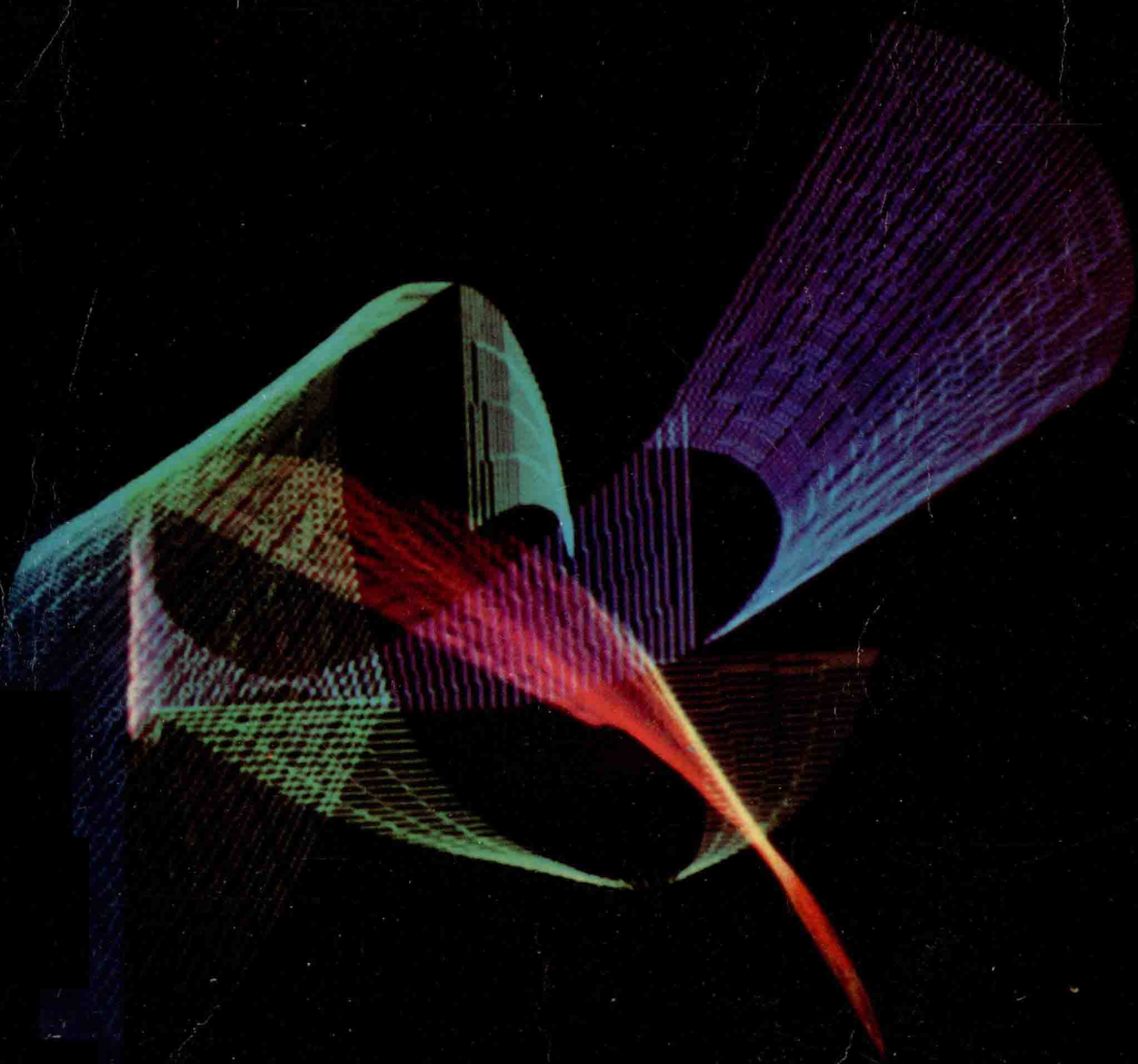


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KINETIC ART: THEORY AND PRACTICE

