

## THERE SHOULD BE NO COMPUTER ART

Frieder Nake

Soon after the advent of computers it became clear that there was a great potential application for them in the area of artistic creation. Before 1960, digital computers helped to produce poetic texts and music; analog computers (or only oscilloscopes) generated drawings of sets of mathematical curves and representations of oscillations (see e.g. [3], [5] and [7]). But it was not before the first exhibitions of computer produced pictures were held (1965) that a greater public took notice of this threat, as some said, — progress, as others thought. The threat and progress being the use of an extremely complicated, sophisticated, expensive and rational machine in the arts, i.e. in one of the last refuges of the irrational, as some believe. And it took another three years before there was a tremendous breakthrough caused by two big international exhibitions of "computer art" ("Cybernetic Serendipity", London 1968, "Computers and Visual Research", Zagreb 1969).

Since then, a serious discussion has been going on in the art world about the consequences and implications of the use of computers. Art magazines are full of articles, exhibitions are held everywhere, seminars are offered by art schools, books are published, portfolios are sold. Computer conferences have their computer art sections, computer journals publish technical papers. Computer scientists are flattered by the little public success they make and amused by the interest artists develop. Artists surrender to the pressures of the new technique or laugh at the results, and get humiliated by the attitudes that scientists assume when they try to communicate with each other.

The discussion centers around the question "is it or is it not art?", and is heated, often extremely ignorant and prejudiced, showing virtually no progress, highly repetitive, although the few interesting new methods and the little knowledge of computers that one needs have been published several years ago. (See e.g. [4]. For a recent survey including a bibliography, see [8]).

I was involved in this development from its beginning onward (1964). I found the way the art scene reacted to the new creations interesting, pleasing and stupid. I stated in 1970 [6] that I was no longer going to take part in exhibitions.

I find it easy to admit that computer art did not contribute to the advancement of art if we judge "advancement" by comparing the computer products to all existing works of art. In other words, the repertoire of results of aesthetic behaviour has not been changed by the use of computers. (This point of view, namely that of art history, is shared and held against "computer art" by many art critics, compare e.g. [2].)

