

ARTISTS TO COMPUTERS

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ABSTRACT

The computer graphics facilities at the University of Toronto were made available to a selected group of artists for a one-year period, with the assistance of a full time programmer. About a dozen visual artists have participated, most of whom were students, since the response from established artists was disappointing. A number of animated films resulted, totalling about 30 minutes running time. Many more people attended demonstrations and discussions, and we participated in detailed planning toward a proposed "responsive environment" system controlled by a small computer. The reactions of some of the artists, as well as some of our own observations are reported in this paper, following which a short sampler film will be shown indicating the results of some of the projects undertaken during the year.

RESUMÉ

Les équipements pour la représentation graphique par ordinateur à l'université de Toronto ont été mis à la disposition d'un groupe d'artistes sélectionnés à qui on a accordé l'aide d'un programmeur à plein temps pendant une année. Environ une dizaine d'artistes "visuels" a participé. Ces artistes, pour la plupart, étaient étudiants puisque la réponse des artistes connus a été insuffisante. Ils ont préparé quelques films animés dont la durée peut aller jusqu'à trente minutes. Beaucoup d'autres personnes ont assisté aux démonstrations et aux discussions et nous avons participé à la planification des détails d'un système d'ambiance sensible, contrôlé par un petit ordinateur. On donne la réaction de quelques-uns des artistes, et l'on fait part aussi de certaines de nos propres observations et l'on projettera un court film-échantillon au colloque afin de démontrer les résultats de quelques projets entrepris pendant l'année.

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From May 1971 to June 1972, the computer graphics facilities at the University of Toronto were made available to a number of visual artists and designers. A Canada Council Research Grant made it possible to provide them with a full time research assistant, Tom Britton. In addition to a programming background we looked for other personal qualities which would enable him to work with various types of personalities, to be available at odd hours, and to assume a coordinating role in such an unstructured situation.

A letter was sent out to a selected list of people in the visual arts, offering computer time and programming assistance. The response was discouraging. Many established artists who had earlier indicated great interest in working with a computer did not reply, or chose - after an initial brief discussion - not to get involved. A number of sessions were held with those who did show interest - outlining the project, demonstrating the graphics system and reviewing the types of computer art which had already been done at various centers. After this the participants worked with Tom on an individual basis.

The facilities centered around our ARTA interactive system (see IFIP '71 Proceedings), a FORTRAN-based picture manipulation system with many animation features. The IBM 2250 graphics display unit at the Computer Research Facility was used, attached to a System 360/44 (256K memory), with 16 mm film output from a Calcomp 835 microfilm plotter.

The participants were primarily students, with the most activity coming from the Ryerson Technological Institute, but amazingly little interest from the Ontario College of Art. Most of them spent their time experimenting with the capabilities of the many picture transformations already programmed

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into the system, resulting primarily in animated film of the type which was reasonably easy to do with it. Here are the comments of one of the students, Elliott Lewitt:

"For some time now I've been aware of the computer's total lack of emotion, intuition, imagination, and the slightest modicum of taste. Only however after this past year's experiences have I come to appreciate the computer's power to amplify all of the above. For example, by giving visual graphic existence to the range of abstruse, mathematical data which define the universe of nature's periodic phenomena, that which yesterday was understood only in the minds of a very few artists, mathematicians and scientists, can now be perceived and analyzed. The very range of man's emotional, intellectual and aesthetic response can be expanded through cinema, and computer generated visualizations can evoke very unique responses.

It is here, for example, that the computer functions magnificently as an intermediary between concept and execution. I am convinced that the computer is a key element in an image-generating system, the parameters of which are defined primarily by the user's imagination, ingenuity and range of emotions.

I personally came away from my initial contact with the university's system with a heightened sense of immediacy with the concepts of randomness, variability and indeterminacy, the concepts I initially wanted to investigate visually. It was almost as if for the first time I came to understand these concepts. I think the complexity of the images we were able to work with was crucial. Rather than deal with concepts in an essentially reductionist manner (reduce the complex concept to its components and construct simple analogues) the computer made it possible to design, examine and analyze phenomena (or images) in all their full blown complexity.

Essentially, what was important was the feeling of "immediacy" in designing images with a concept in mind, as well as the excitement of experimenting with a new means of dealing analytically with images of great complexity."

We did become involved in a project with two established researchers in visual design, Jekabs Zvilna and Julian Rowan. They were experimenting with three dimensional cylinders with various cross sections inclined to a plane, marking on it the lines of intersection after various rotations, then unfolding the resultant marked surface. We simulated this experiment by means of a program which took Tom two months to prepare - the only individual project for which we could afford extensive programming - after which various possibilities could be explored interactively by changing various parameters. They comment:

"For a first and brief encounter with computer graphics, the experience was, for us, impressive. We felt we had accomplished a good deal and although we perceive some limitations to the facilities, we would be most interested in having the opportunity again to carry on ... We were delighted with the serendipity of visual accidents from program or computer input 'errors' and kept a number of aberrations for reference and future use on purely visual grounds."