SELECTIONS FROM THE JOURNAL LEONARDO



EDITED BY
FRANK J. MALINA

KINETIC ART

THEORY AND PRACTICE

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INTRODUCTION

For many centuries different societies have incorporated real motion in artifacts designed to give aesthetic satisfaction. It was only in this century, however, that the term 'kinetic art' was coined and that kinetic art objects became recognized as visual fine art. Since the early 1950s, the number of artists who devote their talents to this kind of art has greatly increased. At the same time, under the impact of new visual experiences, of modern conceptions of aspects of nature and of man, and of novel techniques provided by science and technology, the scope of kinetic art itself has expanded. It includes:

1. Pictorial and sculptural objects incorporating motion and changes of colors with time, brought about by:
 - (a) optical, mechanical, magnetic, electro-mechanical and electronic systems,
 - (b) chemical reactions and the flow of liquids.
2. Objects in which changes with time are random, programmed or responsive to the intensity or the frequency of a sound input and even to the characteristics of alpha brain waves.
3. Visual experiences provided by slide projection, cinema and television techniques.

Although kinetic art is now taken seriously by the art world in many advanced technological societies, it will probably take several more decades before large numbers of art lovers turn to it for emotional satisfaction. At present, only a few museums have permanent displays of kinetic art works and a staff capable of conserving them. Furthermore, the fact that 'kinetics' has been applied in advertising, discotheques and pop concerts leads many people to conclude that kinetic art is suitable only for decorative purposes. They forget that there has long been an interplay between the fine and applied arts. The reproduction of a master's oil painting in an advertisement does not detract from the value of the original painting, any more than a kinetic beer advertisement demeans a kinetic art object using the same technique.

This collection of original articles taken from the journal *Leonardo* is intended to be of help to those interested in kinetic art, be they studio artists, teachers or lovers of art. The texts on the works of artists are unique because the artists themselves are writing about their own creations. This should be of interest to aestheticians, art historians and art critics. There are some educational institutions that offer courses on kinetic art. I believe that this book will serve as a useful source of information for such courses.

The articles are descriptive and analytical rather than literary and many of them require intense concentration on the part of the reader. The visual experience of kinetic art cannot be conveyed by still photographs but the reader should be able to grasp the significance of the artists' works by reading the artists' descriptions of their own aesthetic reactions and objectives. Artists have divulged their 'secrets' in order that other artists can participate in the advancement of kinetic art; some have obtained patent protection for novel ideas that may have commercial significance outside the realm of the fine arts. Details of special techniques and references are provided to permit the techniques to be used by anyone for his own purposes. Addresses of artists at the time of the printing of this edition are given in order that additional information can be obtained directly from them. Any other enquiries should be addressed to *Leonardo*.

Several articles containing information on subjects relevant to kinetic art are included in the last part of the book, as well as a glossary of terms used by artists, most of which have not as yet found their way into art dictionaries. The articles by Nino Calos, Masako Sato, Henri Gabriel and Joël Stein, which originally appeared in French, have been translated for this edition.

I wish to express my appreciation to Pergamon Press Ltd. (in particular to its founder, Robert A. Maxwell) for undertaking on my behalf the publication of such an unusual international art journal of the contemporary artist as *Leonardo*. I have received the most friendly cooperation from Dover Publications Inc., from its President, Hayward Cirker, and from its Managing Editor, Clarence C. Strowbridge. Although much of the work of preparing the texts for publication was carried out under my direction by the editorial staff of *Leonardo*, this book depended greatly on the efforts of my wife and colleague, Marjorie Malina.

FRANK J. MALINA
Founder-Editor of Leonardo

Boulogne sur Seine, France
November 1973

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PART

I

PICTORIAL KINETIC ART WITH OPTICAL,
MECHANICAL, ELECTRO-MECHANICAL
AND CHEMICAL SYSTEMS

ELECTRICITY AND MOTION IN MY KINETIC ART WORKS

Nino Calos*

If one asks why use electricity and motion in visual fine art, I say because they permit the fiction contained in a work to be brought closer to perfection. Each age needs a new art to assimilate the new discoveries of matter and the new ideas of man and of the universe. An art that is based solely on the art of the past would decline into mystification.