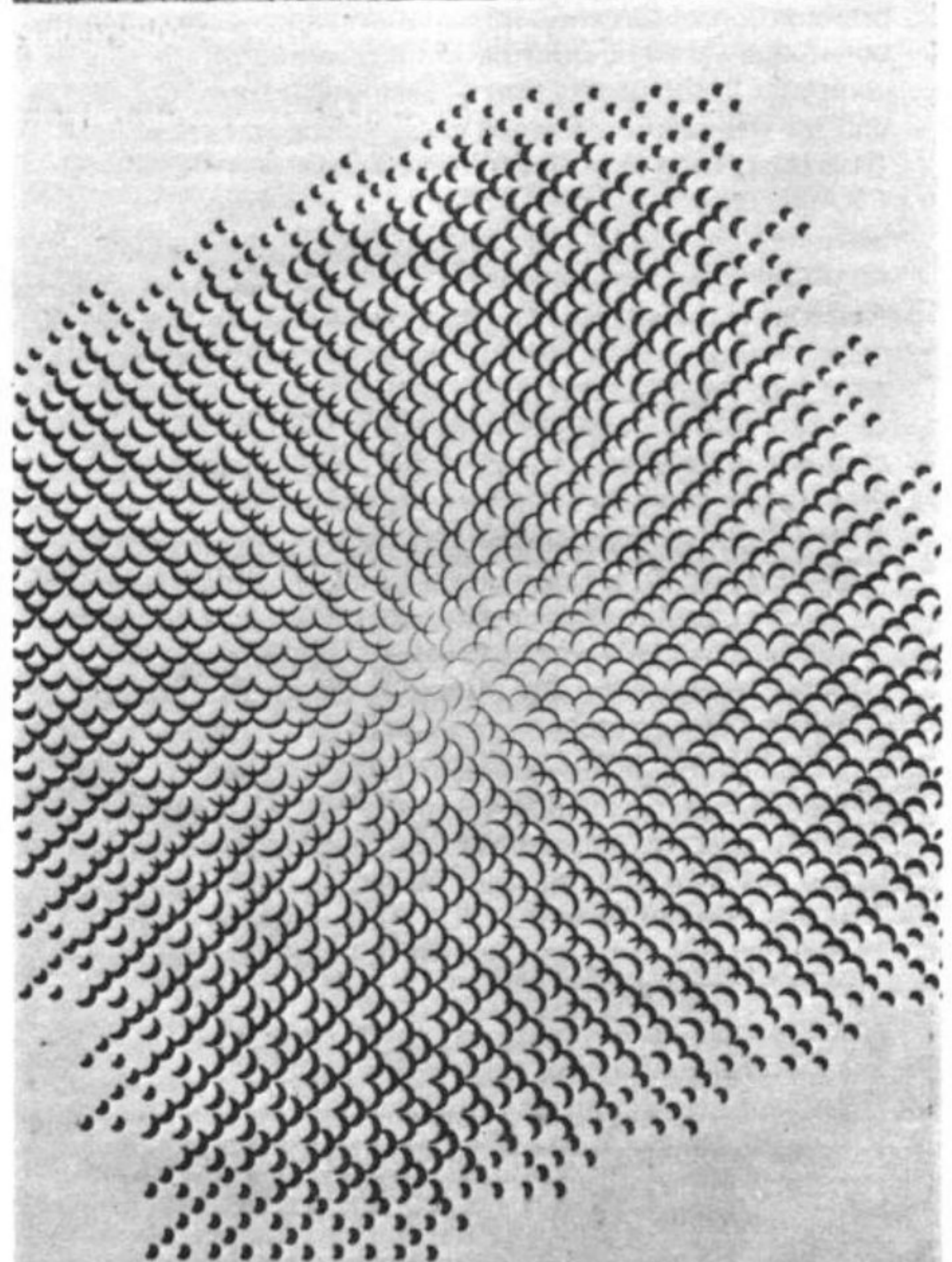
There is no doubt in my mind, on the other hand, that interesting new methods have been found, which can be of some significance for the creative artist. And beyond methodology, but certainly influenced by it, we find that a thorough understanding of "computer art" includes an entirely new relationship between the creator(s) and the creation: BENSE uses the term "art as a model for art" in this context [1].

The dominating and most important person in the art world today is the art dealer. He determines what is to be sold and what is not. It is the art dealer who actually created a new style, not the artist. Progress in the world of pictures today is the same as that in the world of fashionable clothes and cars: each fall, the public is presented with a new fashion, artificially (sic!) created almost a year before in the centers (Paris, London for clothes, Detroit for cars, New York for pictures). Differences from one year to the next are rarely ever substantial, in the majority of cases they are superficial and geared according to the salesmen's requests and analysis of the market.

It seems to me that "computer art" is nothing but one of the latest of these fashions, emerging from some accident, blossoming for a while, subject matter for shallow "philosophical" reasoning based on prejudice and misunderstanding as well as euphoric over-estimation, vanishing into nowhere giving room to the next fashion. The big machinery, still surrounded by mystic clouds, is used to frighten artists and to convince the public that its products are good and beautiful. Quite frankly, I find this use of the computer ridiculous.

In many publications on "computer art" we read complaints that "real" artists do not have access to computers because of the forbidding expense of the machine, and because of the artists' lack of knowledge in programming. We also read that we could obtain really interesting and new results if artists had the opportunity (money) to realize their ideas using a computer, perhaps being helped by programmers and mathematicians.\*

At the same time, artists become aware of the role they play in providing an aesthetic justification of and for bourgeois society. Some reject the system of prizes and awards, disrupt big international exhibitions, organize themselves in cooperatives in order to be independent of the galleries, contribute to the building of an environment that people can live in.



