event one

computer arts society

COMPUTER ARTS SOCIETY

The aims of the Society are to promote the creative use of computers in the arts, and to encourage the interchange of information in this area.

The term CREATIVE will be applied with some strictness; the use of computers in the analysis of works of art, important though this is, will not usually be included, except where it leads to some synthesis of new works. The term COMPUTER will be applied broadly, to include machines and techniques with computer-like functions providing scope for programming, which explore new creative possibilities.

All arts, pure and applied, are included. Many of the ideas and methods for the creative applications of computers and programming apply to more than one art form.

The current information processing needs of artists and the development of new forms of expression will be considered. The underlying purpose will be to foster methods and systems that suit people and to resist the tendency to make people fit systems.

The mutual education of artists and computer people through joint projects and discussions is most important. Initially, the stress will be on activities; formal establishment of a society can follow.

The arts and computers are equally global; a society concerned with fostering new forms of expression and communication, should be world-wide. There are practical problems in running an international society, but publications can be international, and it is hoped that at least one international event can be organised each year.

The group has been given the status of a special interest group of the British Computer Society to aid it in its early organisation. This will not prevent association with other societies later, or the formation of an independent society.

The current information processing needs of artists can be illustrated by the situation in electronic music. Computer control of an electronic music studio causes a dramatic alteration in the composer's attitude towards his medium and material. The many laborious hours of splicing tape are eliminated. This is a solution of practical problems that is bound to be adopted more widely. The composer can use his system much more freely, like a sketch pad, in a more interactive way. In just this way computers can lead to more freedom for artists, not less. This area is clearly related to the computer aided design which is increasingly finding a place in industrial design.

The development of new forms of expression is not something that is bound to happen, but is a matter of the choice and preference of artists. What is possible is the programmed creation of works. The artist is then creating a process, not individual works. In the pure arts this may seem anathema, but art thrives on contradictions, and it can be yet another way of asking what is art? - how should we look at a drawing designed by a program? - how should we look at a drawing designed by a man? - how should we look at the world?

In the applied arts there are important social implications. For here is a way of reconciling the economic need for large scale production with the human need for the individually different.

We cannot return to the days of hand made goods. But we can now, with computers, reverse the tendency for mechanisation to mean standardisation, greyness, uniformity and de-humanisation. It will be an important function of the society to see that this happens. In architecture, for example, it should no longer be necessary to design estates of identical houses or blocks of identical flats; unlimited variety even within standard shells and with standard modules is possible. It needs more work than the easy way, but computers can do that work.

ACKNOWLEDGEMENTS

Boeing Aircraft Co.
B.B.C.
British Computer Society
Brunel University
Calcomp
Electronic Music Studios
Ian Fraser and Associates
Funnell Graphic Ltd.
G.E.I.S. Ltd.
Imperial College of Science
I.C.A.
International Computers Ltd.
Royal college of Art
Systems Research Ltd.
Time-Sharing Ltd.

ALAN M. FRANCE

Age 25. Started in computers two and a half years ago as computer operator, became interested in programming and computer art as a sideline. Entered drawing for 1967 Computers and Automation Computer Art Competition and was baffled when published; even more baffled when an American company bought publication rights to a doodle. Publicity within ICL and a meeting with Bob Parslow led to the initial meetings of C.A.S.

R. JOHN LANSDOWN

Architect in private practice, has been concerned with computer applications in architecture since 1964. Is secretary of the CAS and the Computers in Urban Planning Group, two specialists groups of the British Computer Society and has been co-ordinating the hardware for EVENT ONE.

MALCOLM LE GRICE

b. 1940. Studied painting, Slade School. Film-maker. One man show paintings and film at Art's Lab 1968. 2 week event Free Drama with closed circuit TV and other media, Art's Lab 1968. Teacher Film/Painting/Communications, St. Martin's and Goldsmith's. Connected with CATALYST a group of artists forming an all-arts experimental centre.

JOHN LIFTON

M.A. 24. Studied architecture at the Bartlett School University College, London, for five years. Since qualifying has virtually opted out of architecture to work on own ideas. Exhibited computer controlled light system in geodesic dome at 'Cybernetic Serendipity' exhibition at ICA London 1968. For EVENT ONE, has produced an enlarged version in which light and sound are both affected by human behaviour, and also helped with the 'Trilogy' mime performance.

GEORGE MALLEN

Deputy Research Director of System Research Limited, an organisation doing sponsored research in behavioural science. Professional interests include the application of computer technology to educational systems and the study of organisational behaviour. Broadly is concerned to see that computing power becomes understood by all social groups. Married, three sons, lives in Twickenham.

ALAN MAYNE

M.M., B.Sc.(Oxon), mathematical and statistical researcher, author, inventor, entrepeneur, Managing Director of Creative Enterprises Ltd., International Chairman of Mensa, Co-ordinator of Creative Science Society, Chairman of SPUR. Wide interests in science, technology, computers, the arts etc. Helped draft CAS leaflet. Showing experimental programmed visual art in EVENT ONE.

IAN PICKERING

31. Tutor at the Architectural Association School of Architecture and in the Interior Design Department of the Royal College of Art. Simultaneously bewildered and exhilarated by the potential effect of computers on the whole of society. Has been involved with the CAS since the second meeting.

ROBERT PARSLOW

M.Sc., F.I.M.A., F.B.C.S. Lecture in Computer Science at Brunel University. Chairman of the Organising Committee, International Symposium of Computer Graphics, July 1968. Proceedings just published. 2nd conference April 1970. With Professor Pitteway devised Computart pictures.

JASIA REICHARDT

Assistant Director of ICA. Writes on contemporary art and allied manifestations. Particularly concerned with the periphery of the visual arts. Organised many exhibitions among them one dealing with concrete poetry 'Between Poetry and Painting' 1965, and 'Cybernetic Serendipity' 1968 concerned with the relationships of cybernetics and the creative processes.

BEVERLY ROWE

Born 1935. Chief applications programmer at University of London Computer Centre, which has a CDC 6600. Interested in the whole problem of applying computers to the arts and the social implications. One of the original members of the steering sommittee formed to set up CAS. Acting as consultant to Gustav Metzger for his computer controlled sculpture project which will be presented at EVENT ONE.

ALAN SUTCLIFFE

Manager of programming research and development in ICL. Composer of electronic and instrumental music. With Peter Zinovieff gained second prize for ZASP in IFIP 68 computer composed music contest.

THE COMPUTER AND ART: Some questions and non-apology in advance
OR: I don't know much about art but I know a good subroutine when I see one!

If, as we learn from those in the know, computers are now entering their fourth generation, computer art is still in its infancy - perhaps even in embryo. With this in mind, what are we to expect from Event One ?

Well, certainly no more than tentative approaches to the creative use of computers: poetry to less than sixth-form standard; primitive choreography and drama; fairly simple graphics.

No-one is likely to confuse the sophisticated means of achieving the ends with the ends themselves and many will be tempted to ask, "Why use a computer to do poorly what Man can do so well?"

The true answer to this is; "We don't know" but this is hardly a satisfactory reply.

We know very little about creativity. Did Leonardo create in his mind a multitude of Mona Lisa's all but one of which he rejected during execution of the picture we know now? or did he simply build up the image by stages having no clear idea of the end result until he achieved it?

Did he either by perversity or simply error, perhaps reject images which in some sense are better than the one he finally used? We don't know. We have no 'hard-copy' of Leonardo's thoughts.

It is in the nature of a computer to be prolific and we can harness this to endlessly produce images from which the artist can select, and with interaction, modify.

In Art, as in everything else, blind alleys are difficult to chart in advance: one must explore. Event One shows some of this exploration and some of the tools of exploration and some of the plans for exploration.

Most of what will be found will be useless but something of value may be uncovered.

If nothing else, we may learn just a little more of the process of artistic creation.

R. John Lansdown

To be creative with computers is a difficult task to define. One must be quite sure what the creativity is related to ; whether it is part of the processing of data, or information flow or the hardware which allows the process to take place.

