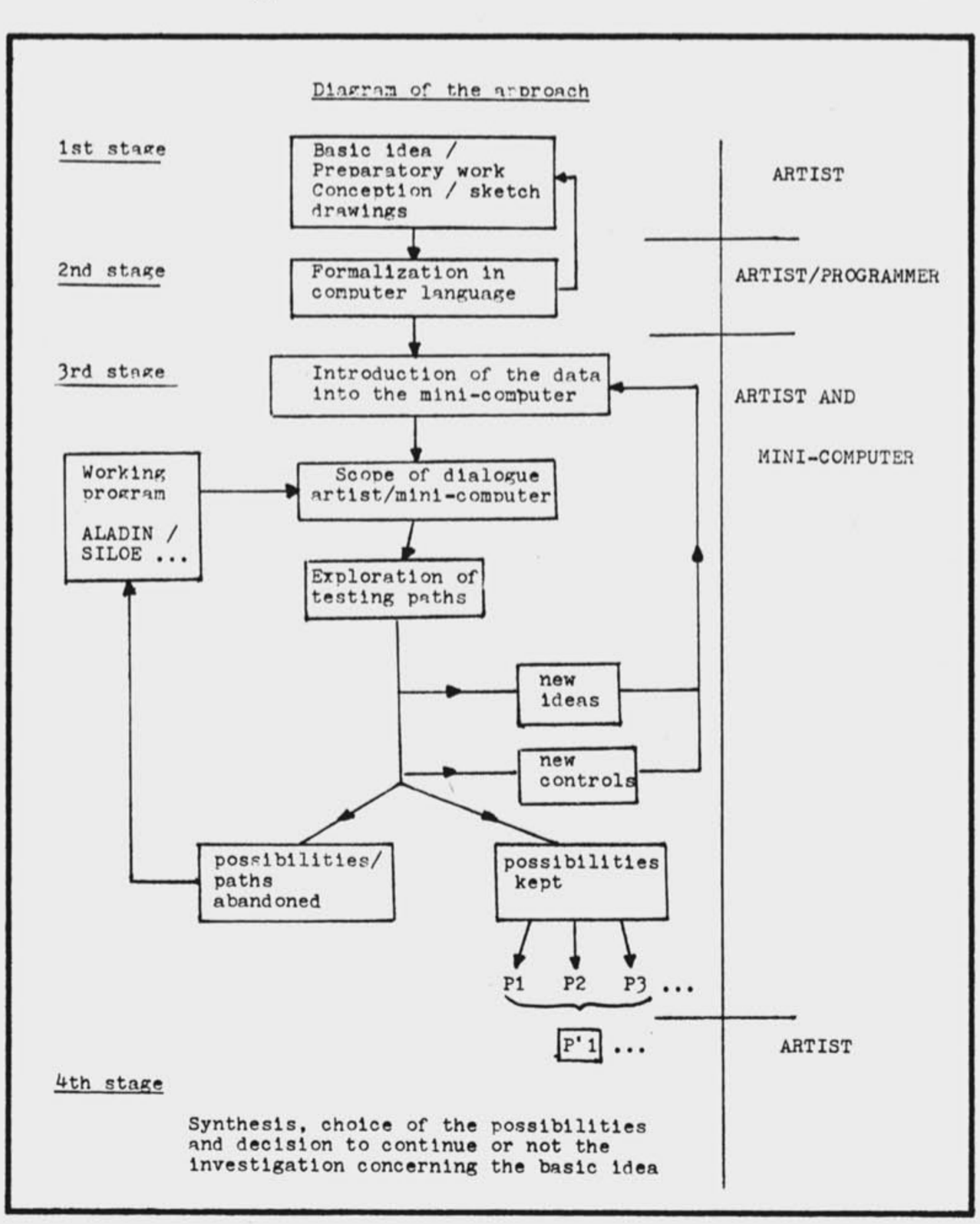

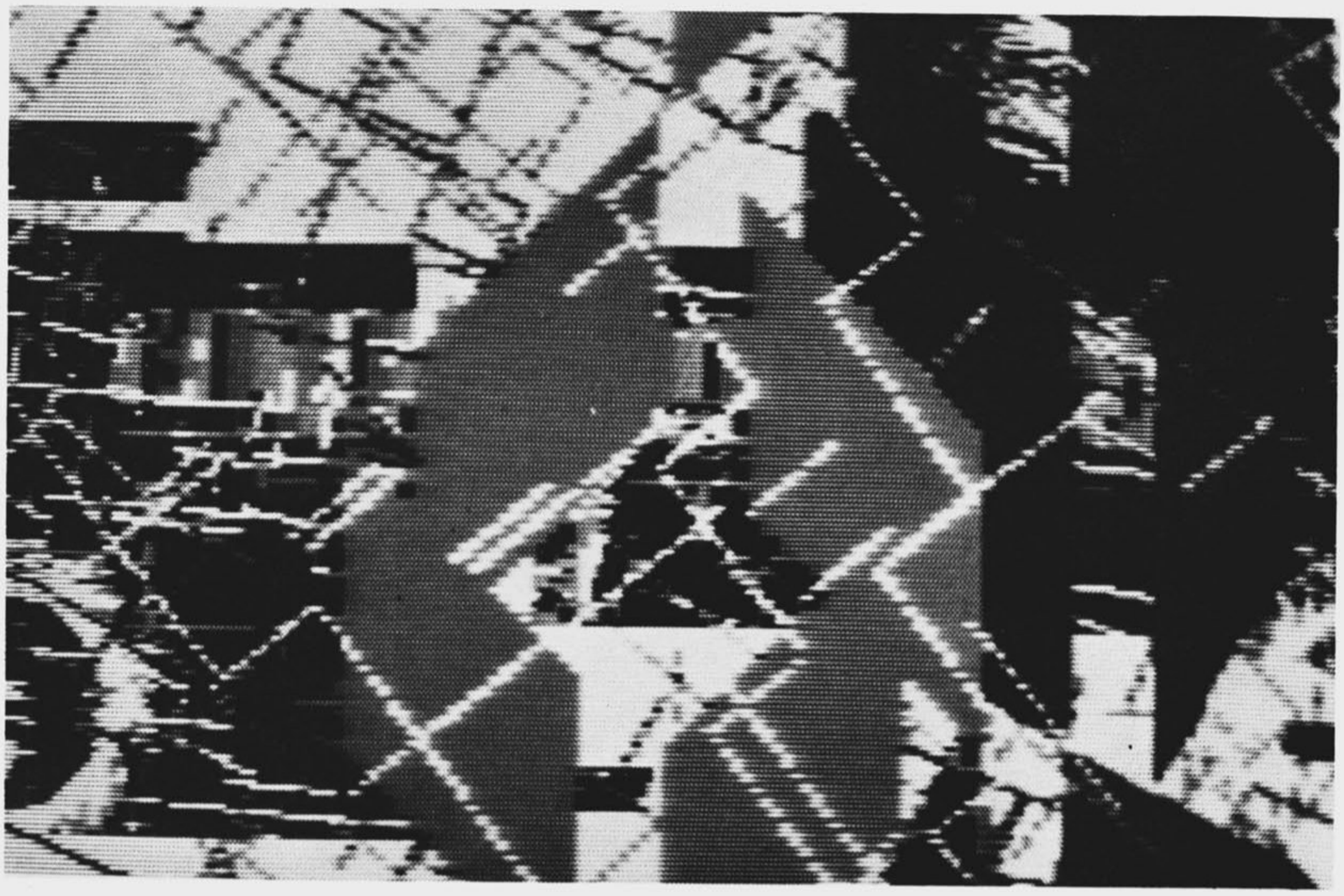

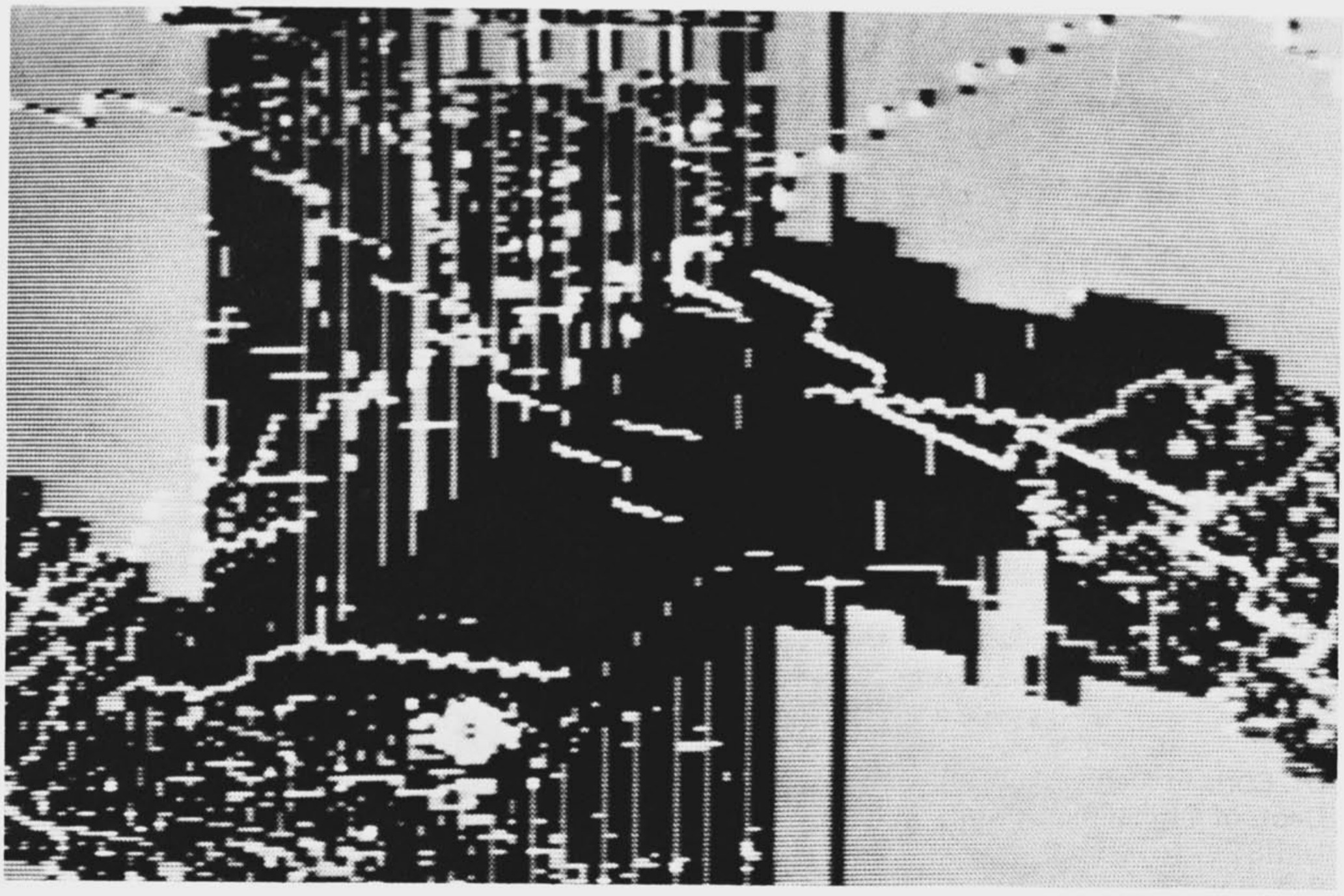

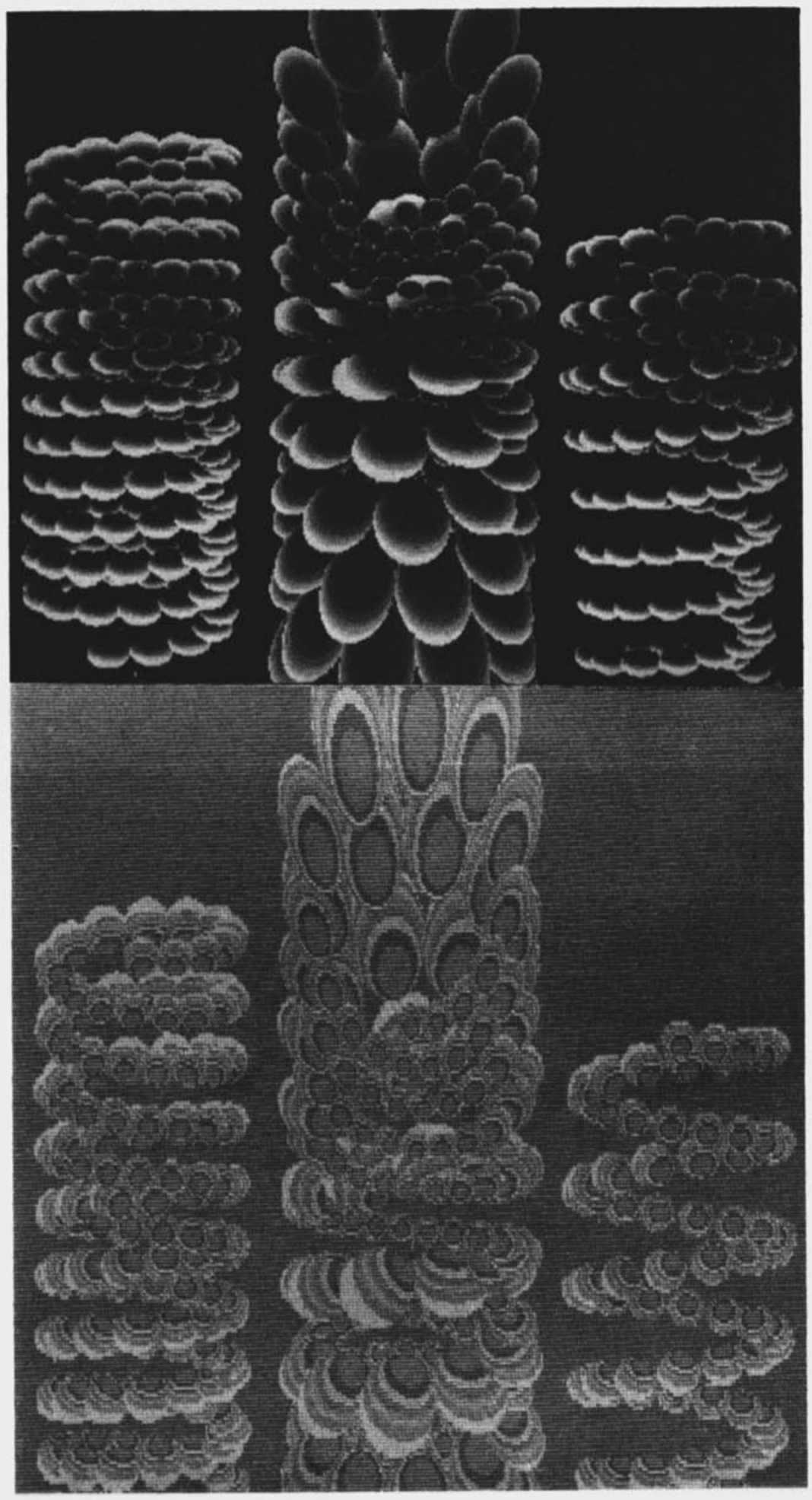

CHRIS FRENCH

(These illustrations are taken from an article by Dr. French which will appear in the next English edition of PAGE. Ed.)