The Emperor hath clothes?



I find it very strange that, in this situation, outsiders from technology should begin to move into the world of art and try to save it with new methods of creation, old results, and by surrendering to the given "laws of the market" in a naive and ignorant manner. The fact that they use new methods makes them blind to notice that they actually perpetuate a situation which has become unbearable for many artists.

Computers ought not to be used for the creation of another art fashion.

Questions like "is a computer creative" or "is a computer an artist" or the like should not be considered serious questions, period. In the light of the problems we are facing at the end of the 20th century, those are irrelevant questions.

Computers can and should be used in art in order to draw attention to new circumstances and connections and to forget "art".

There is no need for the production of more works of art, particularly no need for "computer art". Art (better: the aesthetic object) comes afterwards (but it does come). Aesthetic information as such is interesting only for the rich and the ruling. For the others (and they are in the majority) it comes "with". Namely with other information. Thus, the interest in computers and art should be the investigation of aesthetic information as part of the investigation of communication. This investigation should be directed by the needs of the people.

We should not be interested in producing some more nice and beautiful objects by computers. We should be interested in producing a film on, say, the distribution of wealth. Such a film is interesting because of its content; the interest in the content is enhanced by an aesthetically satisfying presentation. That is, the role of the computer in the production and presentation of semantic information which is accompanied by enough aesthetic information is meaningful; the role of the computer in the production of aesthetic information per se and for the making of profit is dangerous and senseless. (It is interesting to notice in this context that HELMAR FRANK, after a successful beginning in information aesthetics, gave it up and concentrated more and more on problems of education and psychology.)

Reiterating the argument: I don't see a task for the computer as a source of pictures for the galleries. I do see a task for the computer as a convenient and important tool in the investigation of visual (and other) aesthetic phenomena as part of our daily experience. As concrete projects to be investigated I propose:

1. The study of the alienation of the artist from his product which is caused by technology in general and by computers in particular (the distance between the artist and his work increases [1]). What are the good, what are the bad effects of the division of labor taking place in art?
2. Investigation of the repertoires of signs used by individual artists and styles in the past and present. Such repertoires have been described occasionally, but not rigorously enough. The emphasis of such a project should be to describe those repertoires (and their various levels) in a way suitable for an application of information aesthetics.
3. Design and performance of experiments to test the significance of aesthetic measures defined so far; perhaps new definition of such measures.
4. Investigation of the importance of aesthetic information in various areas (education, propaganda, environments of work and living). This work would have to be based on a rigorous numerical definition of "aesthetic information".

\*In some places, this is being tried by universities and companies; e.g. University of Madrid, Mathematisch Centrum (Amsterdam), Ohio State University, University of Toronto, IBM (the Whitneys) and others. Companies, of course, see the potential advertising power.

## References

- [1] M. BENSE: Cartesianische Aufklärung über Kunst. Mitteilungen des Instituts für moderne Kunst Nürnberg. Nr. 2/3. Mai 1971.
- [2] J. BENTHALL: Technology and Art 15, Computer Graphics at Brunel. Studio International June 1970, 247-248.
- [3] H.W. FRANKE: Computergraphik—Computerkunst. Bruckmann Verlag München. 1971
- [4] M. KRAMPEN, P. SEITZ (eds.): Design and Planning 2. Hastings House, New York. 1967.
- [5] F. NAKE: Erzeugung ästhetischer Objekte mit Rechenanlagen. In: R. GUNZENHAUSER (Hrsg.), Nicht-numerische Informationsverarbeitung. Springer-Verlag Wien. 1968.
- [6] F. NAKE: Statement, PAGE 8 1970.
- [7] G. PFEIFFER: Kunst and Computer. Magazin Kunst 10(1970) 1883-1901.
- [8] S.Y. SEDELOW: The Computer in the Humanities and Fine Arts. Computing Surveys 2(1970), 89-110.