This is described more fully in the following roles;

Creators of; Programs, System Evaluation

Workers in ; Language Development, Code Development, Storage of Data, Speed of Processing

These are just a few of the areas within which innovation occurs and there is sometimes little work to copy or to get ideas from. It is a technology which requires a great deal of research into its implications at a technological level.

Beauty has been said to be in the past, a two dimensional art form. Then in sculpture as a three dimensional form, occasionally as in kinetic art there has been an inclusion of the fourth dimension of time. This fourth dimension is an implicit part of computer arts. electon

Such is the nature of the technology, however, that whereas it was possible in latter days for the individual to explore the implications of his era's technology, it is now difficult to express innovatory attitudes since the electronics industry retains its secrets carefully, so that any artistic developments are extremely 'fringe' by nature and do not fully penetrate the characteristics.

Any person who wishes to participate must involve himself with the full implications, by understanding the workings of the hardware; he must also understand the problems with the soft ware, how the problems are expressed and/or interpolated.

Instructions, programs, data can be handled with unbelievable accuracy in nanoseconds or by the year. The electronic equipment and its control system at so many levels, automatic, cybernetic, that it is impossible to envisage the possible developments.

Internal Memorandum
To Ian Pickering
From John Starling Date 14.3.69.

ART, COMPUTERS AND MATHEMATICS

CHARLES CSURI and JAMES SHAFFER

The computer is having an implosive effect upon the way we deal with a variety of problems. As an extension of man's senses, computer technology can provide an exciting new potential for the creation of art. The frontiers of knowledge in computer research suggest a new approach to problem solving in the arts. With a computer the artist can now deal with different variables in his decision making process than with conventional methods. For example it is possible to put into the memory of the computer a colour representation of a landscape. This landscape can be simulated on a graphic console. Then with computer programs which implement mathematical functions, the artist can watch the effects of wind velocity, temperature and factors which involve the amount of daylight upon his landscape. He can also observe data which are generally unavailable such as the effects of molecular structure, weight, mass and time upon the landscape. In his decision making process, the artist can rely on non-visual cues as well as visual cues. He can modify many more parameters in the total landscape environment to create a work of art than by more conventional methods.

Considerable research is in progress which attempts to deal with artificial intelligence programs. Some researchers suggest that once we provide computer programs with sufficiently good learning techniques, these will improve to the point where they will become more intelligent than humans. Suppose we have a machine which has stored in it, a knowledge of art history, theories of philosophy and aesthetics, in fact, the intellectual history of man. Every known technique about painting, sculpture and the computer graphics will also be stored in the computer, not to mention an ability to make judgments more logically than man.

What happens to questions about art when there is a dialogue between man and such a computer program? What are the implications for man? It is both terrifying and exciting at the same time.

The emergence of new forms and media in contemporary art indicates the artist's deep involvement in twentieth century technology, but reveals him to be more concerned about materials and technical processes than any underlying scientific concepts which produced these products. The computer which handles fantastic amounts of data for processing brings the artist close to the scientist. Both can now use the same disciplines and knowledge in different ways. For the first time, the artist is in a position to deal directly with the basic scientific concepts of the twentieth century. He can now enter the world of the scientist and examine those laws which describe a physical reality. The artist can enter a microuniverse of science and alter parameters to create a different kind of artistic world. In a highly systematic and disciplined manner he can deal with fantasy and imagination. In fact he can take a broad variety of well-known equations which describe our physical universe and change the parameters. He can create his own personal fiction.

It is quite apparent that the computer artist will have contact with the scientist. The computer and the mathematical disciplines required to solve problems, artistic and scientific, make for a common ground. Those fields will be brought closely together, and both will benefit by the dialogue made possible through computer science.

The artist, when involved in the creative process, feels free to deal with experience in any terms which can express his conception. He is not restricted to the rules required of the scientist to express a reality. In a sense, one might say that he takes the many parameters of ordinary experience and changes them to express his imagination. He creates a new universe. Since his purpose is to make art, the artist is not bound by the laws which account for the physical world. On the other hand the scientist is also interested in realities. He explains the behaviour of physical phenomena and usually verifies it in mathematical terms. Jacob Bronowski summarizes the similarities and the differences between artist and scientist in the following statement:

"The creative act is alike in art and in science; but it cannot be identical in the two; there must be a difference as well as a likeness. For example, the artist in his creation surely has open to him a dimension of freedom which is closed to the scientist. I insist that the scientist does not merely record the facts, but he must conform to the facts. The sanction of truth is an exact boundary which encloses him, in a way which it does not constrain the poet or painter...."

The problem is one of conception, wherein the mathematical transformations made possible by the computer present a new dimension to art.

ARCHITECTURE

EXAMPLES OF WORK BY LABORATORY OF COMPUTER GRAPHICS AT HARVARD

EXURBAN DEVELOPMENT STUDY (1968-9)

Principal Investigators: John Gaffney, Harry Garnham, Nicholas Quennell
Consultants: Peter Jacobs, David Sinton, Carl Steinitz
Sponsor: Department of Landscape Architecture, Harvard Graduate School of Design

Using gaming simulation methods, a study was made of a prototypical tract of land in rural Connecticut for possible development under different constraints.

A SYSTEMS ANALYSIS MODEL FOR COMMUNITY OPEN SPACE AND RECREATION PLANNING (1968-69)

Project Directors: Timothy Murray, Jack P. Dangermond Wayne Tlusty
Sponsor: America the Beautiful Fund, Inc., and Department of Landscape Architecture, Harvard Graduate School of Design
Consultants: David Sinton, Carl Steinitz, Peter Rogers

The research techniques used in this study are:

1) a questionnaire survey given to residents of sections of East Boston to determine their values and preferences as applied to recreation and
2) a model that will enable the investigation of specific leisure activity patterns and flows, subdivided into origin, link and destination.

COMPROGRAPH (1968)

Principal Investigator: Eric Teicholz
Project Director: Thomas Follett
Sponsor: Perry, Dean and Stewart, Architects

The COMPROGRAPH programs allow a client to become more involved in the decision-making process, allow architects to apply their skills efficiently to design programming and reduce the possibility of error by accurately assimilating new program information into the design process.

COMPROGRAPH 1 developes and generates basic area requirements for building programs, including costs, phasings, etc.

COMPROGRAPH 2 developes appropriate functional relationships between elements of the architectural program. COMPROGRAPH 3 developes three dimensional diagrammatic plans to scale, following the architect's program of relationships between the various building areas.

INTERACTIVE ARCHITECTURAL APPLICATIONS ON A CATHODE RAY TUBE (1967-8)

Principal Investigator: C.C. Pei
Research Supervisor: Allen Bernholtz
Sponsor: Independent Research

An example of one of the first architectural applications on a cathode ray tube at Harvard.

LOKAT (1968-9)

Project Director: Allen Bernholtz
Statistical Consultant: Steven Fosberg
Programming Consultant: David Sinton
Sponsor: Perkins & Will, Architects, White Plains, N.Y. David Ginsberg; Howard Juster; Architectural Consultants

LOKAT tries to directly relate the functional requirements of a design program with the actual physical layout in two dimensions. The plans shown were evaluated by matrices developed by the designers connected with the sponsoring firm.

A COMPUTER PERSPECTIVE PROGRAM: NEW DRAFT (1967-8)

Principal Investigator: Charles Barnaby
Research Supervisors: Allen Bernholtz and Frank Rens

This program creates perspectives, orthographic projections, stereoscopic views, and isometrics from plans and elevations. The program permits vertical, horizontal or cross hatching of areas.

GRASP (Fall 1968)

Principal Investigator: Eric Reicholz

GRASP (Generation of Random Access Site Plans) is a program which generates computer produced site plans using predefined modular architectural units. The computer produces as many "random" solutions to a plan as desired, evaluates each solution according to specified criteria, and draws the appropriate "good" solution.

DECULTURALISED ARCHITECTURE

(An abstract from some notes for a possible book)

The Modern Movement in architecture has perpetuated the classical tradition that man exists within a physically determinate environment. The basis of design may have shifted from beauty and proportion, via beauty and convenience to ergonomics and functional fitness, but the basic attitude is still the same. As long as architecture equates the structure of the environment with physical structure, it will fail to be relevant to our needs.