In 1949-1950, while in Milan, I made small boxes of various shapes and covered them with glittering silver, gold or multi-colored powder or flakes. When flashing lights were projected on them, one obtained an illusion of motion on their surfaces. A dealer to whom I showed these works said that I was either crazy or that I had mistaken his gallery for the International Fair of Milan. Since then the attitude of the art world to such works has changed greatly.

Although at that time I was already convinced that kinetic art had a future, I was not satisfied with my first effort. I continued to play with electric light, as I had done since childhood, not knowing that there already were pioneers of kinetic art with light [1-11].

I made several journeys to France after 1948 but saw nothing to encourage me to work with electricity. In 1956 I settled permanently in Paris and met F. J. Malina. When I saw the few works he had made with electric light, my longing to pursue my researches in this area grew. I had been particularly struck by two of his works. The first was a geometrical construction with superposed layers of wire mesh, behind which shone lights of different color. When one moved, the moiré effect produced by the wire mesh gave an illusion of motion within the construction. The second work, called 'Jazz', consisted of a picture of 11 round and oval shapes in vivid reds, greens and yellows, which were illuminated intermittently and randomly to produce a rhythmic and attractive visual experience. There were also other works in which light patterns of different colors appeared on a translucent Plexiglas screen. These kinetic

paintings used what Malina called his Lumidyne system, which he described in the first issue of *Leonardo* [12].

The Lumidyne system produces effects of light in motion on a screen of a different kind than those obtained by T. Wilfred with his reflecting system, but at the time neither Malina nor I were aware of Wilfred's work. I saw my first Wilfred Lumia in 1966.

The technique one uses to make a work is one thing; the result is something else. It is now almost 12 years that I have worked with the same technique, which is quite surprising when one sees the hurried construction of kinetic works in galleries. There is at present, it seems to me, a sort of self-styled kinetic frenzy. Every day we are offered a new parade of objects, occasionally even pleasant to look at, but obviously of little artistic significance or rather similar to works created by certain artists more than ten years ago.

Motion for motion's sake and electric light in kinetic art are worth nothing if they do not contribute to the aesthetic value of the work. Art, even when it is kinetic, is an emotional experience created by the mind of man—even man is begun by an emotional experience!

Many of the young are attracted by the apparent easiness of constructing kinetic objects. As soon as they have made a few, although they clearly resemble the works of other artists, they exhibit them and expect them to be appreciated. They believe that the important thing is to work quickly. But toward what end?

During recent years, I have replaced the transparent Plexiglas plate behind the translucent screen, called by Malina the *stator* of the Lumidyne system, by a structure made of strips of wood and aluminum, which differently affects the light transmitted from incandescent bulbs or from fluorescent tubes. I no longer use warm colors but instead light, cool ones that bring about a greater contrast with the grey or black shadows cast by the structured stator. An example of such a work is shown in Figure 1, which was shown recently at the exhibition 'Light and Movement' at the Musée d'Art Moderne in Paris. In this polyptych of six sections there are vertical lines

* Italian artist living at 55 rue Pixiérécourt, 75-Paris 20, France. (Received 11 April 1968.) (Original version in French.)

