September 1968 No.6 Price 2/6

The Magazine of the Institute of Contemporary Arts

SERENDIPITY

Is everything or anything here art -
and if not, why not?
We all benefit by asking ourselves this kind of question, and no more enjoyable way of provoking it can be imagined than an hour in this intriguing lively and thought-provoking show.
Nigel Gosling, The Observer

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porary Arts magazine. First I thought
t of the exhibition, or a cartoon making
nother thing that occured
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Anyone unable to visit the exhibition, or driven prematurely away from it by some of the nosier pieces on display, would do well to get the 25s catalogue and information conspectus of the exhibition and its technical and theoretical background.
The Times Literary Supplement

But as unique show of fresh ideas about trends in contemporary art-making, this is a stimulating exhibition for everyone.
Daily Telegraph

ossible. Plus the fact that it took 1,095
en hundered press invitations were sent out,
three thousand people
private views.

computer may
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art as to
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rt.
rson, Art and Artists

This is an exhibition with a tremendously interesting theme.
Guy Brett, The Times

n at hand I had
go on with. So what I have

It is, therefore, a huge pleasure to report that the big machine exhibition at the ICA, Cybernetic Serendipity - is a complete success and well worth its three years planning by Jasia Reichardt. The show provides information which we need, succinctly and entertainingly.
Bryan Robertson, Spectator

CYBERNETIC SERENDIPITY until October 20, 1968

An international exhibition exploring
and demonstrating relationships
between technology and creativity.

The idea behind this venture is to show creative forms engendered by technology. To present an area of activity which manifests artists' involvement with science, and the scientists' involvement with the arts. To show the links between the random systems employed by artists, composers, and poets, and those involved in the use of cybernetic devices.

The exhibition is divided into three sections:

1. Computer generated graphics, computer animated films, computer composed and played music, and computer verse and texts.

2. Cybernetic devices as works of art, cybernetic environments, remote control robots, and painting machines.

3. Machines demonstrating the uses of computers and an environment dealing with the history of cybernetics.

There will be lectures on Tuesdays and Thursdays relating to the theme of the exhibition.

There will also be film shows of films either made with the aid of computers or dealing with the relevance of computer technology to the humanities, the arts, and communications generally.

During the course of the Cybernetic Serendipity exhibition the opening hours will be as follows:

Tuesdays, Thursdays, Saturdays 11-6
Wednesdays, Fridays 11-9
Sundays 2-6
Mondays closed

Admission 8/-
ICA members 4/-
Children free (special terms for school parties by arrangement with Leslie Stack)
Admission to films in the cinema 2/6

CYBERNETIC SERENDIPITY

SECOND ISSUE

This typeface which avoids curves and diagonals
was developed by Epps and Evans at the National
Physical Laboratory (Division of Computer Science)
and is used for machine recognition.

INSTITUTE OF CONTEMPORARY ARTS
Nash House The Mall London S.W.1

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Director	Michael Kustow
Associate Director	Dorothy Morland
Deputy Director & Secretary	Julie Lawson
Assistant Director	Jasia Reichardt

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TRIBUTES TO HERBERT READ

Change of date.
An evening at the ICA devoted to tributes to our late President, Sir Herbert Read, will be held on November 28th, and not on October 24th as announced in the August magazine.

EXHIBITION OF BRITISH PAINTERS
at Macys, New York
September 3 - 21

Macys of New York has invited the ICA to organise an exhibition of yourn British artists in their gallery to coincide with the Festival of Britain. The following artists will be shown: Peter Blake, Patrick Caulfield, David Hockney, John Hoyland, Paul Huxley, Allen Jones, Mark Lancaster, David Leverett, Patrick Procktor, Peter Phillips, Peter Sedgley, Richard Smith, Michael Vaughan, John Walker, David Oxtoby.

The exhibition has been organised by Mario Amaya and will be officially opened by Sir Roland Penrose on 3rd September.

CONTENTS

MAN-MACHINE SYMBIOSIS
Humanizing machines and mechanizing humans are cross trends that are sure to occur in the future, but the extent to which man and machine will be united is uncertain. Computers exist which can learn, remember, see, seak goals, reason, walk, sing on key, talk, be irritable, play games, grasp, adapt to an environment and even design improvements in themselves. While artificial organs made possible by miniature electronic components are being used in the human body, man-like computers may one day contain plasma circulating through a viscera-like envelope, allowing them to be self-healing. Direct man-machine communication is also being explored for the transfer of thoughts instead of words.

The Magazine of the Institute of Contemporary Arts
No.6, September 1968

This issue edited by Jasia Reichardt
Designed by Ann Hildred
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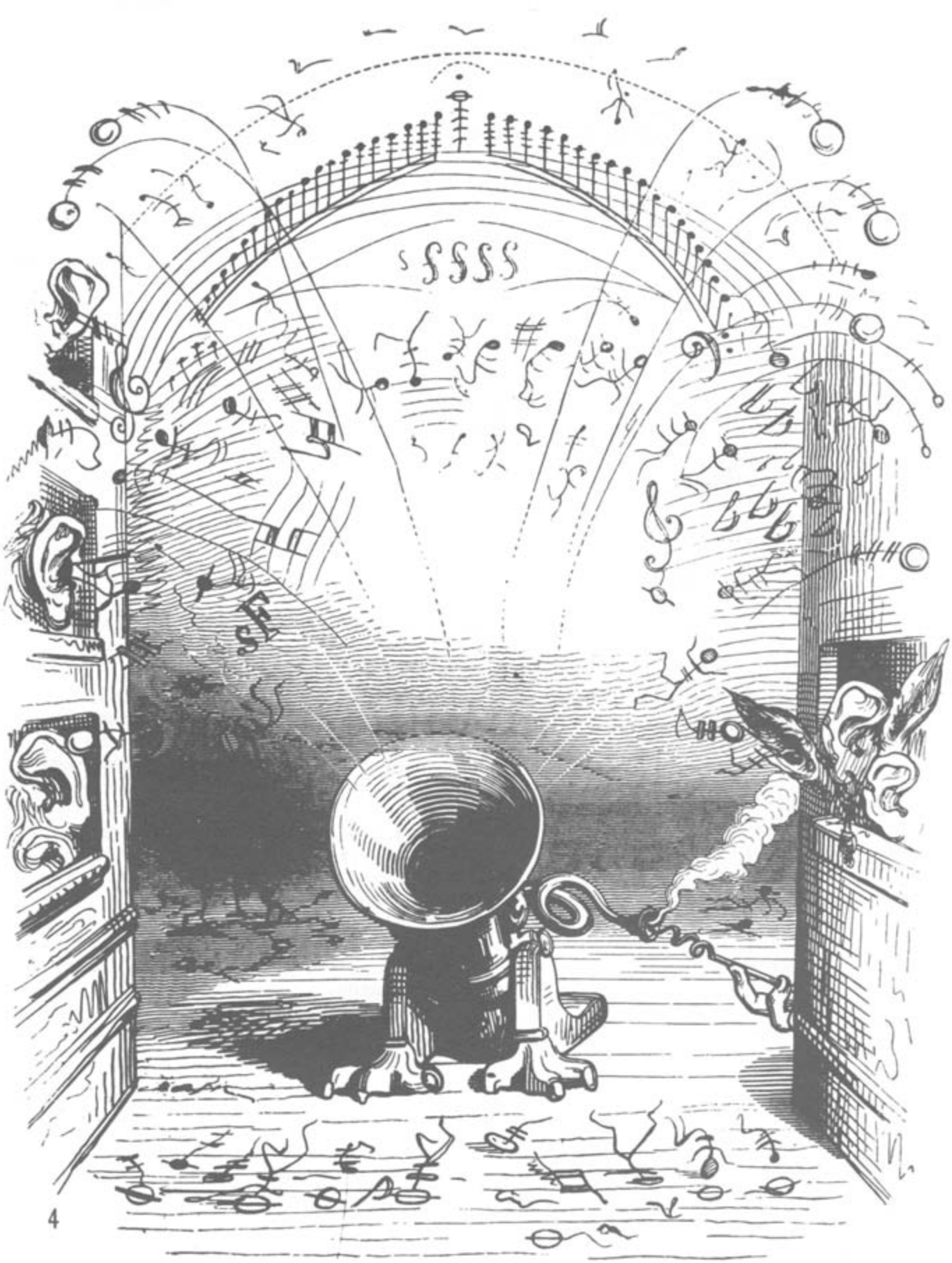
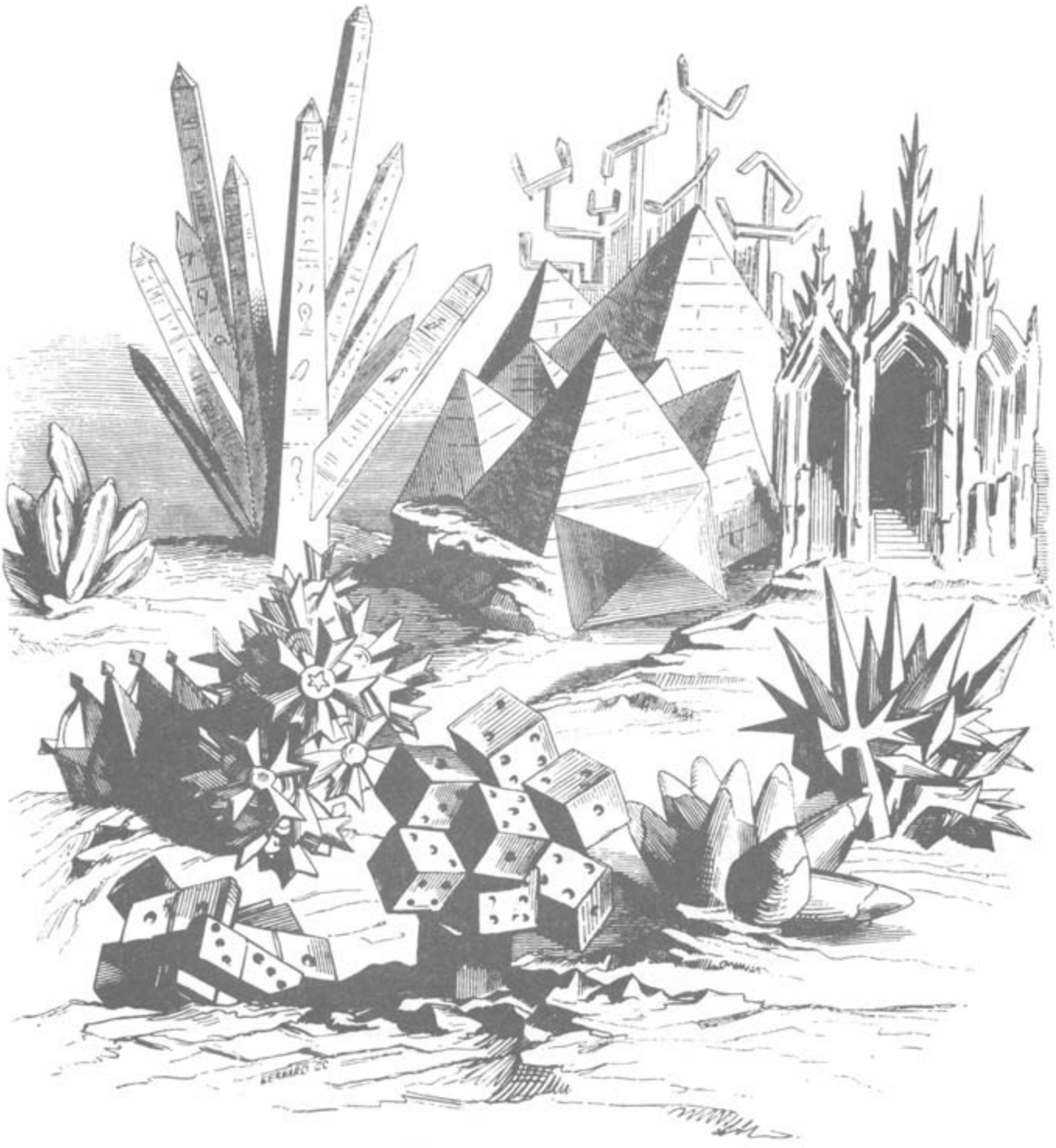
Printed by Oval Press





Grandville's anticipation, in 1867, of new music and advanced sculpture

THE LAW
by Robert M. Coates

(The law of averages applies to all randomly moving objects whether in kinetic theory or in city traffic. This story from The New Yorker magazine raises in fictional form the question of the meaning of a statistical law.)

The first intimation that things were getting out of hand came one early-fall evening in the late nineteen-forties. What happened, simply, was that between seven and nine o'clock on that evening the Triborough Bridge had the heaviest concentration of outbound traffic in its entire history.

This was odd, for it was a weekday evening (to be precise, a Wednesday), and though the weather was agreeably mild and clear, with a moon that was close enough to being full to lure a certain number of motorists out of the city, these facts alone were not enough to explain the phenomenon. No other bridge or main highway was affected, and though the two preceding nights had been equally balmy and moonlit, on both of these the bridge traffic had run close to normal.

The bridge personnel, at any rate, was caught entirely unprepared. A main artery of traffic, like the Triborough, operates under fairly predictable conditions. Motor travel, like most other large-scale human activities, obeys the Law of Averages - that great, ancient rule that states that the actions of people in the mass will always follow consistent patterns - and on the basis of past experience it had always been possible to foretell, almost to the last digit, the number of cars that would cross the bridge at any given hour of the day or night. In this case, though, all rules were broken.