## ZAGREB COLLOQUY

The Gallery of Modern Art, Zagreb, Yugoslavia, held a 2-day colloquy on art and the computer on 26 and 27 June 1971. In the chair was Professor Abraham Moles, Director of Social Psychology at Strasbourg University. Local participants included Dr Bozo Bek (Director of the Gallery), Dr Boris Kelemen, Matko Mestrovic and Dr Vladimir Bonacic (who has recently made a large programmed light-spectacle for the city's central square).

Foreign visitors included Herbert W Franke (Germany), Francois Molnar (Paris), Jean-Claude Marquette (Paris), F Briones (Madrid), Hiroshi Kawano (Tokyo), and several artists from the 'Art et Informatique' faculty at Vincennes, France including J C Halgand. Messages were read out from Frieder Nake (Vancouver) and Lev Nusberg (Moscow), who were unable to attend in person.

This note is supplied by Jonathan Benthall. Benthall, a CAS member and exhibition organizer at the Institute of Contemporary Arts, London, also writes about this event which he attended in the 8 July 1971 issue of 'Computer Weekly' and the September 1971 issue of 'Studio International'.

## CONFERENCES

14-16 December 1971 Delft. Micro and Mini Computers, systems design for communications and equipment survey, Delft University of Technology. Repeat of seminars and exhibition held last September at Brunel University: ONLINE, Brunel University, Uxbridge, Middlesex, London.

5-7 April 1972 (provisional dates). Colloquium on Data Processing in Archaeology Marseille: J G Gardin, Directeur, Centre d'Analyse Documentaire pour l'Archeologie, 31 Chemin Joseph-Aiguier 13, Marseille 9e, France.

11-13 April 1972 Oxford. Interdisciplinary Investigation of the Brain, plus exhibition of scientific techniques and commercial apparatus: Dr J P Nicholson, Physics Department, Westminster Hospital, Page Street Wing, London SW 1. England.

12-14 April 1972 Teddington. Conference on Machine Perception of Patterns and Pictures, National Physical Laboratory, Teddington Middlesex: Meeting Officer, Institute of Physics, 47 Belgrave Square, London SW 1. England.

25-28 April 1972 CADEX 72 Conference of Computer-aided Design, University of Southampton: Manager, IEE Conference Dept. Savoy Place, London WC 2. England.

27-30 June 1972 Symposium on the Uses of Computers in Literary Research Edinburgh. Registration fee £2.50 payable now, full board costs £10-£11: Institute for Advanced Studies in the Humanities (Literary Computing Symposium) 12 Buccleuch Place, Edinburgh. UK.

20-26 August 1972 Cambridge. 12th International Congress of the International Federation for Modern Languages and Literatures. Topics announced include 'The Impact of Technology on Language and Literature': Secretary, 12th International FILLM Congress, Faculty of Modern and Medieval Languages, Sidgwick Avenue, Cambridge, England.

21-26 August 1972 3rd International Conference of Applied Linguistics Copenhagen: Dr A Hood Roberts, Center for Applied Linguistics, 1717 Massachusetts Avenue, NW, Washington DC 20036. USA.

4-7 September 1972 ONLINE '72 International Symposium on on-line interactive computing, Brunel University: E R Elliot Green, Brunel University, Uxbridge, Middlesex, England.



## EXHIBITIONS

31 January-4 February 1972. An exhibition of American Computer Graphics and Computer-aided Design, Old Royal Horticultural Hall, Vincent Square, London S W 1. Will include latest equipment of more than 50 US firms. Free tickets from US Trade Center 57 St. Jame's Street, London S W 1. Sponsored by US Department of Commerce. Contact for participation Eugene F. Shaw, Project Officer, US Dept. of Commerce, Commercial Exhibitions Programme, Washington DC 20230. USA.