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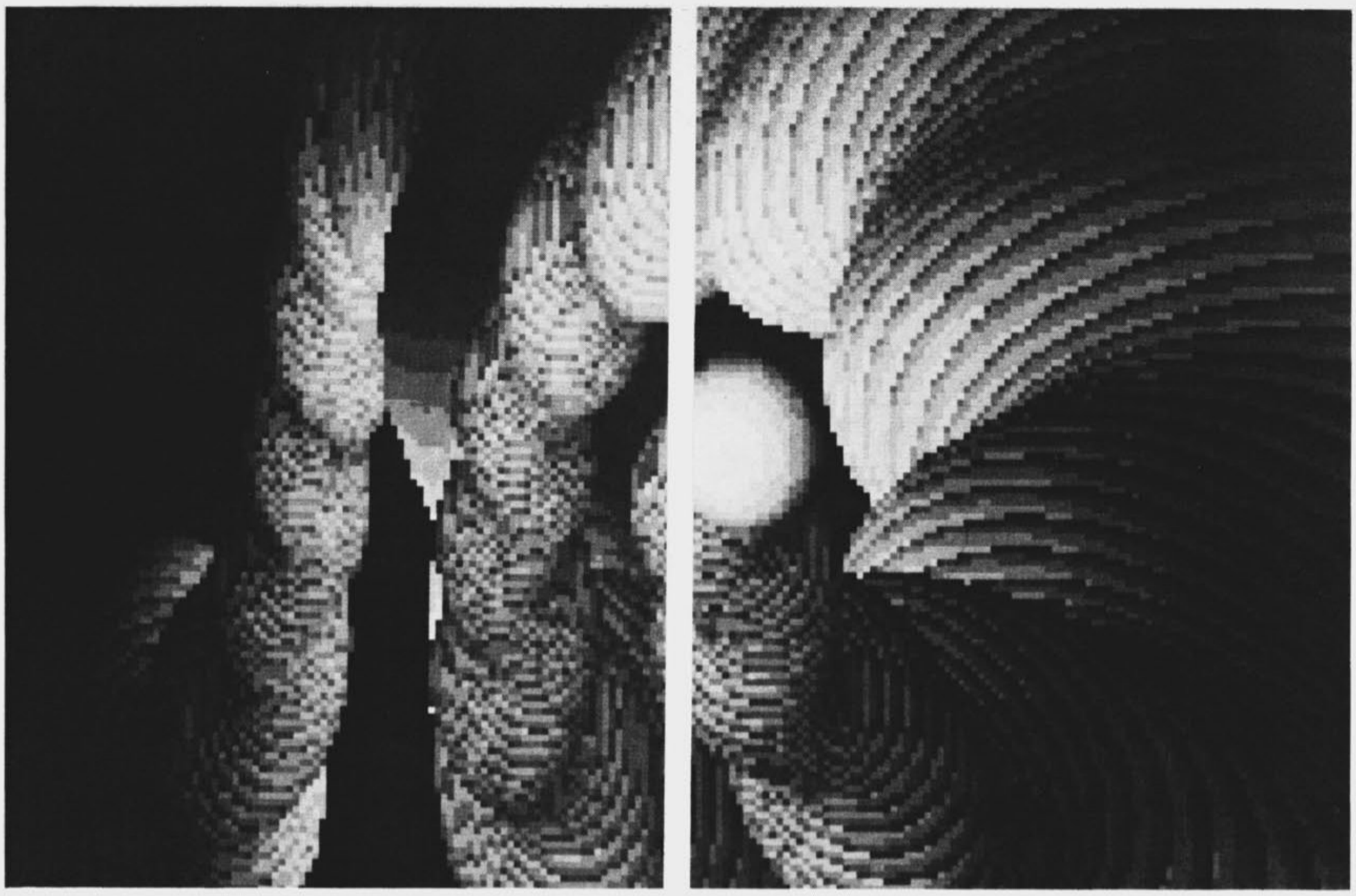
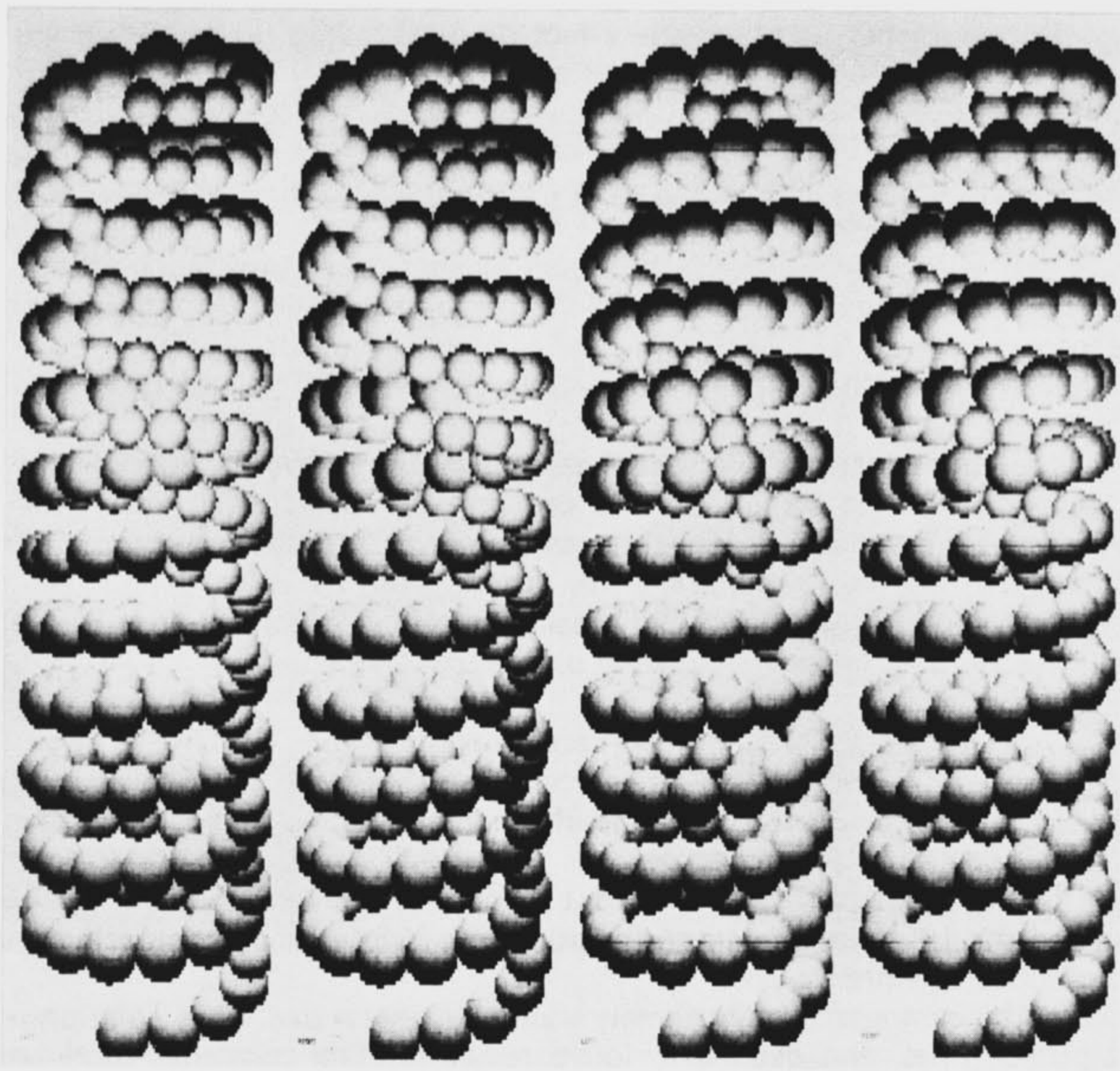
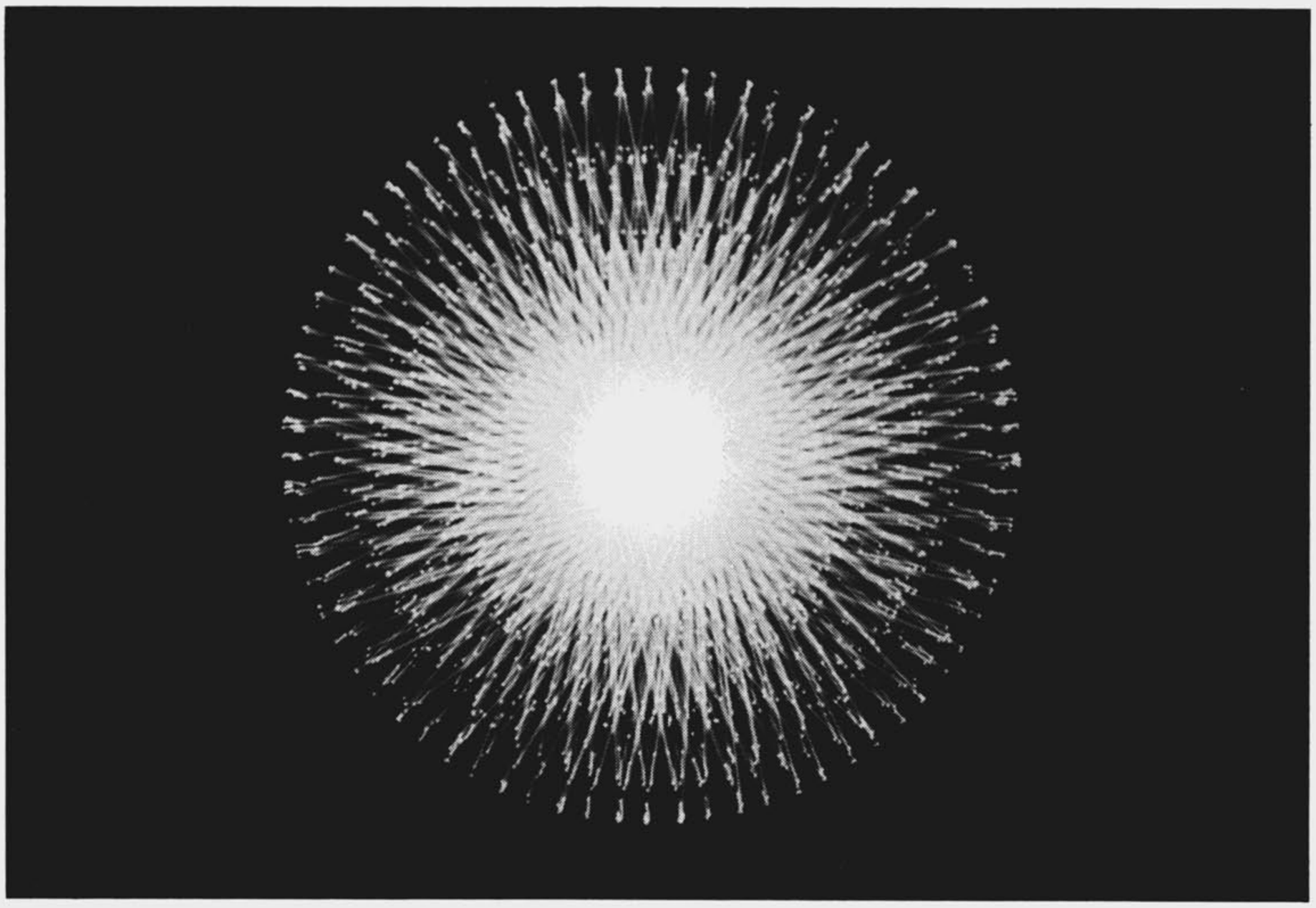






EL-1-17

SOZO HASHIMOTO

UNIVERSAL MANDALA

The Mandala is a visual means for assisting self integration and transcendence. Yoga and eastern esoteric religions developed methods of meditation which make use of the Mandala. In the traditional Mandalas, esoteric symbols were arranged regularly. Aside from their aesthetic charm, the traditional Mandalas have little effect on people who do not know the meaning of these symbols. Good arts and designs are not only for enjoyment, but have a more important function in helping the evolution of consciousness. People in today's modern world should have the elevating qualities of the Mandala. For this reason, I attempted through the use of the computer, to achieve this goal by creating what I term the "Universal Mandala".

By analyzing many traditional Mandalas, I found that each one is composed according to universal rules and special rules; each traditional Mandala's features being shaped by it's own special rule. There are three universal rules of the traditional Mandala's composition, which are:
(a) it has a centre
(b) it has a circle or a form that appears like a circle
(c) it is symmetrical

Simple forms composed of points, lines and geometric forms have a more universal significance for people, than do esoteric symbols which can only be understood within their particular culture. Therefore by composing such universal forms according to the three universal rules, and excluding esoteric symbols, one can arrive at Universal Mandalas.

There are two methods of producing Universal Mandalas: one connected with the special rules of traditional Mandalas, and the second based on the universal rules.

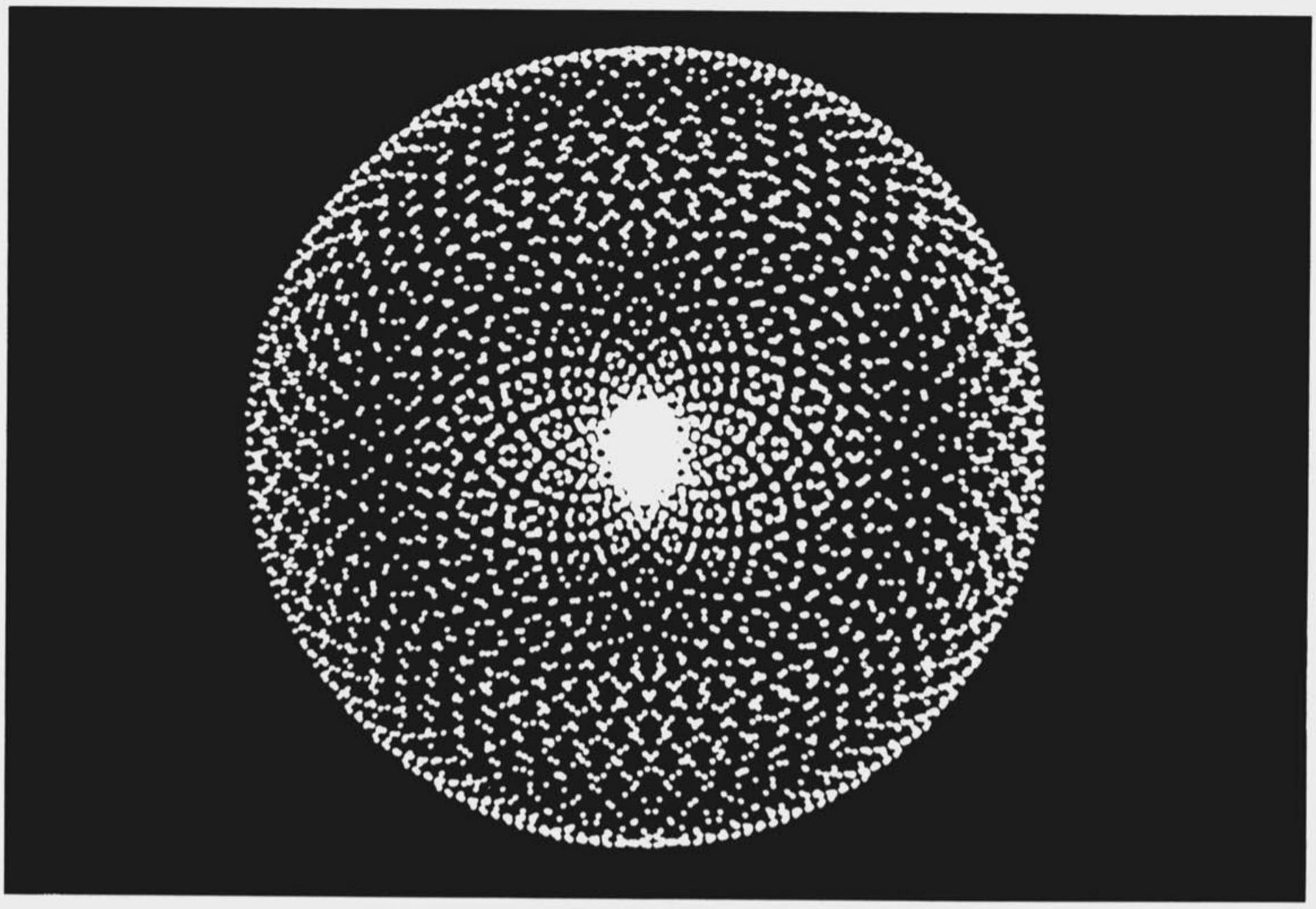
(1) Emphasizing special rules

In this method, special rules of composition are emphasized and esoteric symbols are replaced by universal forms. I produced the KM series from Kongakai Mandala by this method. Kongakai Mandala or "Diamond World Mandala" is one of the most popular Mandalas in Japan.

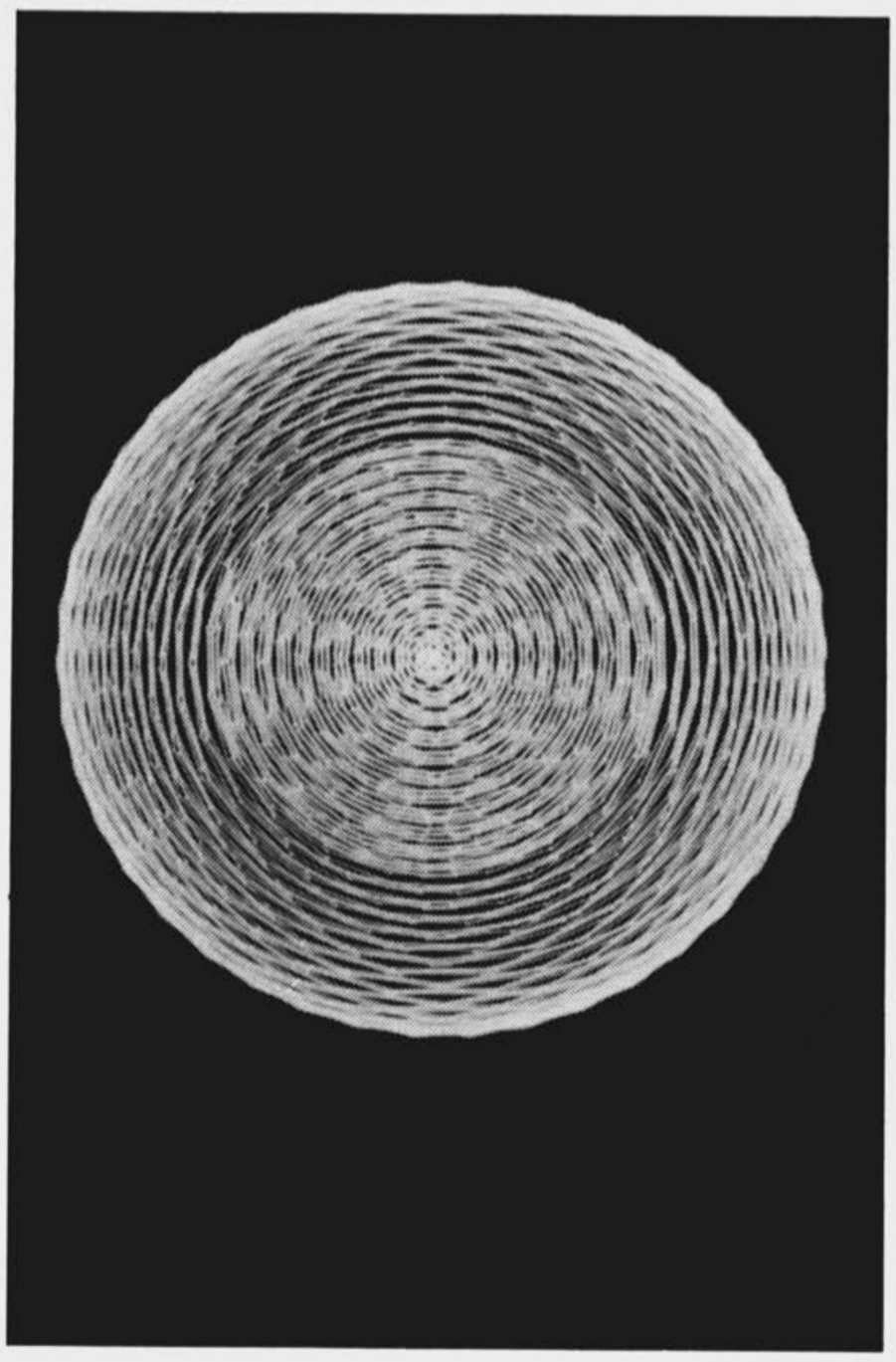
(2) Emphasizing universal rules

This method does not employ special rules, but is concerned only with the three universal rules. I have developed the LP series by composing points, the CS series by composing spirals, and the EL series by composing emissive lines.

In either case, the computer was extremely useful, as a great deal of calculation was necessary to compose points, lines, and geometric forms regularly. The computer used was a FACOM 230-38. The output was on a FACOM 6233A Graphic Display System. The programming language used was FORTRAN IV.