We have also attempted long distance collaboration with Lillian Schwartz, Stan Vanderbeek and Bruce Cornwell - all of whom have done extensive work previous with computers in the U.S.A. Each of them spent one weekend session with us, and stored material into our picture library, which we could further develop and mail for later visual processing. Unfortunately, the project ended before we could complete these films.

About six animated films resulted, totalling about thirty minutes running time, not counting many experimental fragments. The resulting material belongs to the artists, whose responsibility it is to do the editing, color, sound track, etc. We have prepared a sampler film which we will show as part of this presentation - which has some segments from a number of these efforts.

In addition to the dozen or so active participants much wider interest was aroused by discussions, demonstrations and other presentations. We also became actively involved in the development of a proposal for a "responsive environment" system controlled by a small computer.

In addition to the purely educational aspects of the project we gained valuable insights into the needs of creative artists when they attempt to use the facilities of a computer. The participants did not learn to program, and most allowed Tom to do the "flying" of the system through the display tube, while they did the "navigating". It is clear that we need an easier interface which is more natural to the visual designer and which can be learned in easy stages without sacrificing a great deal of flexibility. A combination of the features of the interactive, conversational and programmable systems is needed. The underlying programming language should enable the user to define high level commands interactively, by means of a combination of graphic manipulation and typed instructions. Many new routines were added to our system as an outcome of this work, and a whole film editing system - on which he is reporting in a separate paper - is being developed by Tom.

The major observation we can make is that artists tend to take a much too narrow view of the possibilities of computer systems. Usually they take what is given and explore variations on these unless they already have a specific project which they wish to adapt for computer manipulation. In order for them to fulfill our expectations to enrich the field with their creative insights they will have to obtain a greater understanding of the possibilities of this emerging "process art" and master some of the conceptual and technical aspects to a greater degree. This could include:

- a. An ability to program in at least one language. There is a lack of appropriate courses. Introduction to programming and computer-assisted problem-solving through computer graphics would be an interesting and relevant method.
- b. An appreciation of the major concepts of "informatics." This should include some of the major ideas not only of computer science, but also of cybernetics, systems theory, operations research, information theory, linguistics, morphology, etc. They should explore some of the aspects of algorithm, system, information, communication, feedback, randomness, pattern,

structure and so on. Some mathematical appreciation should also be acquired, particularly in geometry, topology, combinatorics, graphics and networks, probability and statistics.

- c. A review of the common types of computer art with particular emphasis on the kinds of procedures used. These include combinations of geometric figures, families of curves traced out by algebraic and transcendental equations, stochastic processes based on random distributions, topological transformations of representational figures, combinatorial manipulations of modular units, local operations on digitized picture grids and explicit applications of generative grammars. Many of these are illustrated and explained in Computer Art: An International Portfolio of Visualized Processes, L. Mezei, (in press).

Related fields in visual communications should also be explored, such as Informations (or Exacte) Aesthetics; formal principles of design; programmed and behavioural art; art, science and technology collaborative efforts; intermedia environments; video; film animation; visual perception studies; electronic music. Future possibilities for merging of the various media should be discussed, resulting in a new "process art" by means of "responsive environments" in which many more dynamic processes - including those found in nature - could be explored at will through the control possibilities of a central process-control computer.

We recommend that other institutions with the facilities undertake similar programs. It is a definitely satisfying and mind-expanding experience for a technical organization to admit some artists. Bull-sessions in a common drop-in-center patterned on the European coffee would help, or better still - a New Renaissance Pub. Such interaction would especially work well where there already exists an art or design program in addition to the technical section, as well as film and television facilities and the like.

It would be best to avoid the competition with all the other users of the large, expensive systems by using more modest equipment allowing for more hands-on experience and experimentation whenever desired. A small computer appropriate for the purpose with graphics display paper tape and typewriter could be had for about \$25,000. Tom Britton is now using such a system at the University of Western Ontario with a number of art and science students. In addition, for larger production runs the system could be attached to a larger central computer center, or a central graphics facility utilized.

Small groups of artists could get together with sympathetic technical types and gain access to existing facilities for specific projects. The serious artist with a particular project will have to be given the necessary resources much as they are provided for scholars and scientists today. In some instances this could involve the full time services of a programmer for an entire year.

This project - though not meeting our expectations fully - has been a stimulating exploration of creative innovative modes of expression. We enjoyed it, and so did the people who worked with us. A more detailed report

is available on request, including the reactions of some of the participants.
Here is an excerpt by Maurice Bryan:

learning about grafix
learning about animation
learning animatedly about grafix
learning grafically about animation
learning about animated grafix
learning about grafic animation
learning about computers
learning about computer animation
learning about learning
learning learning learning learning learning learning learning