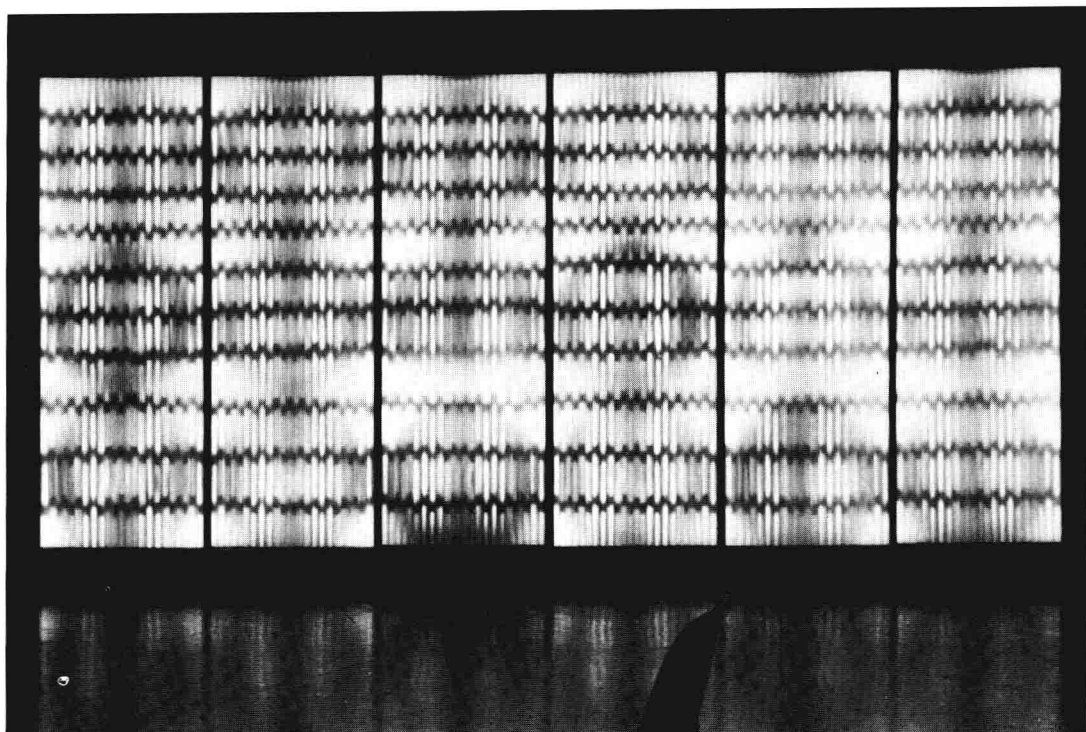


Fig. 1. *'Lumino-kinetic Panel Mural'*, luminous mobile, Lumidyne system, 220 × 420 × 18 cm, 1966-1967. (Photo: André Morain, Paris.)



Fig. 2. *'Luminous mobile, 130/1966'*, luminous mobile, Lumidyne system, 60 × 60 × 11 cm, 1966. (Collection of the Musée d'Art Moderne de la Ville de Paris.) (Photo: Alfio di Bella, Rome.)

cut by groups of horizontal ones with a slow movement of pastel color changes to soften the geometric pattern. The panel provides a wall of light with 18 halos or circular astral shapes. It could be used to provide an ambiance of light in a large room or for a high altar of a cathedral.

To obtain a larger range of motion on the translucent Plexiglas screen, I have warped the screen to vary the distance between it and the stator structure (Fig. 2). The motion in all my works is quite slow, for I wish the viewer to 'penetrate' into it and not to cause shock to the eyes (rapid motion can, of course, also be used when one feels viewer circumstances are appropriate).

My chief preoccupation has been to introduce kinetic painting into sacred art. It was for this reason, among others, that I made the rose window mobile shown in Figure 3 as a possible church window. I know that the liturgy of the Roman Catholic church forbids the use of kinetic art at present but there is a precedent—crèches with automata displayed in the eighteenth century in churches in southern Italy. I am convinced that one day the church will accept kinetic art, for in 1966, when I had an exhibition in Rome, a Catholic official who supervises art in a large diocese in the Federal Republic of Germany shared my view. I believe that churches in the twentieth century cannot limit art to the figurative kind on the grounds that only this kind can lead souls to a meeting with God. Non-figurative or abstract art can have a more efficacious force of suggestion than a representation refining iconographic images of many centuries ago.

It is interesting to note in this connection that the Jesuit Father Louis Bertrand Castel (1688–1757) in France proposed the construction of a color-organ type of kinetic art that was to have been illuminated with lights of that time, candles or oil lamps.