The hours from seven till nearly midnight are normally quiet ones on the bridge. But on that night it was as if all the motorists in the city, or at any rate a staggering proportion of them, had conspired together to upset tradition. Beginning almost exactly at seven o'clock, cars poured onto the bridge in such numbers and with such rapidity that the staff at the toll booths was overwhelmed almost from the start. It was soon apparent that this was no momentary congestion, and as it became more and more obvious that the traffic jam promised to be one of truly monumental proportion, added details of police were rushed to the scene to help handle it.

Cars streamed in from all directions - from the Bronx approach and the Manhattan one, from 125th Street and

the East River Drive. (At the peak of the crush, about eight-fifteen, observers on the bridge reported that the drive was solid line of car headlights as far south as the bend at Eighty-ninth Street, while the congestion crosstown in Manhattan disrupted traffic as far west as Amsterdam Avenue.) And perhaps the most confusing thing about the whole manifestation was that there seemed to be no reason for it.

Now and then, as the harried toll-booth attendants made change for the seemingly endless stream of cars, they would question the occupants, and it soon became clear that the very participants in the monstrous tieup were as ignorant of its cause as anyone else was. A report made by Sergeant Alfonse O'Toole, who commanded the detail in charge of the Bronx approach, is typical. "I kept askin' them," he said, "'Is there night football somewhere that we don't know about? Is it the races you're goin' to?' But the funny thing was half the time they'd be askin' me. 'What's the crowd for, Mac?' they would say. And I'd just look at them. There was one guy I mind, in a Ford convertible with a girl in the seat beside him, and when he asked me, I said to him, 'Hell, you're in the crowd, ain't you?' I said. 'What brings you here?' And the dummy just looked at me. 'Me?' he says. 'I just come out for a drive in the moonlight. But if I'd known there'd be a crowd like this...' he says. And then he asks me, 'Is there any place I can turn around and get out of this?'" As the Herald Tribune summed things up in its story next morning, it "just looked as if everybody in Manhattan who owned a motorcar had decided to drive out on Long Island that evening."

The incident was unusual enough to make all the front pages next morning, and because of this, many similar events, which might otherwise have gone unnoticed, received attention. The proprietor of the Aramis Theatre, on Eighth Avenue, reported that on several nights in the recent past his auditorium had been practically empty, while on others it had been jammed to suffocation. Lunchroom owners noted that increasingly their patrons were developing a habit of making runs on specific items; one day it would be the roast shoulder of veal with pan gravy that was ordered almost exclusively, while the next everyone would be taking the Vienna loaf, and the roast veal went begging. A man who ran a small notions store in Bayside revealed that over a period of four days two hundred and seventy-four successive customers had entered his shop and asked for a spool of pink thread.

These were news items that would ordinarily have gone into the papers as fillers or in the sections reserved

for oddities. Now, however, they seemed to have a more serious significance. It was apparent at last that something decidedly strange was happening to people's habits, and it was as unsettling as those occasional moments on excursion boats when the passengers are moved, all at once, to rush to one side or the other of the vessel. It was not till one day in December when, almost incredibly, the Twentieth Century Limited left New York for Chicago with just three passengers aboard that business leaders discovered how disastrous the new trend could be, too.

Until then, the New York Central, for instance, could operate confidently on the assumption that although there might be several thousand men in New York who had business relations in Chicago, on any single day no more - and no less - than some hundreds of them would have occasion to go there. The play producer could be sure that his patronage would sort itself out and that roughly as many persons would want to see the performance on Thursday as there had been on Tuesday or Wednesday. Now they couldn't be sure of anything. The Law of Averages had gone by the board, and if the effect on business promised to be catastrophic, it was also singularly unnerving for the general customer.

The lady starting downtown for a day of shopping, for example, could never be sure whether she would find Macy's department store a seething mob of other shoppers or a wilderness of empty, echoing aisles and unoccupied salesgirls. And the uncertainty produced a strange sort of jitteriness in the individual when faced with any impulse to action. "Shall we do it or shan't we?" people kept asking themselves, knowing that if they did do it, it might turn out that thousands of other individuals had decided similarly; knowing, too, that if they didn't, they might miss the one glorious chance of all chances to have Jones Beach, say, practically to themselves. Business languished, and a sort of desperate uncertainty rode everyone.

At this juncture, it was inevitable that Congress should be called on for action. In fact, Congress called on itself, and it must be said that it rose nobly to the occasion. A committee was appointed, drawn from both Houses and headed by Senator J. Wing Slooper (R.) of Indiana, and though after considerable investigation the committee was forced reluctantly to conclude that there was no evidence of Communist instigation, the unconscious subversiveness of the people's present conduct was obvious at a glance. The problem was what to do about it. You can't indict a whole nation, particularly on such vague grounds as these were. But, as Senator Slooper boldly

pointed out, "You can control it," and in the end a system of re-education and reform was decided upon, designed to lead people back to - again we quote Senator Slooper - "the basic regularities, the homely averageness of the American way of life."

In the course of the committee's investigations, it had been discovered, to everyone's dismay, that the Law of Averages had never been incorporated into the body of federal jurisprudence, and though the upholders of States' Rights rebelled violently, the oversight was at once corrected, both by Constitutional amendment and by a law - the Hills-Slooper Act - implementing it. According to the Act, people were required to be average, and, as the simplest way of assuring it, they were divided alphabetically and their permissible activities catalogued accordingly. Thus, by the plan, a person whose name began with "G", "N", or "U", for example, could attend the theatre only on Tuesdays, and he could go to baseball games only on Thursdays, whereas his visits to a haberdashery were confined to the hours between ten o'clock and noon on Mondays.

The law, of course, had its disadvantages. It had a crippling effect on theatre parties, among other social functions, and the cost of enforcing it was unbelievably heavy. In the end, too, so many amendments had to be added to it - such as the one permitting gentlemen to take their fiancees (if accredited) along with them to various events and functions no matter what letter the said fiancees' names began with - that the courts were frequently at a loss to interpret it when confronted with violations.

In its way, though, the law did serve its purpose, for it did induce - rather mechanically, it is true, but still adequately - a return to that average existence that Senator Slooper desired. All, indeed, would have been well if a year or so later disquieting reports had not begun to seep in from the backwoods. It seemed that there, in what had hitherto been considered to be marginal areas, a strange wave of prosperity was making itself felt. Tennessee mountaineers were buying Packard convertibles, and Sears, Roebuck reported that in the Ozarks their sales of luxury items had gone up nine hundred per cent. In the scrub sections of Vermont, men who formerly had barely been able to scratch a living from their rock-strewn acres were now sending their daughters to Europe and ordering expensive cigars from New York. It appeared that the Law of Diminishing Returns was going haywire, too.

ORAMICS
by Daphne Oram

(It has not been possible to transport Daphne Oram's Oramics - Graphic Sound Equipment - to the Cybernetic Serendipity Exhibition, so we have invited her to contribute this illustrated article.)

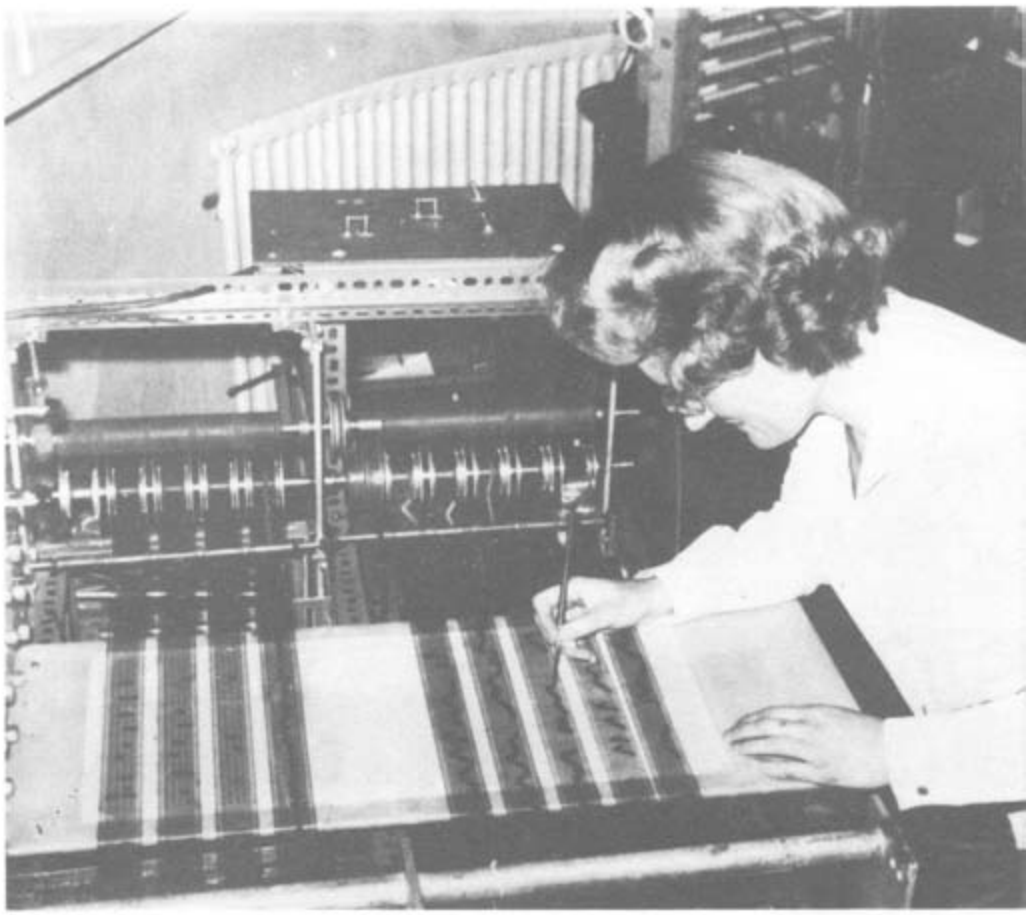
Oramics is a method of converting graphic information into sound - it does not use sine, square, or sawtooth generators and so does not come into the category Electronic Music, nor does it use manipulated natural sounds as in Musique Concrete. Perhaps you could call it Computer Music, but this term usually refers to music wholly or partially composed by a digital computer, which, itself, directly operates the sine, square and sawtooth generators of a classical electronic studio, or produces a manuscript score to be played later by instrumentalists. So I've thought it best just to call my invention Oramics.

Oramics uses some digital programming, but it is really dependent on analogue techniques. Recently, composers in America, too, have been investigating analogue timbre techniques - they have been using vastly expensive computers, such as the IBM 7094, to supply digital information, which is then converted to analogue .... and thence directly into sound. '20,000 three digit numbers a second can describe not only any music that has ever been played but any music that ever could be played, if only we are able to choose the right numbers' writes Dr. J.R. Pierce. But what a task supplying 20,000 three digit numbers for every second! And alas, the expense! On the other hand how much more interesting and rewarding than just using a digital computer to operate those oh-so-dull timbres - the sine, square, white noise and sawtooth generators with their filters, shapers and modulators - that seems such a waste of a computer.

So, for Oramics, I have built equipment of the computer type (yet relatively inexpensive) which enables the composer to programme the timbre, volume and vibrato directly by analogue information, and the pitch by both digital and analogue (digital for discrete steps, analogue for glissandi). I have discarded the normal punched tape, or punched paper, input because, to my mind, the composer's best friend is his rubber - if he cannot erase how can he refashion; how can he learn this new language if he cannot experiment empirically? Have you ever tried going back and altering just one parameter in yards of punched tape or in stacks of punched cards?!