LP-1-55



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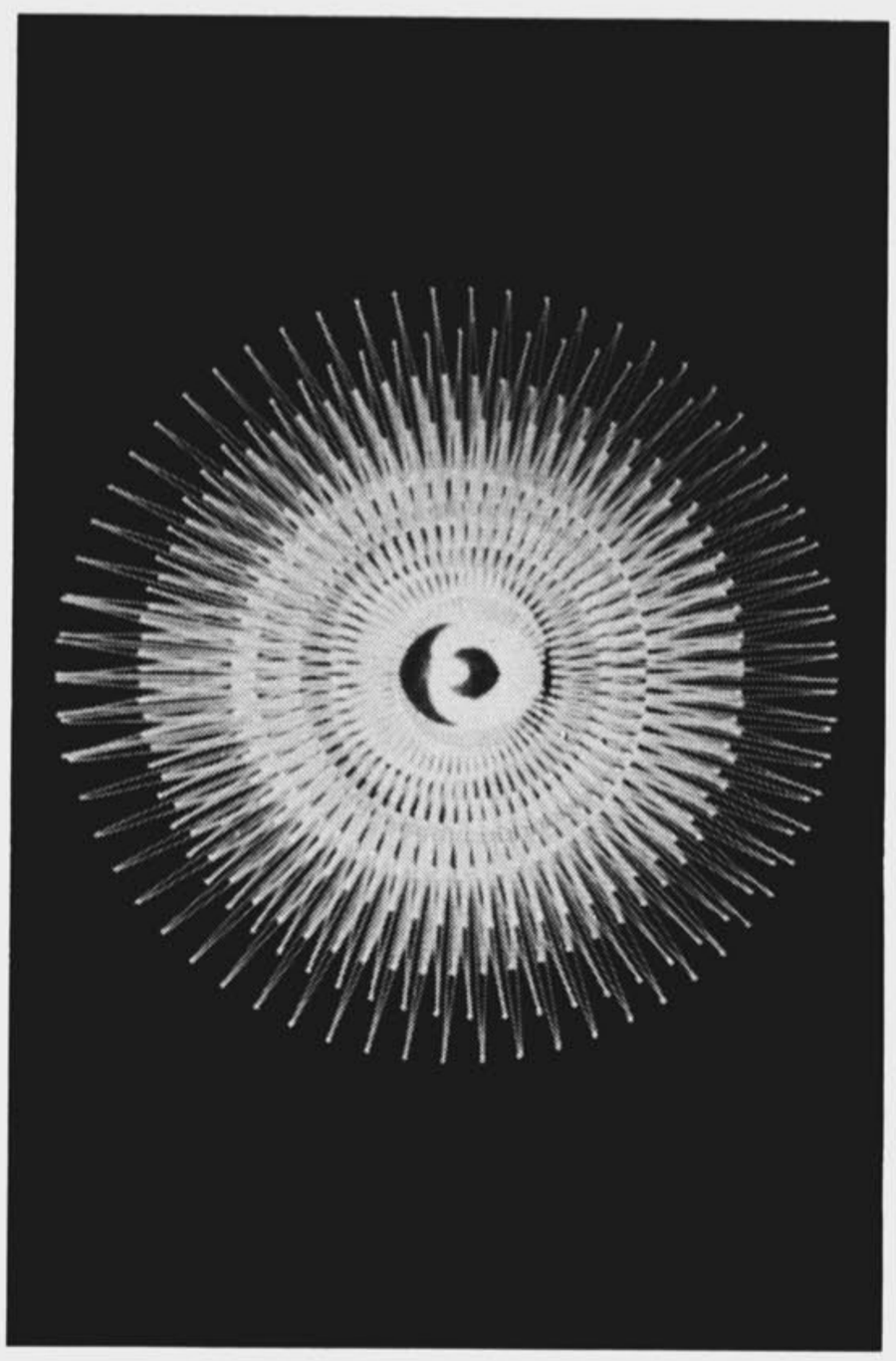
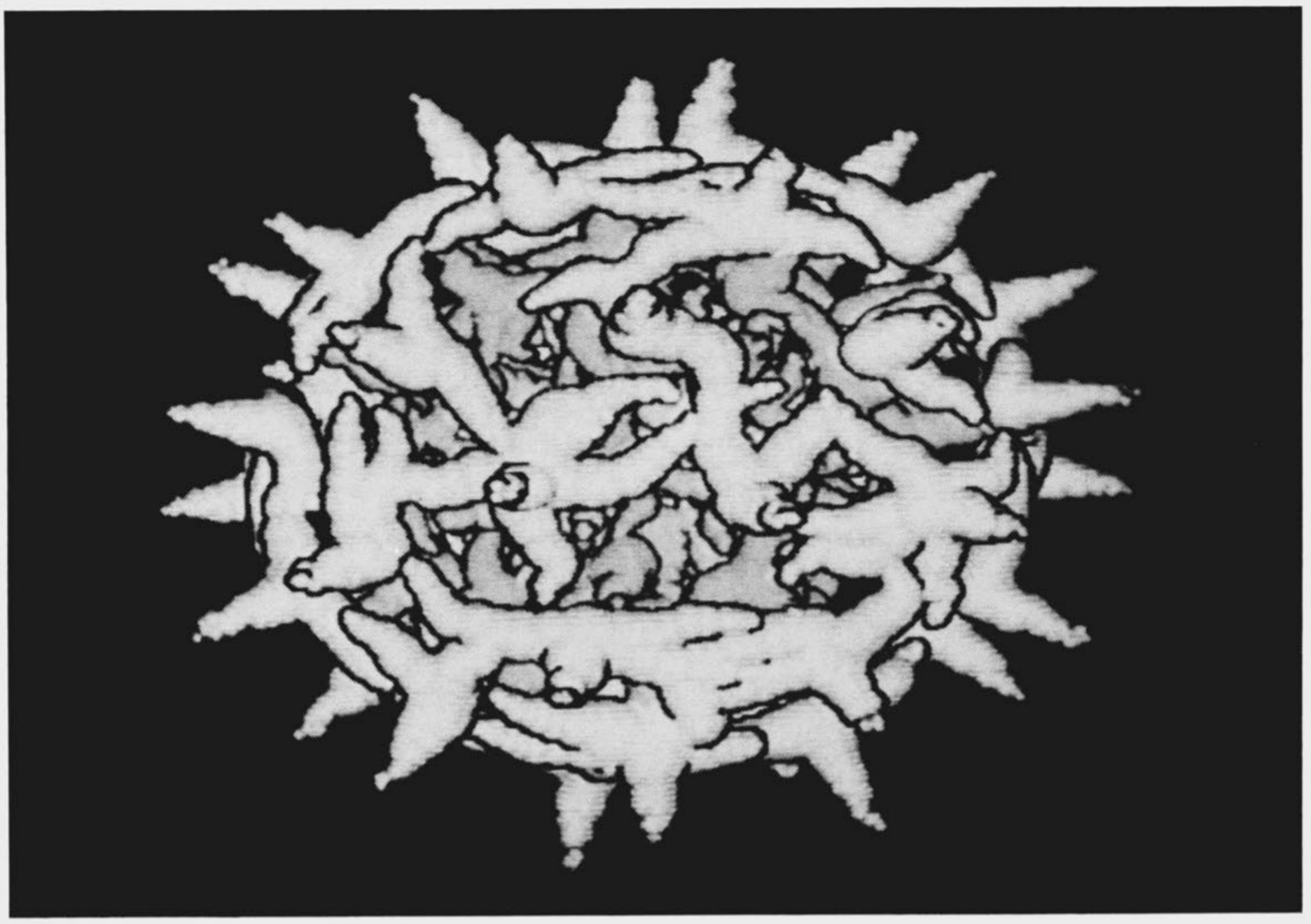
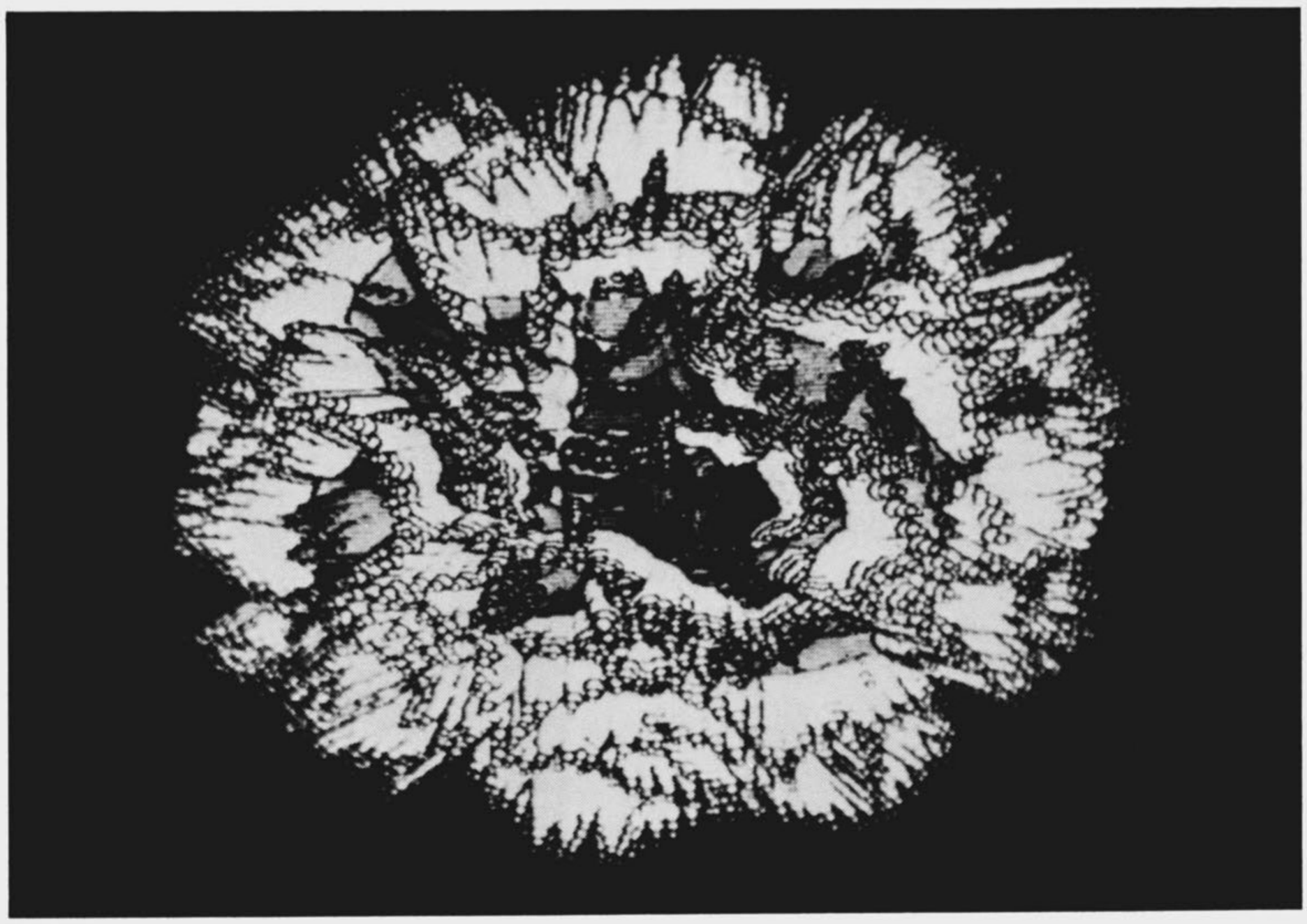


EL-1-59

Sozo Hashimoto
2-28-2 Komazawa
Setagaya-Ku
Tokyo





KEN KNOWLTON

Bell Laboratories
600 Mountain Avenue
Murray Hill
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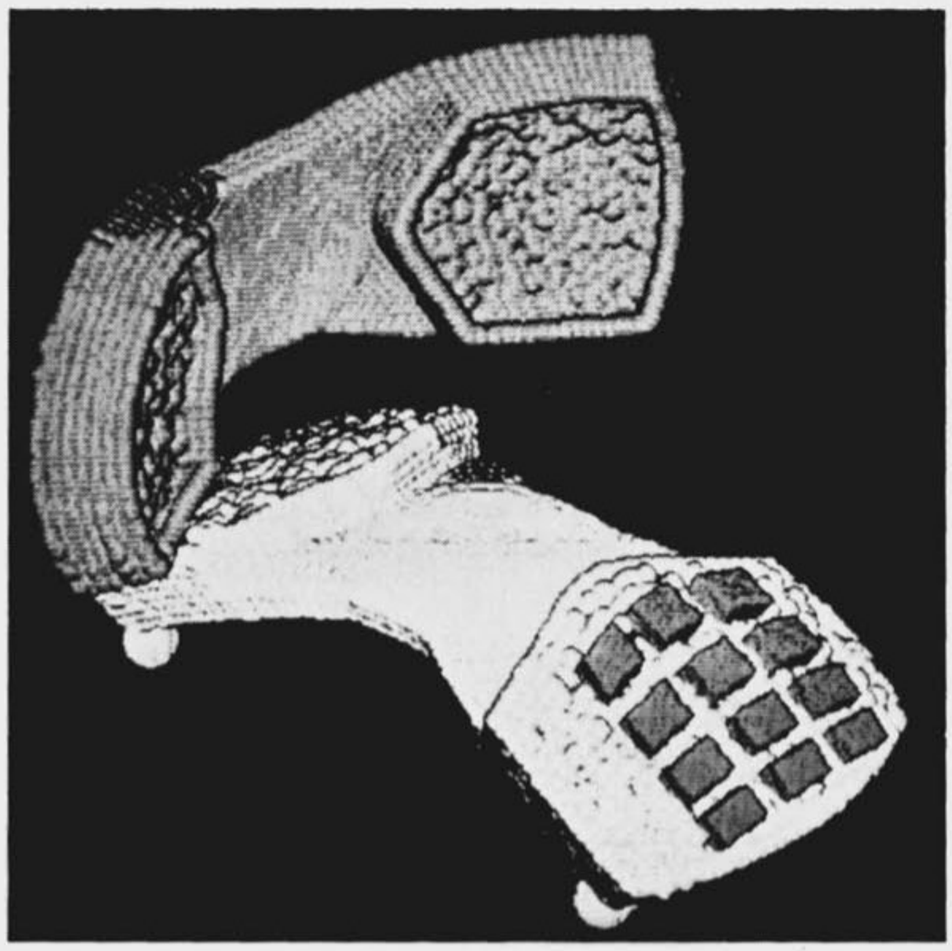
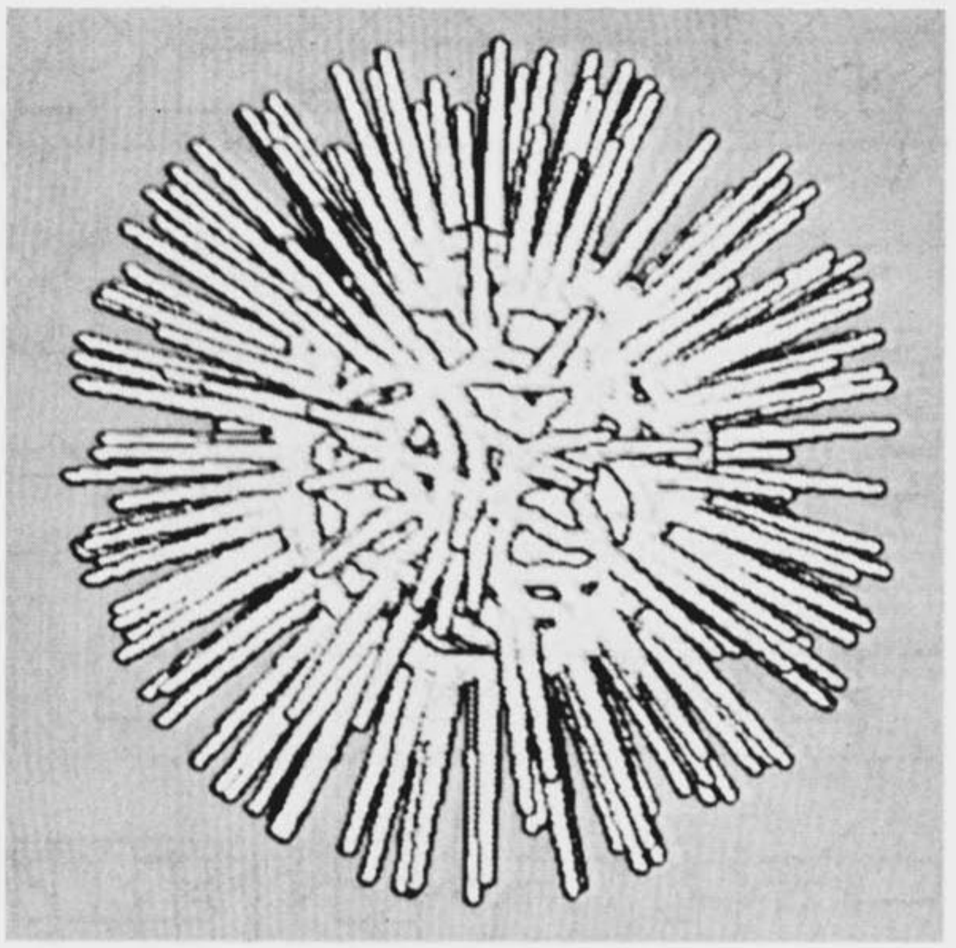
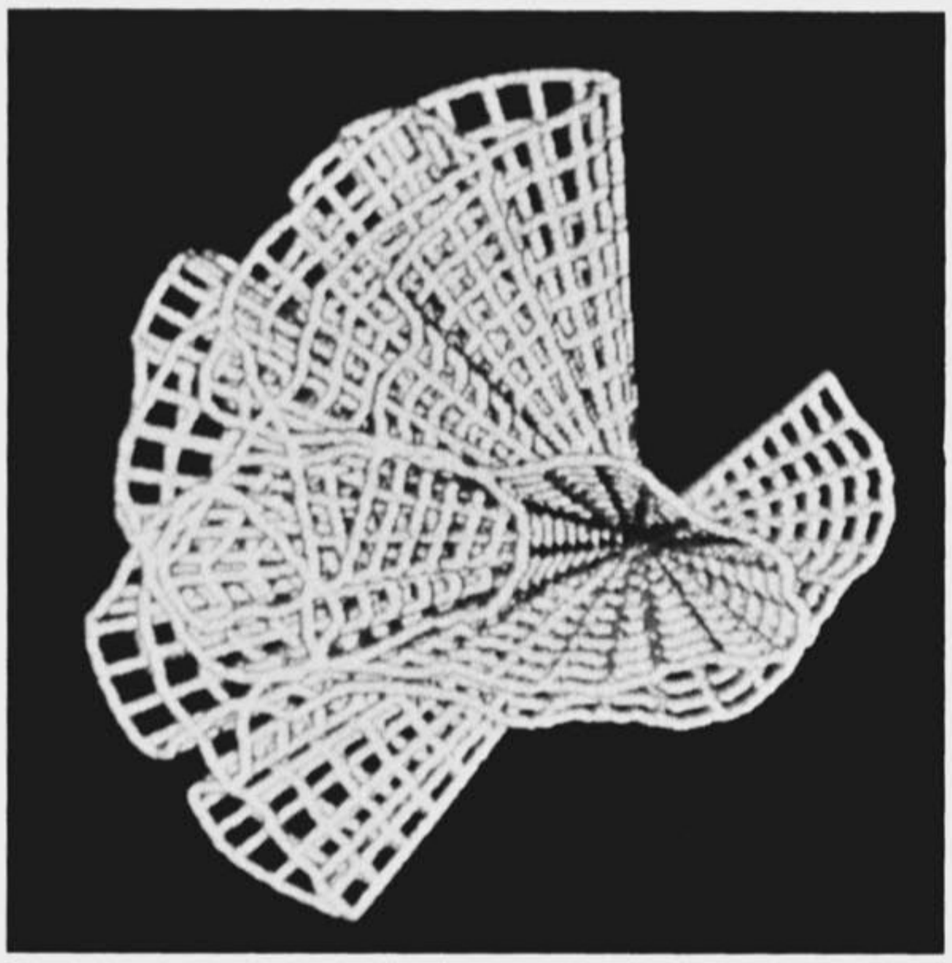
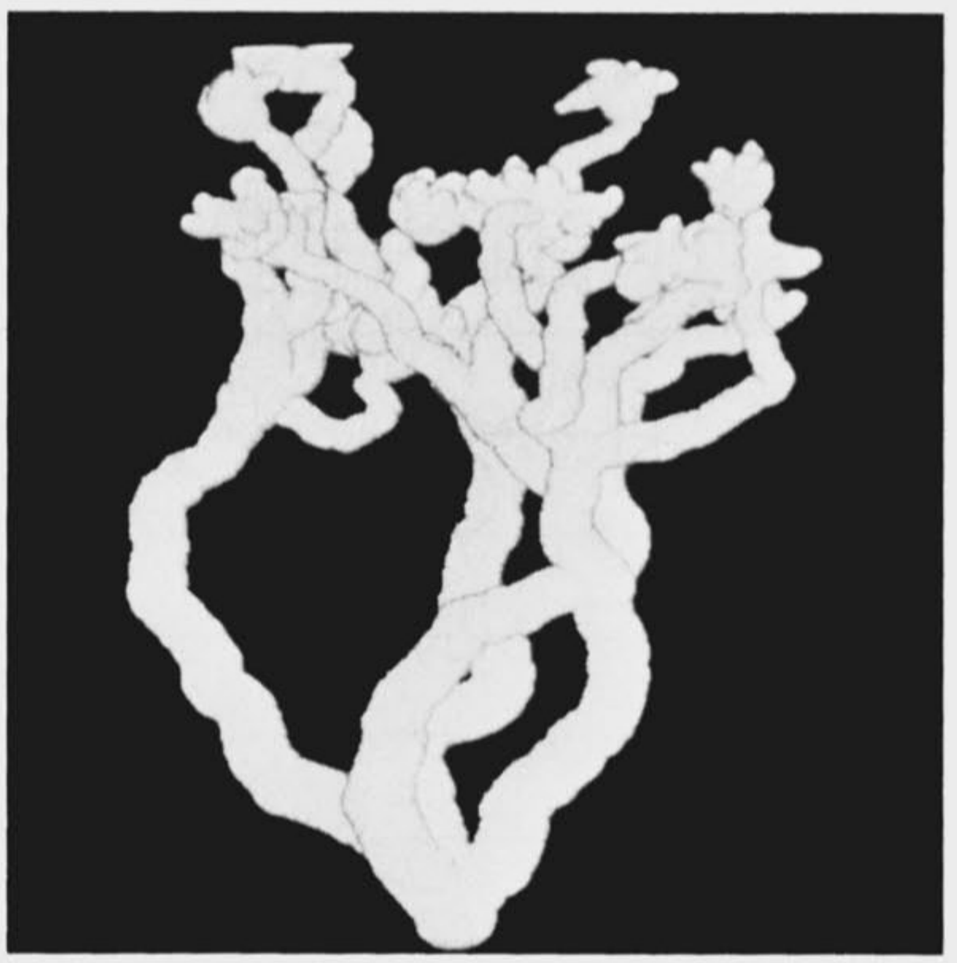
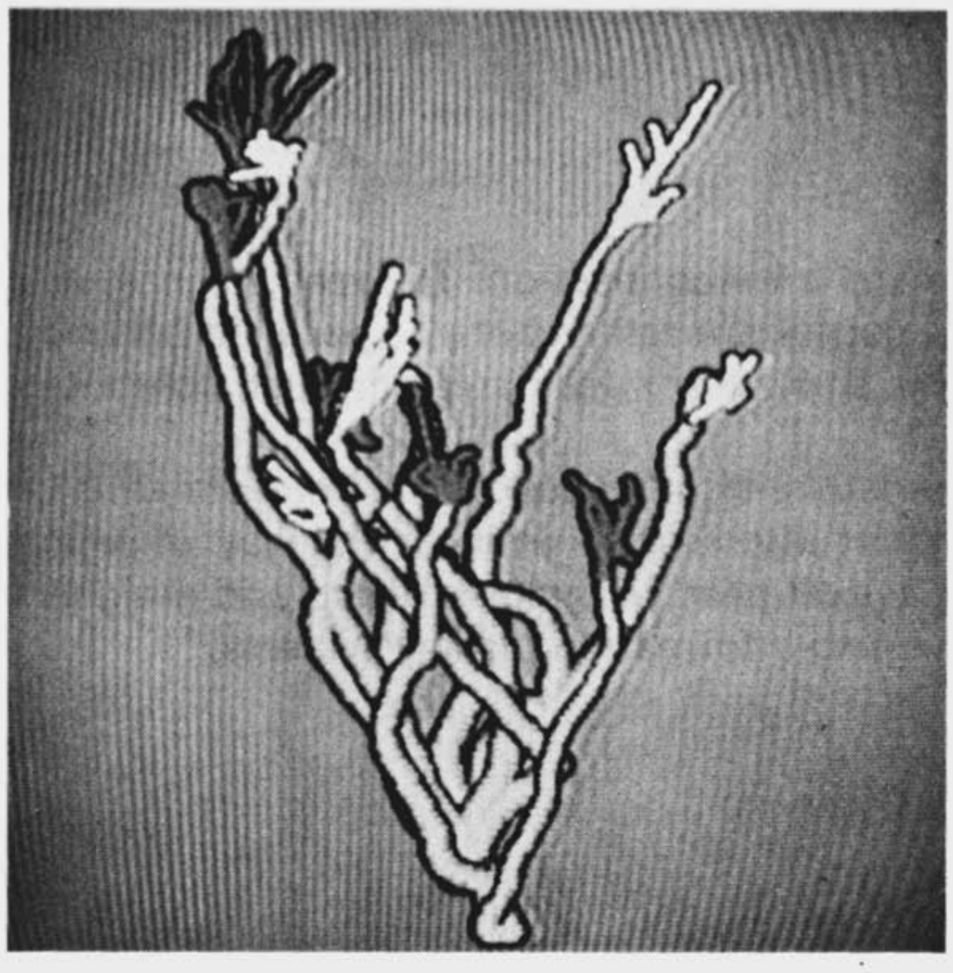
U.S.A.

