

Computer Composers — Comments and Case Histories

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Computer sound processing was developed at the Bell Telephone Laboratories in the mid 1950's in order to study speech coders. When the general power of computer methods was perceived composers were encouraged to try them in creating new sounds and new music. Partly, encouragement was offered from a feeling of responsibility for bringing new technology to the attention of those in the cultural community who can make use of new tools, and partly because increased understanding of sounds may improve speech communication. Composers are very creative and have very good ears for making and analyzing sounds. Much more could be said about the impact of art on technology, but I will not so digress. The theme of this article is the effect of technology on art, or more specifically, on the artist, as seen by a technologist.

Musicians go through a number of phases after they first comprehend that a computer is a musical instrument.

The first phase (and this tends to be the last for an instrumentalist) is a complete disbelief — like the man who feels the noose on the scaffold and can't believe that it is happening to him. Usually the instrumentalist is able to continue in his fiction indefinitely.

The next phase is panic. This is the end of all art. This machine is doing in everything that I value. We are succumbing to a mechanical monstrosity. The human being has abdicated his rights, the machine is now in the ascendancy.

The next phase, and the first constructive one, is a period of long hard work in mastering a new medium. Very few people reach and even fewer complete this phase. The time necessary to learn to use the medium is years — perhaps two, but probably not longer for someone who has a fair amount of aptitude for things computational and a smattering of technical experience.

Finally, after the period of hard work, after the composer has to an extent mastered the medium, comes the last phase which is accompanied by 'Existential Nausea'. The composer at last realizes that the new technology does not solve his most difficult problem — the fundamental problem what to compose, or what he is trying to say. At this point, however, the composer finds that he has become completely trapped. And so, for that matter, are all his contemporaries, whether they have chosen his route or not. They are unable to reject the new technology without becoming anachronisms. There is no turning back into the past. The technical world has inflicted itself upon them.

Not everyone should play the violin. Violinists need a certain speed of finger. Likewise, not everyone should play the computer. What are the characteristics that adapt people to this particular instrument?

One is a technical facility which does not need to be in any existing field of technology. I.B.M. used to say that a better test of programmer talent was whether you liked to play chess and do little mathematical puzzles rather than whether you'd done well in a formal course in mathematics or engineering. It is definitely true that some people find it easier to learn to program than others do.

A second quality which is of great help is patience and an almost academic approach. Academic viscosity has been damned in many circumstances, but the computer for music is no longer a spectacular device. Getting some sound from it is not enough. And, getting the sound you want is more a war of attrition than a blitz-krieg. One must try something. If that doesn't work he must have the follow-through to try something a little different, and gradually to construct the compositions that he is after by a great deal of hard work.

Finally, the third and absolute requirement is proximity to an adequate computer. This is the greatest limitation faced by most of the people who would like to try computer music. Today it means that one must be associated with a school, because most of the available computers are in schools.

Now I would like to turn from these generalities to the case histories of five musicians who have used the computer.

The first real composer (not one of the technical group developing computer sound processing) to write a piece for the Bell Labs computer was David Lewin. At the time he was in the Harvard music department, but he had recently come from Princeton. He had studied mathematics as well as music. He was a very good pianist. I remember once playing the Kreutzer Sonata with him. I had forgotten to bring the piano part but he improvised the whole thing faster than I could go.

Compositionally, he was a student of Sessions and Babbitt and used the 12-tone style.

Lewin's great charm in his use of the computer was an unrivaled bravery, like that of a blindfolded man who confidently raises a shotgun and pulls the trigger. He first learned of the computer when he read a letter in which we described its operation. He promptly wrote a score which he mailed to us, and we synthesized it entirely by remote control.

After completing two pieces, Lewin went to Berkeley and, as far as I know, suppressed all interest in computer music. He used to accumulate the royalty checks which I sent him for years and cash them all at once — perhaps when he moved and they fell off his piano. He has now returned to Long Island and is trying to start a computer music program there.

The next composer to become involved with our computer was Jim Tenney. Tenney's education started with a year's study of engineering somewhere way back in the dim past, together with piano lessons. A rapid focus of interest in music led him to Bennington College, where he had the unique distinction of being a male student at that excellent musical institution. There he wrote a number of pieces for conventional instruments and voice.

From Bennington, Tenney went to the University of Illinois and worked with Hiller in an electronic music studio, where he made at least one piece for electronic sound. He came to Bell Laboratories in 1961 as a dual experiment — an experiment by Bell Labs, to see what a composer would do with our sound programs, and an experiment for Tenney, to see if he could stand the computer. He has continued working with the computer for seven years, it is certainly one of his major musical interests — if not his prime interest.

As you can see, Tenney had the technical background and an electronic music background. During his Bell Labs sojourn he became an expert programmer, and now he could get a job at any aircraft company or any computer company entirely on the merits of his programming. I'm sure that this would be the furthest from his desires.

At Bell, Tenney produced a whole sequence of computer pieces. He considers it one of his most productive periods. His first piece, 'Noise Study No. 1', is one of the best computer pieces that's been done. It's a random composition in which the random element was a coin which he flipped by hand. He rapidly progressed to putting the random element in the computer, where it should be, and letting a random number generator impose the random parts of the composition. He also put constraints on the randomness, in the sense of developing structure in random compositions.

After leaving the Bell Laboratories, Tenney received a National Science Foundation grant to do research in musical acoustics at Yale University Music School. He failed to complete a working music program there, though he did learn something about violin tones through computer analysis. He found it hard to interest his associates at the music school in computers. This was not through any lack of computational facilities — Yale had quite a good computing center. Indeed Tenney interacted more with computer nerds than with the music department.