We must start again from a fresh hypothesis: "The relationship between individual and environment is an information processing system." Some of the information is certainly concerned with the 'traditional' environment - physical structure, physical comfort, etc; but, increasingly in both work and leisure, it deals with communication. By the end of the century, 80% of the working population of Great Britain will be engaged on information processing, and only 15% in direct production of goods.

If we are going to 'design' for this situation, then we must deal with the system as a whole, consciously. There may not be a new 'aesthetic' from the change, but there will certainly be a change of perceptive attitude. We must design for the reality of our experience of the environment, and not in the belief that we are producing objects whose physical form is an end product and justifies their existence.

Architects generally have an interest in computers because of their potential as a design aid, but my own interest is in the direct participation of computers and electronic equipment in the environment. They offer ways of transferring information from expression in one medium into another and of thereby synthesising seperate sense perceptions into one experience. As an extension of this, it may not be long before our environment can be made to learn and respond intelligently to our needs and behaviour, and this will result in an interaction between man and environment in which they become fused into one extended system.

Both this 'sense synthesis' and the experience of intelligent forces in the environment are not new. They are the experience of primitive man, and the study of the psychology of primitive peoples has already investigated the results of this 'mythopoeic' way of thought. Moreover, modern psychology has shown us that certain parts of our minds still function on this level.

Thus, instead of leading us into a more mechanised and de-humanised culture, I see the possibility that the use of computing systems in this way could concentrate our attention on our sense perceptions and the specific qualities of the human being as a self contained system, by bringing these aspects into our conscious relationship with an environment which reflects them, so that we can become 're-humanised' and 'de-culturalised'.

John Lifton

COMDAC PROJECT

Component design augmented by computer: Work in Progress
P.A. Purcell: School of Industrial Design (Engineering) Research Unit, Royal College of Art.

COMDAC is a computer-aided design system which will permit the project architect to use the computer as a design-aid. It will also be used by the development architect who is concerned with the development of building systems. COMDAC when implemented, will form part of a larger integrated computer system currently being operated by the SCOLA and SEAC school building consortia. A major feature of COMDAC is that it will enable the architect to participate in the integrated system which presently incorporates automated scheduling, pre-planning, and production control of components.

The project is being carried out on an ICL 4120 computer and the architect will use an ICL 4280 CRT graphic display unit. The initial version of COMDAC will relate to the design of the window/wall units of the building. The primary function of the system will be to evaluate the fenestration pattern generated by the project architect using a 'light-pen'. The evaluative routines currently being developed are wind load calculation, daylight calculation and costing. These are called by the user when he points to appropriate 'light buttons' on the screen.

It is envisaged that the architect will bring an outline design to the graphic console which he will then bring to completion during an intensive period of interaction with the system. Organisationally this will entail having a large installation located centrally for the participant local authorities, with a large throughput of architect/users.

The project which is sponsored by the National Research Development Corporation began in March 1968 and is due to end in February 1970.

DANCE

COMPUTER GENERATION OF DANCE WITH BENESH NOTATION

R. JOHN LANSDOWN

There are in use at present two major forms of notation designed to record movement: Kinetography Laban, invented about forty years ago by Rudolf Laban and used mainly in the United States, and Benesh Notation, invented in 1947 by Rudolf Benesh and used mainly in Great Britain and Europe, particularly by the Royal Ballet and the Royal Ballet School.

Both systems seem to lend themselves to graph plotter output by computer but I have chosen the Benesh System as the one most suitable to the program.

The Benesh Notation: A brief description.

Whilst the notation is complete in the sense that it can record the position or movement of any part of the body, I have basically limited my use of it to noting the position of the arms and legs.

Like music, the notation is designed to be written on a five-line stave: the top line representing the line of the top of the head of a standing figure and the bottom line, the line of the feet. The other lines then naturally fall into place as the line of the knees, the line of the waist and the line of the shoulders. The dancer is viewed from behind and the movement and position of the straight limbs is shown by the position on the stave code marks representing their extremities.

If we imagine the stave drawn life-size on a wall which the dancer faces with, say, arms outstretched sideways, we can see that, by marking the position of the hands and feet on the wall, we will have achieved a visual record of his body position.

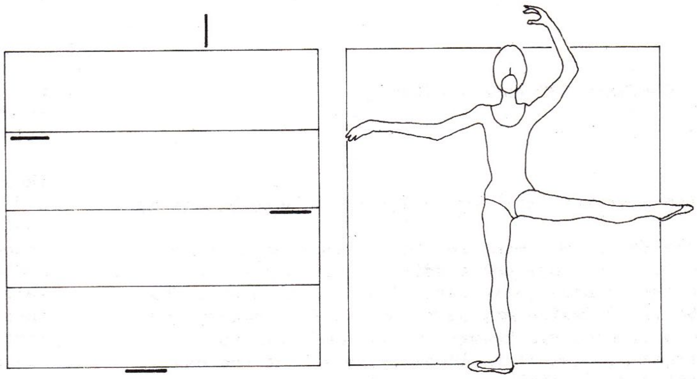
In order to represent the position of limbs when they are in front of or behind the plane of the body, code symbols are necessary and three basic signs are:

— Level with the body

| In front of the body

• Behind the body

With these signs and the staves it is possible to show all the positions of the straight limbs but further symbols are necessary for bent limbs and movement pathways as the limbs move from one position to another.



The notation is written across the stave from left to right to show the movement in time and, in general only limbs which actually move are shown. Spatial movement of the dancer is shown by flat curves (rather like legato phrase lines in music) which connect one record of the position of the feet to the next.

The Program

The position of the symbols on the stave are held in the computer as an ordered set of co-ordinates generated at random but constrained so that impossible movements or limb position are eliminated.

As in the making of a conventional cartoon film where the animator will usually draw only those frames which show the position of the characters at the peaks of particular movements leaving others to fill-in the inbetween drawings, so in the program it is basically this principle which has been followed.

Initially, the computer generates the co-ordinates of the 'peaks' of movements and then backtracks to fill in the necessary inbetweens spaced in time to suit the musical rhythm which is entered as one of the program parameters.

On completion of the co-ordinate generation phase of the program the computer passes on to translate the co-ordinates into a form suitable for direct output onto a graph plotter.

The Results.

At the time of writing (late February 1969) only the broad outline of the work has been completed but it is expected that progress will be sufficiently advanced for demonstrations to be given at EVENT ONE.

FILM

COMPUTER ANIMATED FILMS

Computer animation means putting the output of a computer on film. The way in which this is done in most computer centres is by fixing a film camera to a console containing a cathode ray tube display.

The first computer films were produced at Bell Telephone Laboratories in 1963. One of them by E.E. ZAJAC, showed the result of a simulation of the motion of a communication satellite. Other exponents in this field at Bell Telephone Laboratories are A. MICHAEL NOLL who made an animated version of his initials which gave the illusion of the 4th dimension and a ballet sequence with stick figures and KENNETH C. KNOWLTON who was responsible for the use of the so-called mosaic method and the Beflix (Bell Flicks) movie system.

Computer animation to date is described in 'Movies From Computers' produced by the National Committee for Electrical Engineering Films in California. It includes a number of extracts from various films produced with the aid of computers. It aims to encourage the study and use of computer animation as a powerful and versatile medium which is particularly suited to demonstrating various complex physical processes without making a verbal commentary necessary. It deals with applications of computer animation in mathematics, engineering and the physical sciences. It shows how this process can be used to simulate aircraft landings, the flow of water under a dam, objects undergoing impossible gravitational forces, and the course of orbiting satellites.

Several engineers, computer programmers and artists have made use of this medium for purely aesthetic effects. Among the most successful to date is JOHN WHITNEY'S Permutations, made in collaboration with IBM in America - a brilliantly coloured sequence based on the circle image undergoing a quick, flowing, metamorphosis. Using the Beflix movie system and the mosaic method of colour and shade graduations, STAN VANDERBEEK and KENNETH C. KNOWLTON produced what looks like an extremely complex sequence with the words 'man and his world' fading and re-emerging in another language. Another film in colour is a sequence of images based on a painting by Bridget Riley, call Colour Bridget, made by LEIGH HENDRICKS of Sandia Corporation in Albuquerque. In black and white, one of the most absorbing examples of computer animation is the two minute film by E.E.ZAJAC, 'A pair of Paradoxes' which combines the PENROSE visual illusion of a ball bouncing forever upwards on an impossible staircase with the corresponding sound illusion by R.N. SHEPHERD.