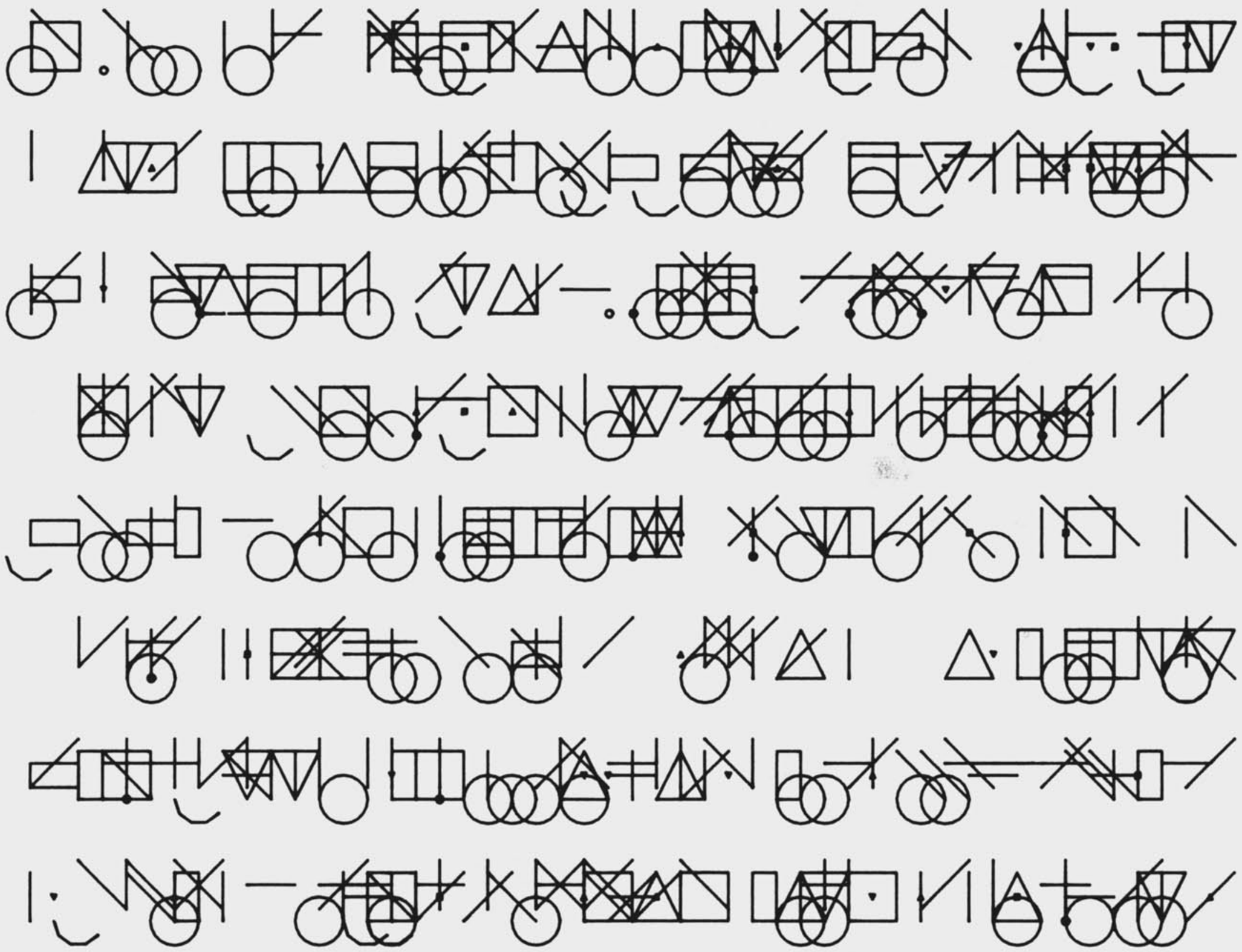












AARON MARCUS

Aaron Marcus is an artist/designer whose work reflects inter-connections between science, art, design and visual communication. At present he is a consultant researcher at Lawrence Berkeley Laboratory, where he is helping to improve the graphic display of information through computer-assisted chart and mapping systems.

He believes that it will be impossible to understand the significance of the huge amounts of data which computer processing creates, unless greater attention is given to the way in which information is — or could be — presented. "There is a great need for graphic artists and designers to help humanize and to raise the quality of the emerging information display systems."

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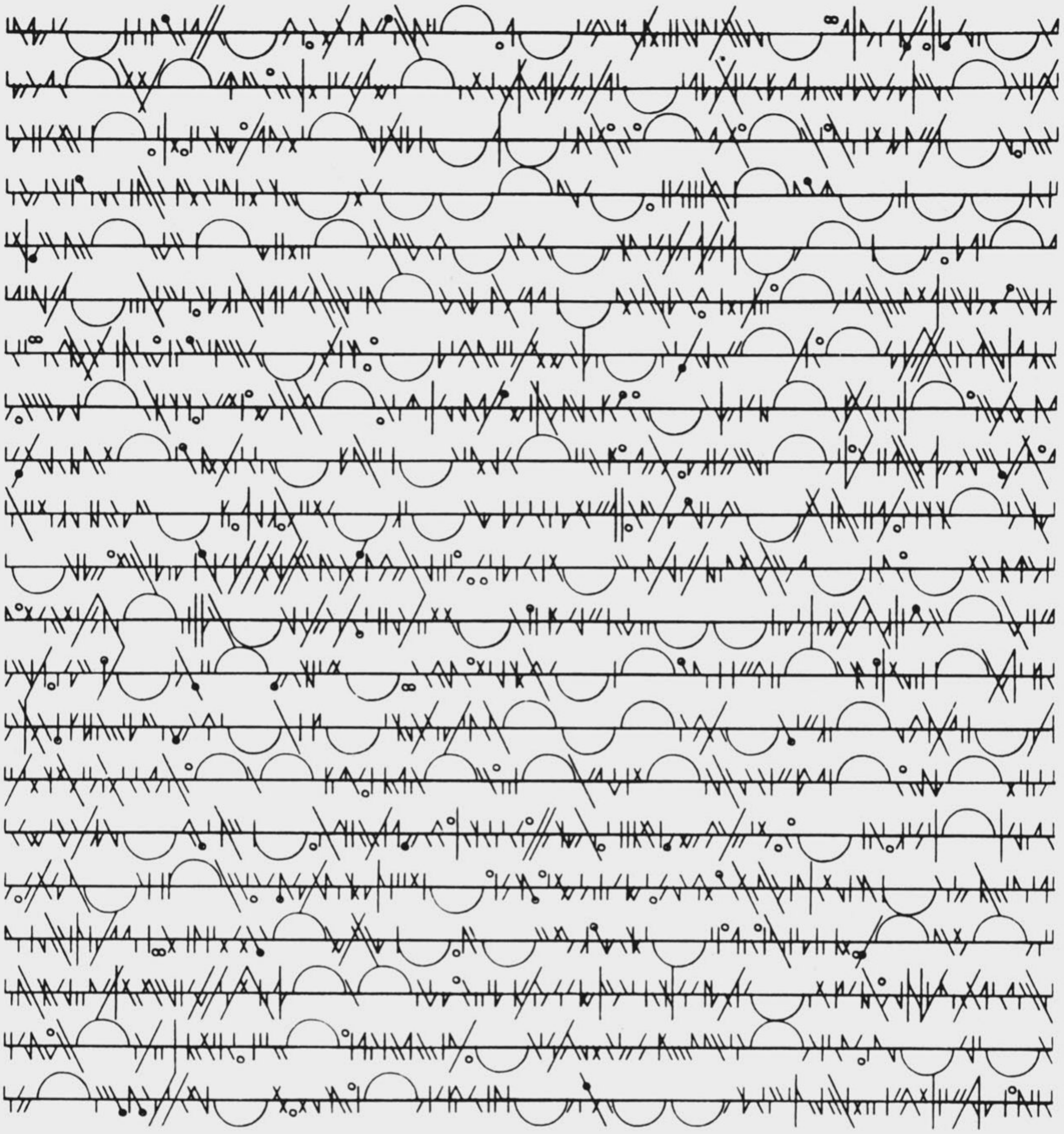
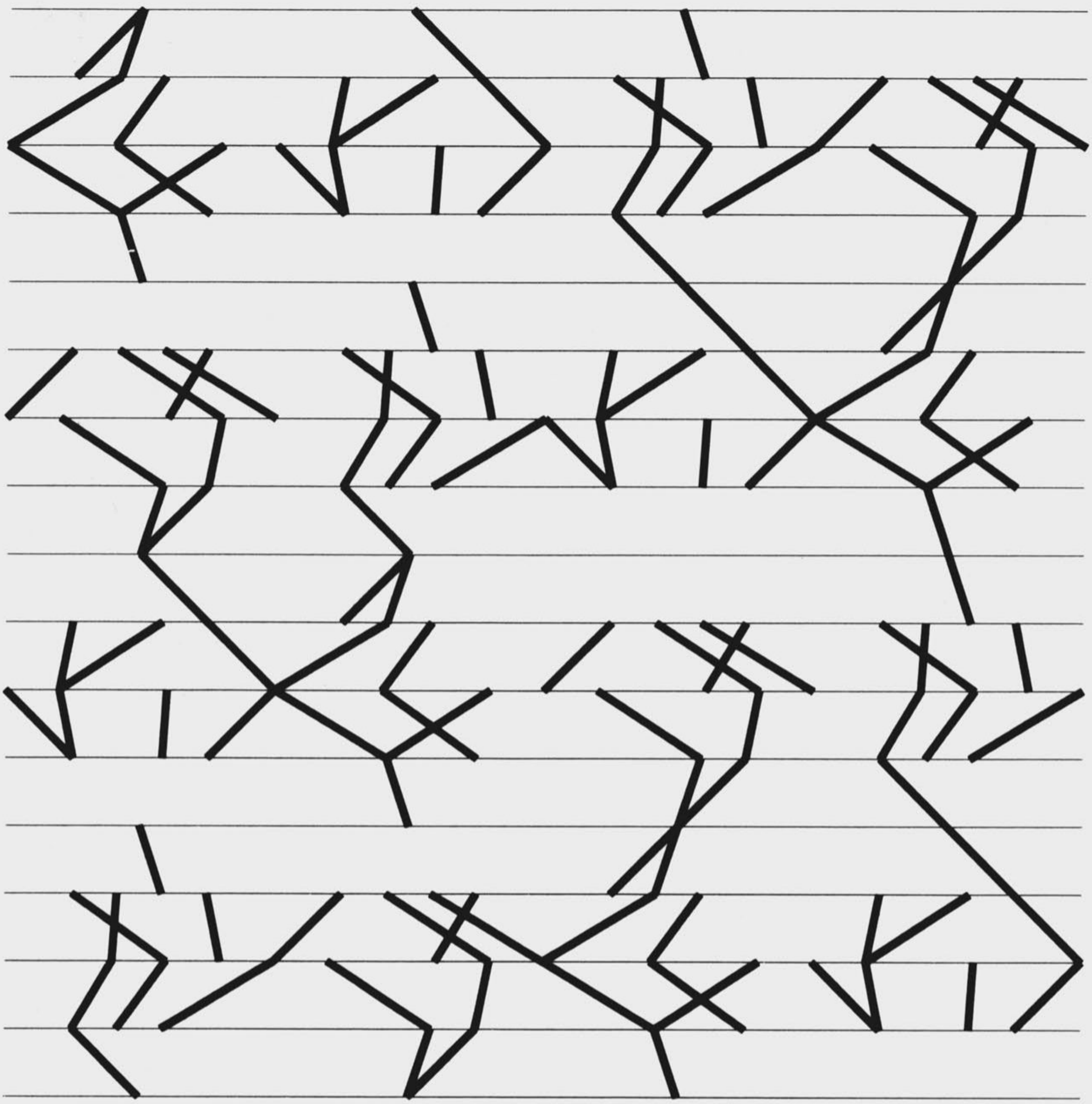


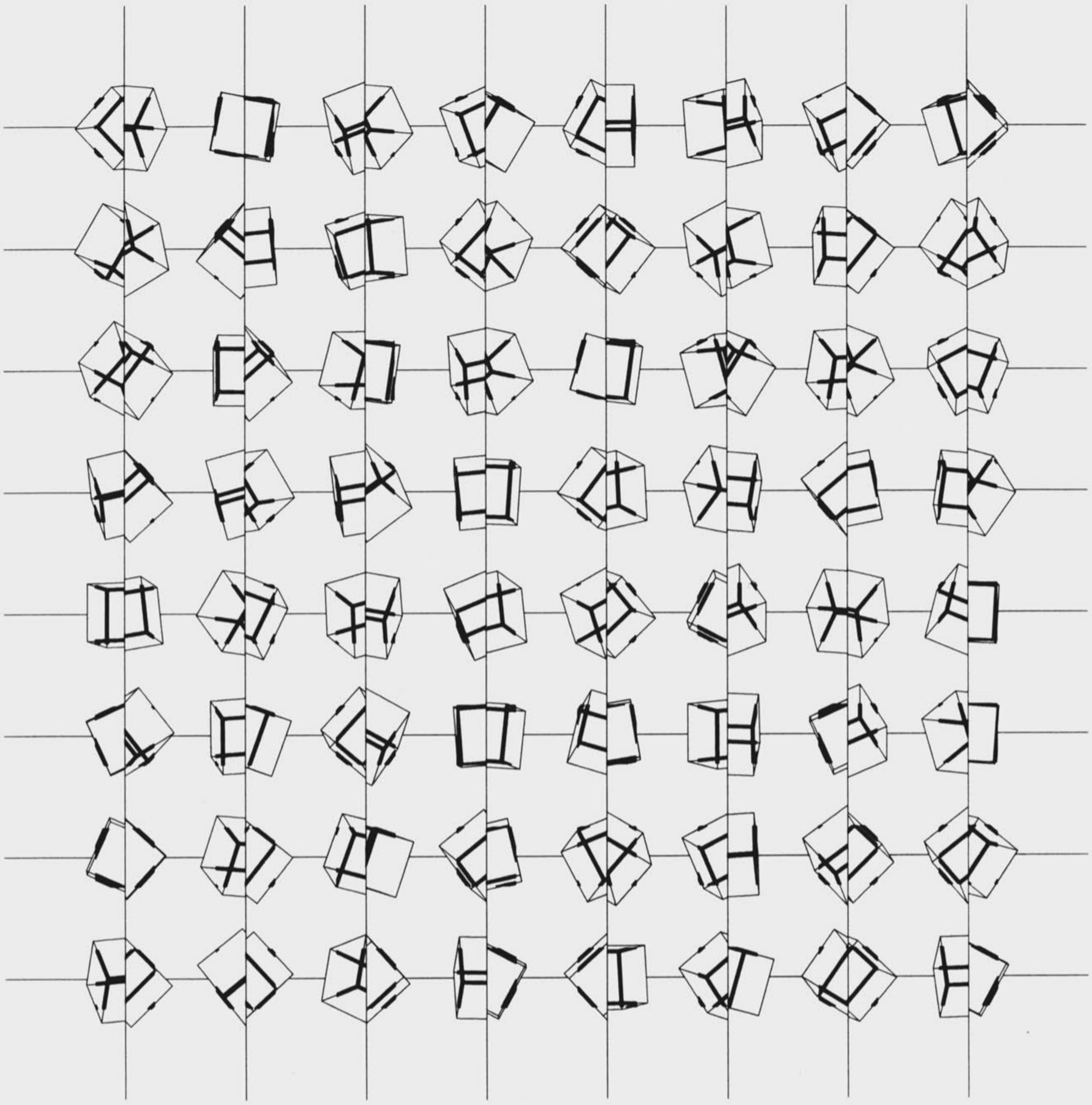
Above and facing: Hieroglyph Series, 1978