After leaving Yale, Tenney went to the Polytechnic Institute of Brooklyn, where he has got a program into operation.

The next composer on this list, Jim Randall, does not have the characteristics I have postulated; he defies analysis. He is a member of the Princeton music department. I don't know precisely what his background is, but I doubt that he has had technical training.

Randall visited Bell Laboratories for a few weeks one summer, picked up what he needed to know to use the computer music programs, went away, and started to use them. He is one of those specially gifted individuals who understands instantly the essential parts of something, the things which are necessary in order to make use of it effectively, and ignores the rest.

On his return to Princeton, Randall retired to his cellar where he chewed his cigar, growled at his associates, and has been composing computer music ever since. His first piece, 'Mudget — or Monologue for a Mass Murderer', was a landmark as a long and major work. Mudget was, according to Randall, an historical character who lived in the last half of the nineteenth century somewhere near Philadelphia. There he out-fitted his house as a murder factory. In Randall's hands, the computer represented him well. Randall has subsequently completed a second piece for violin and computer. He now carries an unexplained cane — I have never observed him limping. The cane has a heavy head — perhaps he hits people with it.

A very different sort of man visited Bell Labs at the same time as Randall. John Chowning spent a few days playing with the computer. He then returned to Stanford University and accomplished an impossible task. He got a music program to operate on the Stanford computer without outside assistance.

Programs that work on one computer don't work on another computer. It generally takes six months of hard work by an expert programmer to transplant a big program. Chowning was not an expert programmer at the beginning — he was an expert drummer. What he did to succeed, I don't know. It may have been his charm. It may have been his inherited technical abilities. It may have been an element of artificial intelligence. The program eventually worked on a computer which was designed for artificial intelligence experiments. This was fortunate, because artificial intelligence still has a low IQ and generates interesting results with painful slowness. It is a blessing that someone could use the excellent computer, and Chowning had a program which worked spectacularly. As a consequence, he has been showered with computer time and other blessings such as degrees.

Chowning has done some very impressive acoustic and psychoacoustic experiments on the computer. As far as I know, he has composed little. This is curious, because he is a musician by training. The kind of experiments he's done deal with reverberation and changing the position of the sounds relative to a two-channel or four-channel speaker system. In this way he has introduced an entirely new dimension to music — that of motion of the sound source.

The last musician I will speak of is Jean-Claude Risset — a native of France who came to study with us in completing a Ph.D. in Physics at the University of Paris. He was supported by a French fellowship — one of the rare cases of the French government supplying dollars to support a student in America. Even so, his relationship with the government had its ups and downs.

Risset originally intended to stay with us for two years, but he was drafted into the French army after one year. Fortunately, France has some unique advantages. Their telephone system is run by the government. His military service consisted of working in the research laboratories of the French telephone administration and completing his Ph.D. in Physics. After that, he returned to Bell Labs for an additional two years.

Why do I call Risset a musician? In addition to taking the degree in Physics, he has studied the piano and is a concert pianist. Except for his parents' influence, he would have specialized in music. I think he stands a good chance, when he goes back to France, of entering a technical area in which he can carry on in his musical work.

During his first sojourn with us, Risset studied trumpet tones, and he used the computer to synthesize tones which are indistinguishable from real trumpet tones. This is a great breakthrough in both the analysis and synthesis of sounds. The purpose was not so much to put trumpeters out of business — the computer was still far more expensive than the trumpet — but rather to understand the essence of the brass quality in tones.

During his second visit, Risset has synthesized close approximations to many other instruments — flutes, woodwinds, other brasses, pianos, bells, and a host of other percussion instruments plus numerous noninstrumental sounds. In addition, he has invented another musical dimension — spectral pitch control — which can be used to produce tones which seem to be simultaneous ascending and descending in pitch. He has become so expert in tone quality that he can achieve a desired timbre with almost no experimentation. He has made his expertise available to the world by making a catalogue of sounds. I believe that this is the most important musical document of the century. It contains a tape of sound examples plus computer scores which show exactly how the sounds were created. Never before have we been able to describe interesting musical sounds with such precision.

In addition to these technical achievements, Risset has completed a major work and two shorter pieces during his second visit. The former — incidental music for a play — far surpasses any other existing computer music in tone quality. He now returns to Paris.

If some conclusion must be drawn from these examples, it is that the computer requires its master — requires its Mozart or Bach — before we will have great computer music. At first John Pierce's anecdote was appropriate. He likened the musicians and the computer to a tribe of savages who are suddenly presented with a grand piano. They push down the keys and hear a sound. In a vague way they realize that they could use this machine to make beautiful music, if they only knew how. Today we see another picture. Enough musicians have become hooked on computer music, and enough good music and powerful sounds have been created, so that an epidemic infection has become inevitable. Music can no longer be cured, but there is every prospect that it will survive.

## UNITED STATES

### REVIEW OF THE 1969 ACM COMPUTER ART, MUSIC & FILM FESTIVAL ACM National Conference & Exposition August 26-28 San Francisco

The exhibit consisted of some 132 entries, representing various artistic fields such as the graphic arts, film, music, poetry and the theater. Works ranged from those created with some aesthetic concern, to those serving a purely illustrative function of a computer-oriented experiment or project.