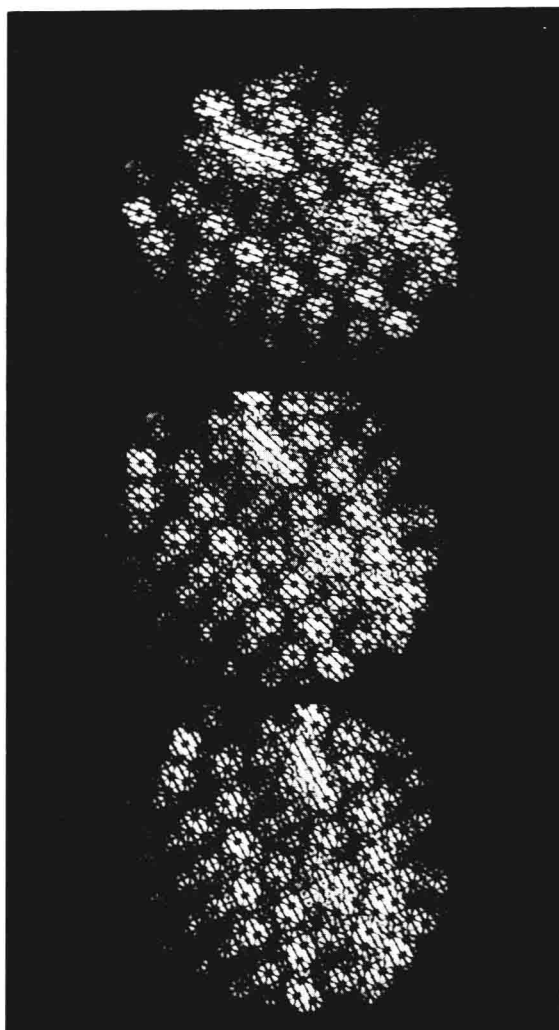


Fig. 3. 'Rose windows', luminous mobile, Lumidyne system, 210 × 70 × 12 cm, 1964. (Photo: Nino Calos, Paris.)

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*Article included in the present edition.

KINETIC ART: THE KINOPTIC SYSTEM

Valerios Caloutsis*

When I came to Paris in 1953 as a painter in traditional media [1], I became acquainted with the works of several artists in the field of kinetic art. Those of Malina, Boto and Schöffer particularly interested me [2–4]. The first phase of my own work in this domain was devoted to making metal constructions in motion, however, the use of electric light for producing images projected from reflecting parts onto surfaces entranced me [5].

After trying various ways of using light, in 1965 I finally arrived at what I call my *Kinoptic* system (from the Greek, *kinisis*—motion and *optiki*—visual). This system permits projection of a kinetic light image from as little as 20 cm from a pictorial surface. It consists of four elements: (1) a light source (a clear incandescent bulb), (2) a fixed polished sheet-aluminum reflector, (3) a rotating polished sheet-aluminum reflector and (4) a synchronous-type electric motor to rotate element (3) (cf. Fig. 1.) These

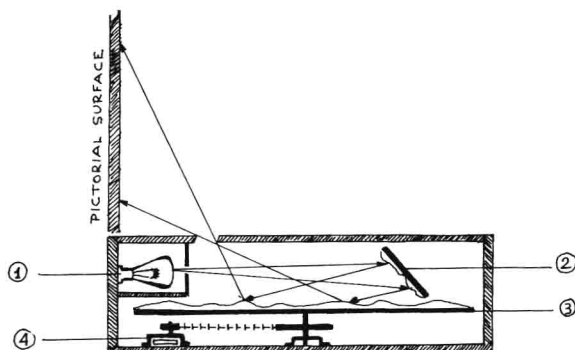


Fig. 1. Diagram of the Kinoptic system: (1) Light source, (2) fixed sheet-aluminum reflector, (3) rotating sheet-aluminum reflector and (4) electric motor.

parts are contained in a box approximately 16 cm high, 24 cm wide and 10 cm deep.