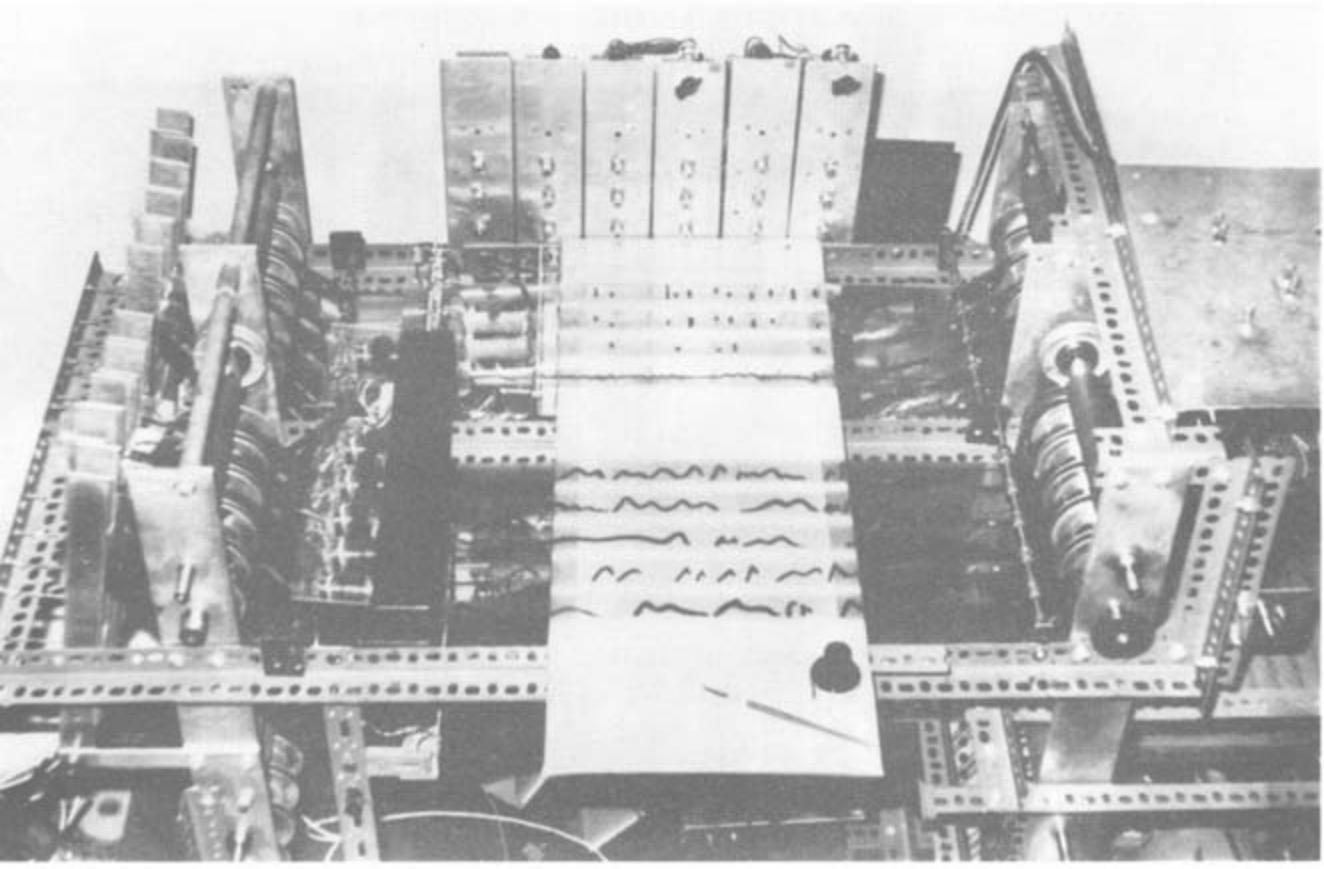
Oramics, therefore, allows the composer to programme

Daphne Oram writing in analogue programme



graphically - using special ink which can easily be erased and altered in a moment. The graphical notation is simple, direct, and enables the composer to draw in, freehand fashion, nuances and subtleties which make the music more alive and less clinical than Electronic Music. Oramics will therefore only attract the composer who feels he has the patience to specify by analogue exactly what he wants - and that's hard work! For those who would rather get the computer to do it all for them, there is always the random number table and the digital computer - they can then sit back and have music by the mile! But not for me!

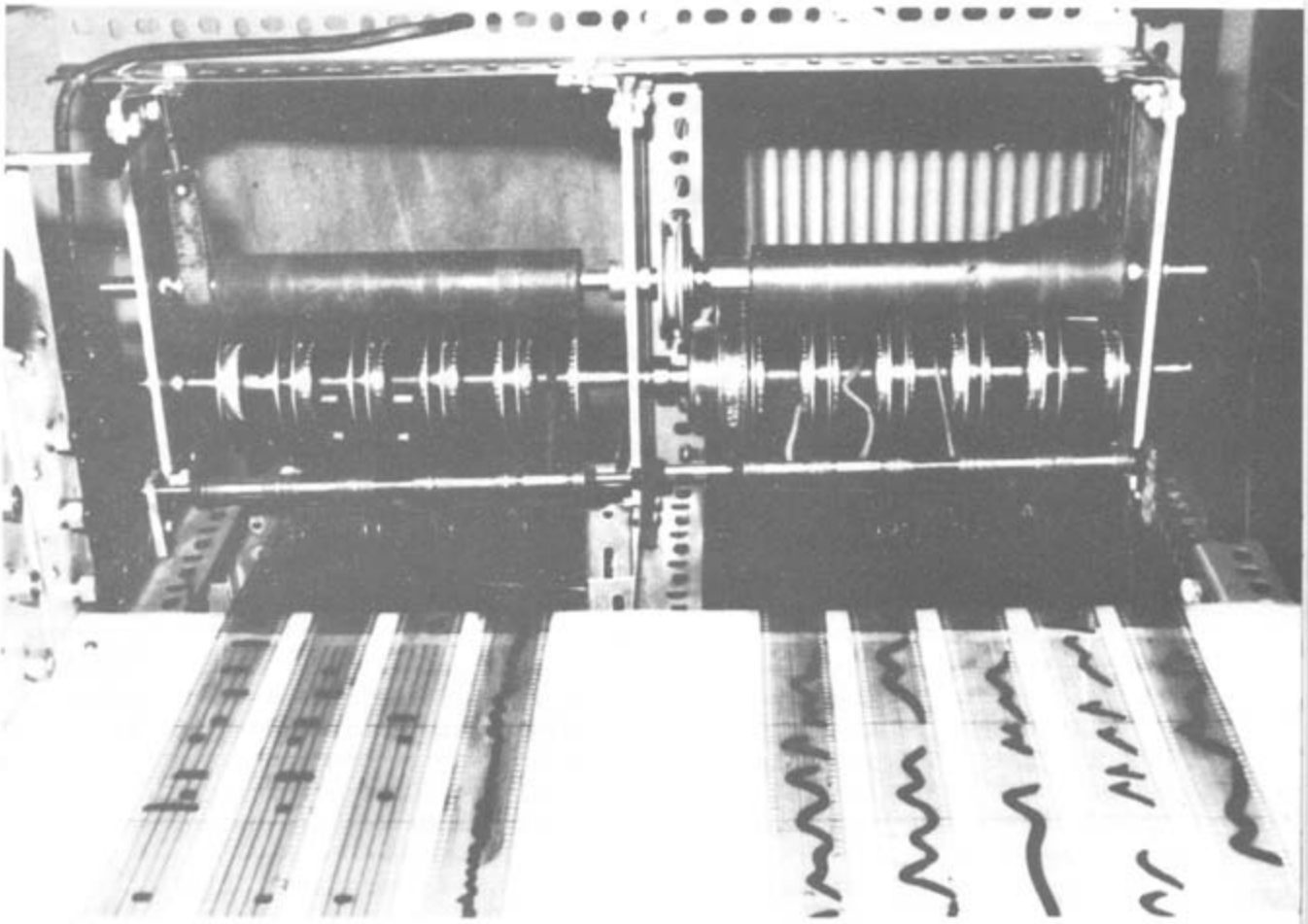
Perhaps Tristram Cary and the Electronic Music Review would allow Oramics to adopt this apt and fervent prayer - 'O Electrons (as Sophocles never said) O Recalcitrant Holes and all Ye Assembled Nand Gates Keep Your Appointed Places - under my thumb'. (Tristram Cary, Electronic Music Review No. 4, 1967).

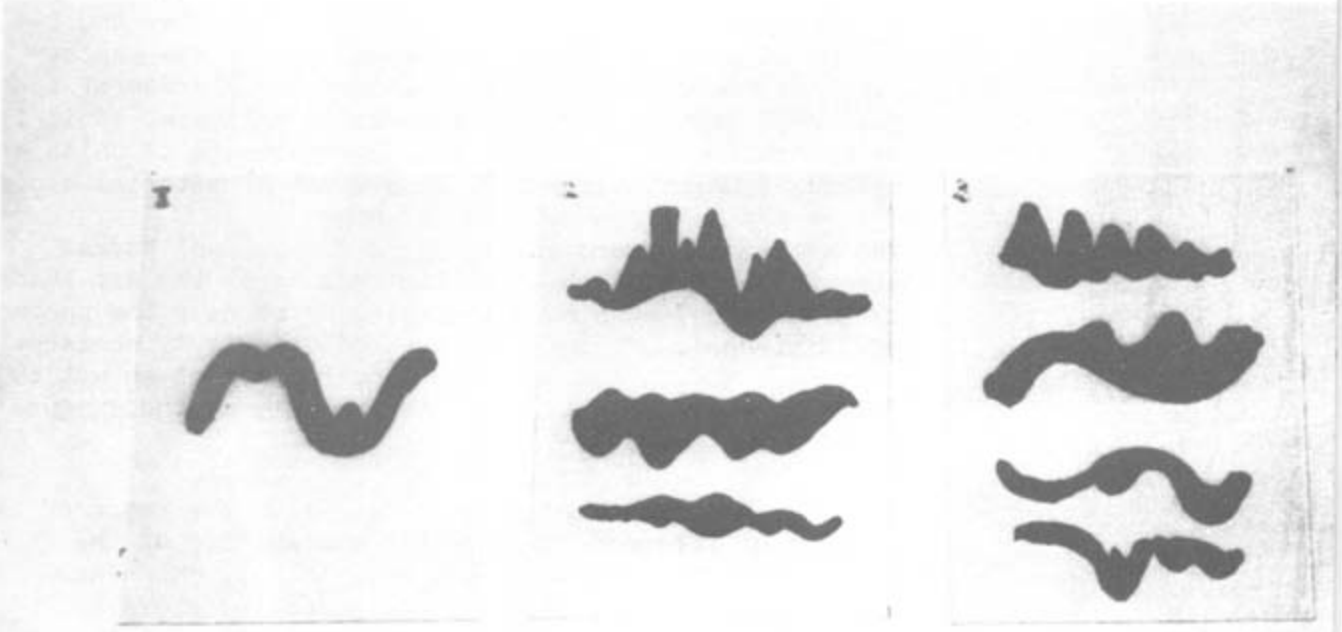


Programming equipment

top right
Analogue information for timbre control

bottom right
An Oramics score
a close-up of analogue and digital programme





GENERATIVE AESTHETICS PROJECTS
by Max Bense

By Generative Aesthetics, we understand all the operations, rules and theorems which, if applied to an unordered set of material elements, can produce aesthetic situations. In this sense Generative Aesthetics is an analogue of Generative Grammar, the first building aesthetic structures as the other builds sentences of a schema of grammar.

Obviously to make the aesthetic synthesis possible, each system of Generative Aesthetics must be preceded by a process of analytical aesthetics, i.e. the investigations of existing aesthetic structures in a given art object. According to this aesthetic information a generative system is prepared. The above information must be describable in abstract terms. Then, according to the system, it can be applied to a set of material elements and thus be realised.

At the moment there are four possibilities of abstract descriptions for aesthetic situations (either distributions or configurations) which can be used to generate an aesthetic structure; the Semiotic description, which makes use of classifications of signs and symbols, and the Metric, Statistical and Topological descriptions, which are numerically or geometrically orientated.

The semiotic procedure makes use of the triadic relations of signs, which was first developed by Peirce. The signs (or symbols) which constitute an object of art are determined by means of three main (and nine sub-) classes: A. in relation to object B. to the interpreter and C. to the signs themselves. The knowledge of the process of constructing an art object out of the classes of signs (symbols) is necessary for a semantic analysis, as it is necessary for the translating of a synthesis of units of meaning (semantic elements) into a set of material elements.

The metric procedure which, as in traditional formal schematisations (such as poetic metrics or the art-theories of proportion) uses numerical data which have the character of 'distance', of 'interval', of 'continuity', achieves above all the macro-aesthetic construction of an art object, that is, the composition of the 'Shape', of the 'Figure', or of the 'Form'.

The statistical procedure which works on the basis of the concept of frequency i.e. of the probability of the appearance of elements or characteristics, which are capable of numerical evaluation, generates above all the micro-aesthetic structure of an object of art. It does not prepare the 'principle of configuration',

but only the 'principle of distribution'.

The topological procedure is mainly concerned with the collection of elements which constitute the object of art, and works through such crucial concepts of 'environment', 'relationship', 'open' or 'closed' quantities and their simplicity and complexity. Thus after the principles of 'configuration' and 'distribution' comes the 'principle of collection' of elements.

The aim of Generative Aesthetics consists in the numerical and functional description of the characteristics of aesthetic structures which are realisable in a collection of material elements. Thus they become abstract schemata of a 'principle of configuration', a 'principle of distribution', and a 'principle of collection'.

According to these principles when they are applied to an amorphous mass of elements we can find out what in the art objects relates to macro-aesthetics in two classifications: 'orders' and 'complexity', and in micro-aesthetics in 'redundance' and 'information'. This process should not be understood as the application of a formula, but as a generating principle. Even the 'programmes' in certain 'programme-languages' for the 'mechanical' realisation of 'free' (intuitive) or 'formal' (predetermined) aesthetic structures belong to the system of Generative Aesthetics experiments using the metrical (intervals, lengths of words), statistical (word-sequence, position), and topological (connections and deformations) procedures to produce the 'aesthetic information'.

Aesthetic structures supply 'aesthetic information' only as far as they reveal innovations. Since these obviously represent only a probable (future with every new work in progress) and not definite (existing) reality, one can say that the artificial creation by means of theorems deviating from the norm of probability, is the main function of Generative Aesthetics.

SOME THOUGHTS ON THE ART/COMPUTER RELATIONSHIP
by Petar Milojevic

(Petar Milojevic works in the Computing Centre at McGill University in Montreal. His computer graphics have been limited to the use of dots, lines and very simple designs with which he attempts to create visual illusions. They were programmed in Fortran on IBM 7044 in association with Calcomp 565 plotter.)

Artists express the environment, feelings and dreams through various forms and means, thus communicating messages of which content and timing are the prime values. Art is a feeling like love and hunger, unidentified by any formula; a feeling which differs in all possible ways from person to person. Communication between artists and the public inevitably leaves a gap.

When we come to something new, we try to make it familiar to ourselves in terms of things we know and evaluate it within the same terms.