The large computer art exhibition which has toured Europe will be seen in Japan next year. It will be extended by 30-40 works from 1971, including works of sculpture. The exhibition is organized by Kathe Schroder. It can be seen in the beginning of 1972 in Tokyo, Osaka, Kyoto and Sapporo. For further details contact: Ronald P Haertel, 5-56, 7-Chome, Akasaka, Minato-Ku, Tokyo, Japan. Haertel is in charge of the Tokyo branch of the Goethe Institut.

cayc continues to pour out volumes of print about their exhibitions and lectures. There has been a concentration on Concept Art recently. Here, in Spinglish, is a policy statement published in their Kosuth catalogue, June 1971. 'The main purposes of the Centre of Art and Communications are to stimulate, support and develop social interest tasks, experimental studies or investigations on art and group communication. Moreover it pretends an interdisciplinary integration which should improve and extend the human interests scenery.

It is composed by artists, sociologists, logicians, critics of art and psychologists. They intend to enhance behaviour and massive behaviour communication phenomena and the rupture of traditional forms. This should permit the opening to new expression systems, where researchers and artists attempt to represent the plastic interests of the XXI man'.

You might write to centro de arte y comunicacion, elpidio gonzales 4070, buenos aires, argentina, and ask for the recent green-cover leaflet which lists their exhibitions and other activities since 1969 (in Spanish); you will then realize why the centre is referred to as ICAMOMA of South America in the trade.

## 1971-1972 Northern California USA Regional Computer Network

18 Colleges in Northern California are participating in a computer network with Stanford University, Palo Alto, as the focal point. A typewriter terminal has been installed at each college within the 150 mile radius and linked by telephone lines to Stanford's IBM 360/50.

During August 1971 a workshop in programming for the 72 college professors who are participating in this two year National Science Foundation Matching Funds grant subsidized program was held at the Stanford Computational Center facility under the direction of Ronald Code. The 72 professors represented a variety of academic disciplines; physics, biology, chemistry, mathematics, psychology, anthropology, social science, literature, music, visual arts, Spanish, logic. Four subgroups were formed, all were trained in 'Wylbur' the time sharing interactive language of the Stanford System. Each received training in programming techniques and used BASIC as the first language for programming in his discipline. The 'number crunching' people were trained in Fortran and the humanities group of 10 people were trained in using SNOBOL.

This project is expected to accumulate some useable programs that can supplement college curricula. Interim reports will be made during this year and next year. If you are concerned with music, art, Spanish, logic and English, Mrs. Pat Box, Stanford University Computation Center, Campus Facility, 210 Polya Hall, Stanford, California 94305, USA is the Arts and Humanities Group Leader. She will have the latest information about the project on sound description, logic, concordances, Spanish idioms and graphics that are being created by the following people: Dr. Eugene Bales, Menlo College; Nick Bertoni, Mills College Tape Music Center; Dr. Gale Engle, Foothill College; Gordon Keddington, Diablo Valley College; Sister Carol Kenning, College of Notre Dame; Roberta Palumbo, College of Holy Names; Dr. Lillian Mary Quirke, De Anza College; Ronald Ward, Gavilan College; Arlene Woehl, College of Holy Names; Richard Wolhr, College of Notre Dame.

Dr. Quirke kindly supplied this information when she visited London in September. Her address is De Anza College, 21250 Stevens Creek Boulevard, Cupertino, California, 95014, USA. Telephone: (408) 257-5550.

## LITERATURE

Library Trends, April 1971, Vol 19, No. 4. Issue on 'New Dimensions in Educational Technology for Multi-Media Centers'. Technological Forecasting and Social Change, Vol 3 No. 1 1971. Includes Jay W Forrester's much-quoted study 'Counterintuitive Behaviour of Social Systems'. This article has also appeared in Technology Review 73, January 1971 No. 3.

IEEE Transactions on Electron Devices, September 1971. Special issue on Information Display Devices.