MANFRED MOHR

P-226/C Drawing 1978

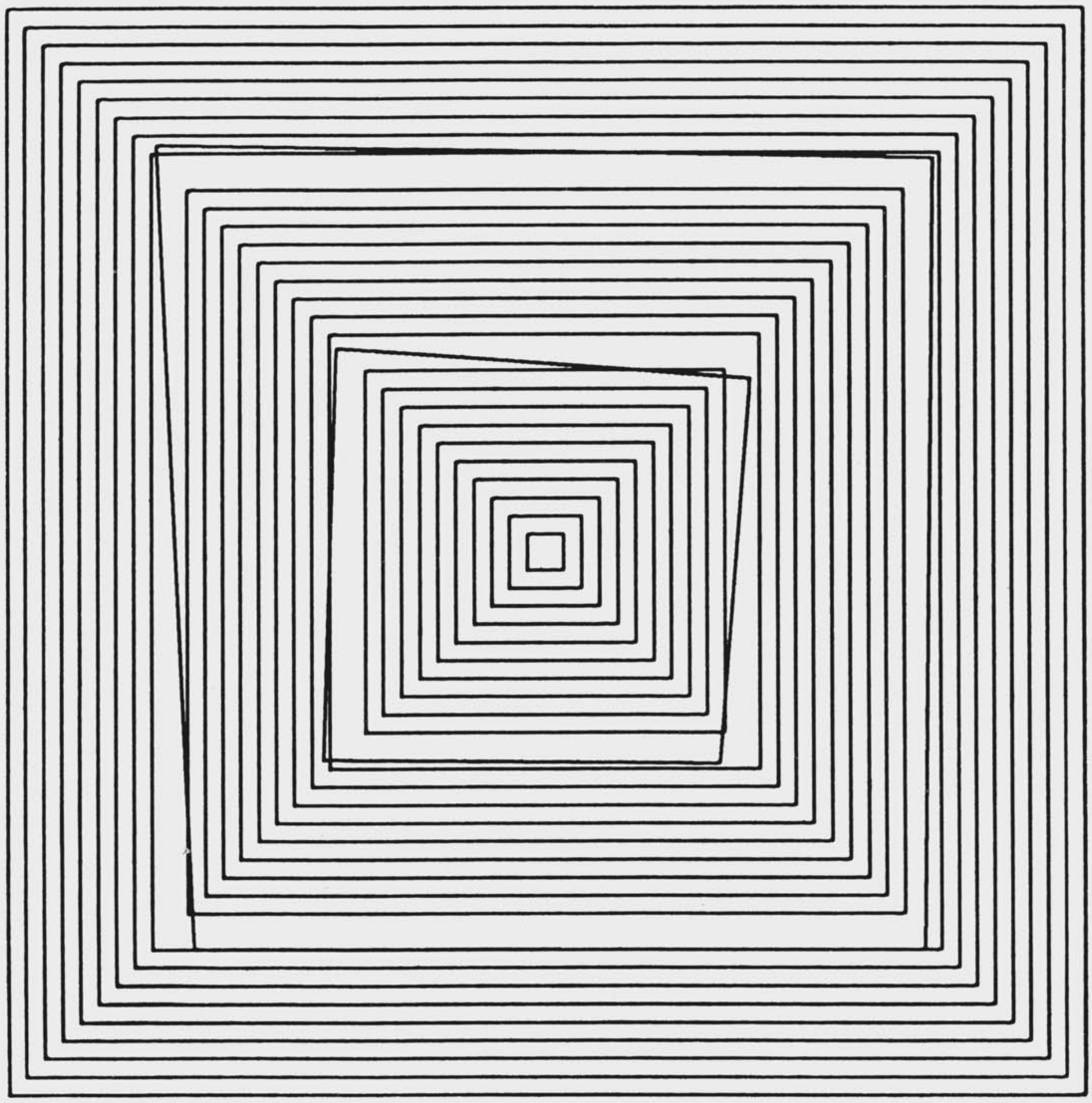
The graph of a 4-D hypercube is divided into 4 groups of 8 lines each. Every group contains one randomly chosen but distinct edge of the 8 cubes inherent to a hypercube. These groups are placed in the form of a 4 x 4 matrix, so that the sum of all chosen edges adds up to the complete structure in all directions.



P-197/A Drawing 1977 600 mm x 600 mm

A matrix of randomly rotated cube couplets having thick lines within the window imposed by the frontal view of a cube.

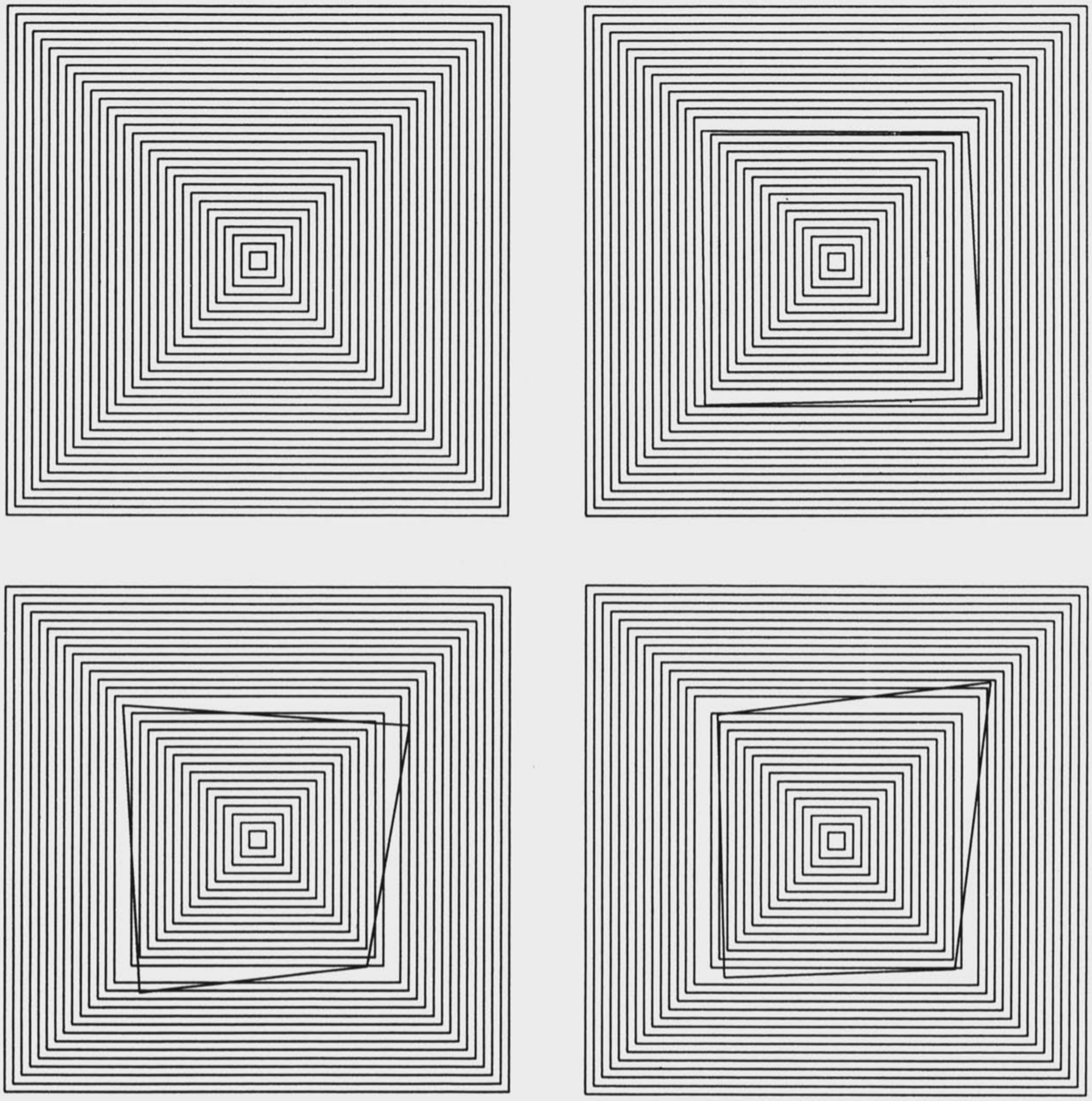
Manfred Mohr
7 Rue d'Olivet
75007 Paris



VERA MOLNAR

"KUNST IST EIN FEHLER IM SYSTEM" (Art is a mistake in the system) said Paul Klee. I would like to take up the same idea for my own purpose and express it in a less poetic manner: I introduce step by step an increasing amount of disorder or irregularity in a regular set of elements (here a set of 30 concentric squares) in order to try to obtain a special kind of visual experience called "art".

My work is built up with the most simple geometric forms. This fact is not due to the conviction that they are "better" or more "beautiful" than other forms; or that they are privileged forms having qualities necessary for building up valid visual artwork. This choice is to be considered first as the result of my subjective taste: I like the plastic strength of geometry, I like the rational purity of mathematics. But there is also another less emotional reason for my basic choice: these elementary forms are easier to describe, to manipulate, and to maintain control over. One can more easily proceed with their construction, following the rules the painter has given to himself. The third reason for my choice is that it seems to me that elementary geometric forms are less likely to be interpreted by the onlooker who often tends to project all kinds of semantic content which are irrelevant to the purpose of the painter.



I use a computer to combine the forms because I hope that the assistance of this tool will permit me to go beyond the bounds of learning, cultural heritage, environment; in short: of the social thing, which we must consider to be our second nature. Because of its huge capacity for combination, the computer permits systematic investigation of the field of possibilities in the visual world, helping the painter to clear his brain of mental/cultural "ready-mades", and enabling him to produce combinations of forms never seen before, either in nature, or in museums, to create *unimaginable images.*

Vera Molnar
October 1979

54 Rue Halle
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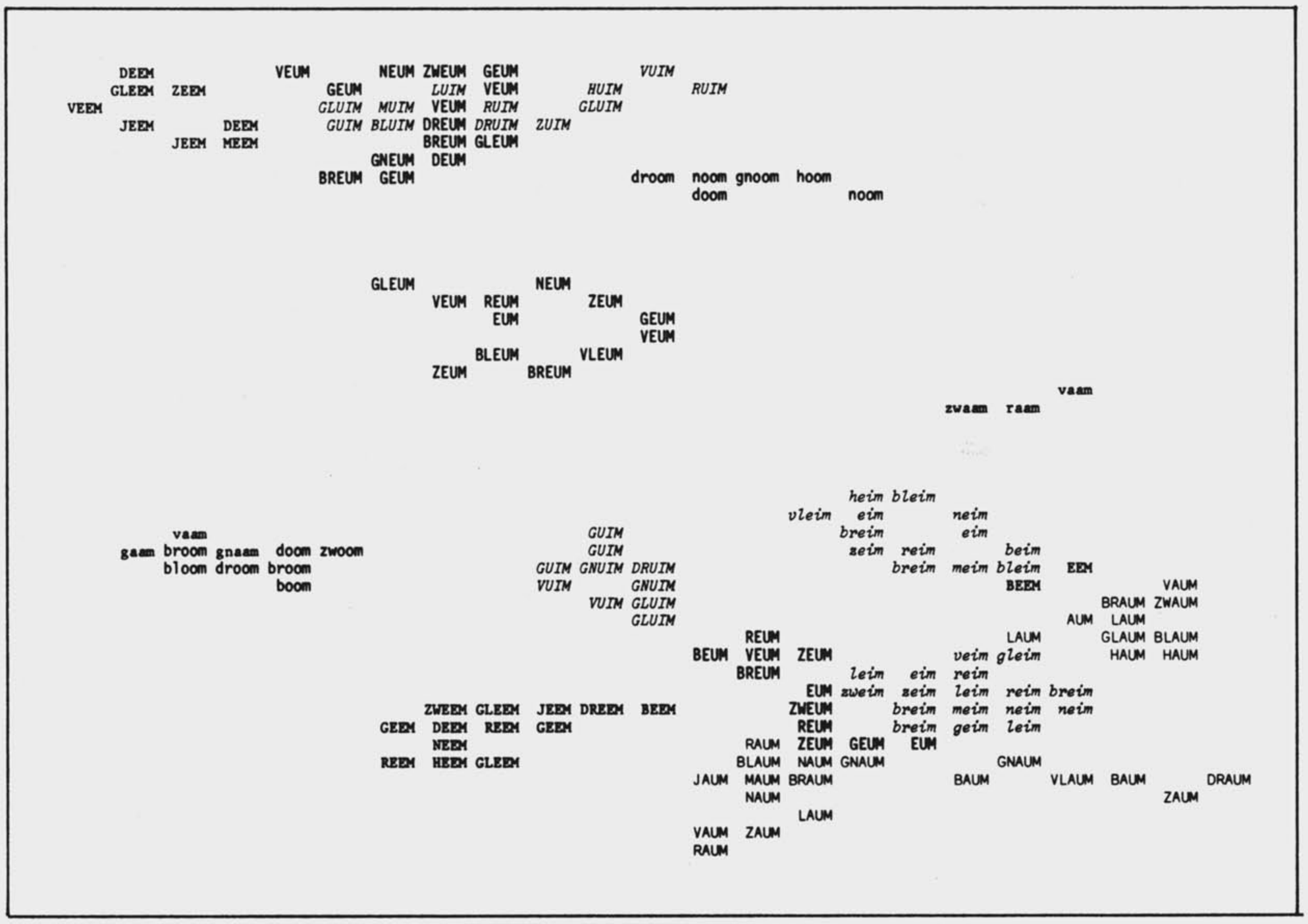

GRETA MONACH

Automatergon 72-9A (above) and Automatergon 72-73D (facing) are two of a large series of abstract (=non semantic) poems, in which inter-relations between short, word-like structures are investigated.

The "words" are abstract compositions of letters. They form part of the input data to the program; the latter is responsible for their spatial distribution. The words within each poem are (visually and auditively) related; the more closely related ones are grouped into "categories".

The program sets up a two-dimensional grid of variable size. In the output, only the borderlines of this grid are visible. Words are allowed to spread in chains through the compartments of this grid. Each chain uses words of one category only. Starting in an aleatorically selected compartment, the chain develops step by step, a random selection determining the direction of each step. Important variables in the program are: the size of the grid, the density of words in each grid and the size of the chains.

Because of the use of a two-dimensional grid, relations between words become active in many directions. Thus, the poems generated by this program are multi-interpretable, interpretations varying with the wanderings of the eye over the page.