Do we know what 'Computer - Art' is?

Computer-Art is a convenient word for combining two completely unrelated ideas, the true meaning of which has yet to be discovered. Computer-Art could find its place between the artist and critic.

An artist is a performer as well as a producer. There are many producers of good ideas who are poor performers. The artist, together with the computer as a performer could accomplish very distinguished results.

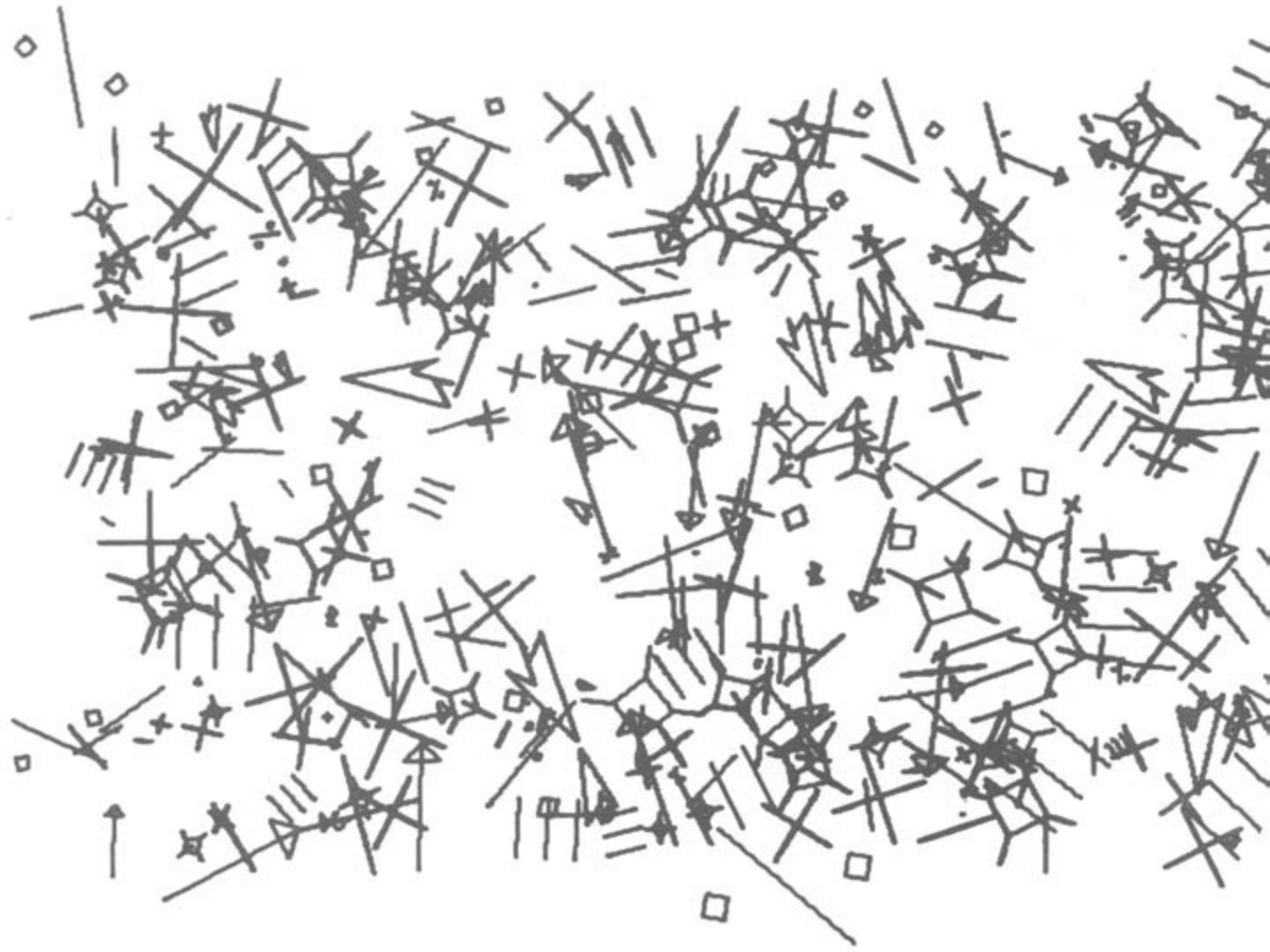
The public at large likes to participate, and is becoming more active. We have seen the public choosing the ending of a film, adjusting stereo-recording equipment affecting their environment in many ways which are new.

Computer revolution is a revolution of re-examination. In art we are already asking, what is art? Could we accept as art a chimpanzee's painting? Shall we consider the Golden Rectangle, La Corbusier's Modulor, and follow Birkhoff and others in pursuit of a formula as the answer? If we do, more sophisticated methods must be applied in the use of computers.

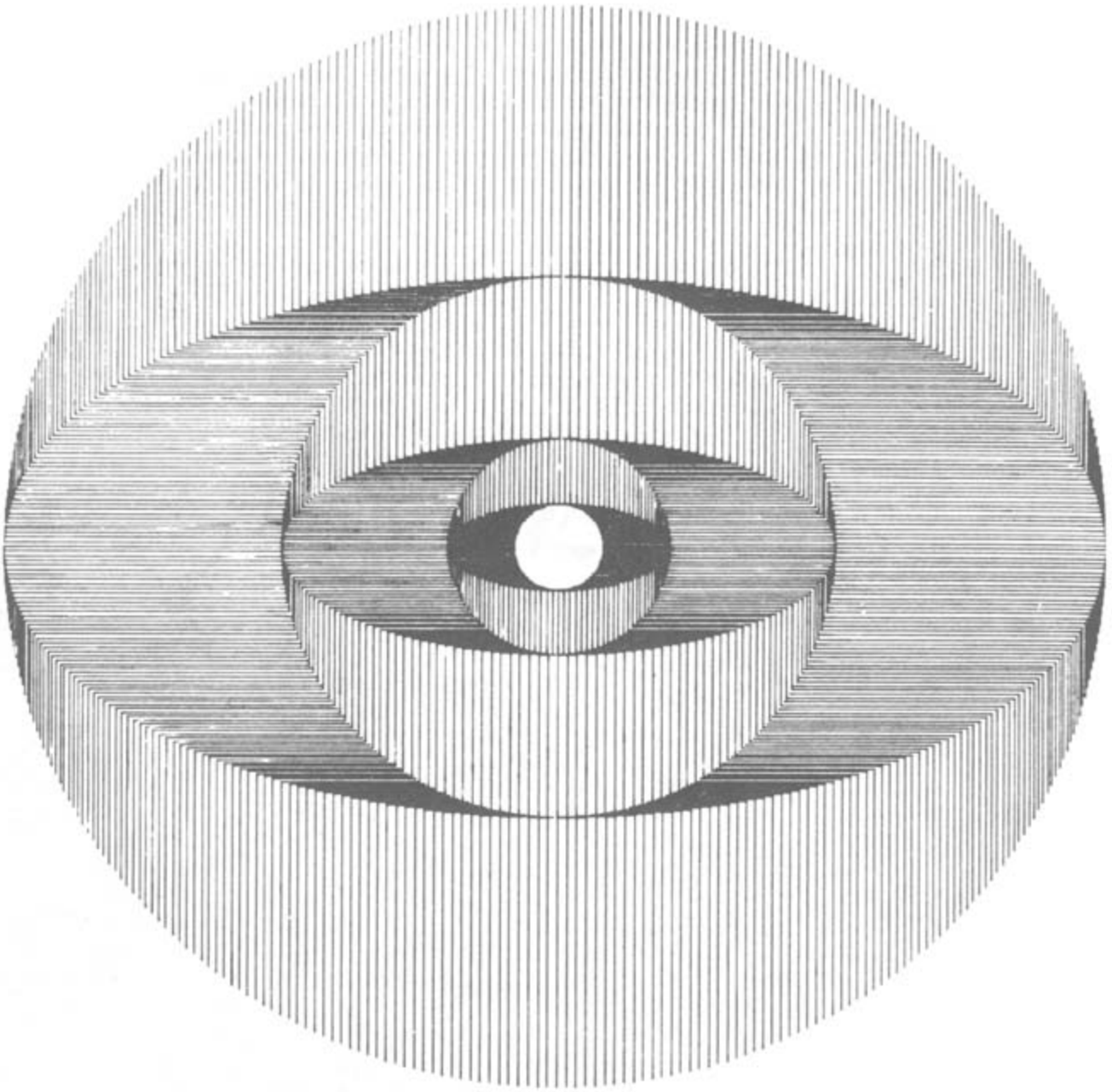
Computers are made today for scientific and business application and speak the same languages. Art in this field has been treated as a luxury. Computer-Art today is in its primitive period. There is a chance that it can grow and graduate one day, and learn networks and cluster analysis, pattern recognition and artificial

intelligence, and who knows what more.

Primitive Computer Art as it is today has a long way to go before finding its own Renaissance, Baroque and Modernistic periods which will express more accurately the intentions of the contemporary man. It will not take a long time to get there, and it does not take a mind of Jules Verne to make this prediction.

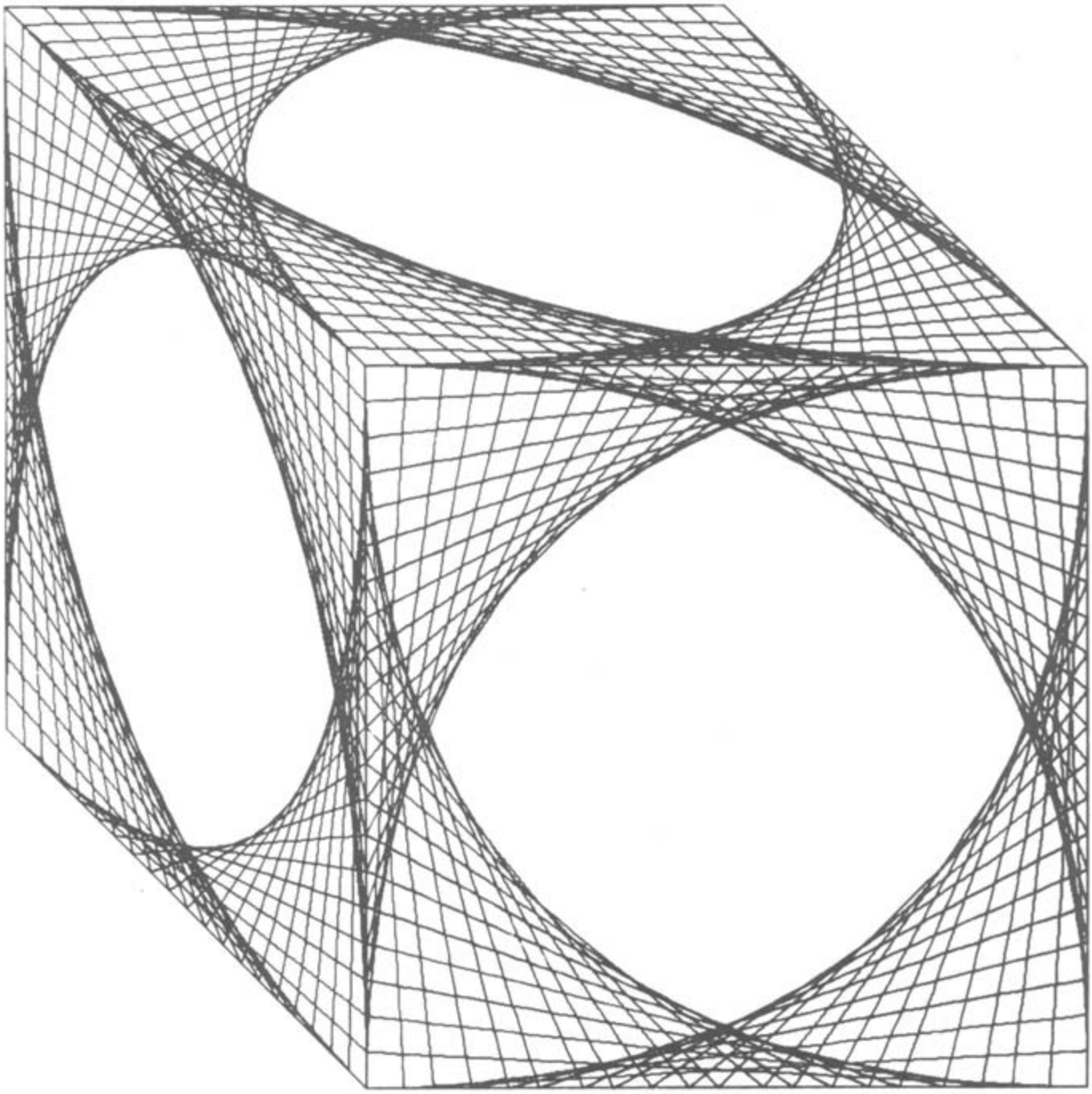


PETAR MILOJEVIC: Shattered glass
selected symbols drawn at random



PETAR MILOJEVIC: Ellipses and Circles

The programming of this work was done in Fortran and processed on the IBM 7044, and it was drawn on a Calcomp 565 plotter.



PETAR MILOJEVIC: Cubic Figure

These figures were obtained by connecting certain points on the sides of a cube, with the positions of the lines changed by translation or rotation. Drawn by Calcomp 565 plotter.

EXPANDED EDUCATION FOR THE PAPER-LESS SOCIETY

by

Nam June Paik

This report was written during the first three months of my tenure at Stony Brook, on a Rockefeller grant.