In England, two examples of computer films done in 1968 are a magnificient abstract colour film by LUTZ BECKER and 'The Flexipede' by TONY PRITCHETT probably the first example of computer animation humour.

Jasia Reichardt

FILMS BY STAN VANDERBEEK

SANDRA DALEY

VANDERBEEK is especially well known for his multiple projection pieces. He is interested in architecture, having built his house and a Movie-Drome in Stony Point, New York; an environmental movie theatre with all surfaces designed to be covered by projected images. Besides these "movie murals" or "Newsreel of dreams", as he calls them, VANDERBEEK has drawn for C.B.S. "an electronic collage" with videotape, called "Panels for the Walls of the World Number 1" (1965) and two computer generated films, one of which, Collide-ascope (1966) has been imported especially for EVENT ONE.

PROJECT BARD. UNIVERSITY OF SURREY POETRY GROUP

ROBIN SHIRLEY, GRAHAM WALLEN, JEFF HARRIS, LYNETTE WILLOUGHBY

Output generated by BARD 0, a test program for BARD 1 a general poetry generating language, from SPIKE HAWKINS' "INSTANT POETRY BROTH".

```
  26
FIRE
LIKE     I SAT ON THE SHELF
         SNOW TURBINES

  12
THE LOST FIRE BRIGADE    TO FLOAT ON        MEEK MEEKER BE
SAGGING WITH EGGS            HAS ITS PROBLEMS
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GRAPHICS

When we pare away the mechanical skills in any human activity - and mechanical skills can be reproduced - we are left with the problem of selecting what is valuable to us. In the context of man plus computer generated art mechanical skills lose their importance and the ends take on an added importance - "what" rather than "how".

The ability to generate ideas and to recognise what form (or forms) appropriately express them are the peculiarly human characteristics in the symbiotic relationship between men and computers.

We select from many end products those which we recognise as having some quality - and this is an ability which is common to many people. It is significant that computer scientists now produce drawings for pleasure.

The relative ease with which computers produce visual output has given graphics a lead over other forms of computer art - with the possible exception of text. I think we must resist the temptation to use a computer simply as a drawing machine - important as this may be in related fields such as computer aided design. Existing forms are the result of existing skills - what happens to the forms of art and the barriers between the arts when many forms are available as alternatives or as simultaneous expressions of the same idea?

Ian Pickering

SOFTWARE FOR COMPUTER ART

KENNETH C. KNOWLTON

A computer equipped with a graphic output device is potentially a very powerful tool for making drawings; it can draw straight lines and true circles, can copy, reflect or mathematically distort images; it can create textures and combinatoric images of great complexity. The computer can be used to develope elaborate and hierarchically arranged repertoires of operations. In short, the computer can be used for creating and manipulating a wide variety of images which are logically easy to define, but which might be too difficult, if not impossible, to render by hand. The computer will be, I believe, a tool of great power for artistic expression if appropriate software techniques and languages can be devised.

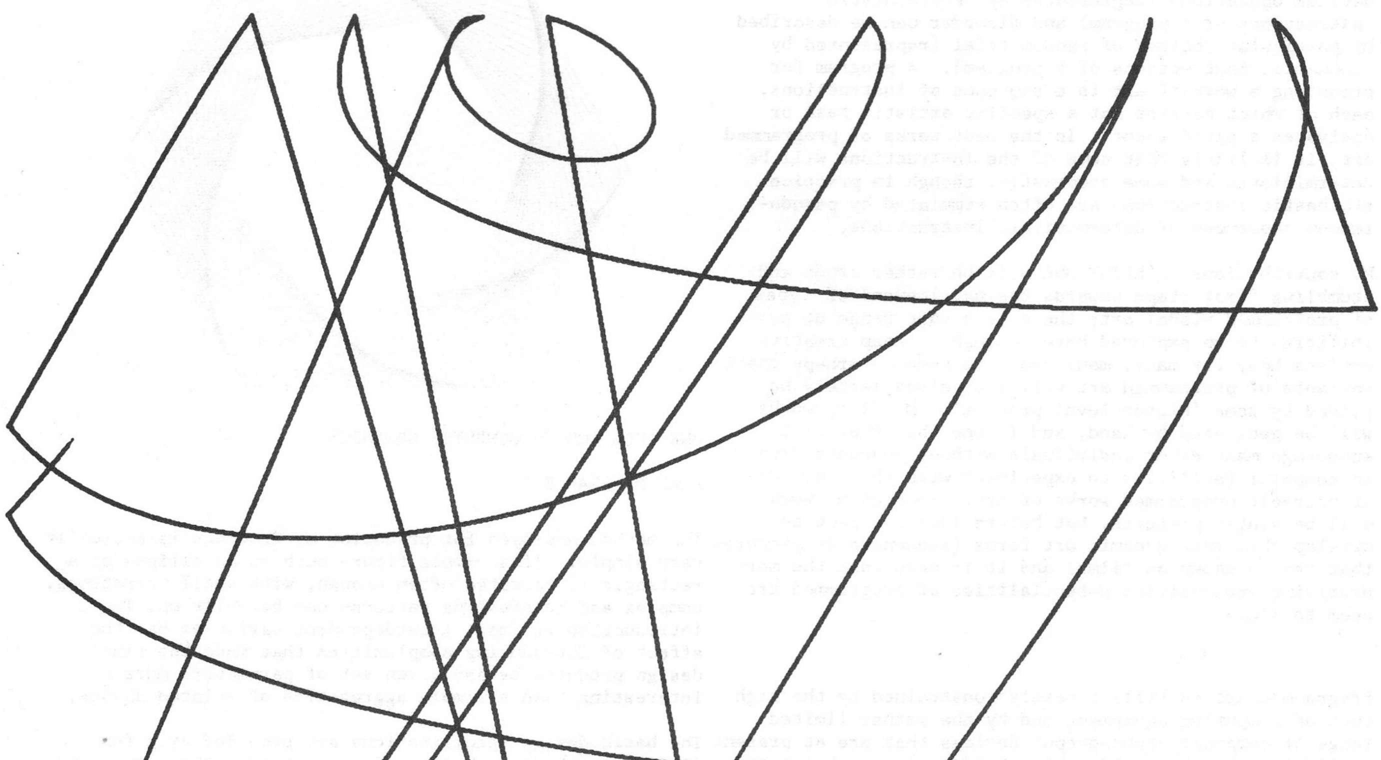
But there are serious problems in the creation and interpretation of computer "art". First of all, just what languages should one adopt? At one extreme we can imagine a machine governed almost entirely by its own random number generator, requiring very little human participation except culling of the results; at the other extreme we can devise a system where the artist has complete spot-by-spot control over the output picture but where it requires far too much human effort to achieve an interesting result. In between, there are areas where the machine utilizes a great deal of its own computational powers, but still leaves a large number of parameters to be specified by the programmer-artist. There is such a thoroughly bewildering array of conceivable languages and tools that it is difficult to know where to start, or to know what it means if the first few attempts are not very successful.

A second problem is deciding who we should expect to be the artists in these new media - people who have traditionally called themselves artists or computer programmers? These two groups are, I think, quite different bunches of people. I would describe both groups as creative, imaginative, intelligent, energetic, industrious, competitive and driven. But programmers are painstaking and cold in human terms. Their exterior actions are separated from their emotions by several layers of logical defences so that they can always say "why" they did some thing, without in the least revealing their ultimate motives. Artists, in my experience, are free, intuitive and vulnerable. They do things without being able to say why they do them nor what they were trying to accomplish; the rules of the game are that one doesn't ask. In view of these considerations I expect art to come from artists or artists working closely with programmers - I do not expect much art to come from programmers alone, solely by virtue of their clever gimmicks for doing cute things.

What this means in practical terms, then, is that we need to develope a great deal of collaboration between artists and programmers in order to develope meaningful sets of tools and ways of using them. A by-product of this collaboration, of course, will be better organized artists and more human programmers - who can complain about that.

Finally there is, I think, a fairly serious problem in the interpretation of computer art. The machinery which intervenes between artist and viewer precludes a great deal of normal communication. Even at the first stage - the punched card - one cannot tell whether the card was punched tenderly or in fury. In addition, the medium itself is so new that the viewer is apt to be completely disoriented. He has little feeling for the nearby pictures which the artist could have produced but didn't, or what sort of search the artist made in settling upon and preserving this particular result.

Because of these difficulties, I see no short-cut to the very large amount of experimenting which has already begun. The outcome, hopefully, will be a number of relatively stable languages, each for a distinctly recognisable medium of expression. Such a medium should become sufficiently established that the artist can use it to "say something" without the medium itself arousing such curiosity as to severely distract from the artistic content of the work.



Robert Parslow

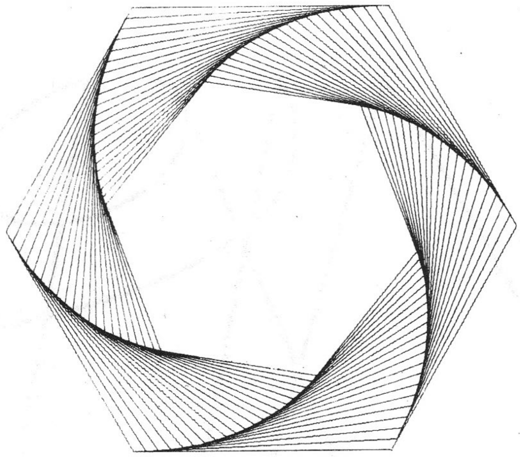
Good art lies in the middle of the spectrum between order and disorder. Order can be specified by exactly defined operations (represented by deterministic instructions of a program) and disorder can be described by particular choices of random trial (represented by stochastic instructions of a program). A program for producing a work of art is a sequence of instructions, each of which carries out a specific artistic task or activates a given event. In the best works of programmed art, it is likely that some of the instructions will be deterministic and some stochastic, though in practice stochastic instructions are often simulated by pseudo-random sequences of deterministic instructions.

My contributions to EVENT ONE will be rather crude and stumbling first steps towards the development of types of programmed visual art; there is a vast range of possibilities to be explored here, enough to keep creative artists busy for many, many years to come. Perhaps these variants of programmed art will themselves largely be guided by some 'higher level program'. My first works will be generated by hand, and I hope that they will encourage many other individuals without adequate access to computer facilities to experiment with their own do-it-yourself programmed works of art. Some of my works will be single pictures, but before long I expect to develop them into dynamic art forms (sequences of pictures that can be shown as films) and it is here that the more promising and exciting potentialities of programmed art seem to lie.

Programmed art is still severely constrained by the high cost of computing equipment and by the rather limited range of computer input-output devices that are at present available; though considerable strides are now being made in display technology. An extensive program of research and development is needed to remedy this situation. For example, advances in photochromic materials technology could place a "magic paintbrush" in the hands of the colour artist, and new dimensions could be opened up in op-art by the invention of a suitable simultaneous projector of several moire patterns, each undergoing a programmed sequence of motions.

Is programmed art worth all this effort? In my opinion definitely it is. I predict that it will be a new breakthrough in the development of the arts, a creative synthesis of the computer's capacity for endless and accurate execution of the sequence of routine steps, that is laid down by a program, and of the human imagination and intuition that brings this program into being.

Alan Mayne



ONE APPROACH TO COMPUTER GRAPHICS

ALAN M. FRANCE

The method employed for producing my drawings is basically very simple. If a simple figure such as an ellipse or a rectangle is repeated often enough, with small variations, complex and interesting patterns can be built up. The introduction of small interdependent variables has the effect of introducing complexities that make the final design produced by any given set of parameters more interesting than a simple aggregation of related shapes.

The basic design specifications are provided by a few figures punched in a piece of paper tape - the dimensions of the fugure, the changes in size for each repetition of the figure, the angle by which the figure is to be rotated, and the number of times the figure is to be repeated. The program then calculates the co-ordinates of the required figures and plots them on a computer-controlled drawing machine called a 'digital incremental plotter' or graph plotter.

The parameters concerning the size, and development of the basic figure may be any combination of positive and negative numbers, giving a large number of possible interactions and generating apparently unrelated designs.

Developments along the lines of repeated figures could perhaps include changing the basic shape of the figure as the design progresses, using size and position changes that are functions of more complex mathematical expressions, and using randomly generated numbers to influence the progress of a design. My applications of the computer to producing pleasing designs is a lazy man's approach - I supply a few figures, chosen without much thought, the program and the machine do the donkey work, and lo! a design.

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POEM 3124                  FOR SPASMO                ALAN SUTCLIFFE
COMPOSED USING ICL 1904       INTERNATIONAL COMPUTERS LIMITED

29 AND 30 MARCH 1969       EVENT  ONE      COMPUTER ARTS SOCIETY
SATURDAY AND SUNDAY        EVENT  ONE        ROYAL COLLEGE OF ART

WHEN YOU SEE THE ROAD PLEASE SAY THIS POEM BEGINNING QUIETLY



                             LIKEW                     LIKE CLOUDS
                             LIKERA                     LIKELEAVES
                             LIKEHAI                     LIKEPLUME
                       LIKE  BLOOD  LIKE  FLAMES                                 FLAMES
                       LIKE  BRASS  LIKE  PLUMES                                 PLUMES
                       LIKE  PRINT  LIKE  POETRY                                 POETRY
                       LIKE  FLESH  LIKE
                       LIKE  STEAM  LIKE
   LIKEWEFT   LIKEFLESH   LIKELEAVES   LIKEFLOWERS  LIKECIRCUITS                    LIKE
   LIKESAND   LIKEPRINT   LIKELOAVES   LIKECARNAGE  LIKESHUTTERS                    LIKE

                       LIKE  BLOOD  LIKE  CLOUDS                                 FINGERS
                       LIKE  BRASS  LIKE  LOAVES                                 FREEDOM
                       LIKE  PRINT  LIKE  LEAVES                                 CARNAGE
                       LIKE  FLESH  LIKE  FLAMES                                 FLOWERS
                       LIKE  STEAM  LIKE  PLUMES                                 PLANETS
                             LIKEW                     LIKE STONES
                             LIKETI                     LIKELOAVES
                             LIKEBAR                     LIKEFLAME
```