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3581 LL Utrecht
Holland

```
                                                                        vlag
                                                                              vlug
      ug    oeg                                         druug                 geg
eg    eg                                          drog  druug             gog
og    ug                                          drog  drig                    gieg
                                                      drieg                         gag
                                                                                          gug
                                                                                          goeg                        glieg glieg
                                                dwoeg dweg                                                            glig  glieg
                                                      dwug                  zug                     blieg
            wug                                             dwieg       zwoeg zwug  zweg  zweg
            wag   wug                                                         zwoeg zwig  big
            weg   wieg                                                        zwug        bug   bieg
            wig   woeg                                                              zwag  bag   bog
                                                                                          beg   big
                                                                                                bug   muug  meg
                                                                                          bieg  mag   muug        brig  bruug brug
                        vig                                                                           rieg              brag        brag
            grug  vuug                          ieg                                                                           brag  brug
      gruug       vig         vruug vrig  uug                                           wieg                                          broeg
greg  vag   vuug                    eg    vrag                                                wog                               greg  bruug
grig  vug                           oeg                                               weg   wuug
                                          zwieg                                       wuug  wuug                                      bloeg
                                    zwug                                              wug
                                          zwug
                              druug druug drig  rag
                                          drag  dug   deg                                                             vig
                  lieg                    drug  drag                                                                        veg
            loeg                                      dreg              hig                                                 vag
                                                                        hag   hog         drug                              veg
                                                                                    heg         drug        jag   jug   vug
                                                                              hieg  hoeg  heg   jog   jog
                        lig               lieg  luug                          heg         jeg
                        luug  log   lieg              luug        gleg              joeg  jieg
                              log                           glog  glog                    juug  jieg
                                                                                                joeg
            vlig  vlag                                                                                jog   joeg
duug                    muug  mog   mug   muug                                      nag         nuug  nog         joeg
      doeg                          mig         mag                                       nug   neg   nog   neg   nag   nieg
            dieg                          mag                                       noeg        nog                     nuug  noeg
                  duug                    brieg brig                                      noeg              vrig  vrig
                                          bruug       brog
                                                breg              dweg                                            hig   hieg
                                    zoeg        zig   zieg  zeg   dwug  dwig                                      hag
            boeg  boeg              zeg   zoeg  zieg  zug         dwuug dwag
            beg   bag   bog   bag         zug   dwieg dwig  dwoeg       gig
                  beg   big   bag
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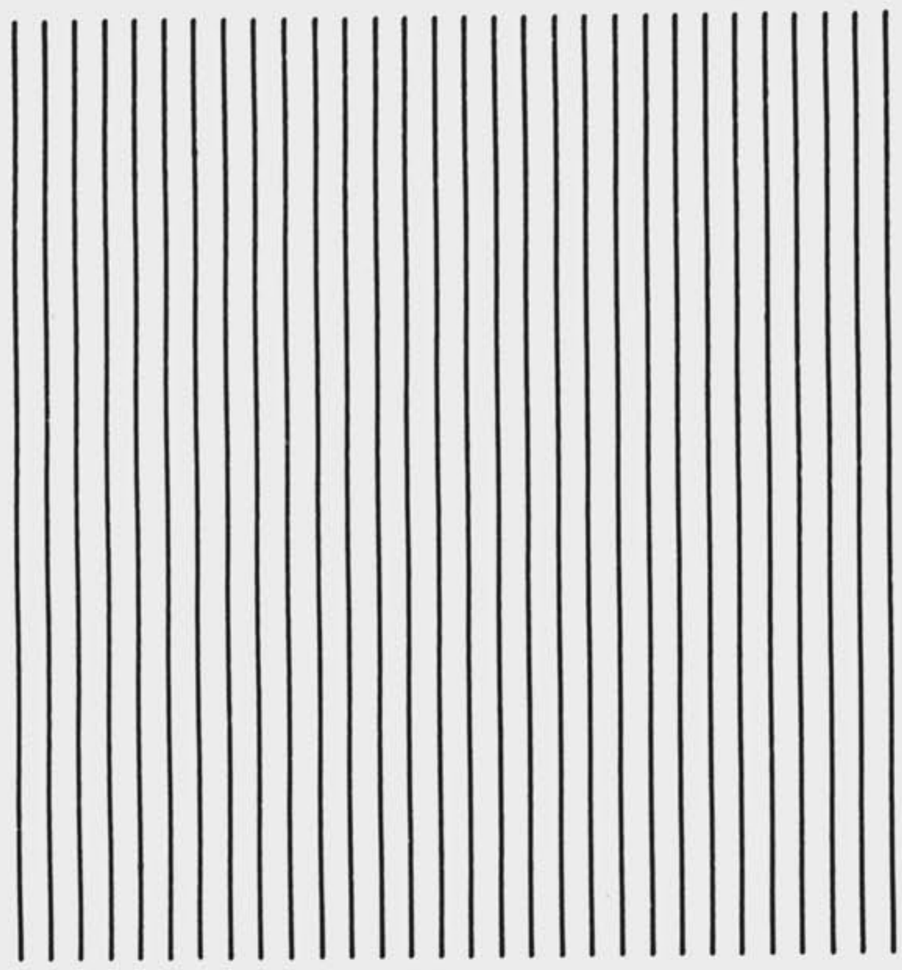
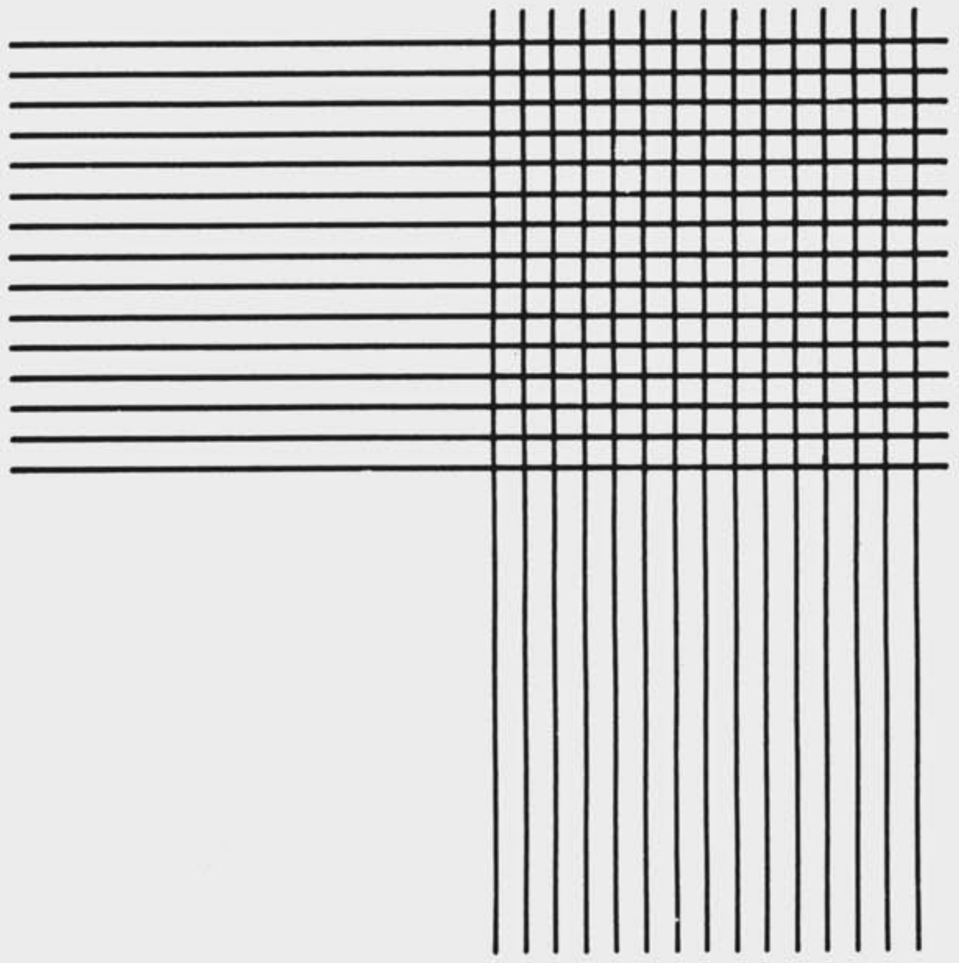
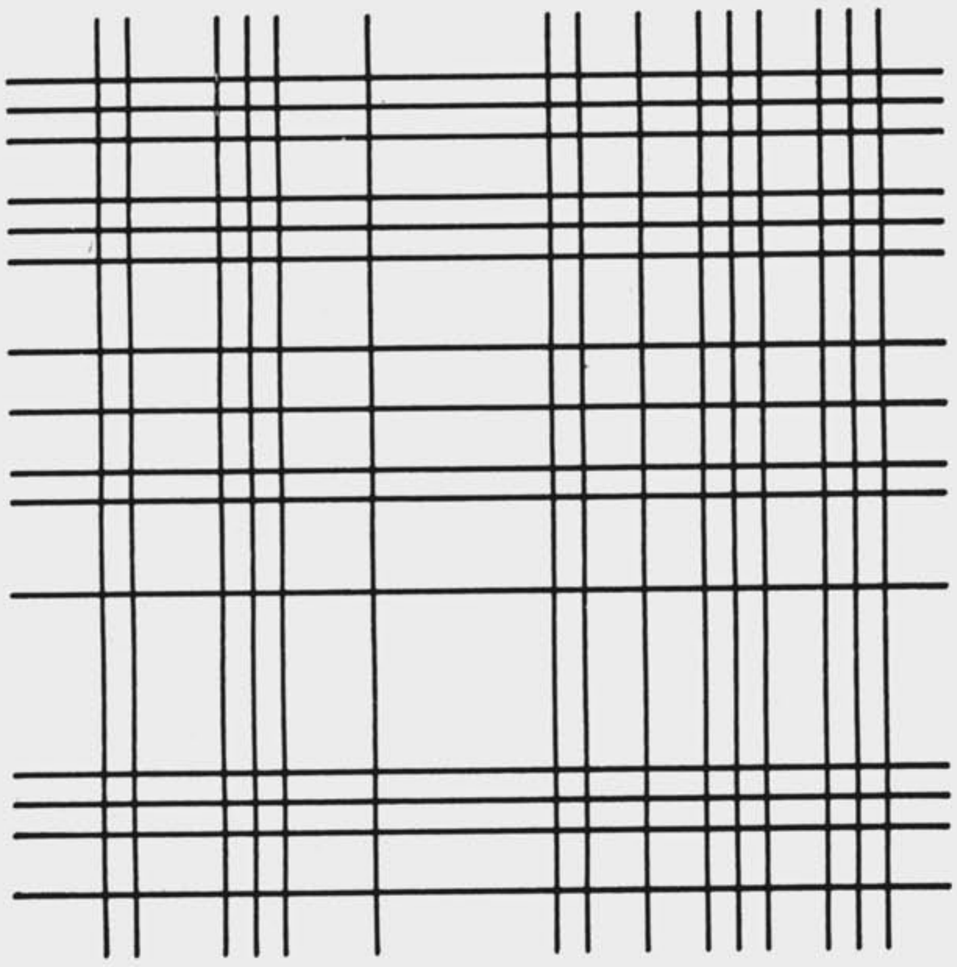
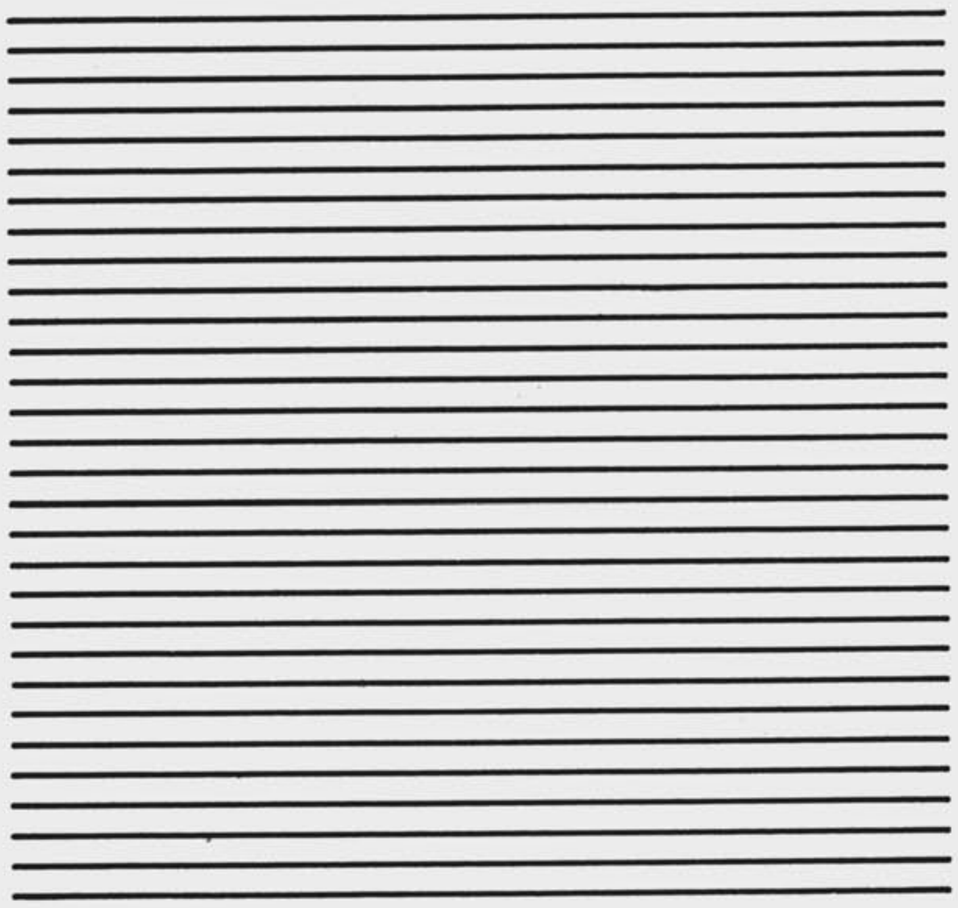








TORSTEN RIDELL

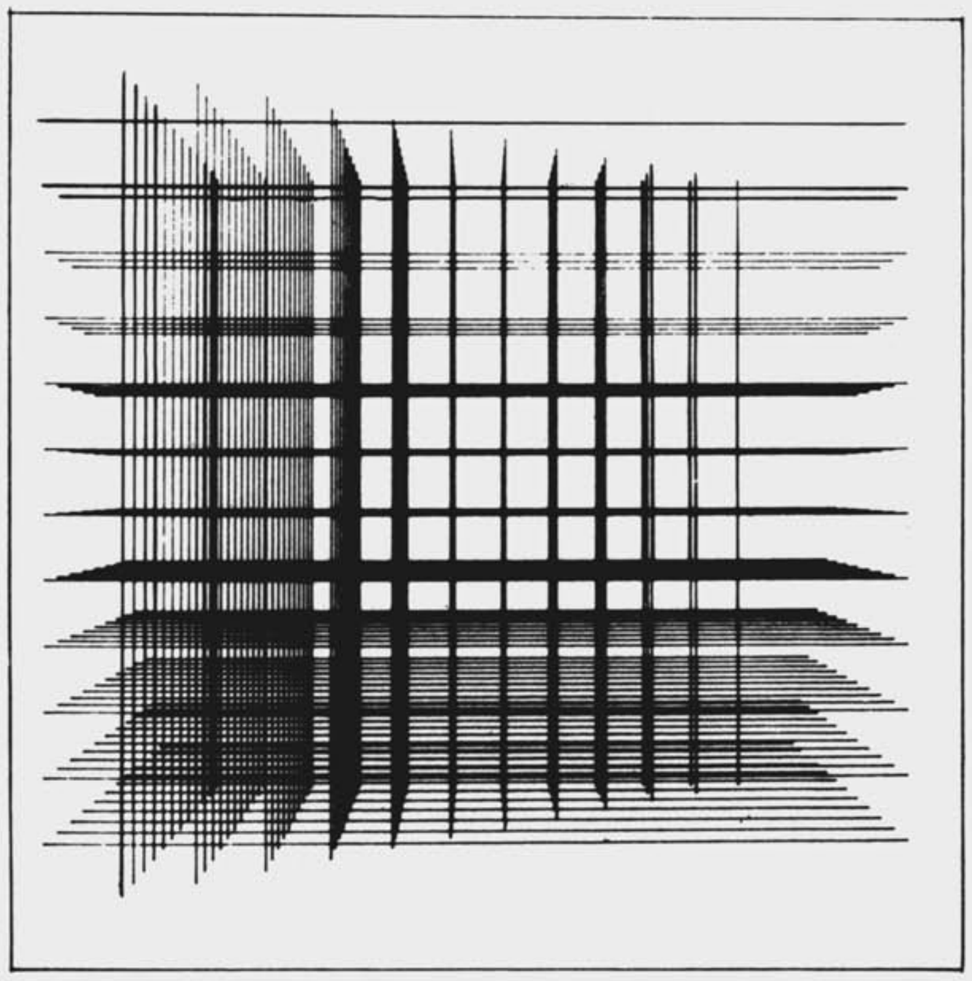
The drawings reproduced here are some examples based on my idea of "permutating lines".

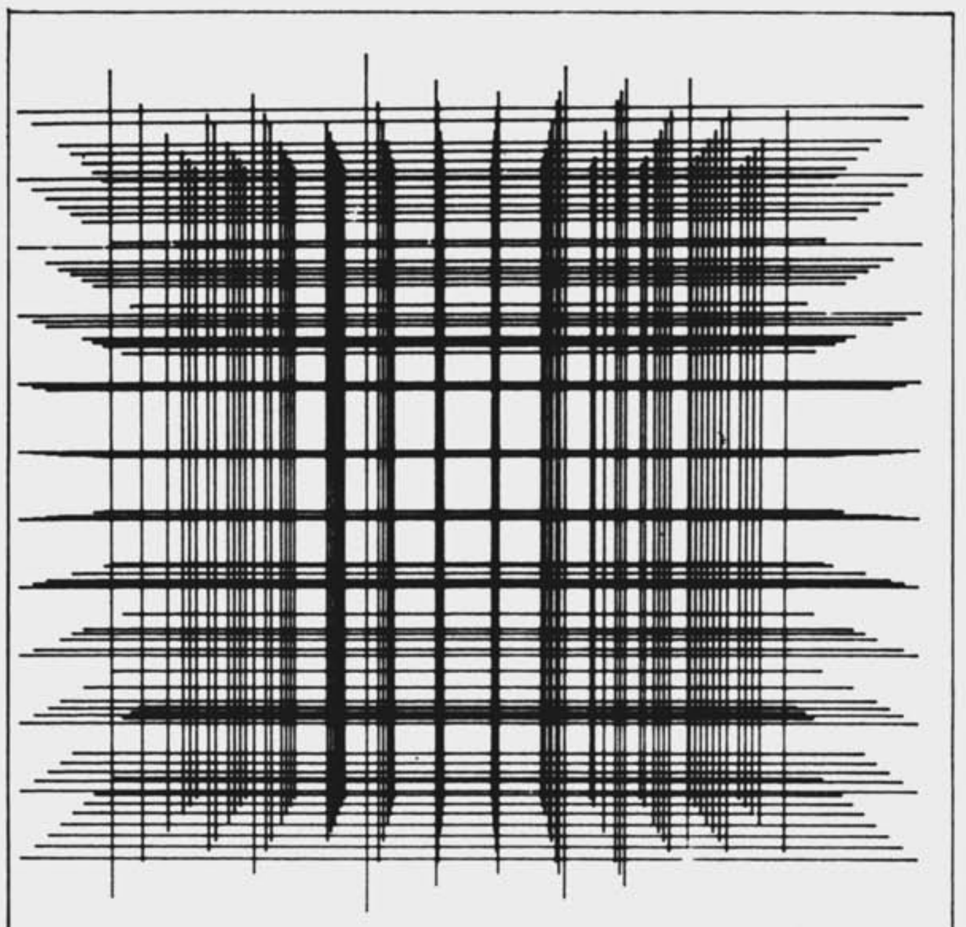
On a given surface, there are both horizontal and vertical positions for lines. These lines are distributed either systematically or aleatorically, resulting in a series of two-dimensional images. (above).

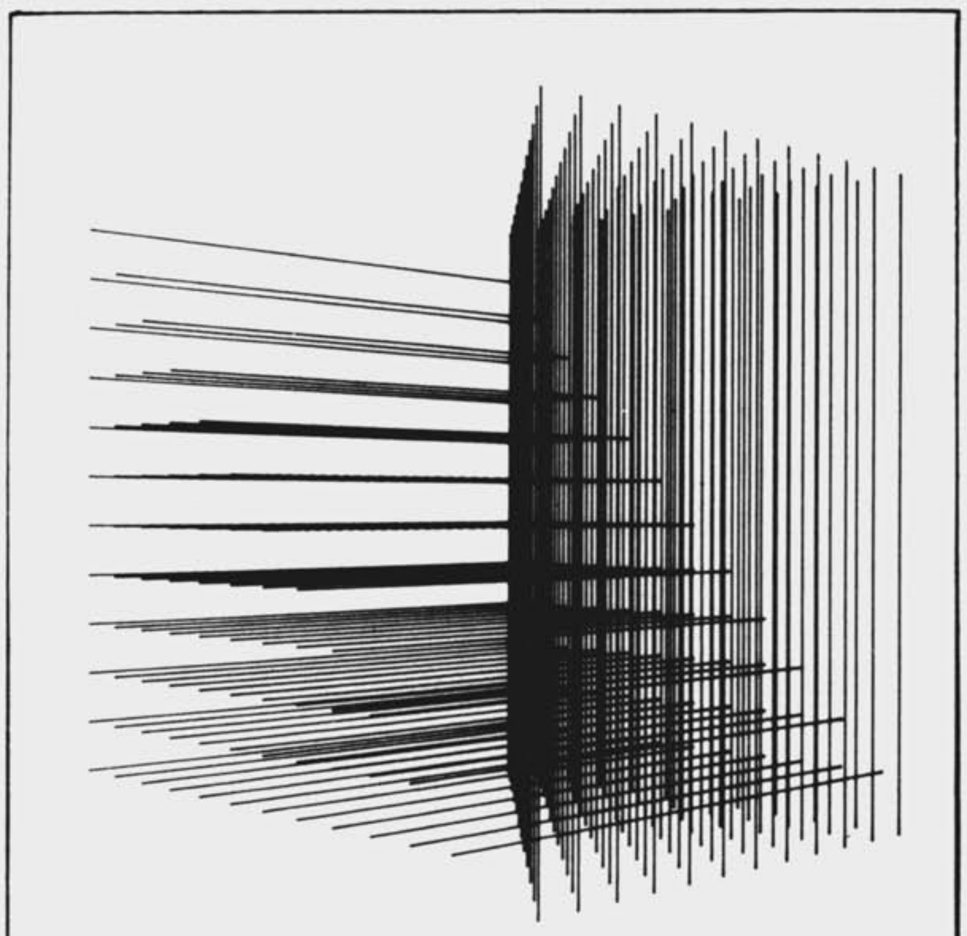
I next tried to combine some of these series to create a three dimensional image.

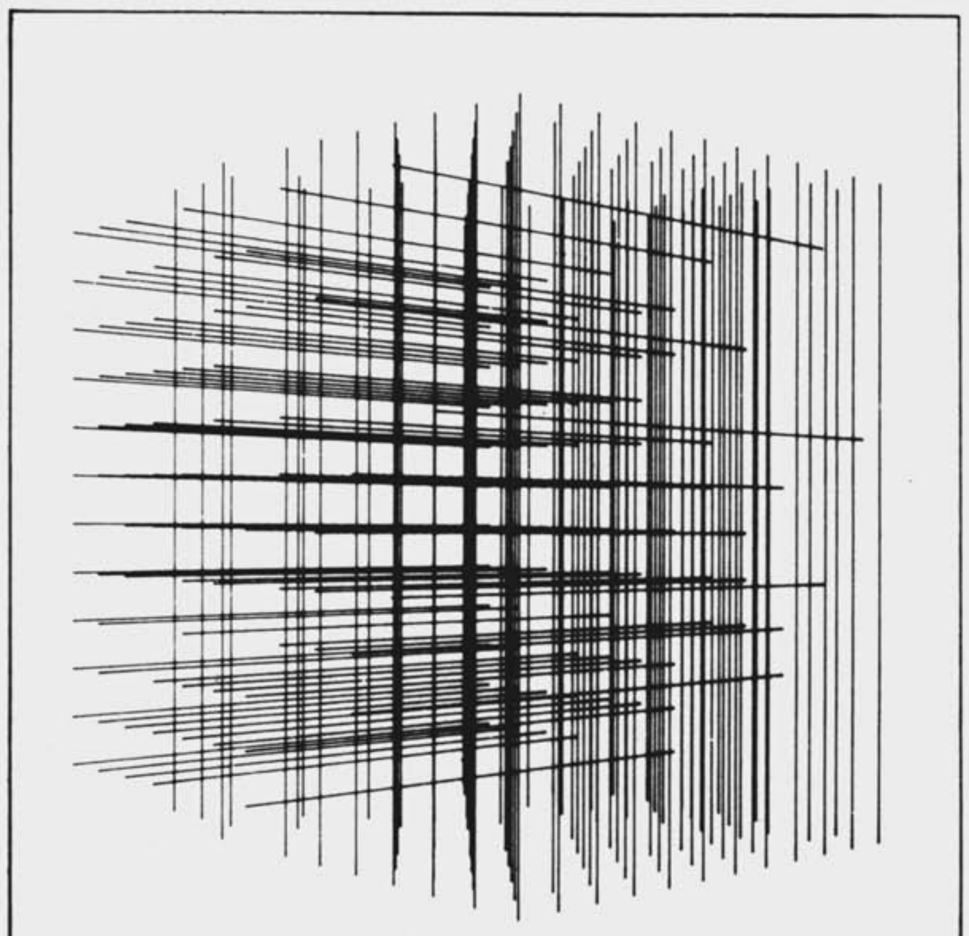
Each of the serial progressions of lines was used as a section through a cube where the distance between each line is equal to the distance between each section. By rotating each cube on its' axes, I obtained a new set of drawings whose serial progressions are in three dimensions. (opposite)

For the earlier series of drawings I used the machine for its capacity to make repetitive movements, in order to achieve the desired precision. For the later series, the computer itself









played a determining role: it allowed me to "see" my ideas as concrete visual forms, giving rise to some highly complex images which I would have found difficult to realise by traditional methods, or of which I might never even have conceived.

It is for this reason that I regard the computer not simply as a useful tool, but as being complementary to my artistic creativity.

(trans. Juliet de Mowbray)

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ALAN SUTCLIFFE

INFORMATRIX A Book of Figurative Dialogues by Edward Zajec

This procedural package for making graphics consists of 64 schemes in black and white or red and white. Each has a circle, square or triangle A as its most prominent visual feature, though procedurally it is not so important. There is also a smaller L-shaped or rectangular area B and two circles C. On the black and white schemes there are in addition two integers in bold type D which are pointers to other schemes. The centre of each scheme is marked with its numerator E. Scheme 2 is shown opposite on a reduced scale, with pointers 24 and 64. The numbers 5 and 16 at the centres of the two circles relate to their size. A well defined procedure is given which results in two concentric circles being drawn. These are construction lines that locate an element in the graphic to be made. Other aspects of the element are derived by less well-defined procedures.

1. Mark the centre of a piece of tracing paper and select one of the schemes
2. Put the centre of the paper over the centre of the scheme
3. Mark any point in area B
4. With this point as centre trace one of the circles C from this scheme
5. Choose another scheme, using the pointers, if any, otherwise by some other means
6. With the same centre as before trace one of the circles C from this scheme.

The shape, size and orientation of the element is then determined more or less using information taken from the two schemes. Further elements are derived by starting again at Step 2. The number of elements is given by setting a time for the generation of the elements.