1. Instant Global University

Suppose a girl in Kentucky wants to study the Japanese Koto instrument, and a graduate at Oxford wants to experiment with certain Persian or Afghanistan musical instruments. How would they do this?

The mailable television (i.e. video tape) would enable the individual lessons for many subjects to be given from anywhere to anywhere. For instance, twenty different music students at an American university could study twenty instruments of a Gagaku orchestra, which exist only in the Japanese emporor's court, using video tape, and then go on a concert tour to Japan dressed in authentic costumes. This would be a major cultural shock to the Japanese, comparable to that of Admiral Perry. This technique applies in less spectacular, but more substantial fields.

There could be an Oxford-Stony Brook lecture exchange, a Yale and Stanislavski School (Moscow) drama lesson exchange, a Tulane-Nairobi dance lesson exchange, a Yeshiva-Tel Aviv liturgy study exchange, Berkeley-Stony Brook lecture links, a star-lecture cooperative amongst eighty-six New York State university campuses, etc. In order to avoid a complicated foreign exchange problem, a barter system of service should be created.

2. It is a blunder, bordering on a miracle, that we have no, or very few, images and voices of the great thinkers of the recent past on record, especially as the 16 mm talkie was readily available. For instance we have hardly a record of Husserl, Freud, Proust, Joyce, Kandinsky, Berdyaev, Merleau-Ponty, Suzuki, Gide, Thomas Mann, Schoenberg, Varese, Bartok, Mondrian, Dilthey, Wittgenstein, Shaw, Valery, Jung, Keynes, Buber - even Nietzsche and Tolstoy lived well into the film age, as did Thomas Edison himself. This negative wonder is the biggest waste of instructional resources, if we recall how much footage of late-late show movie and Hitler news reel was filmed. Therefore, nothing is more urgent and success-proof than to film the images and voices of ageing great thinkers of today, and yesterday, in sufficient and surplus quantity, who might pass away any day, such as Marcel Duchamp, Jaspers, Heidegger, Gabriel Marcel, Ortega Y. Gasset, Lukacz, Toynbee, Radhakrishnan, Ernst Bloch, Niebuhr, Buckminster Fuller, Sartre and Russell. The interviewer should be a qualified philosopher himself and the camera crew as minimal as possible, so that Jaspers or Heidegger can talk as naturally as 'Chelsea Girls'. An NBC or NET-style expensive film

technique is not only unnecessary, but may be harmful for these subjects.

3. The western music as a whole can be grasped as a many faceted dialectic struggle between TIME (sound) and SPACE (notation and other various visual elements). Therefore the impact of the video tape recorder cannot be over-estimated in composition (electronic opera), musicology (the whole Eitner Lexikon on video tape for the instant access to all sources in Montpellier or Mannheim) and music education. Synchronized visual accompaniment to the sound track on video tape (notation, written explanation and, occasionally, the performer himself) will enrich the study and appreciation without disturbing the musical flow, while saving the teacher's time. While the sound of the video tape proceeds, the following information can be visible on the accompanying video part:

(a) Serial and electronic music

Intellectual information concerning the total organisation of whole parameter, frequency analysis, and technical information of electronic sounds. In some music of Stockhausen and Boulez, the complexity of score makes the simple following of sound with the score very hard, and this 'paper music' requires paper understanding, since an accurate performance is impossible.

(b) Music graphic

In this other kind of 'paper music', sound and notation are far apart so that the imaginary double play becomes an integral part of understanding. The listener should know, for instance, that Tudor pushes the middle C for an apple figure in Cage's piano concerto, whereas K.E. Welin goes under the piano and eats a nut for the same symbol. This fetishism of ideas goes right through Pop art, Mini skirt and the Fortran block diagram and is a stylistic criterion of the 20th century culture. Following the score in indeterminate music is indispensable in the opposite way to deterministic music.

(c) Event and action music

Often there is no way to make music notation except by recording the whole performance. Stockhausen and Ligeti suggested a film of my action music pieces (1959-61) to be used as a score, which I rejected for a philosophical reason. However, for many music events such as those by Brecht, Chiari, Christiansen, Hidalgo, Kosugi, Moore, Patterson, Schabel, Shiomi, Tone, Welin, Young, video tape will be a useful supplement for their sketchy instructions.

4. Most singing students finish their full college course without playing even once in the opera which they studied so painstakingly. This kind of half study turns them into half teachers. Acting in the opera should not be reserved only for the most talented. Following video Ersatz will enable singing students to taste the operatic situation much more than now, and to shorten the rehearsal time by ten to one, which results in the increased frequency of actual performances.

e.g. La Traviata:

1st film (or video tape) should be made of everything but the soprano part, and used for the soprano part rehearsal.

2nd film is made likewise without the tenor part and used for the tenor part rehearsal.

3rd film - likewise without the baritone part.

4th film - likewise without the base part.

The film can be projected onto four walls simultaneously to facilitate the acting lesson.

This method, which has already proven workable in the field of pop music, applies even more to drama.

e.g. Macbeth without Lady Macbeth

Hamlet without Hamlet

Romeo without Juliet

A teenage Ophelia in Nevada can be a co-star to Lawrence Olivier's Hamlet via the screen.

A simple chorus piece without one part would help the sight singing exercises and a string quartet without one instrument would cut out the rehearsal time and ease the traffic jam - slightly.

5. It is often said that in the big university the faculty and student body lack interrelation. I urge a simple but effective solution. Important faculty members, especially the President and Deans, should make regular TV speeches or hold discussions with the student body and this video recording should be going on day and night at gathering points of students. A video recording system would also be allotted to students, so that they can also convey their answer to the higher administrative body. Many universities have a million dollar TV system, and currently it is no more than a 'sleeping beauty'.

6. French, German, Italian, Spanish, Russian, Chinese and Japanese TV should be shown constantly in the student gathering places. It helps language study (without strain), deepens global consciousness, (again the instant global university), and helps the study of journalism, political science, arts, economics, etc.

7. An international catalogue of educational film and video tape at least, on music, art and philosophy, should be made, or accelerated if in progress. Also a salvage action should be conducted on the remaining newsreel of film including 8 mm amateur film fragments of great thinkers who have died recently, such as Schweitzer, Buber, Shaw, Camus, Suzuki, etc., before it gets too late.

Internal and international exchange promotes efficiency, through the division of work, and the elimination of double work, which constitutes a main point of McNamara's new operational philosophy. As business-men's capital should turn over as fast as possible, so academic resources should turn over as fast as possible.

An academic currency system (say, one NEWTON equals 5 skilled manpower hours) can be created in order to undercut the barrier of foreign currency control and differences of purchasing power, and the ox-cart tempo of budgetary offices.

'There were 61 global services in 1965 fall' (John Cage), and we will have one more now.

8. Last, but not least, I was happy with Richard Hartzell's opinion, that my electronic colour TV experiments have instructional resource value.

Dozens of playabilities can be assembled to a console and can be distributed to kindergarten or elementary school. Its educational effects:

(a) Children are exposed to electronic situations very early.

(b) My electronic TV shows various basic facts of physics and electronics concretely, such as amplitude modulation, radar, scanning, cathode ray, shadow mask tube, oscilloscope, ohm's law, overtone, magnetic character, etc. and it is a very pleasant way to learn these important facts.

(c) It gives the possibilities of electronic drawing. It is better than the light pen because my way is multi-coloured and it provides much interaction with the air programme.

(d) Since my colour TV is the unusual, unorthodox application of an every day commodity, this stimulates the kids to more original, less prejudiced thinking.

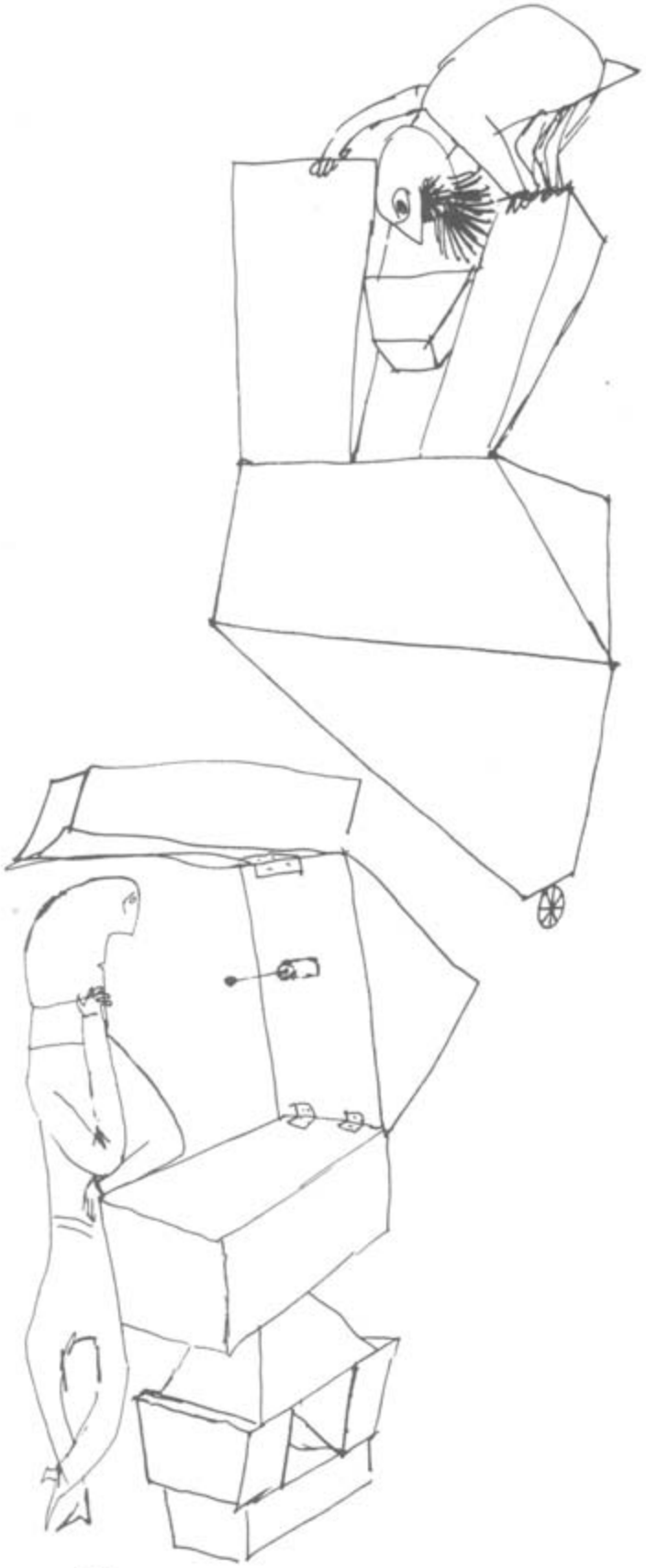
9. There is often a complaint made that a big microphone class kills the personality of the teacher, but this technique can be used in such a way that it not only amplifies the voice of the teacher, but also amplifies his whole personality. John Brockman Associates Inc. and USCO used mix media techniques in the promotion of Scott Paper Company, with great success. It should also be tried in education.

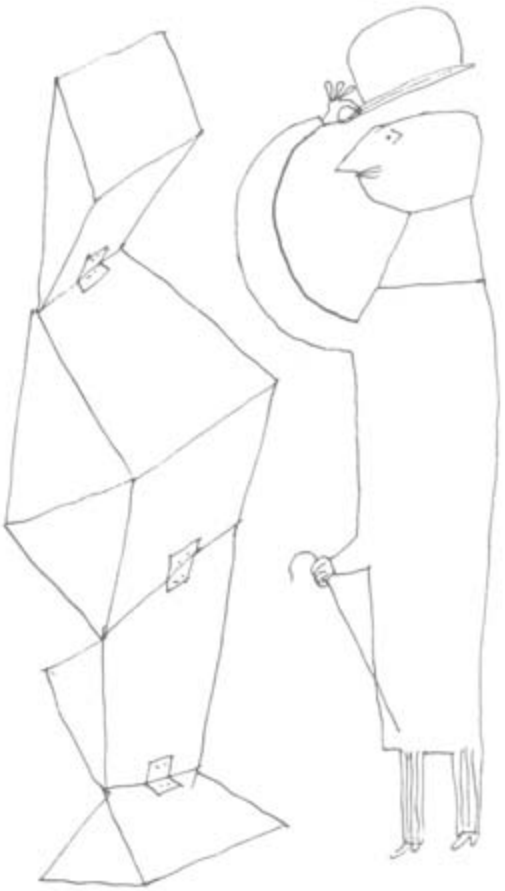
10. How to prevent a slum kid, who would knock down even a teacher, from breaking an expensive teaching console?