MUSIC

POEMS FOR SPASMO

ALAN SUTCLIFFE

These poems were composed as part of SPASMO, for electronic tape, colour slides, solo piano and audience, first performed in the Queen Elizabeth Hall, London on 10th February 1969.

The poems, all different, are recited by the audience.

Each run of the program produces 256 poems. The program can be given a different vocabulary as data to produce a different set of poems.

The program is written in FORTRAN and was run on an ICL 1904 in the ICL bureau at Reading, England.

Is one of the poems better than any other?

Which is better, 1000 people all saying the same poem, or 1000 people saying different poems?

Would you write a program to compose one poem?

Are 1000 poems better than one poem?

If 1000 people read different poems, is that music?

Do other poets want to be able to write 1000 poems in an hour?

If a computer can be used for writing poems, can it be used for praying?

Would it make any difference if we could produce a million poems in one hour?

Could there be a mistake in the program?

Do you need a computer to obey a program?

WORKS FROM S2FM

PIETRO GROSSI

The first Italian excursion into the field of computer music occurred in May 1967. These preliminary experiments were initiated by S2FM with the collaboration of the General Electric Information Systems Italia Center for Research and Study at Pregnana, in the province of Milan.

The sole piece of electronic apparatus employed in these experiments, both as the source of sounds and the performer of the music, was the GE 115 computer. This instrument produced the sounds directly within its central unit and during each experiment recorded the results on magnetic tape. Indeed, these experiments made possible an exploration of the capacity of this computer with respect of parameters, frequencies and time durations.

The three programs prepared for use in these experiments were utilized either whole or in part, depending on the nature of the particular musical performance or research.