IEEE Transactions on Computers, September 1971. Special issue on Feature Extraction and Selection in Pattern Recognition. Computers and the Humanities, March 1971, Vol 5, No. 4, Annual Bibliography for 1970. This bibliography on 21 pages includes about 500 items dealing mainly with language and literature, and also music, visual arts, archaeology, history, ethnology and political science.

Melos, May 1971. Joel Chadabe 'Das elektronische Studio von Albany'.

Lloyd Summer, a catalog of selected Computer Creations. This attractively produced publication of 20 pages with many illustrations is available free from the artist. Summer's book 'Computer Art and Human Response' 1968, is now out of print, but a special limited numbered and autographed edition of 250 copies is still available, price \$10.00. Lloyd Sumner, Computer Creations, Route 7, Box 117, Charlottesville, Va. 22901. USA.

'Creativity in a Machine Environment' Stroud Cornock, Editor. Transcript: of the proceedings of a Symposium, March 1971, held at City of Leicester Polytechnic. Includes Albert Pountney, Stroud Cornock, Ernest Edmonds, Edward Ihnatowicz, John Lifton, John Shotter, John Bogumsky, Peter Ullathorne, Mark Lee, Stephen Willats, George Mallen. For a copy of this interesting collection of writing in duplicated form write to Albert Pountney, Dean of the Central Division, City of Leicester Polytechnic, Leicester, England.

Barry S Brook, Ed. Musicology and the Computer. City University of New York Press, 1970. Greater New York Chapter of the American Musicological Society Symposia Proceedings. Includes a bibliography of over 600 items.

Computer type setting in the UK - a review by H J Davis (November 1969, reference DPC 4001).

A selected bibliography of on-line visual displays and their applications by J Braidwood (December 1969, reference DPC 4002). Both obtainable free from Office for Scientific and Technical Information, Elizabeth House, York Road, London SE1.

INTERFACE - Journal of New Music Research. Electronic Music Reports (Utrecht) and Jaarboek IPEM (Ghent) have merged to form this new journal appearing twice a year. The first issues contains an article on melodic analysis by computer, and the computer system at the Utrecht Institute for Sonology will be described in a future issue.

Articles may be in English, or French, or German with an English summary. The borderline areas of music science and technology are dealt with, and new fields of research, as well as new methods in known fields, will receive special emphasis.

Editors' addresses: Seminarie voor Musicologie, 45 Munkkaai, Ghent, Belgium.

Institut voor Sonologie, 14-16 Plompetorengracht, Utrecht, The Netherlands. The subscription is \$20 per year: Write to Publishing Department, Swets & Zeitlinger NV, 347B Heereweg, Lisse, Netherlands.

## WOW!

Interesting technological rivalry is developing at IBM's laboratory in San Jose, Calif. While G J Fan and colleagues deem recent advances in semiconductor lasers an important step toward magneto-optic mass storage, another group is exploring a laserless system based on a ferroelectric read-write memory addressed with light from a cathode-ray tube focused by an array of lenses. An experimental ferroelectric device has already stored binary information at densities approaching a million bits per square inch with switching speeds of a few micro-seconds. Researchers say a single system could address 256 chips simultaneously in a memory of 50 million to 100 million bits. By linking 10 such systems electronically, IBM considers a billion-bit memory a reasonable goal.

Laser Focus, September, 1971.

## WAHBM!

It is not surprising, then, that psychologists have found engineers to be a peculiar group. Professor Charles Goshen of Vanderbilt University recently found that engineers "exhibited conservative, conventional behaviour," had a "tendency to avoid esthetic and intellectual pursuits," avoided subjects in which they were inferior, lacked curiosity, sought to "disclose imperfections in both things and people," had difficulty communicating, and sought security.

'The Engineer as a Radical?'. IEEE Transactions on Aerospace + Electronic Systems, July, 1971.



## ENGLAND

Tuesday 9 November: Lillian Schwartz. OLYMPIAD and UFOs: My recent computer films, both with computer generated sound tracks.