The graphics section contained the largest number of works in a given field with 83 entries, many of which have appeared in such publications as 'Computers and Automation', and the 'Cybernetic Serendipity' Catalogue. Some of the better known works were Maugham Mason's 'Moire Fabrics' (IBM); Lloyd Sumner's 'Friendly Flowers' (Computer Creations); H.P. Peterson's 'Cybernumerics'; and P. Milojevic's 'Awaiting Spring in the Snow'. Other numerous contributions came from such companies as Bell Telephone, Burroughs, ICL-London, CALCOMP, IBM, and Huston Instruments.

Although the majority of works consisted of the usual graphic representations of mathematical formulae and diagrams of the 'Mona Lisa' stamped-out in symbols, there were several very informative displays involving the visualization of data from computer-generated projects. Included in this category were weaving techniques and fabric samples; computer enhancement of photographs; ballet and music notations; and two-dimensional designs produced by young students with no previous programming experience. The only examples of poetry in the entire show were those of Robert Gaskins Jr., 'Haiku Examples' (UCB); and Alan Sutcliffe, 'Likeness' (ICL-London). Unfortunately, many of the works in this section were not mounted professionally or labelled properly to give the greatest effect. In many cases, they were just stuck on the wall with no discernment for appearance, and with no explanation given as to the technique involved, or to their origins. Nothing was left for the viewer but to marvel at the precision of execution. Here too, Jonathan Benthall's criticism applies, in that it raises the questions: 'Do the means exceed the end?'. More should be expected of computer application in the graphic arts than its previous role as an expedient draftsman. Or, perhaps these works should be viewed as experiments or explorations, and not as objects of aesthetic concern.

The most interesting section of the exhibit consisted of 14 films with selections of computer-generated music interspersed between each film. Unfortunately, the film equipment was not functioning properly, and some of the films with sound tracks had to be viewed silently. John Whitney and his son, Michael, contributed 4 films, 3 of which did not lose any of their sensuous appeal when viewed without the accompanying auditory effects. The textural and color qualities of 'Binary Bit Patterns' by Michael Whitney and Information International were hypnotic in effect, and quite visually stimulating. John's film, 'Experiments in Motion Graphics', offers one of those rare occasions where the artist talks about his work, and the equipment involved in producing that work. John Lansdown's 'Computer Ballet-Royal Ballet Company (G.E.I.S.), A.M. Noll's 'Computer Generated Ballet' (Bell Labs), and K. Knowlton's 'A Computer Tech for Animated Movies' (Bell Labs) were highly informative films, and in themselves, self-explanatory. Bell Telephone and the Virginia Polytech. Inst. contributed 4 other films, which would have been less tedious to view, if the intent behind each film had been explained, and if the sound equipment had been functioning correctly. Other films primarily concerned with the commercial aspect of computers were sponsored by CALCOMP, IBM, and Computer Image Corporation, the latter of which used a Disney-type animation coupled with a woman's erotic groans to sell Coca Cola.

The selections played of computer generated music can be classified within the conventional framework of traditional composition techniques, and/or traditional sound synthesis. Included in this category were several selections by Max Mathews (Bell Labs), Arthur Roberts (National Accelerator Labs), Gerald Strang, James Beauchamp, and J.K. Randall. Other well known composer-programmers contributing works were John Pierce, Lejaren Hiller, Pietro Grossi, and Herbert Brun. Unfortunately for the listener, many of the musical pieces had no recorded introduction, and were not played in order according to the program, making it difficult for identification.

Although several important computer artists such as Stan Vanderbeek, Charles Csuri, Tsai, etc., were not included, this exhibit did give some indication of recent trends in the creative use of computers in the fine arts field. However, the faulty equipment and poor organization did detract from the works themselves, as well as making the exhibit a tiresome experience for the viewer. Perhaps, when ACM sponsors another computer exhibit, they will put as much energy and consideration into its organization and content as they did with the more commercial aspects of the exposition.

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We are unable to print the two-page list of art exhibits, films and music supplied by the reviewer. If you wish to see this please communicate with the writer, or Alan Sutcliffe.

## 'SOFTWARE' SHOW HARDENS

This exhibition at the Jewish Museum, New York, originally scheduled for January 1970 (P3) is now due to take place in April or May. Jack (Beyond Modern Sculpture) Burnham has been appointed guest curator; here is his statement on the show.

In the course of defining and planning the scope of the 'Software' exhibition, several things have become apparent. All previous objects are both hardware and software embodied in the same object. To a great extent, all previous machine art is more hardware than software. The range of software mediums, however, goes far beyond computer languages and programming. In an exhibit of electronic software, one might also include radio, telephone, telephone photo-copying, television, microcard library information systems, teletype and teaching machines. So far, most of these techniques have received only a minimum of attention from artists, yet each has its own software potential as an artistic medium.

If the 'Software' exhibit is to be successful in emphasizing the nature of electronically supported software, it should then remove the traditional hardware props of art from the eye of the viewer, mainly those vestiges of painting and sculpture. For this reason, it seems advisable to visually orient the show around the output devices and transducers listed above. This forces each viewer to engage every work in terms of its software output instead of primarily visual appearances.

In designing such an exhibit, careful attention must be given to viewer preparation. Since every person enters the museum with preconceived expectations, it is important that a comprehensive but simple description of software be given. Otherwise, many points of the exhibition will be overlooked or misunderstood. Some of this educational

background will be given in the catalog, but a more important approach will be to build this information into the exhibition as a mixed-media presentation.