In half an hour I made the design of 5 elements shown opposite. Through unfamiliarity with the system the piece of tracing paper was not big enough for all the elements. Once familiar with the system, generating each element takes only 2 or 3 minutes. I used the minimum of discretion, making all the choices I had to as simply as I could: select the smaller number, the nearest point, the most straightforward outline. Then I added texture to the design. It reminds me of cells or viruses seen in a powerful microscope. I had not expected anything so interesting.

"An ideal means which simultaneously mediates experiencing during the act of picturing is the electronic computer with video display". It would be a straightforward but moderate sized task to implement these procedures in a program. This would be well worth doing for use in teaching, for which this method seems ideally suited.

Whilst the rules are to be followed strictly at first, Zajec insists that after some use they should be changed and broken. The "ultimate intention is to lead the reader to an ever-increasing creative involvement by letting him simultaneously act and experience".

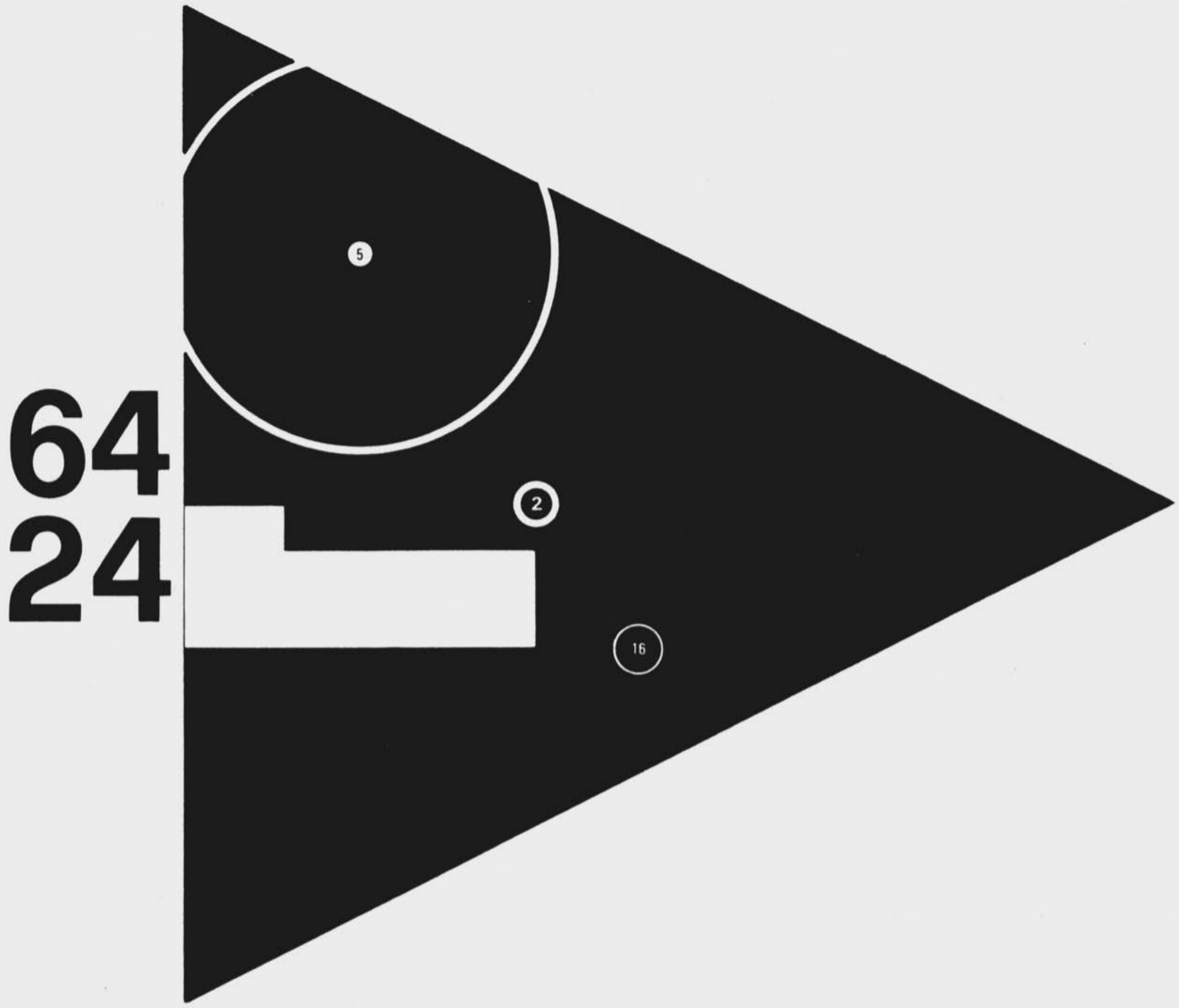
But even keeping to the original rules I find the material too rich, 64 schemes too many. I have not seen the necessary logic that holds these schemes together, they seem to lack economy. They could be used to make almost any preconceived drawing. I could place an element anywhere I chose and have it the size I wanted,keeping strictly to the rules. Then, with a liberal interpretation I could make the element any shape I wished.

Procedural schemes such as this should limit the universe of possible outputs. Rather than alter or ignore the given rules, I would add to them. The procedure allows this.

These are reservations that tinge my admiration for this important work, in which the problems of presenting a complex set of procedures for graphics have been solved. I hope you can get a copy and use it.

The last word goes to Zajec, "The book is therefore to be considered as a point of origin, introducing a new concept of pictorial expression, and not as a manifestation of a particular style. It is presented in the form of a scheme which leads towards transcending its schematicity. And it is perhaps within the reaches of this paradox that a way may be found for the popularization of creative activity". Amen.

Alan Sutcliffe.


64
24
5
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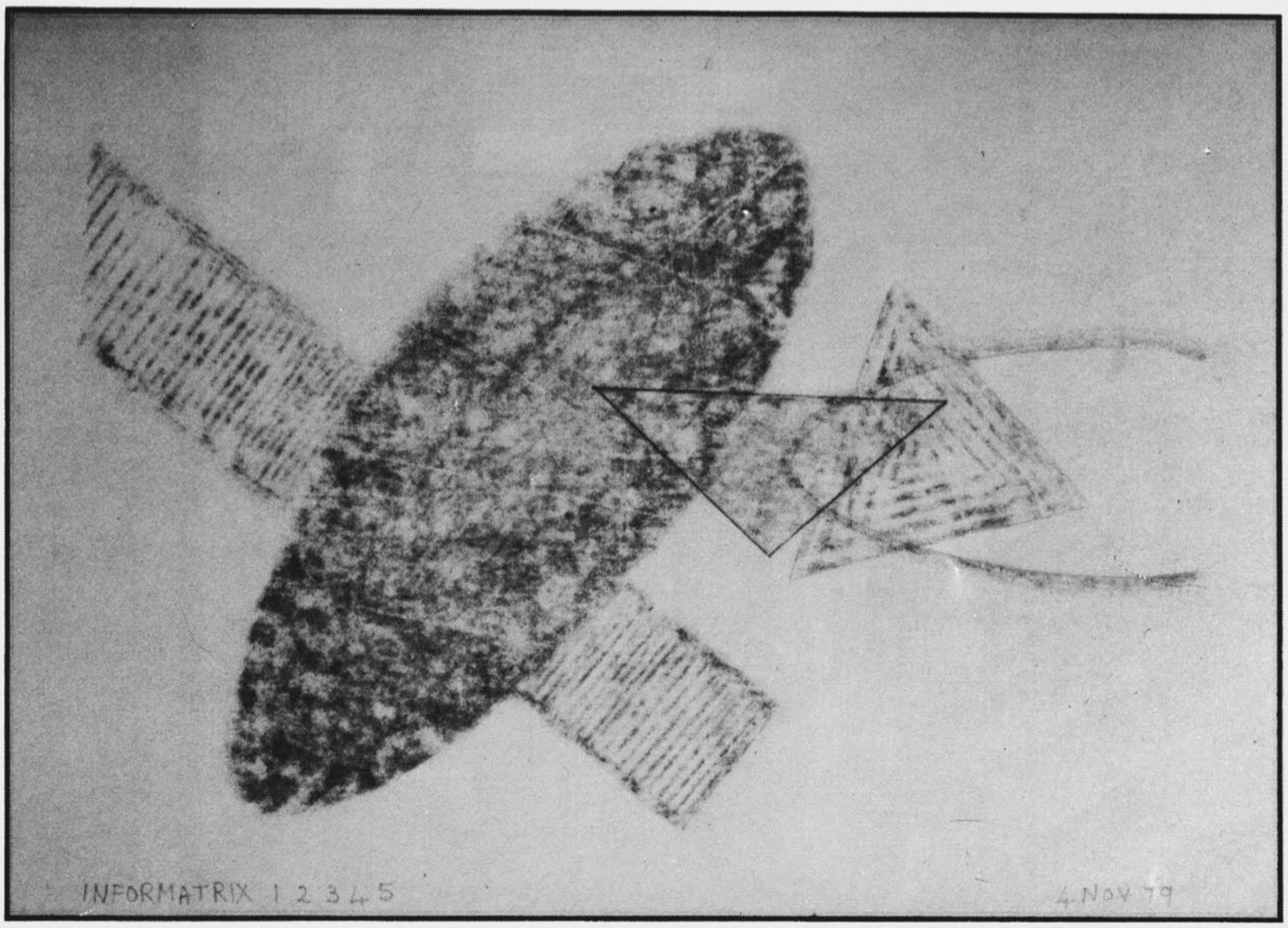
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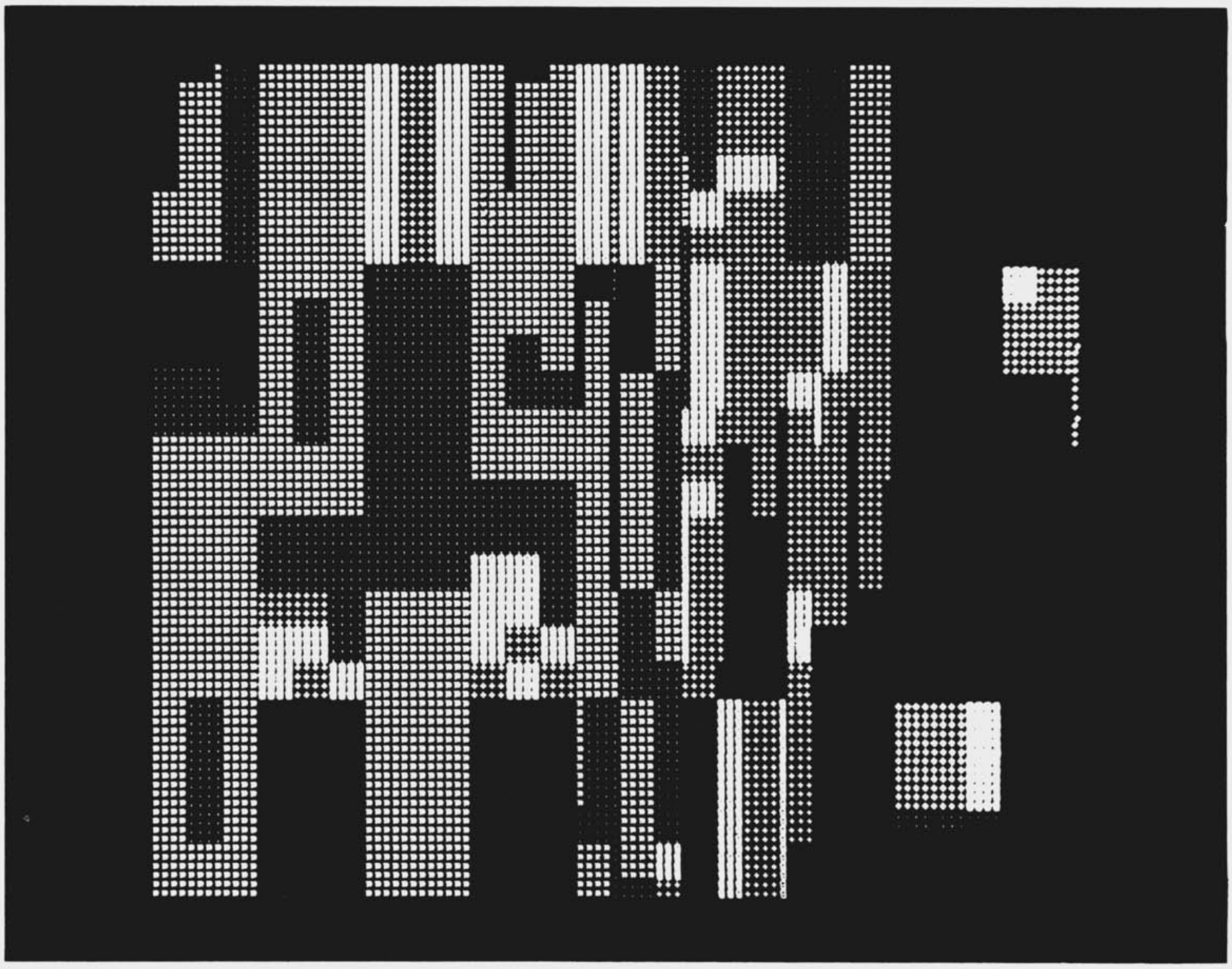
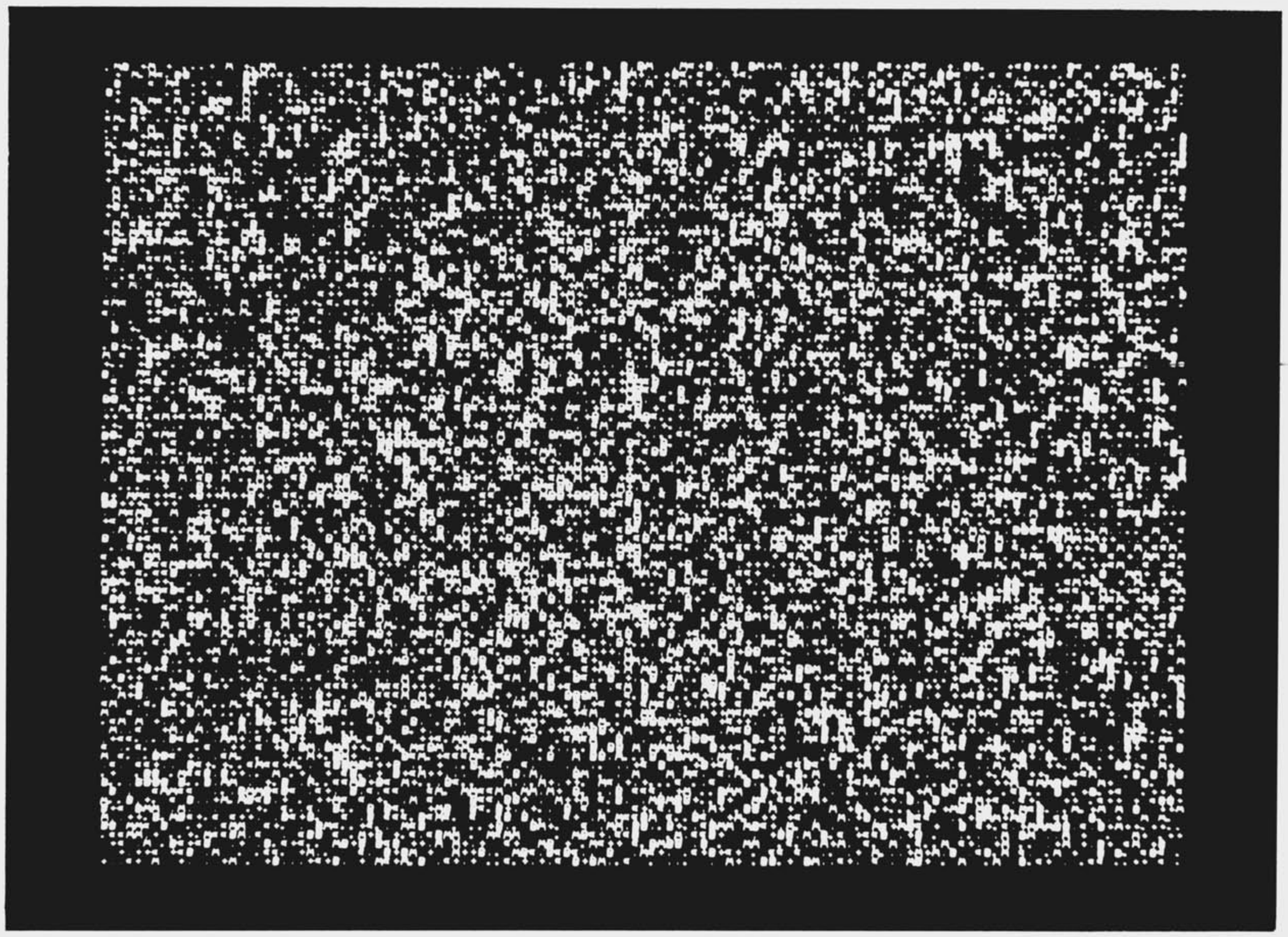
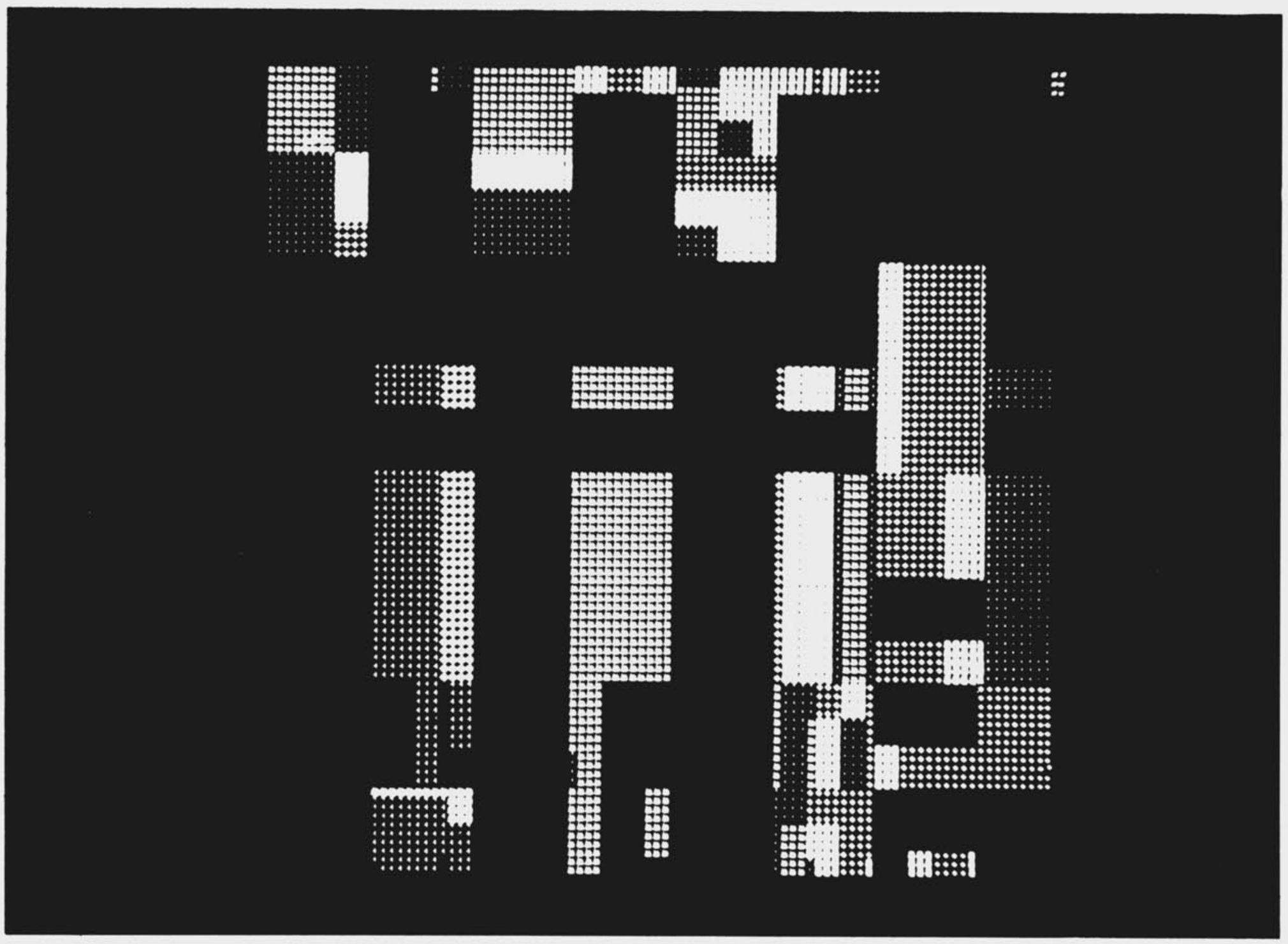


STAN VAN DER BEEK

3 Frames from computer generated films.
"Poem-field" series.

Stan Van Der Beek
Visual Arts Department
UMBC
5401 Wilkens Avenue
Baltimore
Maryland 21228





emas

ELECTRO-ACOUSTIC MUSIC ASSOCIATION OF GREAT BRITAIN

THE ELECTRO-ACOUSTIC MUSIC ASSOCIATION OF GREAT BRITAIN was inaugurated in January 1979 following two day meetings and a weekend sponsored by the Arts Council, which brought together directors of electronic music studios throughout the U.K. In the last ten years a surprisingly large number of universities have established basic teaching facilities, but it was doubly gratifying to discover that several community studios were flourishing, usually as part of an adult education programme. The Association therefore seeks a broad basis of membership: from composers, studios, technicians, research workers in computers, acoustics, psycho-acoustics, publishers, promoters and performers.

Why the term "electro-acoustic"? Over the last thirty years a wide variety of terms has been used to describe music requiring the loudspeaker for performance: "musique concrete", electronic music, live electronic music, computer music — even simply "amplified" music. From whatever source the sound comes, the final electro-acoustic device is the loudspeaker. So Swingle II, a Stockhausen tape, the Who, a computer — generated tape, a work for instrument and tape delay, are all electro-acoustic and demand a special expertise in presentation. At least in the area outside rock music, concert presentations have too often been badly handled. It is not adequate to throw two under-powered loudspeakers in the corners of the Roundhouse to project a piece ot tape music, as I heard at a BBC concert two years ago! With the view of promoting better electro-acoustic presentations, both for ready-established concert series and for their own promotions, the Association has recently established an equipment pool with financial assistance from the Arts Council.

The interest of musicians in computers is a natural extension of the investigations into electronic sound generation which took place during the 1950's. With respect to music, computers may and have been used in three basic ways:

(a) *Composition programs:* the generation of sound structures, usually the macro-structure, having the possibility of being transcribed for acoustic instruments played in the traditional manner. Xenakis used this approach in several works from 1958-62.

(b) *Control programs.* The control (via D/A converters) of the "traditional" electronic music studio; i.e. oscillators, filters, etc., in the analog domain. The D/A's produce very low frequency control voltages. This method was developed in "hybrid" studios during the 1960's, but fell out of favour when Wave Generation (c) q.v. was more firmly established. Now being re-investigated following the development of the micro-processor. The concept of a hybrid system becomes less meaningful when the analog devices are replaced by *digital* oscillators, filters, etc. This mode then merges into a dedicated version of:

(c) *Wave generation by computer.* In the U.S.A. during the early 1950's, experiments had already been carried out at Bell Laboratories in the digital generation of sound waves. The computer's number crunching capacity is used to produce (in recent programs) 4 or more high quality audio outputs via D/A's. A/D's too were developed to store "real" sounds in digital format for manipulation acoustically, (predating the current move to digital recording by fifteen years). The current generation of programs: Music V (Bell Labs. 1968), Music 10 (Stanford, California, and IRCAM, Paris), and Music 360 (MIT), share the major drawbacks of expensive mainframe computer time and delays caused by time-sharing arrangements. This has encouraged new developments in the use of micro-processors, which, though on paper not so powerful, may allow fast real time control and sound manipulation fot the sound engineer and composer, whose roles I see converging in the late twentieth century.

In the U.K., our software has (as usual) been more developed than our hardware. Computer music has been slow off the mark. Three universities currently run music programs on mainframe computers: Music IV BF at Southampton, and Music V at Birmingham and at the City, London. Only the latter has a full on-sight (but off-hire!) conversion facility, and even then in mono only. University College, Cardiff has small programs on PDP8's for music generation and sound manipulation, while Durham and East Anglia have developments in the pipeline for small dedicated computers. Glasgow has a computer controlled "Synthi 100", (a large analog synthesiser). At the City University, London we are developing two micro-processor based systems. An ITT 20:20 with colour video display is being used to develop light/sound interaction

programs and composition programs. A Z-80 Nascom system is also being developed, which will (via D/A converters) control at first analog, then we hope, digital devices in the studio. One research project related to this will be the development of a micro-processor program, (developing Chowning's work at Stanford, California) for the placement of a sound in space — controlling amplitude, reverberation and later perhaps Doppler shift. The most powerful new development is taking place at the University of Edinburgh, where a substantial new composition and synthesis program is being developed by Steven Holtzman. Nearest the non-standard synthesis programs developed at the Institut voor Sonologie at Utrecht University, the system, which should be operational any moment, allows the composer to establish complete "linguistic model" hierarchies at any level of the generation of sound structure.

COMPUTER MUSIC CONFERENCE