PDP8/L ON LINE TO LIGHT PEN, DISPLAY SCREEN AND LOUDNESS AND PITCH CONTROLS.

PETER ZINOVIEFF and DAVID COCKERELL

The exhibit is a model of one aspect of working in a modern electronic music studio. The composer specifies some aspects of the sound that he wishes to produce and then allows the computer to make some judgement as to how to use his definitions.

In this case, the composer may draw a pattern on a screen with a light pen after having written the answers to some questions displayed. The pattern represents changes in pitch in a vertical direction and loudness in a horizontal direction.

When he has completed what he thinks is a good pattern he tells the computer to play back his pattern by writing the word 'GO' in an appropriate place on the screen. The computer will then play endless variations on the pattern that has been given it; that is variations on the pitches and dynamics drawn on the screen. At any time, the operator may request permission to draw a new pattern.

The hardware involved is very simple. Two digital to analogue 10-bit convertors and a voltage controlled oscillator and amplifier. The rest is the computer and light pen, flags and display screen.

In a computerised electronic music studio there would be many times as much equipment and the input would vary from typwriters and exact numbers to the sort of graphic input shown. There is obviously no need for the computer to behave in an aleatoric fashion but in this instance it is probably more entertaining if it does.

The primitiveness of the sounds produced is of course no indication of the sounds made in a complete environment.

COMPUTER CONTROLLED LIGHT AND SOUND ENVIRONMENT

JOHN LIFTON

This system has two completely separate parts. One of them picks up sounds and uses them to modify projected images, and the other uses what it sees to produce electronic music. They can be used separately, or together when they feed information as lights and sounds to each other across the space they stand in.

SOUND TO LIGHT SYSTEM

This is a development of the system I built for the 'Cybernetic Serendipity' exhibition at the Institute of Contemporary Arts last year. The new system, instead of splitting up the projected light, produces a coherent image which is distorted in response to the sound signal. The sound is picked up by a cluster of highly directional microphones, amplified, and fed into an analogue computer. The computer analyses the signal as to frequency, rate of change, rate of movement by phase shift, etc., and sends an output signal to a number of specially designed highly sensitive servo mechanisms, which are used to distort flexible sheets of diffraction grating surfaced with a vacuum deposit of aluminium. Projectors are aimed at this surface, and the reflected image, shown on a wall or screen, moves as the surface distorts.

LIGHT TO SOUND SYSTEM

This might be considered as the first musical system where no information needs to be passed from the composer to the performer. The first stage of the system is a compound eye, composed of a number of photocell/lens assemblies which are focused along a narrow beam, and whose output feeds a hybrid computing system. The signals enter an analogue computer and are fed from it, via a threshold logic system, to a digital system. The output from all three sections are used to control electronic sound generating circuits via a programming interface. The sound signals are amplified and fed to loudspeakers. The composer programmes the sound response that he wants the visual signals to produce. He does this work on the interface, using the neon and meter readouts from the computer circuits as a guide. He can then mix the sound in stereo into the amplifier and add reverberation to suit the performance space. The performer only needs to move in front of the eye for music to be produced.

If the light to sound system and the sound to light system are set up facing each other, they will feed each other across the space between them. If a person enters this space their silhouette presents a high contrast edge against the projections and the sound and light will both respond. Any sound or movement the person makes, will bring a further response.

The equipment will later be extended, in particular by the addition of short term and tape memory systems, and of a 25' diameter pneumatic dome for it to stand in.

I would like to thank the following for the assistance they have given towards this project:-

The Arts Council of Great Britain
Motorola Semiconductors Ltd.
The Plessey Company Ltd.

FIVE SCREENS WITH COMPUTER (1963-69)

GUSTAV METZGER

This auto-destructive sculpture is to be made of stainless steel. It consists of 5 frames 40ft. long, 30 ft. high, and 2 ft. deep. These frames will be spaced 30 ft. apart-staggered in plan. Each frame will be packed with at least 1200 uniform elements 2 ft. in length, with a square or rectangular face. These elements can be moved forwards or backwards within a frame at controlled speeds, and will finally be ejected at various controlled speeds, reaching a maximum distance of 30 ft. After a period of ten years in which all the elements will have been ejected and the frame disintegrated in stages, the site will be given over to another use.

The computer is used in three areas.
DESIGN OPERATION RECORDING

DESIGN

Since all the decisions on the activity of the screens will be made before production begins, it is necessary to have the most complete understanding of the work's potential at the design stage. A computer allied to graphic output will be used to plot the numerous possibilities for moving and ejecting elements, and for visualising the possible shapes of the screens in transformation.

55% of the elements will be ejected on a pre-determined programme. The rest (including one entire screen) will be ejected in a random manner. These random ejections will be sparked off by intense sun or electric light, or by the assembly of people above a certain number in the vicinity of a screen. Random ejections are subject to a variety of controls such as structural considerations, and will be co-ordinated with the overall programme.

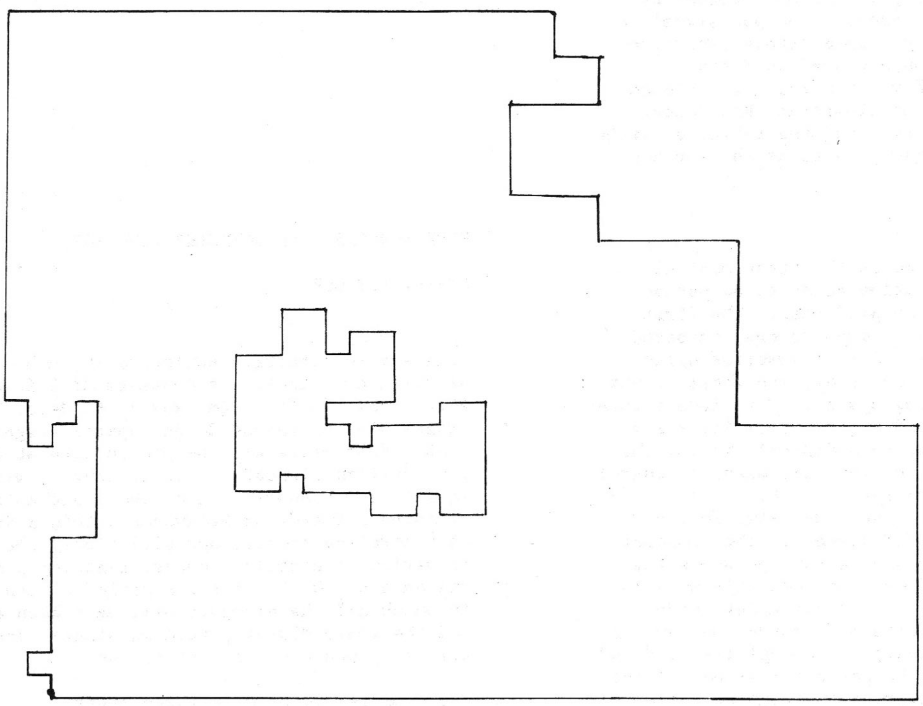
OPERATING

A computer will be in general control of the electro/mechanical activity of the sculpture - continuous adjustments (on-line) will be necessary. The computer will also direct peripheral activity such as the raising of the glass wall surrounding the site before ejections can take place.

RECORDING

The computer will be used to print out and draw the day-by-day development of the screens. This will be necessary to check on operational, structural, and safety factors, and will be an aid to maintenance activities. This graphic output, along with photographs and films, will be preserved as part of the documentation on the work.

This drawing is the last in a series of ten showing the development of one screen (No. 3) in the first three years of its activity. It was produced by Mr. D.E. Evans, Computer Unit, Imperial College, London in March 1969, on an IBM 7094 11 (32K memory), with CALCOMP plotter.



THEATRE

TYPOPROT AMADRAM

It is misleading to consider this piece as a play written by a computer: seeing how well a computer can be made to take over the playwrights activity has no part in our intentions.

What is seen is neither a performance nor a rehearsal. Developments are possible over a long period of time to both the particular kinds of script and to the general structure of the interactions. There is no reason why the activity should not be viewed publicly at any time during this process.