The reasons for this unorthodox approach to an art exhibition might be summed up in a statement by Marshall McLuhan:

"The difference between the artist and the organization man in these matters would seem to be that the artist senses at once the creative possibilities in new media, even when they are alien to his own medium, whereas the bureaucrat of arts and letters moans and bristles whenever his museum of exhibits is threatened by invasion or desertion. The artist is the historian of the historian of the future because he uses unnoticed possibilities of the present."

Jack Burnham June 10, 1969

## ART IN A PALACE

San Francisco is one of the hot spots of technological art. The focal point is the Palace of Arts and Science 3601 Lyon San Francisco California 94123. This is also the address of E.A.T.-BAY AREA, run by Merlin Stone and John Almen. The newsletter gives a vivid picture of the local activity. Society member Richard Friedman took a leading part in the 'Inside/Outside' evenings held in August. 'NOW' is a constantly changing exhibit where artists are invited to go on adding and changing their exhibits.

## GERMANY

The Center for Electronic Music Technische Universitat Berlin

Director: Professor Dr.-Ing. Fritz Winckel (founder), Dipl.-Ing. Manfred Krause, Tonmeister Rüdiger Rufer, and Professor Boris Blacher (composer and consultant).

The experimental studio of the Technische Universitat in Berlin-West was founded in 1949. During the subsequent reconstruction of the main building, a lecture hall for

300 students was equipped with electroacoustic devices, and a sound-control room for musical and acoustical experiments for the education of 'Tonmeister' (sound-control managers) have been established by the university in co-operation with the adjacent Hochschule für Musik.

In this center work is also done on experimental studies of speech and music structures in collaboration with international research in speech and music. A complete list of publications is available. Special studies have produced an objective method for the testing of the quality and efficiency of the singing voice. Additional research is concerned with tuning systems and other problems of musical acoustics.

In 1968, the fourth T.U. Studio was constructed, adjacent to two lecture halls, one of them serving as music recording room, the other as reproduction room with a variable reverberation time adaptable to the respective purposes. This plant serves as the Central Control and is connected with the other three studios in the same building by a communication network of sound and video control lines which guarantees exact synchronisation. It is thus possible to combine the music of several distantly placed players on the central 8-channel sound-control board in the main studio. There is also a connection to the Auditorium Maximum (200 feet away) which has a separate control booth with a 4-channel control board. This hall which seats 1100 persons has properties favorable for a concert hall and is used for performances of experimental music as well as for audiovision experiments on a TV-Eidophor screen.

In the Technische Universitat various computers are available which are at times used for the analysis and synthesis of music and speech. Several methods of producing music are studied. The studio is available for experiments and is concerned with the problems of art in our time.

The center provides all sorts of sound productions with electric generators, sound processing devices with voltage control, and the electronic processing of instrumental music structures. As basic material for electronic rearrangements serve tapes of music and speech, as well as live performances.

There is constant collaboration with the Akademie der Künste. The German Pavilion at the World Fair Osaka 1970, will feature music designed and executed by the TU Studio. For a copy of the leaflet (in English and German) from which the above is an extract write to: Experimental-Studio, Technische Universitat, Berlin 12, West Germany.

## ITALY

The Italian architect Allesandro Martini who had been in correspondence with the Society about the foundation of an Italian society for computer arts, attended a committee meeting of the Computer Arts Society in January. We learnt about the great difficulties experienced by artists in Italy who want to use computers. Martini was connected with 'la sfida elettronica-realta e prospettive dell'uso del computer nell'architettura'. This event included an exhibition, symposium and films, and took place in Bologna 4-12 October, 1969. We wish Martini and his colleagues success with their plans for CAS Italiana. Dott. Alessandro Martini, Architetto, via R. da Capua 12 - 00153 Roma Italy. Tel 575 605 - 578 606.

Edward Zajec showed computer graphics at Trieste, his birthplace, 13 January-15 February 1970. The artist now lives in America where he is teaching in the art department of Saint Olaf College, Northfield, Minnesota. A three-page catalogue has been produced. This includes an introduction by Giulio Montenero, a statement by the artist (in Italian), and a reproduction of a drawing. The show took place at La Capella, via Franca 17 34123 Trieste Italy. Tel. 61668.

La Capella is a centre for research and experimentation in art, music, film and events. In conjunction with this exhibition, the centre arranged two evenings in January where computer films were screened, music played, and the subject Civilization and the Computer discussed. Edward Zajec spent a week in London in January and met several members of the Society.

HOLLAND

'Nieuwsbrief nummer 1 van de WERK GROEP VOOR COMPUTERS EN WOORD, BEELD EN GELUID', is a three-page duplicated document dated 6 January, 1970. It is issued by the secretary; Johannes van der Wolk Otterstraat 51 Utrecht Holland. Tel. 030-15286. Here is a translation of the first page.

1. The first meeting of the working group took place on the 19th December in Utrecht. An initial scepticism towards the collaboration of such divergent disciplines, was followed by increasing enthusiasm for the aims of the working group: 1. Exchange of experiences, problems and results. 2. Coordination of projects. 3. Standardisation. 4. Communication between researchers and the computer industry.