The light bulb (24 W, 6V) is housed within a metal container provided with a circular opening through

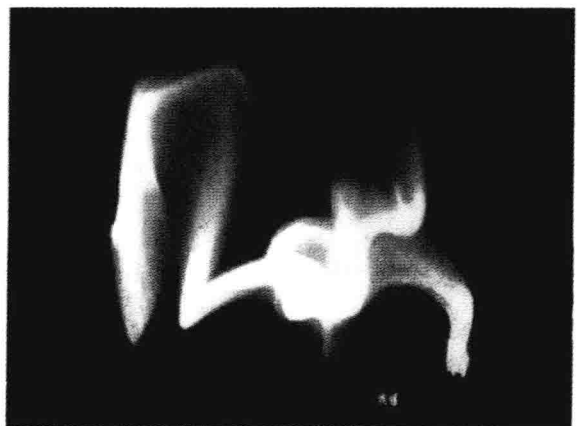


Fig. 2 (a and b). Two pictures produced by 'Kinoptic 7', wall projection, 100 × 120 cm, 1969.

* Greek artist living at 4 rue Antoine Dubois, 75-Paris 6, France. (Received 13 May 1970.)



Fig. 3. 'Kinoptic 53', enclosed unit with projection onto a translucent screen, 50 × 70 cm, 1969.

which the light beam impinges upon the fixed reflector. The fixed reflector directs the light beam onto the rotating reflector, which projects it through a slit in the box onto the pictorial surface.

The forms of moving light images projected onto a surface are determined by the shapes given to the fixed and rotating reflectors. The speed of the continuously changing forms is controlled by the rotating reflector and the distance from the reflector to the pictorial surface. I find that when the reflector moves at one turn per minute the speed of changing forms is satisfactory. One can obtain a cycle of greater duration by using two or more reflectors rotating at different speeds in front of a larger fixed reflector.

It is possible for a spectator to vary the range of images produced by the *Kinoptic* system in the following way. Two or more fixed, shaped reflectors are installed that can be placed in position to intercept the light beam by turning an external knob.

Colored images can be made either by painting sections of the reflecting surfaces with transparent paints or by placing colored transparent materials between the rotating reflector and the exit slit in the box.

In my first *Kinoptic* works, a one-meter square pictorial surface was attached to the projection box to make a single unit. The surface was a sheet of aluminum painted opaque white. The images can, however, be projected directly on a wall, whose larger surface permits more of the image produced by the projector to be seen (cf. Figs. 2a and 2b). Two or more *Kinoptic* boxes placed appropriately in a room create an environment of continuously changing light forms and colors. If the projector is hung on a wall with a translucent screen in front of it, one obtains a kinetic picture that appears to be suspended in space (cf. Fig. 3).

A darkened room is necessary when the *Kinoptic* box is used for projection onto an opaque surface. When projection is made from behind a translucent screen, the kinetic picture can be viewed in a room with ordinary illumination.

I believe there are numerous applications of my *Kinoptic* system. I am particularly interested in producing large scale environments of kinetic light images and in the possibilities of using this form of art in architecture.

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*Article included in the present edition.

KINETIC ART: ANIMATION OF COLOR FOR CINEMA FILM

Ana Sacerdote de Guthmann*

I. INTRODUCTION

The work I shall discuss is a two-minute animated 16 mm film, consisting of 2880 frames, entitled 'Ensaio de côr animada' ('A Trial with Animated Color'), which I showed at the international short-film festival held in conjunction with the 8th Biennial of Sao Paulo, Brazil in 1965 [1].

Since the beginning of this century, painters have shown much interest in the components from which a painting is made: lines, shapes, illusions of space, color effects, color relationships, etc. Artists frequently employ non-figurative geometrical compositions in order to study the visual effects produced by varying one or two components systematically. In a way, the painter might be said to assume the role of the psychologist of visual perception. Paintings of these kinds have been found to give aesthetic satisfaction to certain viewers.

Many of the works of Albers [2, 3] are primarily studies of the interaction between different colors within essentially concentric squares. Lohse [4] and Vasarely [5] are concerned with color relationships within more complex arrays of geometrical shapes. The utility of a digital computer for assigning shapes and colors within an array has been recognized for some time [6].