Question? Does this piece have any relationship to conventional drama?

Yes, in as far as it is in the arena of the interactions between role playing participants that the tensions should be created and resolved.

Who writes the piece?

Those who produce the program and the data and who determine the context of the performance, but they are only in a position to partially predict the particular out-comes if the program is complex.

What kind of relationship is available to the actors and the audience?

At the present moment in this piece the actor makes certain initial choices which determine his script and within the script some choice of sequence. The role of the audience is uncertain, but it is at present assumed that they could be the actors although the direct participants at any one time are limited to three or four.

How will this particular piece work?

For the participant his first action will be to make a number of choices of objects in different categories which become his props. For each combination of these objects a separate script is generated by the computer. This script will have three categories of information. Text, attitudes and action; each of the objects provided for the actors choice is intended to refer to, or characterize, certain personality types.

The most complex aspect of the script programme lies in the text generation. For each of the 10 personality types, seperate sets of word store will be made and the sequential selection order will be biased. The intention is to allow various basic forms, tenses and styles of text to be controlled, for example: at certain points on the continuum it may seem appropriate that the majority of utterances are commands with some predictions about 'self', at another point poetic reminisence may seem most apt. The attempt is to write a program which biases the textual structure in the chosen directions.

The products of this approach normal grammar but include non-grammatical structures and unexpected links.

There is a second program which provides action and attitude instruction to the actors. These include: how to use the spoken text - the kinds of general attitudes to adopt with the other actors - specific actions in respect of the chosen objects and instructions about movements within the arena. The instructions which the actors get again depend on their initial object choices. Incorporated in this piece is provision to use an 'on-line' terminal to control some interactions which take place on the spot.

The principle upon which the present piece will probably be planned for the on-line computer is as follows:

1. Each part of the pre-generated script (text, actions, attitudes) will be divided into five to ten numbered parts.

2. The object choices which each of the three or four 'actors' made initially (masks etc) will be given to the computer.

3. The computer will compare the 'characters' which each actor has chosen with each other according to certain pre-determined principles.

4. The computer will direct each actor to a certain numbered part of his script in each of the three categories to use for that 'scene'.

At the end of each scene some new information will be provided for the 'on-line' computer from which it will give a new script directive for each actor.

In the long term, it is the sophistication of this aspect of the piece which seems to provide the most interesting possibilities, however, there are a number of practical difficulties encountered at this stage, the most evident of which are:

1. The kind and amount of information which can be given the 'on-line' terminal accurately and quickly enough not to disrupt the action.

2. The way in which the observations and instructions etc., which the on-line computer constructs can be simply communicated back to the participant.

Ideally, one would like the 'on-line' computer to be able to handle a wide range of parameters and generate complex observations,instructions, suggestions, etc. However, this area of the piece will be kept at a simple level for the present.

The general lay-out of the arena and the action will be formalized and each element of the participants activity kept separate to some degree. For example: The use of the spoken text will in general be kept separate from the physical interactions.

Malcolm LeGrice

"TRILOGY"

Performers: DIANNE LIFTON
JEAN MICHELSON
DAVID WEBSTER
Costumes: DIANNE LIFTON

Program for computer generated mime script devised by: JOHN LIFTON
GEORGE MALLEN

Live computer controlled light/sound system built and programmed by: JOHN LIFTON

"TRILOGY" consists of three pieces which explore the degrees of control that the computer can exercise in a live performance.

1. STICK DANCE

This is based on a movement piece devised by Oscar Schlemmer at the Bauhaus. The performer is dressed in black from head to foot so that no part of the body is visible. Sticks are attached to each limb, and are about twice the length of the limb so that they extend past the joints in each direction. When the performer moves, only the movements of the stick can be seen.

In our version, fluorescent sticks and ultra violet lighting are used to enhance the effect. The performers use a computer generated mime script. In the 'stick dance' they are allowed to choose an individual script out of several hundred that have been generated. They also have the freedom to make the pauses that occur in the script as long as they like.

2. PNEUMATIC DANCE

In the pneumatic dance the performers wear a costume containg partially inflated pneumatic compartments. These compartments are joined together inpairs so that whenever a movement is made, one or more compartments are deflated and this causes compartments on other parts of the body to swell. The performers movements therefore make their shapes alter in unexpected ways. This time the computer has chosen which script the performers will use and pauses are fixed.

3. COMPUTER DANCE

In the computer dance the performers are superseded and the computer assumes complete control. Two computer controlled systems are used. One turns sounds into projections and the other turns what it can see of the projections back into sounds. They will perform an improvised piece, responding to each other.

FIGHT SCRIPT NO: 39169

ACTOR 1:
CUTS TO RIGHT FLANK MOVING FORWARD

ACTOR 2:
PARRIES

ACTOR 1:
CUTS TO LEFT FLANK MOVING BACK

ACTOR 2:
PARRIES

ACTOR 1:
THRUSTS TO STOMACH

ACTOR 2:
CUTS TO LEFT SHOULDER MOVING FORWARD

ACTOR 1:
PARRIES

ACTOR 2:
LUNGES MOVING FORWARD

ACTOR 1:
EVADES AND PARRIES
LUNGES

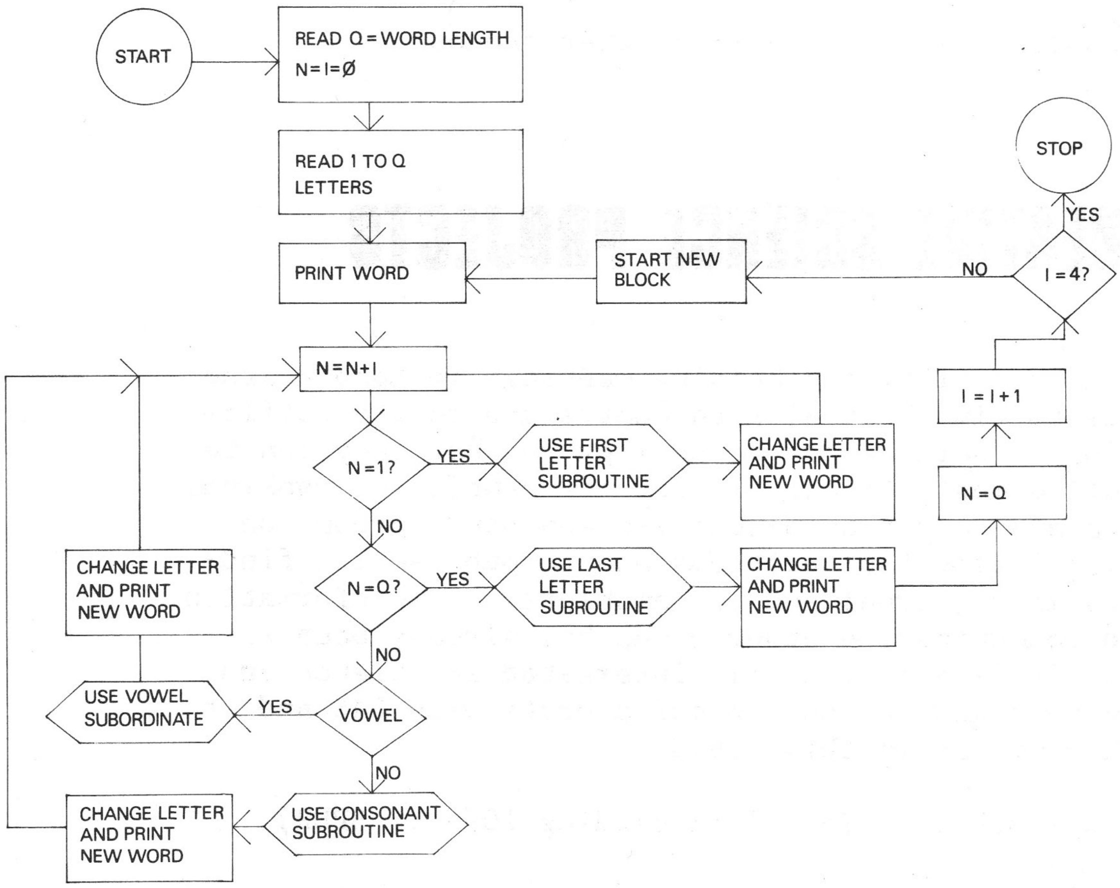
ACTOR 2:
THRUSTS AND KILLS

THEATRICAL SWORD FIGHTS DIRECTED BY COMPUTER

WORK PRODUCED FOR WILLIAM HOBBS AND BBC BY
R. JOHN LANSDOWN

This program prints out short scripts for theatrical sword fights. Some of the scripts will be performed by William Hobbs students, at EVENT ONE.