2. Anyone who has specialised, or who is engaged in becoming a specialist in the utilisation of computers for the analysis, and/or the production of words, visuals or sound, is most welcome to attend the meetings of the working group. So far, the following have signified their interest in the working group:

M.L. Alinei, J.J.M. Bakker, P.B. van der Burg, C.L. Citroen, J. Clausman, L.D. Couprie, J. Daan, R.M. Dippel, J.A. Emmens, A. Feitsma, R.H. Fuchs, L. Geurts, G.H. Gromberg, F. Haks, J. van Halm, J. Hekking, A. Jelsma-de Boer, L. de Klerk, G.M. Koenig, H. Koetsier, H. Kowalke, J.C.P. de Kruif, J. van Leeuwen, E. Liewens, L. Meertens, E. Melis, P.L. Mol, J.C. de Moor, H.E. Reeser, A.W. Reinink, E.K.J. Reznicek, H. van Rossum, R.J.H. Scha, J. Schelling, B.C. Slijgers, J. Smit Sibinga, R. Spoor, R. Staakman, P. Struycken, E.M.M. Stutterheim, S. Tempelaars, E. Terwindt, S.I. The, F. de Tollenaere, W.G. Traast, P.A. Verburg, G. Vermeulen, A.J. Vervoorn, K. Vogt, H. de Vries, J. de Vries-van Nieuwenhoven, W.A.M. de Vroomen, H. van de Waal, F.C. Weiland, A.L. van Wesemael, J. van der Wolk, L.J. van der Wolk, A.M. Zwaneveld.

3. If you have not already given f 3,- as contribution to the costs of organising the first meeting, and wish to be kept informed in future about the activities of the working group, kindly send f 3,- marked giro 516606 to J. van der Wolk at Utrecht.

4. The aim of this newsletter is to facilitate communication between members of the working group, and to supply information on activities. A regular feature will be publications by members of the working group. It is requested that reports for the newsletter be sent to J. van der Wolk. An issue of the newsletter appears as soon as sufficient copy is available.

The Newsletter No. 1 of the Working Group for Word, Visual and Sound Research, goes on to list a number of events, concluding with a questionnaire. J. van der Wolk is the author of a useful guide to newsletters relating computers and the humanities (P5). The list of events announced by the working group is impressive; some of these will be found in our Future Events section. It is evident that this group - which includes several members of our Society - will make a significant contribution.

YOU ARE INVITED. . .

XVI Int. Festival of Short Films Oberhausen 12-18 April 1970. Final selection for this event takes place in London, 25-27 February. Francis Howard, PO Box 76, Hercules Rd., London, SW 1. 01-928 2345 ex. 429.

Woolwich is running Pavillions in the Parks March-April on a triangular site in Blackheath, which includes a pond, next to Greenwich Park. Camden is running a scheme April-May in Euston Square. Haringey is starting a scheme in July to run for a year. Other plans - a Welsh scheme; in the Newcastle area; during the Amsterdam and Rotterdam Festivals, June-August. Artists in any medium are invited to take part. Write for application forms to: Pavillion in the Parks Advisory Service 1 Site St. Katherine Dock St. Katherines Way London EC 1.

The Department of Music of Dartmouth College announces the third competition for the Dartmouth Arts Council Prize for an outstanding composition of electronic music (five hundred dollars). The judges will be: Francois Bayle: James K Randall: Christian Wolff. All entries must be received by April 1 1970. Professor Jon Appleton Electronic Music Studio Dartmouth College Hanover New Hampshire 03755 USA

FUTURE EVENTS

The Pierrot Players will perform works, mainly by Harrison Birtwistle, at the Queen Elizabeth Hall, London, 3 March, 7.45 pm.

The Cockpit is London's latest theatre. Electronic music will be played in March. For interesting brochure describing the theatre and activities, write to Cockpit, Gateforth Street, London, N.W.8. 01-262 7907.

'The Invention of Problems' An exhibition of experiments in art and technology with an emphasis on systems and process. Organiser: Stroud Cornock (01-348 4307). Fletcher Building, City of Leicester Polytechnic, LE 19 9H. England. 9-18 March 1970.

13 February 1970: Meeting on information retrieval and library automation. Central Library of the T.H. Delft, Doelenstraat 101, Delft, Holland.

20 February 1970: Meeting on computer graphics. Michiel de Ruyterweg 10, Delft, Holland.

20-21 March 1970: Symposium of the Dutch Working Group for Computers and Verbal, Visual and Sound Research. Central Library of the T.H. Delft, Doelenstraat, 101, Delft, Holland. Professor Joseph Raben, Editor of Computers and Humanities, will address the meeting. Main language will be English. Contact for all these meetings: J. van der Wolk, Otterstraat 51, Utrecht, Holland.

16-18 March 1970: Solar Energy Society. 6th annual meeting. Sidney, Australia. F.E. Edlin, Arizona State University, Tempe, USA.

23-26 March 1970: Symposium on the use of computers in literary research. Cambridge. R.A. Wisbey, Literary and Linguistic Computing Centre, 2, Sidgwick Avenue, Cambridge, England.

14-16 April 1970: Joint Conference on Automatic Test Systems. Un. of Birmingham. I.E.R.E. 8-9 Bedford Square, London, WC 1, England.

18-26 April 1970: 'YUREMA 1970' 15th International Seminar and Exhibition of Regulation, Measuring and Automation. Zagreb. JUREMA, Zagreb, Unska 17, POB 2-123. Yugoslavia.

26-28 May 1970: IDEA Symposium. Society for Information Display. New York. Vernon J. Fowler, GT+E Laboratories Inc. 208-20 Willets Point Boulevard, Bayside, New York, 11360 USA.

15-19 June 1970: 1970 IEEE Int. Symposium on Information Theory. Noordwijk, Holland. F.L. Stumpers, Philips Research Laboratories, N.V. Philips, Eindhoven, Holland.