The Computer Department at Edinburgh is co-hosting with the Electro-acoustic Music Association the first Computer Music Conference to bring together these small but important developments in the U.K. It will take place from 8 to 11 April 1980, when limited hands-on sessions will alternate with papers describing developments and plans.

Those interested in the **ASSOCIATION** or the **CONFERENCE**, please contact:
Simon Emmerson
Hon. Sec. EMAS
c/o The Centre for Arts (Music)
The City University
Northampton Square
London E.C.1.

Simon Emmerson is Hon. Sec. of the Electro-acoustic Music Association of Great Britain (EMAS) and Lecturer with responsibility for Electronic and Computer Music at the City University, London.

EDITORIAL

40 pages is something of a landmark for PAGE. Even so, it has not been possible to include all the artists who should have been represented in the present "survey of contemporary computer-assisted art", which has accordingly been designated "Part 1". If the response is good, I would like to publish Part 2 next January and then . . . . . .

It is a great pleasure to welcome French colleagues new to the Society, as well as long-standing members, in the formation of a French Branch of the Society. Plans are currently being made to organise CASF; anyone interested is invited to contact Bernard Demio (see Announcements and Addresses).

Simon Emmerson has contributed some interesting information about EMAS, the Electro-acoustic Music Association of Great Britain. I hope that the EMAS page(s) will become a regular feature, and that composers and others concerned with computer music will take note and contribute articles, and news of concerts, meetings, etc. It's your journal, make it useful. Computer Art is not confined to graphics.

! IMPORTANT ! SUBSCRIPTIONS

As members are well aware, PAGE has not been published with any regularity for several years, and the Society has therefore refrained from asking for membership subscriptions, preferring to send the last four editions of PAGE (40-43) free of charge. The two main consequences of this are (1) a severely out-of-date mailing list (2) a large over-draft. To help us rectify this situation please be sure to return the accompanying Subscription Form, enclosing a crossed-cheque or International Money Order for £4. CASUS members should send their name and address to Kurt Lauckner, enclosing $10.

If you know of someone who would like to receive PAGE, or who has lost contact with the Society, please photocopy the Subscription Form and send them a copy. The CAS is growing as an international organisation; help us to up-date our records and mailing list by returning the Subscription Form now!

EXHIBITIONS AND ANNOUNCEMENTS

FRENCH BRANCH: CASF

At the conference entitled "Artiste et Ordinateur", held at the Centre Culturel Suédois, Paris, last October, several French artists expressed an interest in forming a French Branch of the CAS. Plans are at present being made to establish CASF, which will be responsible for publishing an edition of, or supplement to PAGE, in the French language. Anyone interested in participating in the organisation of the new Branch, or simply in becoming a member, is invited to contact Bernard Demio, 12 Rue Rambuteau, 75003 Paris. Tel: 271 96 76.

ROGER COQART

ROGER COQART has an exhibition at the Steglitz Klinikum
of the Free Berlin University, during January 1980.

CAD80

4th INTERNATIONAL EXHIBITION AND
CONFERENCE ON COMPUTER-AIDED DESIGN
METROPOLE BRIGHTON SUSSEX ENGLAND 31 MARCH - 2 APRIL 1980

COMPUTER ARTS SOCIETY INTERNATIONAL EXHIBITION

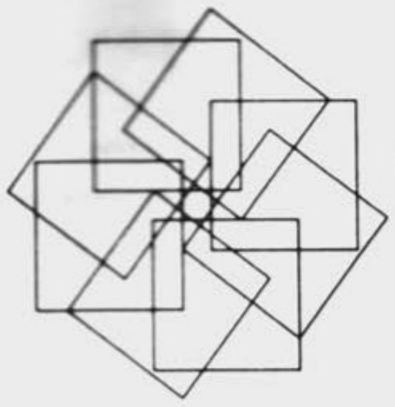
DOMINIC BOREHAM	Gt. Britain	TONY LONGSON	Gt. Britain
PAUL BROWN	Gt. Britain	AARON MARCUS	U.S.A.
HERBERT FRANKE	W. Germany	MANFRED MOHR	France
TAMSIN GILES	Gt. Britain	GRETA MONACH	Holland
SOZO HASHIMOTO	Japan	TORSTEN RIDELL	Sweden

Conference Programme and Exhibition Brochure available from: Alan Pipes, Conference Organiser, PO Box 63, Westbury House, Bury Street, Guildford, Surrey, GU2 5BH England. Tel: 0483 31281

Ukrainian institute of modern art
2320 West Chicago Avenue • Chicago, Illinois 60622 • (312) 227–5522

ART IN/ART OUT: COMPUTER AIDED GRAPHICS
February 1 – March 16, 1980

Charles and Colette Bangert
Roger Coqart
William Fetter
Herbert Franke
Aldo Giorgini
Richard Helmick
Grace Hertlein
Ken Knowlton
Bill Kolomyjec
Ruth Leavitt
Robert Mallory
Aaron Marcus
Kevin McMahon
Vera Molnar
James Pallas
Duane Palyka
Joan Truckenbrod



SIGGRAPH '80

Seventh Annual Conference on Computer Graphics and Interactive Techniques
July 14-18, 1980 Seattle, Washington

Sponsored by the Association for Computing Machinery Special Interest Group on Computer Graphics

SIGGRAPH '80, the Seventh Annual Conference on Computer Graphics and Interactive Techniques, will be held July 14-18, 1980, at the Seattle Center, Seattle, Washington. The conference will consist of a blend of paper and panel discussions with major emphasis on human-machine communication and applications demonstrating state-of-the-art techniques. Both hardware and software topics are encouraged. An emphasis will be placed on industrial (foreign and local), government, and other innovative end-user applications. Tutorials will precede the conference.

Technical Program Chairman

Jim Thomas
Battelle Northwest Laboratories
P.O. Box 999
Mathematics Building
Richland, Washington 99352
(509) 946-2504

General Conference Information

SIGGRAPH '80
P.O. Box 88203
Seattle, Washington 98188
(206) 453-0599

CAS VISIT TO SIGGRAPH '80

It has been suggested that the CAS might organize a group visit to SIGGRAPH '80. If a sufficient number of people are interested, the Society will negotiate for reduced air fares. Please write to John Lansdown.

COMPUTER ARTS SOCIETY

BRITISH COMPUTER SOCIETY SPECIALIST GROUP

AIMS AND MEMBERSHIP

The Society aims to encourage the creative use of computers in the arts and allow the exchange of information in this area. Membership is open to everyone at £4 or $10 per year. Members receive PAGE four times a year, and reduced prices for the Society's public meetings and events. The Society is a Specialist Group of the British Computer Society, but membership of the two societies is independent.

Libraries and institutions can subscribe to PAGE for £4 or $10 per year. No other membership rights are conferred and there is no form of membership for organisations or groups, though members of other organisations are welcome to join the Society as individuals. Membership and subscriptions run from January to December. For further information write to John Lansdown, Dominic Boreham, or Kurt Lauckner (U.S.A.)

COMPUTER ARTS SOCIETY ADDRESSES

Secretary: John Lansdown, 50/51 Russell Square, London WC1B 4JX

Treasurer: Dr. George Mallen, 50/51 Russell Square, London WC1B 4JX

PAGE Editor: Dominic Boreham, 10 Archel Road, West Kensington, London W14 9QH
Tel: 01-385 5228

CASH – Dutch Branch: Leo Geurts and Lambert Meertens, Mathematisch Centrum, Tweede Boerhaaverstraat 49, Amsterdam, Holland.

CASF – French Branch: Bernard Demio, 12 Rue Rambuteau, 75003 Paris

CASUS – US Branch and Editor of US editions of PAGE: Kurt Lauckner, Mathematics Department, Eastern Michigan University, Ypsilanti, Michigan, 48197, U.S.A.

LONDON MEETINGS

The Society holds regular meetings at 7.30pm on the 1st Monday of each month at John Lansdown's office, 1st floor, 50/51 Russell Square, London WC1. Members and guests are welcome; there is no charge.

PAGE

COMPUTER ARTS SOCIETY QUARTERLY

PAGE is published quarterly, and mailed to subscribers, (see under Membership). Articles, papers, news, reviews, pictures, announcements, should be submitted to the Editor at least eight weeks prior to the month of publication. Please submit manuscripts typewritten. Photographs should be of good quality, high contrast and definition, and either the actual size intended for publication, or larger. Pages are layed out with 1 inch margins, leaving a maximum size for photographs of 6¼ x 9¾ inches. Please document photographs clearly on the reverse, with author, title etc., and indicate which way up they should be. It usually helps with layout if diagrams, flowcharts, etc., are presented in landscape format rather than portrait. Please enclose a pre-paid mailer if you wish your manuscript to be returned. PAGE is printed in Univers on A4 paper.

The Editor is pleased to receive articles from anyone with an active interest in the use of computers in the Arts, whether or not they are members of the Society.