Word Generator Program



WORD GENERATOR PROGRAM

R. JOHN LANSDOWN

This is an elementary program designed to produce blocks of words in the form of concrete poetry.

The program accepts a given word and modifies it letter by letter printing the new word as it goes.

The selection of the new letters is determined both by the choice of letters in the original word and by tables of the relative frequency of English letters.

As the frequency count and, hence, probability of choice depends on position or type of letter, the program needs four selection subroutines to cope.

These are:
1. First letter subroutine
2. Last letter subroutine
3. Vowel subroutine
4. Consonant subroutine

Whilst words of any length will be accepted, the chance that recognisable words will be output is greatly enhanced by the initial use of three-four or five-letter words.

SPUR

A new group holds meetings in London on the ninth of each month.

Looks into current world problems.

Explores unified practical philosophies.

Investigates new political systems.

Studies interconnections of branches of knowledge.

Promotes co-operation with other groups.

CREATIVE SCIENCE PROJECTS

Founded in 1967 and holding meetings in London from time to time. It aims to contribute to the unification of science and technology so that they can be applied most effectively for the benefit of mankind. It plans to set up discussion and study groups on several important problems and to publish its findings in a journal and in pamphlets. Its Information and Communication Study group has already been set up. It is also actively interested in science and the arts and intends to collaborate with CAS and other groups in this field.

Annual subscription £1 (including 10/- to SPUR)

Enquiries about membership of either of these societies should be sent to Alan Mayne, 19 Aberdeen Road, London N.5 and will be welcomed especially from scientists and technologists with wide interests and from 'integrated thinkers'.

Enquiries about possible assignments for CREATIVE ENTERPRISES LTD should be sent directly to the offices at Archers Court, Hastings, Sussex.

Supplement to Advertisement in CAS EVENT ONE Booklet

It is regretted that several errors and omissions were made in the text of the advertisement about SPUR, CREATIVE SCIENCE SOCIETY and CREATIVE ENTERPRISES LTD. The opening phrase about SPUR should start "A new group which holds meetings..." The annual subscription of SPUR is 10/- a year. The name 'CREATIVE SCIENCE SOCIETY' was misprinted as 'CREATIVE SCIENCE PROJECTS'. The entry about CREATIVE ENTERPRISES LTD., should have read:

"A small company set up to explore possibilities for new developments in science and technology and their applications for the benefit of mankind. Planned activities will be in: research and development, invention, mathematical and statistical consultancy, computer software, information services, publications, and education. It's work will include projects in the science-arts field. It's headquarters is at Archers' Court, Hastings, Sussex".

Anyone who wishes to receive further information about any of these organisations or to participate in their work is invited to complete the application form below and send it, with stamped addressed foolscap envelope please, to:-

Alan Mayne, 19 Aberdeen Road, London, N.5.

To Alan Mayne, 19 Aberdeen Road, London, N.5.

(please delete whichever is inapplicable)

I would like to receive more information about

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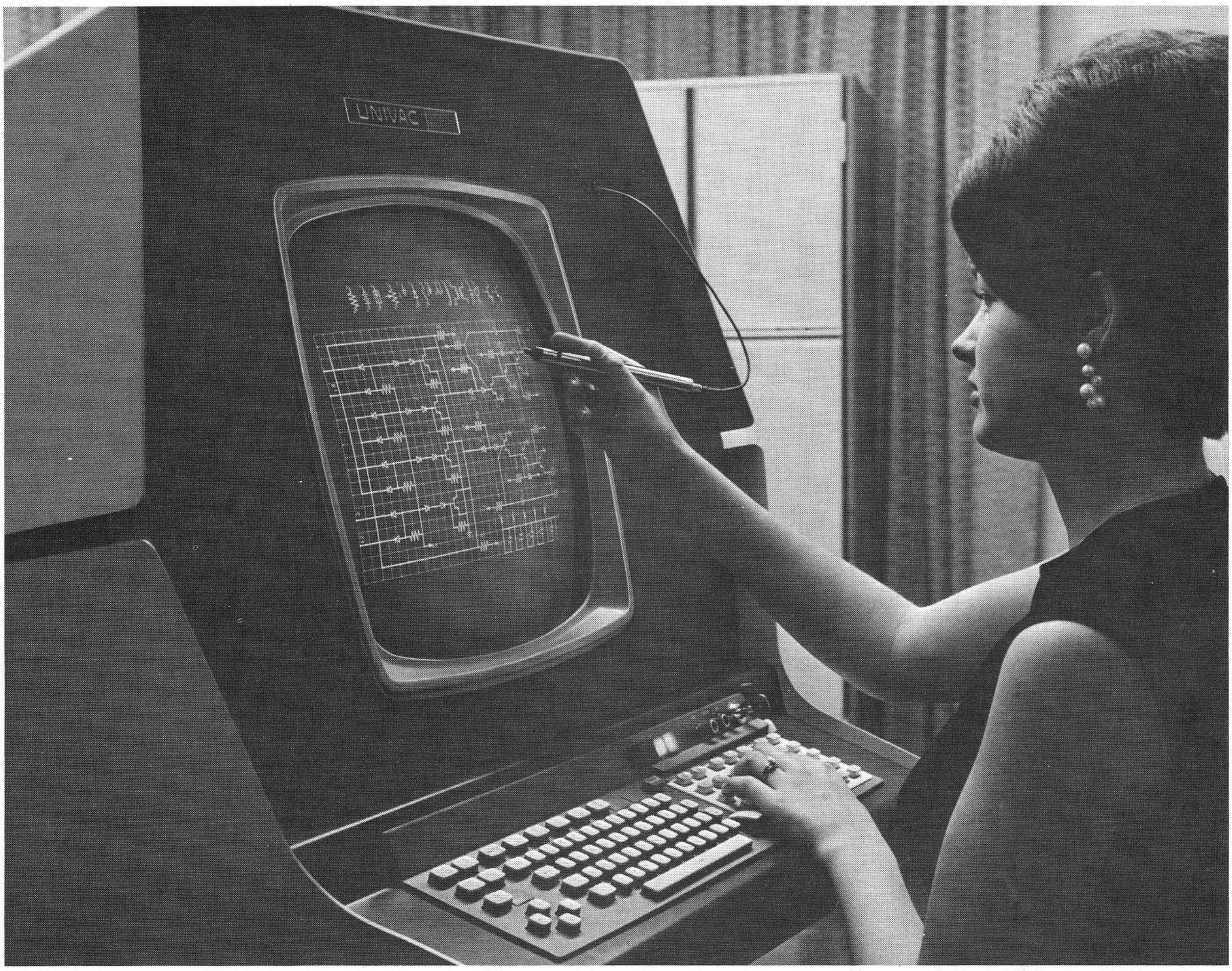
E.M.S. hire their own facilities (the most advanced in Europe) to composers wishing to use them; from initial composition through realisation to final performance advice and equipment is available.

E.M.S. organise concerts; both equipment and management can be hired.

TRISTRAM CARY DAVID COCKERELL HUMPHREY EVANS PETER ZINOVIEFF

UNIVAC
1557/1558 Advanced Graphic Display System



The UNIVAC 1557/1558 Advanced Graphic Display System is an integrated hardware-software concept. The hardware employs digital deflection techniques giving displays of superior accuracy, speed and resolution ideal for computer aided design. The software contains a Graphics Program Library of service and communication routines for the mainframe containing the application program and a monitor attention handling language for the display controller. This permits use of the display as a remote terminal via a link, yet allows local modification to the display without reference to the mainframe, thereby reducing mainframe time and the amount of data transmitted.

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