16-18 June 1970: Computer Conference. Washington Hilton. G.L. Tucker, Office of the Secretary of Defense. Room 3 E 1014, The Pentagon, Washington DC 20301, USA. Exhibition is planned.

LETTER

Dr. Evan Harris Walker defends random numbers in a letter to PAGE 5 pointing out that some of the inadequacies of computer art today stem from programs being 'long on random numbers and short on Process'. I should like to make some points concerning Process.

a. The process is often not obvious and rarely clear to an observer looking only at the art object produced by the process. Some would reject the need for any knowledge not contained in the art object itself, but my own feelings are that this attitude will inhibit progress in computer art.

b. In more conventional fields, repetition and duplication are reduced by exhibitions and reproductions in the art press. However, development of processes in computer art is likely to be wastefully repetitive even if the final 'art objects' are seen by many. The process should be published as well as the art object, and I suggest some international media be set up.

c. Such a publication ought to contain articles that are comprehensible to both artist and technologist. I refer technologists to the useful standard set by Karl Gerstner (1) whose writings on programmed art are quite free of obscurity. Artists might look at the Algorithms Supplement (2) in the Computer Journal (3) to see how a similar problem is tackled by technologists.

d. Is there anything more fundamental than the spread of useful programming in this attention to Process? Kawano (4) has suggested that an approach rather like that found in mathematics could be used in art, and describes it as logical-axiomatic rather than empirical. This approach would stress the Process, which may be universal whilst the art object produced by it would be merely particular.

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1. Karl Gerstner, 'Designing Programmes', Tiranti, London. See page 55, which contains some material from the book in German 'Kalte Kunst' now out of print. 'Kalte Kunst', Tiranti, London, 1957, contains many examples of programmed paintings by a number of artists including Bill, Gerstner, Graeser and Lohse. Each painting is accompanied by a description of its programme. 2. Strictly, an 'algorithm' is a systematic mathematical procedure which enables a problem to be solved in a finite number of steps. Common usage however can include methods which narrow down the field of search for a solution. My point however is that publication of these algorithms exposes them to criticism and also enables others to freely use them. 3. Computer Journal, e.g. November 1969 pp 405-409. 4. Hiroshi Kawano, 'The Aesthetics of Computer Art'. In BIT INTERNATIONAL no 2 pp 21-28.

YOUR FRIENDLY NEIGHBOURHOOD ART STUDIO

In the wake of the Student Revolt of 1968, there emerged an active campaign against authority in the schools of this country. This article is taken from REBEL, Vol 1, No 2, December, 1969, printed and published by Schools Action Union, 160 North Gower Street, London, NW 1.

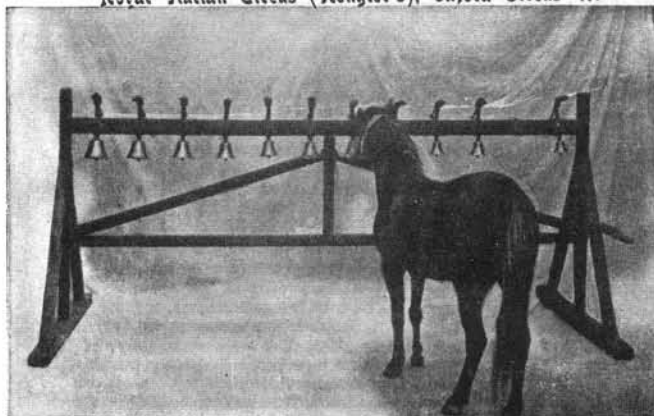
'There is one postal address at Battersea Grammar but inside the school there is a definite division. One part of this division is the older main building. It is old also in its ways of teaching, its discipline and perhaps even in its need for discipline. It is here that students are kept under control by the threat of Mr. Cooley the deputy headmaster and his swishing discipliner the cane, with the prefects administering the day to day discipline and their own special detention (P.D.).

It is walk in the corridor; do not touch the windows; do not smoke, or listen to radios; do not enter form rooms without a master on/prefect present; do not wear brightly coloured socks, brown shoes, boots or waistcoats; do not enter the gardens; do not walk up and down the main staircase or loiter in the main entrance hall. And as a sort of rebellion against these rules desks have been smashed, circulars on walls slashed and even windows broken and stealing from one another's desks.

Yet, perhaps a hundred yards down a corrugated iron roofed passage the half of the division exists. This is your friendly art block where somehow the students and teachers have learned to exist together without the cane or Mr. Cooley's name waving overhead. The art studio here is always open (unlike the rest of the school where there is a strict no entrance to all except sixth at breaks), yet there is no vandalism. Here also students have not been forced to build unwanted and unused buildings by forced labour (remember the pavilion), yet have got together and have radically changed the whole face of the studio, willingly giving up their evenings.

This is obviously a step in the right direction. But remember art is a relatively free subject, would the authorities allow the same thing for maths, physics or whatever. I fear we will have to change society before we can remedy this. Think about it and send in your views.'

Royal Italian Circus (Kengler's), Oxford Circus W.



"THERSA," THE MUSICAL AND CALCULATING PONY.

BACKGROUND TO COMPUTER ART. No 1. Advertising postcard, English, c.1907.