Wednesday 17 November: Malcolm LeGrice. A survey of recent computer films.

Thursday 25 November: John Whitney Jr. My recent work.

Wednesday 15 December: Colin Emmett and Tony Pritchett. Manipulation of Visual Images employing Software.

All the above CAS meetings take place at 7.30 pm at the British Computer Society, 29 Portland Place (near BBC), London WC1. Please invite your friends to come. Admission free.

John Whitney Jr is showing his films:

10 November 7.30 pm: US Embassy, Grosvenor Square, London W1. Contact Robert Baker, Student Affairs Officer for tickets (free) 01-499 9000 ex. 617 or 644.

12 November: Students Union Building, The University, Bristol

13 November: Exeter. 16 November: Oxford. Locations to be announced.

23 November: University Film Society, Leicester. Contact Peter Tanner Beaumont Hall, Stoughton Drive, South Leicester.

On 27 November Malcolm LeGrice will present a survey of recent computer and abstract films at Leicester.

John Whitney Jr plans to stay in Europe till 1972, and hopes to meet other animators; contact him through Malcolm LeGrice at 48 Salisbury Road, Harrow, Middlesex, England.

The Computer Arts Society travelling exhibition will be on view at the following places.

The Art Gallery, Ramsden Street, Huddersfield, December 1971.

Letchworth Museum, Broadway, Letchworth, February 1972.

Gordon Maynard Gallery, Welwyn Garden City, June 1972.

The Park Lane Group has issued a leaflet announcing its programme of concerts for the next six months. The programme for 10 December looks particularly interesting. It consists of a piano recital by Antonio Ballista to be held at the Purcell Hall in association with the Italian Institute. Fifty works will be performed ranging from Chopin and Beethoven to many first performances, first British, and first London performances. Tickets 70, 50 and 30p (half price to Friends of the Park Lane Group). For subscription details write for a copy of this leaflet to: Park Lane Group, 6 Monmouth Road, London, W2.

David Hanley, lecturer in Computer Studies at Twickenham College of Technology sent details of two courses. The address of the College is Egerton Road, Twickenham, Middlesex; phone 01-892 6656/59. John Moss is the Head of Division of Cybernetics and Data Processing.

Computers for enjoyment. The computer is an exciting tool with many unexplored possibilities for creative use. These courses have been arranged so that those who wish to become better acquainted with the potentialities of computers in their leisure time and who prefer to 'learn by doing' may have an opportunity to develop creative and imaginative uses of the computer.

The aim of the course is to equip participants to work on the sort of applications which they find interesting. These may include such areas as—(a) Game playing techniques. (b) Exploration in the creative arts. (c) Professional applications.

## UNITED STATES

Dick Land has now returned to Harvard from his circumnavigation having visited England, Europe, Israel, India, Australia and New Zealand. He taught a class on models in applied maths — covering plasmas, combustion, geophysics, vision, interactive graphics and the mathematical basis of art — for 8 weeks in the University of Western Australia. He warmly thanks all the friends who made it such a fruitful trip.

EUROPE Richard Friedman of KPFA Radio, Berkeley will visit Holland, France and Britain in October and November rounding up electronic music tapes. Lasso him via Alan Sutcliffe.

HOLLAND The winter programme in Utrecht includes four concerts of electronic music in the Geertekerk, an evening of Muziek films and three studio workshops at the Institut voor Sonologie. For details write to: Stichting Combinatie van Utrechtse Muziekbelangen, Postbus 30, Bilthoven.

CANADA The Centre for Gestalt Learning is presently located on an 11 acre farm at the base of Prevost Mt in British Columbia. The Centre offers workshops in nutritional well-being, music and art. The address is Auchinachie Road, Duncan, BC, Canada.

1. The First International Contest 1972 of Computer Music will be sponsored by the CNUCE of Pisa which will award a prize of L. 1,000,000 for a Program using the computer in musical composition and performance.