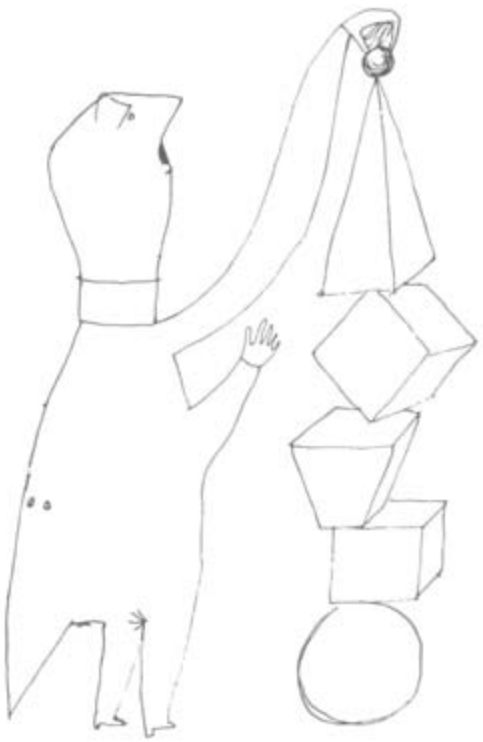
A live teacher is the combination of scholar (that is, data storage and data processing unit) and personality (that is, a highly versatile input-output unit). Presently the main job of Computer Assisted Instruction is concentrating on the programming of central processing units. But if Computer Assisted Instruction proves to be economical and if it were to be spread to mass education (which actually is the main goal of all endeavour), then how would the console replace the stimulation, attraction, reproach and praise of the teacher's personality, especially to small children and unmotivated and less privileged kids from bad neighbourhoods? In the practical application stage of CAI, this so-called peripheral unit (input-output unit, equivalent to the teacher's personality) will become actually as important as the so-called central processing unit. Who wakes up a drowsy girl, and who protects the frustrated kid from breaking the high vacuum cathode ray tube, and who soothes the intellectual scepticism which does not agree with the computer's answer? Just at this point the high flying imagination of the avant-garde artist should be mobilised and put to work, as Allan Kaprow is preaching, and has been for the last five years, to stone ears. Significantly enough, the President of Xerox announced a parallel opinion. According to Mr.McColough, 70% of computer business and profit was made in the hardware section (that is the Central Processing Unit) in the past decade. But in the coming decade this proportion will be reversed, and 70% of the profit will be made in the so-called peripheral unit (input-output unit), in which Xerox will be more competitive with IBM. The artist is the professional manipulator mind, and we should also use our surplus imagination for this project. Medical electronic devices to wake up, stroboscopic light,

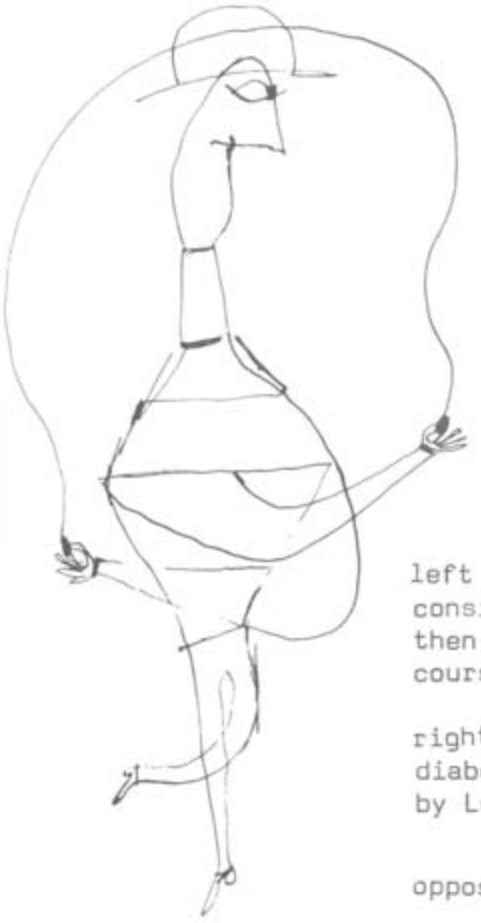
direct influence of brain waves, wind-light-tactile devices, certain noise-refrigerator devices, etc., can be added, plus an electro sleep generator, to put a girl with insomnia to sound sleep. Serge Booterline of Inter-Action Inc, is experimenting with several interesting devices in relation to this input-output problem. In teaching, even a robot should be considered for first and second grade children.

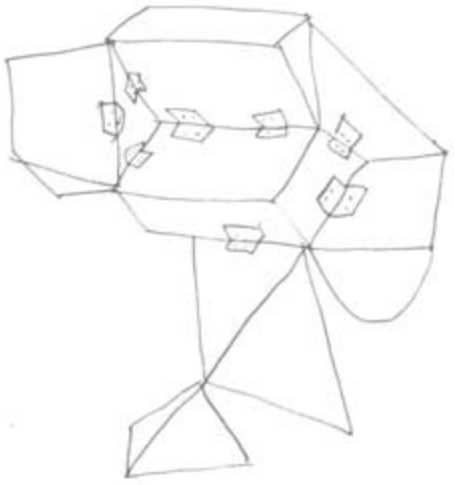
Nam June Paik
February 1968 New York











left People are frequently in doubt what to do; having considered alternative courses of action, they then, sometimes, select or choose one of these courses. Gilbert Ryle, 'The Concept of Mind'

right Défiez-vous des ensorcellements et des attraits diaboliques de la géométrie. Fenelon, quoted by Le Corbusier in Le Modulor

opposite page

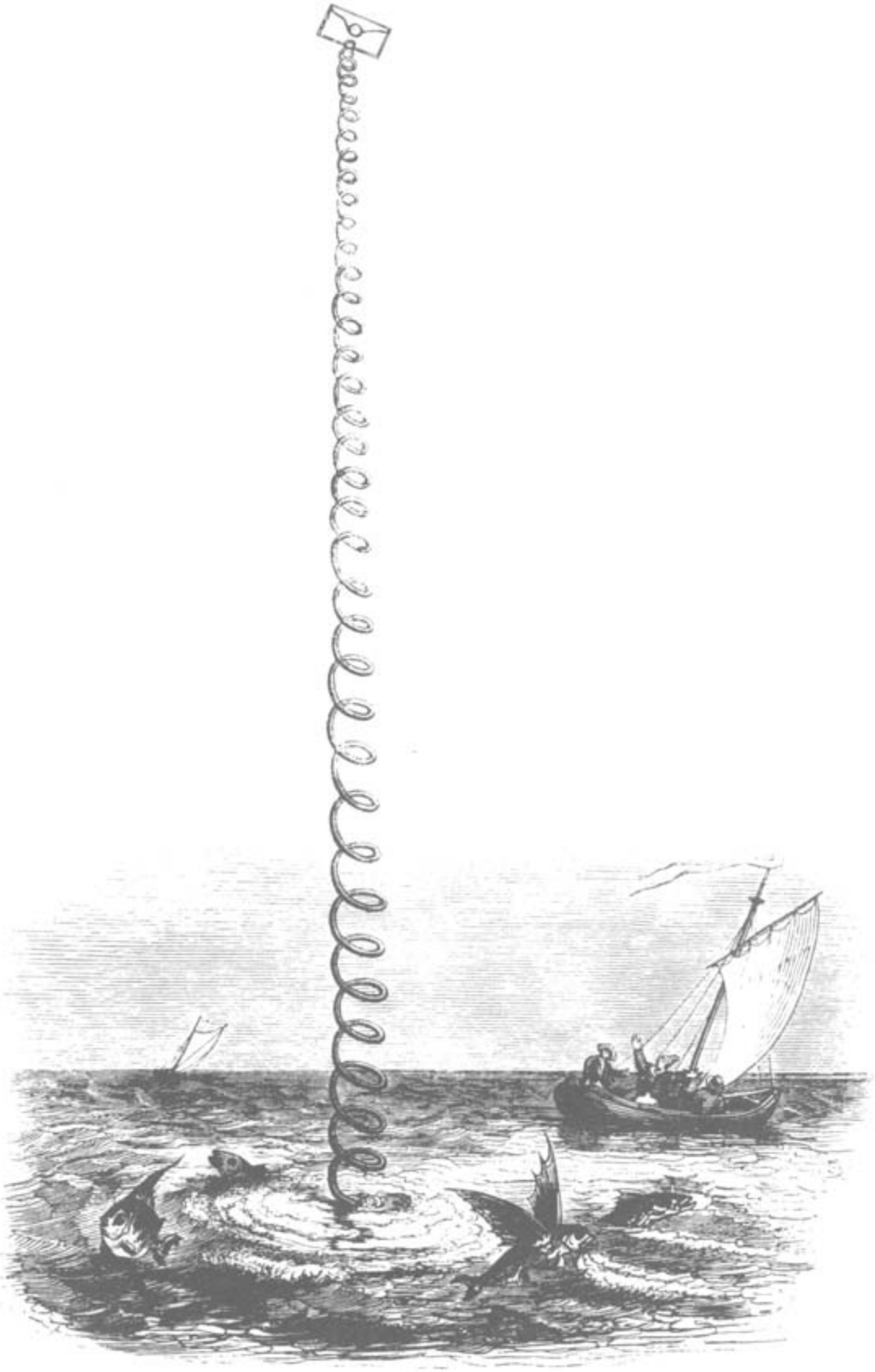
top left Yet sometimes, a few times only in a man's life, there comes through the chaos of his sensations something that has a special quality. Denis Saurat, 'Modern French Literature'

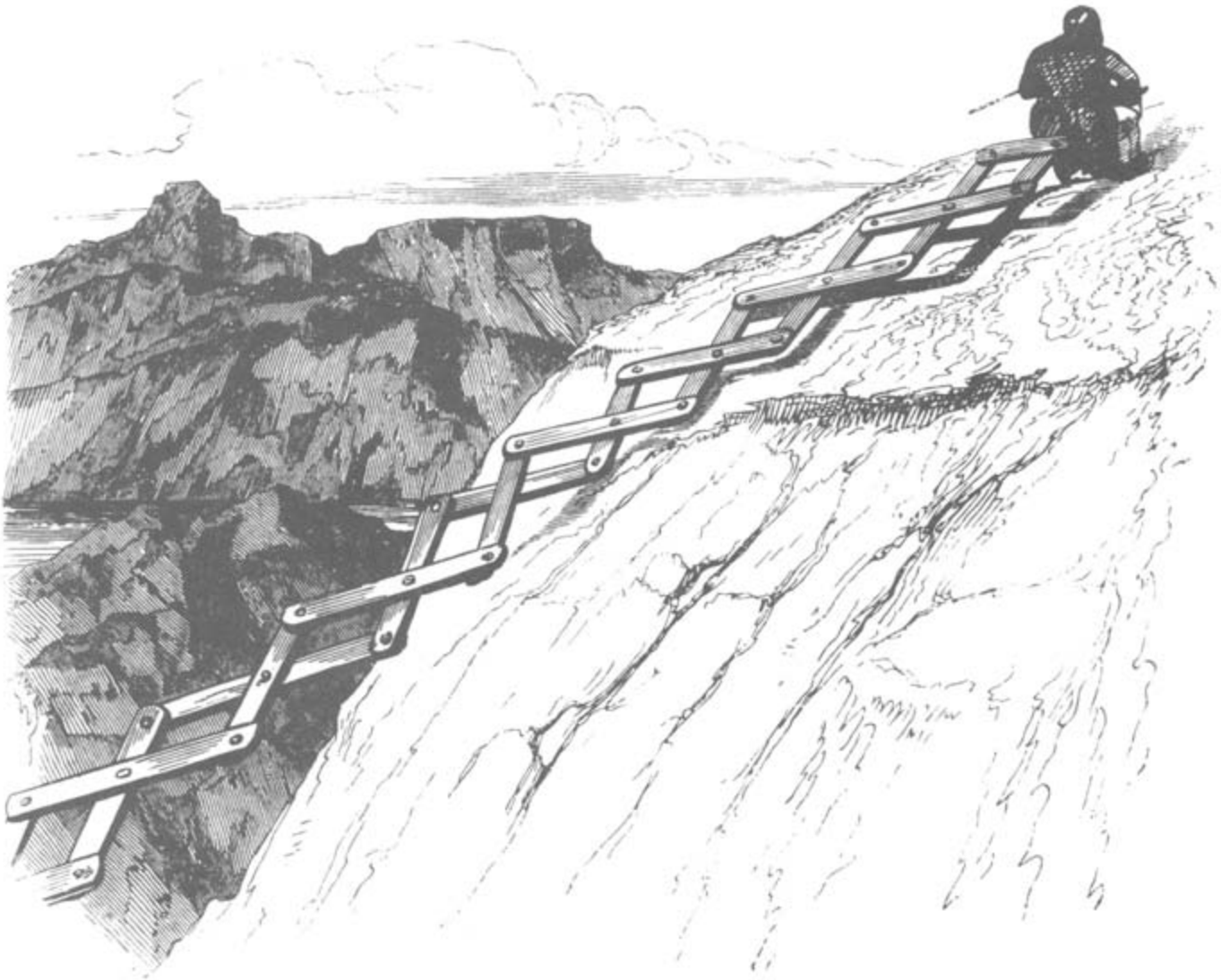
top right L'homme est la seule créature de la terre qui ait la volonté de regarder à l'intérieur d'une autre. Hans Carossa, 'Les Secrets de la Maturité', quoted by Gaston Bachelard in La Terre et les Reveries du Repos

bottom left Ce plaisir particulier que j'avais quelquefois éprouvé dans ma vie. Cette qualité inconnue d'un monde unique. Marcel Proust, 'A la recherche du temps perdu'.

bottom right When a person does something voluntarily, in the sense that he does it on purpose or is trying to do it, his action certainly reflects some quality or qualities of mind, since (it is more than a verbal point to say) he is in some degree and in one fashion or another minding what he is doing. Gilbert Ryle, 'The Concept of Mind'

From 'The Way it Walks' by Franciszka Themerson Gaberbocchus Press 1954





Some interpretations of automatic
locomotion and new postal services
by Grandville, 1867

SEPTEMBER LECTURES AT THE ICA

Tuesday September 3rd at 8pm

Rex Malik
TOMORROW IS ALREADY HERE

On the computer as a basic instrument of social change, with some thoughts on implications of the machine as artist.