## SOCIETY MEETINGS

7 p m Wednesday 25 February. DISCUSSIONS AND DEMONSTRATIONS by members of the Computer Arts Society. Arranged by the Arts Association, in conjunction with the Slade School, University College. At the Collegiate Theatre, Gordon Street, London WC 1. The Collegiate Theatre is a new and very attractive theatre, having over 400 seats. Admission to this event is free to anyone — so please pass the word to your friends.

7.30 p m Wednesday 29 March. Subject to be announced. British Computer Society, 29 Portland Place, London W 1.

7.30 p m Wednesday 29 April. MUSIC AND STUDIO VISIT. Electronic Music Studios, 49 Deodar Road, London SW 15.

7.30 p m Wednesday 27 May. EVENING OF COMPUTER FILMS. Institute for Research in Art and Technology, 1 Robert Street, London, NW 1.

BRADFORD ARTS FESTIVAL 21 February to 21 March. Computer Arts Society exhibition in the foyer of the main University building.

3 p m Saturday 28 February. ART AND TECHNOLOGY SEMINAR. Small Hall of the University. Included will be contributions from Computer Arts Society members, and Trevor Wishart's MACHINE-ONE, which consists of various rhythms and images designed to produce an environmental poem.

6.30 p m Sunday 1 March. EVENT 1.1 New Works by John Lansdown, Malcolm LeGrice and Alan Sutcliffe. KING OF SHOUTING HOUSE by John Wood, with students of Manchester College of Art, directed by Gerald McNally.

## AIMS AND MEMBERSHIP

The aims of the Society are to encourage the creative use of computers in the arts and allow the exchange of information in this area.

Membership is open to all at £1 or \$3 per year; students half price. Members receive PAGE and reduced prices for Computer Arts Society public meetings and events. The Society has the status of a specialist group of the British Computer Society, but membership of the two societies is independent.

Libraries and institutions can subscribe to PAGE for £1 or \$3 per year. Extra copies will be sent to the same address at half price. No other membership rights are conferred and there is no form of membership for organisations or groups. Re membership, subscription, circulation and information, write to Alan Sutcliffe.

## COMPUTER ARTS SOCIETY ADDRESSES

Chairman Alan Sutcliffe ICL Brandon House Bracknell Berkshire

Secretary John Lansdown 50/51 Russell Square London WC 1

Editor of PAGE Gustav Metzger BM/Box 151 London WC 1

## PAGE

PAGE welcomes information regards events relevant to the Society taking place in any part of the world.

Graphic Credits for PAGE 5 Front: collage includes extracts from editorial in adl-nachrichten, No 53/1968. Centre: Progress? by George H Meyfarth and Philip Meyfarth, Scorpion by Sidney Robertson (from Computers and Automation, August, 1969). Back: design by Projektgruppe Informationsästhetik, Institut für Kybernetik an der Pädagogischen Hochschule, Berlin, (Computer-Kunst, Hannover, 1969), Schema for Swansea Festival Cantata by John Lansdown.

## MUST CATALYST

'Catalyst' has now definitely replaced stuffy old 'Who's Who' on the shelves of event organisers and heads of Liberal Studies in universities and colleges. This 1970 guide to practitioners in various art media, the underground, pop, inter-media, etc. in Britain, has just come out; on 75 printed pages. Price £1. From the Editor, Jos Tilson 11 Argyll Road London W 8.

Harrison Birtwistle has been taken over as chairman of BSEM and intends to get some things done quickly. To canvass strongly for good concert reproduction equipment for electronic music. To accept Peter Zinovieff's offer to donate his studio, worth about £30,000 to the nation on the condition that it fits in with a financially realistic and musically ambitious programme of work. To form a sub-committee to deal especially with the recalcitrance and muddle at halls where electronic music is performed. In support of this a national advertising campaign is to be launched.

## A NEW MUSIC GROUP

The Electric Candle was formed last year to promote and perform works by contemporary American composers, especially those involved with multi-media techniques. The group is hoping to continue to commission new works, and to enlarge its repertoire of recent compositions. All the members are freelance musicians; they hope to arrange a tour in the States this summer, playing at festivals, and working with composers on new pieces. Concerts are also being arranged in Wolverhampton, Cheltenham, Manchester and Liverpool.

The Electric Candle, led by Meirion Bowen, will perform at the Wigmore Hall, London, on 20 February, 1970, 7.30pm. Tickets available from the hall. The programme includes works by Elliott Schwartz, Lejaren Hillar, Alvin Curran, David Reck. Most of these works will receive their first performance, or first London performance. 'Multiples' by Elliott Schwartz, was commissioned by The Electric Candle, and completed in December, 1969. This work will be played at the start of each concert by the group. In it the three percussionists and pianist perform 'live' in the context of film, slides and recordings made of rehearsals and previous performances. Further information from: Nicholas Wright, 42 Christchurch Avenue, London, NW 6. 01-459 0945.

MUSIC 'The Patronage and Presentation of Contemporary Music' is the subject of a one-day conference on 2 March 1970. It takes place at Purcell Room, South Bank, London. The principal speeches will be published as a booklet, price 10/-; price of tickets is 25/-. The event is arranged by The Redcliffe Concerts of British Music. Francis Routh 33 Pembridge Square London W 2.

## FANCY THAT!

From Pop to flipflop. A photo at the head of an extensive illustrated survey of the work of Ronald B Kitaj, in Mizue (No. 777, 1969/10), the Japanese monthly on the fine arts, shows the bearded artist earnestly using a light pen. The last finger of the artist's stubby right hand is shown in intimate contact with the curved surface of the glass display — the painter's touch?