2. The competition is open to all individuals or groups (musicians, programmers, mathematicians, etc.) regardless of nationality.

3. Candidates must submit their programs to the SIMC, Segreteria del Concorso, Piazza Buenos Aires, 20 - 00198 Roma, no later than February 29, 1972.

Programs may be submitted with the name of the author or authors, and in this case date and place of birth, nationality and address should be clearly indicated; or programs may be indicated by a motto to be repeated on the outside of an attached sealed envelope containing first name, surname, date, place of birth, nationality and address of author or authors.

4. Candidates may submit more than one work.

5. Programs may be compiled in symbolic or machine language.

6. Programs may require partial or total use of computer: that is, total if the computer is required at every moment during performance; partial if, for example, the choice of parameters such as their elaboration or their performance is carried out by other instruments as well.

7. Programs must be previously unpublished and accompanied by detailed explanations. Italian, English or French is recommended.

8. Programs submitted for competition will be returned to the authors at their own expense within four months after the final meeting of the jury. In case of unforeseen circumstances, the SIMC reserves the right to delay this deadline. Programs indicated by motto will be returned only upon request and at the expense of those concerned. This request must arrive at the Secretary's office no later than April 30, 1972. The Secretary of the Contest will not be held responsible for works not requested before the established deadline.

9. The jury will be made up of three members to be chosen by SIMC and CNUCE. A delegate of SIMC will assist the work of the jury.

10. The jury's work will end on April 15, 1972, excepting unforeseen delays, and a joint decision on the works will be made by the jury.

The decision of the jury is final.

The SIMC is also running another concorso internazionale di composizione, which includes a section *Musiche elettroniche e Computer music*, but for this, works must arrive by 31 January 1972.

## AIMS AND MEMBERSHIP

The Society aims to encourage the creative use of computers in the arts and allow the exchange of information in this area. Membership is open to all at £1 or \$3 per year, students half price. Members receive PAGE eight times a year, and reduced prices for the Society's 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. No other membership rights are conferred and there is no form of membership for organisations or groups. Membership and subscriptions run from January to December. On these matters and for other information write to Alan Sutcliffe.

## COMPUTER ARTS SOCIETY ADDRESSES

Chairman: Alan Sutcliffe, ICL, Brandon House, Broadway, Bracknell, Berkshire.

Secretary: John Lansdown, 50/51 Russell Square, London WC1.

Editor of PAGE: Gustav Metzger, BM/Box 151, London WC1

Dutch Branch (CASH): Leo Geurts and Lambert Meertens.

Mathematisch Centrum, Tweedle Boerhaavestraat 49, Amsterdam, Holland.

ABOUT THIS ISSUE. Frieder Nake is one of the pioneers and masters of computer graphics. Born in Germany in 1938. Studied mathematics, physics, electronics, philosophy, politics and literature at Stuttgart. Worked for two months as programmer with IBM. Assistant at the computer centre, University of Stuttgart. Post-Doctorate Fellow of the National Research Council of Canada at the University of Toronto.

Since 1970, Frieder Nake has been on the staff of the Department of Computer Science, University of British Columbia, Vancouver, Canada. The present article was originally written as an invited paper for the International Colloquium on Art and Computers, Zagreb, June 1971.

The cover picture comes from the brochure 'Computer — Design in der Textilindustrie', giving details of a Symposium held at Mainz Hotel Hilton 7-8 September 1971. Participants included Roman Antonoff, Herbert W Franke, Manfred Mohr, Peter Kreis, Gottfried Jager, Gunnar Frank, Ludwig Rase, Georg Nees, and Stephan Eusemann.

Gottfried Jager, shown behind one of his works, spoke on Generative Means and Methods of Photography. He is known for his 'Lochblenden-Strukturen' (Shutter-Structures). We do not know which technique produced the picture shown. (The other participants were conventionally attired).