'We are creating a machine orientated society. Immediately obvious. This has implications which threaten to change and alter the basis of the social order as we understand it. Not quite so immediately obvious. The machine primarily responsible for the coming crunch is the computer. Even less immediately obvious. You do not have to be a genius to foresee this; it is already happening and the evidence is all around us. The nature of that evidence. Some implications of a machine society on the nature of organisations and on the social order. The machine as artist - some possibilities and some limitations. Conclusions: Utopia or chaos? or neither?'

Rex Malik is a writer, journalist, broadcaster and consultant. He writes a monthly column in Data Systems and broadcasts regularly specialising in computer and communications orientated subjects. He has done work on computer in the home and is making a study on the impact of computer on society.

Thursday September 5th at 8pm

Professor M.W. Thring
ROBOTS IN THE SERVICE OF MAN

'The engineer has developed machines that can give everyone in the world an adequate standard of living for a working week which is no more than 40 hours and will go down considerably more. These machines have been largely applied in N.America, Europe, Japan and some other countries so that they have brought civilisation to a major cross roads. We can either develop a system called 'The Affluent Society' based solely on the desire of the individual for possessions beyond the necessities of life: this leads inevitably to an ever-increasing divergence between the lives of employed and unemployed in rich countries, and between the lives of rich countries and poor ones. Alternatively, we can struggle to set up 'The Creative Society' in which the profit motive is

supplemented to an increasing extent by the other basic motive of the desire to create things of beauty and value, that is to do a job well for the satisfaction of doing it.

beauty and value, that is to do a job well for the satisfaction of doing it.

If we can decide to strive towards the creative society then the tasks of the engineer are

1. To develop machines which can give all mankind an adequate standard of living without doing boring sub-human routine work. These are the robots or machine slaves.
2. To obtain this result without bad consequences such as accidents, noise, pollution and destruction of natural beauty.
3. To develop machines that increase the possibilities of creative work for the individual.'

Professor Thring was Research Officer of the British Coal Utilisation Research Council 1937-1946, Head of the Physics Department of the British Iron and Steel Research Association until 1953 when he was appointed Assistant Director of B.I.S.R.A. He was also appointed Professor of Fuel Technology and Chemical Engineering at Sheffield University. He is well known among robot enthusiasts for his lectures and essays on the subject.

Tuesday September 10th at 8pm

Dr. Gordon Pask
COMMENT ON JOY AND INNOVATION

Broad comments on the cybernetic view of the nature of man's mind. Some conditions that foster the experience of joy and their relation to conditions that engender innovation. The design of special aesthetically potent environments. Features of static environment which makes them aesthetically potent.

Dr. Pask is experimental psychologist and cybernetician. He is Director of Research at System Research Ltd. - a company which he started 16 years ago when possibilities to make investigations in this field were minimal. He is particularly concerned with cybernetic models of learning, teaching systems and cybernetics in relation to creativity.

Author of 'An approach to cybernetics' (Hutchinson), newly appointed professor of cybernetics at Brunel University.

Thursday September 12th at 8pm

Iannis Xenakis
UNIVERSAL CONSTANCY IN MUSIC AND ITS FORMALISATION

Xenakis will talk about his work.

Iannis Xenakis was born of Greek parents in Rumania in 1922. Along with musical studies he pursued a scientific education and took an engineering degree. He studied music under Honegger, Milhaud and Messiaen, and worked in architecture with le Corbusier.

He settled in Paris in 1965. In 1967 he became Associate Professor of Mathematical and Automated Music at the University of Indiana.

STRATEGIE - A GAME FOR TWO ORCHESTRAS 1959/62
by Iannis Xenakis

Instruments:

2 piccolos, 2 flutes, 2 oboes, 2 clarinets in B flat, 2 clarinets in E flat, 2 bass clarinets, 2 bassoons, 2 contrabassoons, 4 horns, 4 trumpets, 2 mirimbaphones, 2 maracas, 2 suspended cymbols, 2 bass drums, 2 x 4 tom-toms, 2 x 5 temple-blocks, 2 x 4 wood blocks, 2 x 5 goat-bells, and strings (12,12,8,8,6).

Duration: 10 to 30 minutes according to outcome of the game.

Two orchestras are placed to left and right of the platform, with the two conductors back to back. They select and play one of six sound structures numbered in the score from 1 to 6 referred to as 'tactics'. These are of stochastic structure and have been calculated by the 7090 IBM in Paris. Each conductor may make his orchestra play certain simultaneous combinations of two or three 'tactics' at a time.

The six fundamental 'tactics' are:

1. wind instruments
2. normal percussion
3. backs of the stringed instruments struck with the hand
4. plucking of the strings
5. glissandi of strings
6. sustained string harmonics

The list of 13 possible simultaneous combinations of the basic 'tactics' for each orchestra is as follows:

a. 1 + 2	f. 2 + 3	j. 1 + 2 + 3
b. 1 + 3	g. 2 + 4	k. 1 + 2 + 4
c. 1 + 5	h. 2 + 5	l. 1 + 2 + 5
d. 1 + 5	i. 2 + 6	m. 1 + 2 + 6
e. 1 + 6		

There are, therefore, 19 'tactics' in all which each conductor may perform with his own orchestra. Thus the two conductors between them can make 361 possible combinations simultaneously.

Each of the 361 combinations is assigned a positive or negative number which, when added up, comprise the conductors' score. The numbers are noted down in a double-entry table at the intersections of the 19 horizontal and 19 vertical columns. The horizontal lines represent the possible tactics for conductor X and the vertical lines represent the possible tactics for conductor Y. Thus all positive numbers represent gains for X and losses for Y, and vice versa. This table is called the 'Matrix of the Game'.

The musical game of STRATEGIE consists of both conductors making choices among the 19 possibilities available to them and executing the chosen 'tactics', one after another, without interruption.

STRATEGIE

matrix of the game

STRAT
EGIE

MATRICE DES REGLEMENTS. DUEL, (VALEUR DU JEU = 0).

CHEF X (LIGNES)

CHEF Y (colonnes)

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	
I	116	10	84	-48	4	-52	-60	-40	132	-44	-8	-36	-22	24	-46	102	138	-38	32	2
II	-56	96	-44	-22	-24	52	-50	-14	12	28	6	-48	-20	-16	-10	-24	-36	-20	44	3
III	-110	-2	96	96	24	0	4	-56	-32	-24	4	-52	-48	-40	-16	-44	-16	20	72	1
IV	0	-20	24	84	4	-12	12	-12	-28	8	-8	-24	-40	4	22	-10	-16	28	-16	H
V	-110	-104	-86	4	104	-8	44	20	-8	4	8	-8	-38	-24	-16	40	8	20	-24	1
VI	24	44	12	-14	-6	64	24	-8	24	4	-24	-40	-52	-44	24	44	4	4	-48	7
VII	-56	-52	20	16	36	44	44	4	-52	-48	0	-46	-36	-12	-20	-40	-44	16	40	4
VIII	-32	-8	-52	-8	12	4	4	48	-44	-12	8	-52	-4	8	32	-36	-40	-16	24	3
IX	-36	10	-16	-32	2	4	-44	-52	52	44	2	48	-18	64	24	22	-36	-28	-52	6
X	-48	12	-22	4	-4	32	-46	-16	8	-36	-24	-4	8	32	24	4	-8	20	-32	4
XI	4	24	26	-4	4	-28	-36	-12	20	4	64	68	4	40	-12	-2	-24	-27	-32	10
XII	-36	-196	-188	-28	-34	-42	36	32	24	0	-32	74	76	-4	4	-32	-28	40	76	1
XIII	166	-20	-42	-40	-52	-44	14	-16	4	22	-14	80	72	-26	-58	40	-18	78	42	2
XIV	32	-14	-34	0	-32	-52	36	12	-12	36	24	-28	42	76	-48	-64	-30	-29	72	5
XV	-20	8	4	28	-28	14	0	20	2	-4	-32	14	26	-56	46	-36	12	-8	14	4
XVI	88	88	104	-28	20	16	-2	-16	20	-20	-50	-26	-8	-36	-40	108	-24	-33	60	9
XVII	32	92	52	-28	16	8	-44	-48	-32	0	-16	-16	-20	-32	24	-30	96	52	-36	8
XVIII	-36	-24	8	4	0	-2	52	78	-12	-4	36	-8	28	-24	-16	-14	42	-12	-40	9
XIX	-52	-52	-66	4	6	-6	-4	44	-66	-4	44	12	44	40	16	-46	44	-42	-32	4
	1	1	2	3	7	11	3	3	4	6	9	2	5	7	10	4	4	8	10	: 100

VENTS
PERC. HARM.
CORDES : PERC. CASSÉ
CORDES : PIZZ., ETC...
CORDES : GLISS.
CORDES : TENUES

(VENTS + PERC) SIM.