Bottom of the list (of 27 subjects), but 'Computers and the Fine Arts' just made it for the Liberal Party's Computer Study Group. The group is preparing papers to serve as a basis for a conference in August, 1970. The terms of reference are: 'To assess the growth and applications of computers until the end of the century, and their effects on society. To detail measures and legislation that will be necessary to integrate computers into a liberal society.' Art artists, you have been warned! Convener: Ron Coverson 9 Vincent Square Mansions London SW 1.

AT LAST — BEYOND MODERN SCULPTURE! The orbiting US Air Force 1968 81-Alpha earth satellite, has been adopted by the Stanford University Committee for Art. Art Journal, Fall, 1969, has pix.

In a recent publication dealing with Kunst und Computer — in Österreich, there is a quotation from — you guessed it — Adolf Hitler!

ARE YOU GOTHIC? Under this heading, December QUEEN asked: on which side of these lists do you feel at home? The true-blue Goth will stick firmly to the left. If, however, you turn to the right-hand column, the Seventies may not be your decade at all. There followed two pages of what is IN-U-OK on the left, from nose-picking to Computer Arts Society, while among those recommended to skip straight to the Eighties were Christopher Evans and the Friends of Covent Garden.

PSST. Included in a list of topics in the Conference on Signal Processing Methods for Radiotelephony, to be held in the London Headquarters of the Institution of Electrical Engineers, 19-21 May, 1970, is the subject 'privacy techniques'.

## HEY — WANNA CIRCUS?

Circus time is here, and was duly celebrated at the Roundhouse, London. Members of the Society who caught the itch, may like to know of two ventures now being planned in which they could join. The Psi Circus aims at mobility and will provide 'adequate living accommodation for the resident and visiting performers'. That's good, but a glance at their list of desired equipment raises doubt about the orthodoxy of this troupe. 'The Circus will contain: electronic control centre; one haulage caravan; one living caravan; three haulage vehicles; one inflatable arena; one generator. The Electronic Control Centre. A plate steel army communications control unit, 15 x 7, three tons, four wheels, structured with; generators A.C. current; amplifiers; speakers; record decks; tape recorders; radios; transmitters; receivers; oscillators; microphones; television; horns'. The Draft Constitution of the circus quickly reveals that we are indeed faced with a bunch of deviants from the circus world. 'Definition: a collection of people coming together for the purpose of engaging in some educational activity within a mobile environment. Aim: To establish a travelling group of people whose interests are concerned with education. The nature of the activities could be: Theatrical, demonstrations of cooking, boat building, plays etc. Lectures: Philosophy, Homecraft, Geography etc. Group activities: running races, chess, building etc. Instruction: writing, playing musical instruments etc. Audio: musical concerts, radio programmes, telephones, receiving and transmitting messages. Visual: films, pictures, sculpture, backgrounds, architecture, television, scenes etc.' People like Peter Zinovieff have fallen for the idea and offered equipment. If you want to muck in, or give equipment, contact Psi Ellison 23 Fowlers Hill Salisbury Wiltshire England.

Now for a circus on water. Here is the text of a duplicated leaflet announcing THE INTERTOTAL CIRCUS, picked up by the Editor last autumn in Indica bookshop.

The International Total Theatre Circus has in view: to join a group of people that is or wants to be creative and to let them go on a boat through, in the first instance Holland, after that France, Germany and England. On this boat (Circus boat number 1, called CIRUS) there's room for 20 people. Not only people who perform something in music (blues, folk cabaret) but also people who make good and/or special things in the domain of dancing, creating clothes and objects of art, painting or whatever it may be.

W've got in mind: A 1 Regular appearances of the Total Theatre: musicians, living objects-show, galanty show, sessions etc. (all music is acoustical, mind the theatre sphere) Appearances in theatresin relating places is possible. 11 Regular filmrepresentations (slapstick-drawing- and underground-films). For both of these happenings such a compensation is asked, that we can live of it. (2-4 sh.)

Fortunately no compensation is asked for other things, as: B 1 The always existing possibility of using the boat which is opened for anybody at all time. There are always magazines and papers from most of the European countries. (about music, art, the scenes, philosophy etc.) 11 Joining the Circus, as your creation or expression, whatever it is, fits in the all whole of the Circus.

There will be: 111 Most of the time a little exhibition of the made dressing- and art-products. 1V A Communicationbook, in which anybody can mention: name and adress, interests, needs, records, to have or not to have of sleeping-place for guests etc.; so that anybody in his turn can nose in the book and visit some people who seem to be alright. Realize that this will imply an improvement of communicationpossibility.

Some more about the boat: Type: talk-houseboat Seize: 20:4,5 mtr. Inside two very pure rooms: — the smallest one to use as sleepingplace like the biggest part of the hold. There's an excellent living- and sleeping space for twenty people. The biggest room will be used as living and working-space. (Frontpiece is stage.) Beyond this little theatre in boat, there will also be appearances on the quai, for which a so-called BLOWDAMN will be used as background. This is a beautiful worked up fan which can be fold out all over the length of the boat. (at one side of course)

Papers and other mediums are interested. (okt.17th.in "Aloha" = ex-Hitweek. Appendix-remark: May-June, when the Circus starts, a very special event will take place. Anyhow: — if you want to join (may be the first boat, otherwise the second or next one's) — if you want to say your views or opinions (with pleasure) Write to; MARTIN (after nov.23th.) VREESWIJKSTR.194 DEN HAAG HOLLAND tel. 070-674791