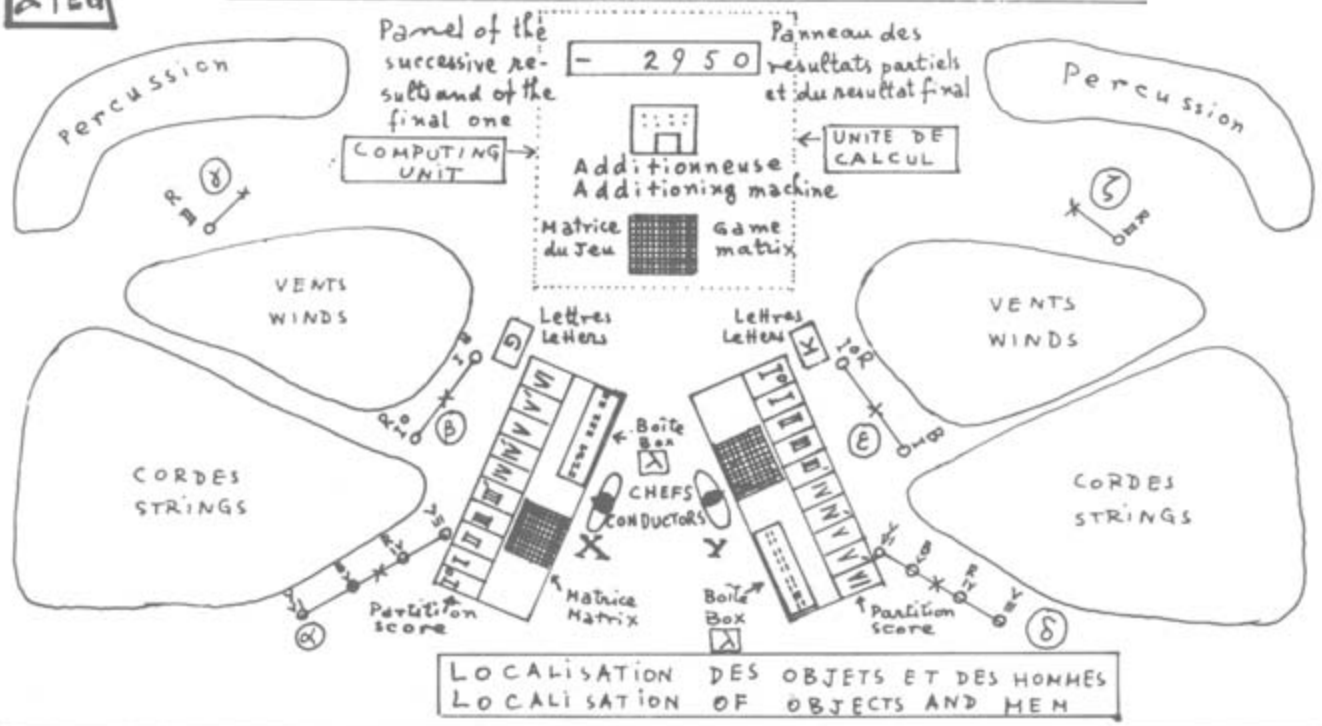
(VENTS + PERC + CORDES PERC) SIMULTANÉMENT

I. Xenakis
ST/VENISE - 1010G2

STRATEGIE

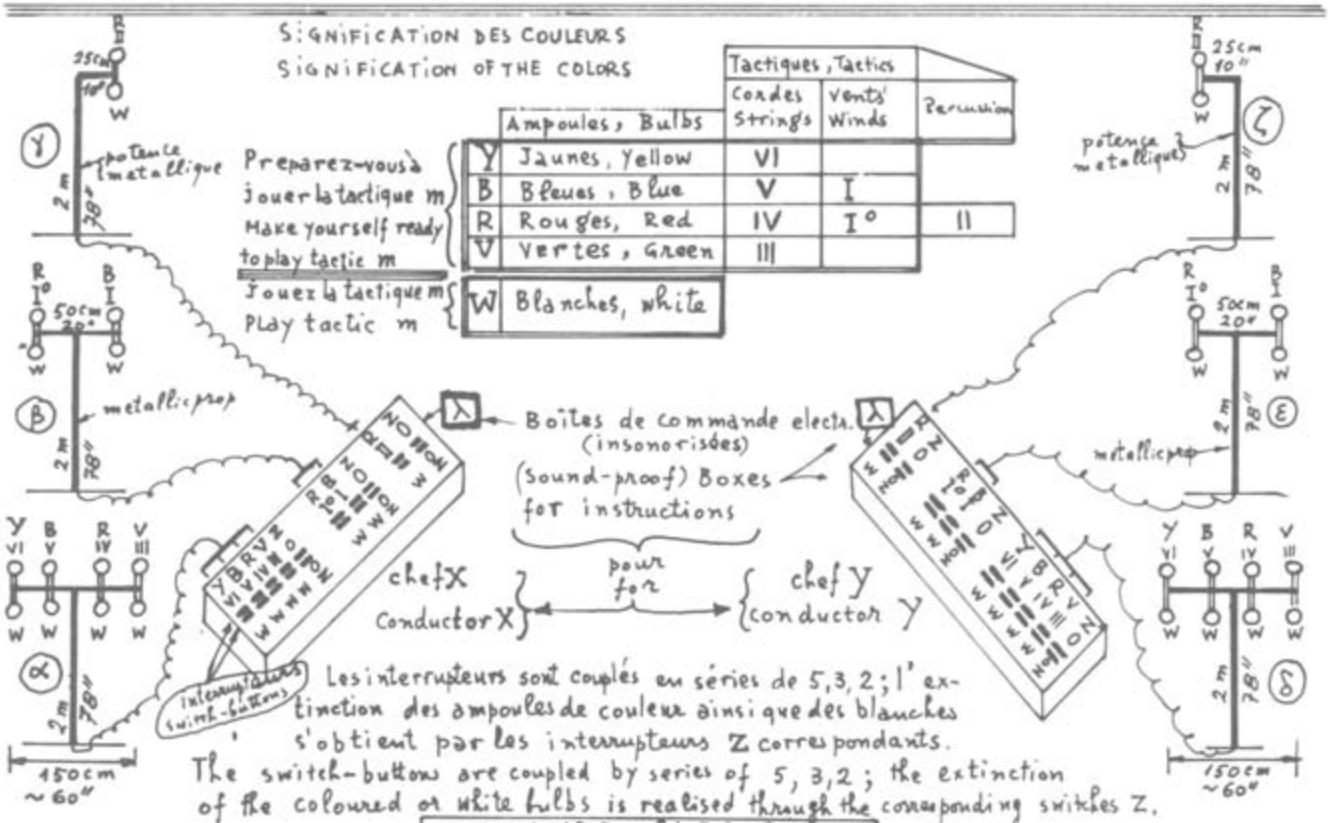
PLANS OF DISPOSITION AND SIGNALLING SYSTEM

STPAT: STR ATEG
{ DISPOSITIFS DE CALCUL ET DE SIGNALISATION: [CHEFS ↔ ORCHESTRES ↔ CALCUL] → PUBLIC
{ SYSTEMS FOR COMPUTATION AND FOR INFORMATION: [CONDUCTORS ↔ ORCHESTRAS ↔ COMPUT.] → PUBLIC



SIGNIFICATION DES COULEURS
SIGNIFICATION OF THE COLORS

	Ampoules, Bulbs	Tactiques, Tactics: Cordes, Strings	Tactiques, Tactics: Vents, Winds	Tactiques, Tactics: Percussion
Préparez-vous à jouer la tactique m / Make yourself ready to play tactic m	Y Jaunes, Yellow	VI		
	B Bleues, Blue	V	I	
	R Rouges, Red	IV	I°	II
	V Vertes, Green	III		
Jouez la tactique m / Play tactic m	W Blanches, White			



Thursday September 19th at 8pm

Reverend A.Q. Morton
THE COMPUTER AS AN AID TO LITERARY STUDIES

A non-technical description of how a computer works and is used to study literature. First the lecture explains how the machine reads literature and how it makes all kinds of indexes and word lists. Then it describes how the authorship and date of a text is determined from these lists, even how one can check if Aristotle really had a lisp or not. The role of the computer in archeology such as the Dead Sea scrolls is discussed finally covering the organisation needed to get most out of the computer.

'My claim to fame in this field' - writes Morton - 'is that I was the first to use the computer on literary texts. It is important to understand that people had used marks before this, let X equal one word, but I argued that this was a waste of time and that we needed a print of the actual texts. Especially for Greek.'

A.Q. Morton graduated from Glasgow in the Arts, Science and Divinity. With the late G.H.C. Macgregor he pioneered the application of scientific techniques, including the use of computers, in New Testament studies and in Greek literature in general. He is currently engaged on an investigation of the Homeric poems.

Tuesday September 24th at 8pm

Pietro Grossi
THE COMPUTER IN MUSIC

The lecture will deal with the development from electronic music to computer music and the gradual change to the process of composition achieved by totally automatic means.

Pietro Grossi trained as a cellist and was professor of the cello and electronic music at the Conservatory of Music in Florence and the University of Indiana. He has been concerned with research into the uses of computers in the field of music. He founded the association 'Vita Musicale Contemporanea' and S 2F M ('Studio di Fonologia Musicale di Firenze').

Thursday September 26th at 8 pm

Professor Abraham Moles
THE SOCIAL IMPLICATIONS OF ART WITH COMPUTERS

Abraham Moles, sociologist and cybernetician is concerned with the application of cybernetics and information theory to aesthetics and music. He will talk about the future possibilities of using computers in relation to creative activity.

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isamu noguchi: a sculptor's world

ISAMU NOGUCHI

FOREWORD BY R BUCKMINSTER FULLER

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September 24 - October 25
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Susanne Levy, paintings
until September 13

Rudolf Scheurer, sculpture
Adele White, paintings
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Robert Adams - sculpture
September 5 - 28

HANOVER GALLERY
32a St. Georges Street, W.1.
629-0296

Sculpture and drawings
September

GRABOWSKI GALLERY
84 Sloane Avenue, S.W.3.
536-1868

100th Exhibition of the gallery until September 28

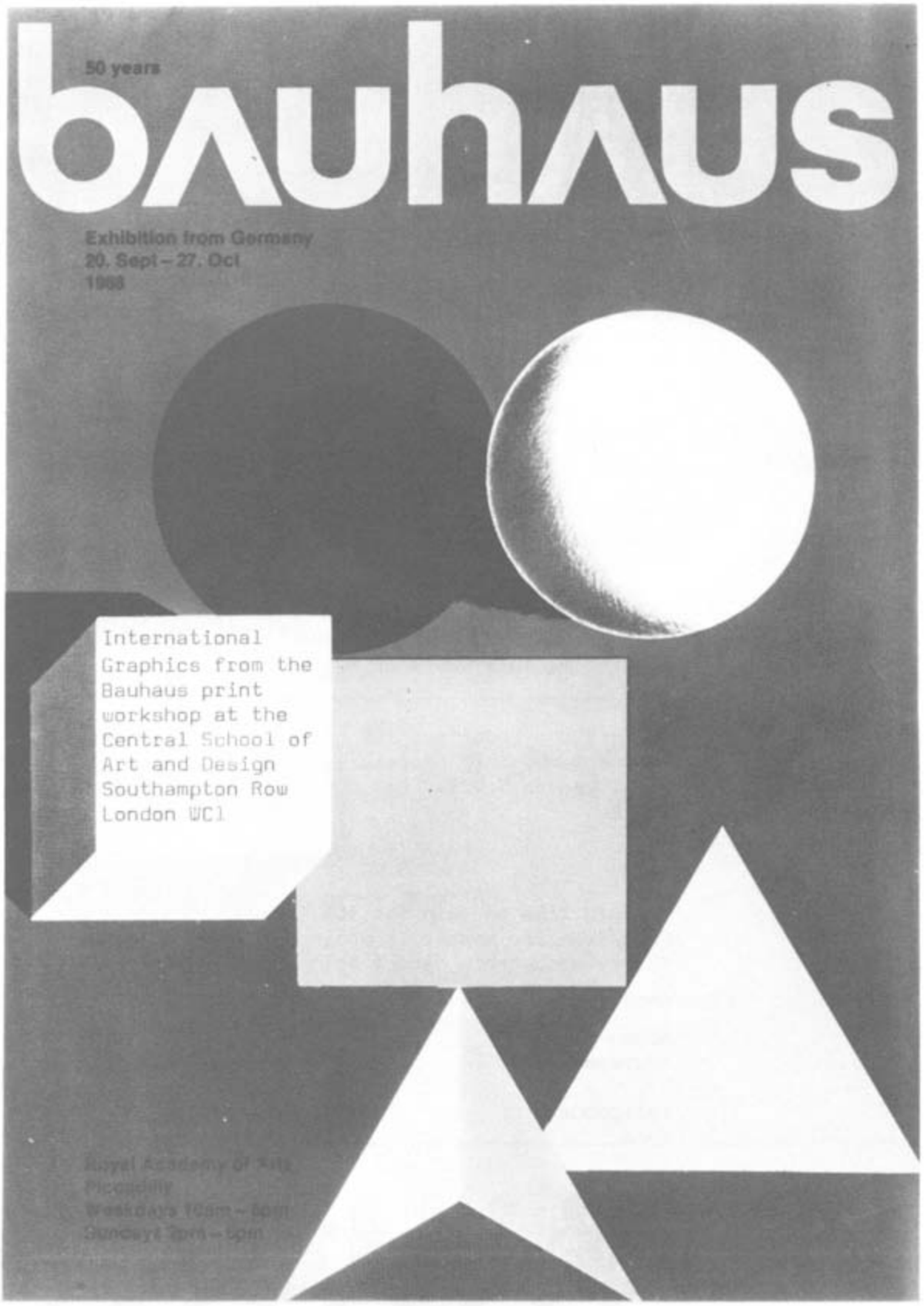
ANNELY JUDA, FINE ART
11-12 Tottenham Mews
off Charlotte Street, W.1.

Important Paintings
Monday-Friday 11-6
Saturday 10-1

50 years

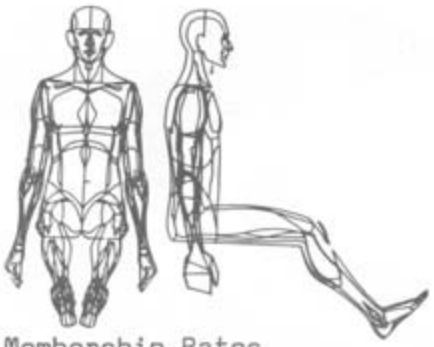
bauhaus

Exhibition from Germany
20. Sept – 27. Oct
1968



International
Graphics from the
Bauhaus print
workshop at the
Central School of
Art and Design
Southampton Row
London WC1

Royal Academy of Arts
Piccadilly
Weekdays 10am – 8pm
Sundays 2pm – 6pm



Membership Rates
Full Membership: £5.5.0. per year
Free admission to all ICA exhibitions.
Invitations to preview performances
and private views.
Priority booking and reduced rates for
cinema, theatre, music, poetry, lectures
and other events.
Regular diary of activities & the ICA Magazine

Standard Membership: £1.0.0. per year
Admission to all ICA exhibitions
at half-price or less.
Admission to ICA films and theatre performances.
Priority booking and reduced rates for music, dance,
poetry, lectures and other events.
Regular monthly diary of activities.

Cut off the lower section of this page and send it to the Membership Secretary, ICA, Nash House, The Mall, London S.W.1. For further details enclose S.A.E.

I would like to join the ICA for one year as a Full/Standard member, I enclose £5.5.0./£1.0.0. for my membership card & printed information.

Name
Address

Telephone
Date

Arts Council Exhibitions

HAYWARD GALLERY
Southbank (next to the Royal Festival Hall)

Inaugural Exhibition
MATISSE
Closing September 8
Weekdays 10.30-7 Sundays 10-6
Admission 5/-

EMIL NOLDE 1867-1956
Watercolours from the Nolde Foundation, Seebull
September 27 - October 27
Weekdays 10.30-7 Sundays 2-6
Admission 5/-

TATE GALLERY
Millbank

HENRY MOORE
70th Birthday Retrospective Exhibition
Closing September 22
Weekdays 10-6 (Tuesdays and Thursdays 10-8)
Sundays 2-6
Admission 5/-

ROYAL ACADEMCY OF ARTS

AMERICAN NAIVE PAINTING
September 6 - October 20
Weekdays 10-6 (Thursdays 10-8) Sundays 2-6
Admission 5/-

'Cybernetic Serendipity' provokes,
in its implications, it is as different
from an every day 'art exhibition'
as a major operation from a manicure...
it is an experience which no one should miss.
John Russell, The Sunday Times

CYBERNETIC

The winking lights
the flickering television screens
and the squawks from the music machines
are signalling the end of abstract art;
When machines can do it,
it will not be worth doing -
Robert Melville, New Statesman

Gasia Reichardt asked
Noman
to design the cove
Institute of Conte
I could do a drawing depicting po
some whimsical comment.
to me was to describe in
some of the things that
in the organising of this exhibition. For ex
were some three hundered and twenty
persons involved to make this show
days to bring it to fruition. Some se
and more than
attended the

A joyous exhibition.
It demonstrates that art
can live with modern science.
Daily Mirror

I think that t
be able not so
our concepts o
widen immeasur
of what is not
Alexander Weat

Where in London could you take
a hippy
a computer programmer
a ten-year-old schoolboy
and guarantee that each would be
perfectly happy for an hour
without you having to lift a finger
to entertain them. From today,
there is just one such place -
The Institute of Contemporary Arts.
The Evening Standard

With this informatio
more than enough to
decided to do

The Industrial revolution
produced the machine age,
with the computer
comes machine age art.
The Evening News