The use of animation for kinetic art of a non-figurative kind began about fifty years ago. Hans Richter made scroll-pictures in 1919 of two to five meters in length that were unrolled while viewing [7, 8]. He began making abstract black and white motion picture films in 1921, the first being 'Rhythmus 21', some frames of which are shown in Figure 99 of Reference 7.

Henri Valensi in the 1930s pioneered in non-figurative animated film in France and the sequence on a fugue by Bach in the Walt Disney film 'Fantasia' is known to a wide public. Many artists have continued to produce kinetic art of various kinds by means of animated film and I wish to describe the results of my work for the benefit of those interested in this form of contemporary art.

II. THE STARTING POINT IN MY COMPOSITIONS

Analogies between music and painting have long intrigued artists [7, 8, 9, 10] and my love of music

has also led me to conceive paintings in musical terms. For example, I use as my starting point six or eight shades of color that I find visually harmonious. These I call a *basic chromatic unit* or a *basic chromatic syllable*. I have prepared many different chromatic units with the shades chosen in a free and sometimes arbitrary manner.

My procedure has been to select a chromatic unit for coloring a composition of geometric shapes (Fig. 1). New compositions were generated successively by varying the shapes and their positions and their color shades. I thus arrived at a sequence of compositions suitable for making an animated film, in which each arrangement of a composition would normally appear successively on two frames of the film. Thus, a static series of compositions could be made into a form of kinetic art.

* Artist living at Vidt 2004 p. 14, Buenos Aires, Argentina. (Received 23 September 1971.) (Original in French.)

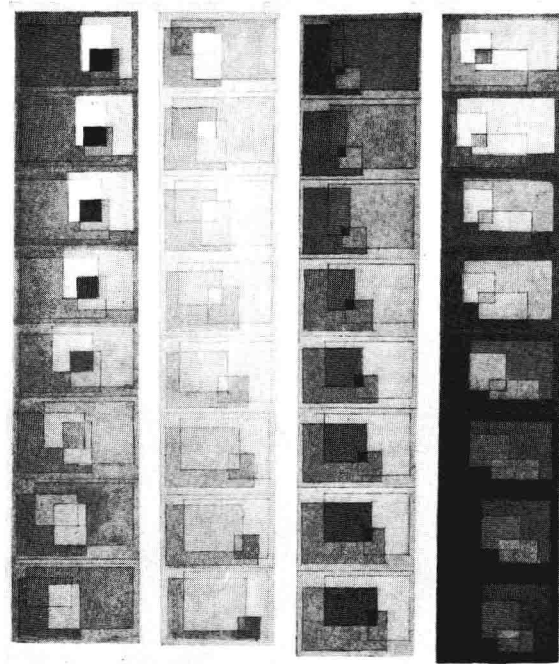


Fig. 1. 'Monochrome', gouache on paper, 32.5 × 27 cm, 1965.

III. MY ANIMATED FILM 'A TRIAL WITH ANIMATED COLOR'

This film consists of three parts entitled 'Monochrome', 'Suggestion of Complementarity' and 'Rhythm'. Each part involves different compositional characteristics, as described below.

A. Monochrome

This was my first attempt to produce a series of compositions for a film. I restricted the colors (gouache) to one palette of red mixed with white and with black to give different shades, i.e. different tone values and saturation. Neutral greys (mixtures of black and white) acquired a blue cast in juxtaposition with warm greys, reds and maroons [2, 3]. Four strips, each with a different basic composition of square and rectangular shapes, are shown in Fig. 1. The changes in shapes, in their arrangement and in their shading from one composition to another can be seen.

B. 'Suggestion of complementarity'

In this sequence (Fig. 2), I broke away from the restricted palette I used in 'Monochrome' by introducing the color yellow and I made the basic composition more complicated to take better advantage of animation possibilities.

The series contains a number of compositions with shades of green and small piercing red rectangular or square areas that gradually fade away, followed by a number of compositions of a red shade with small piercing green rectangular or square areas that also fade away. I am not entirely satisfied with the series because the small red and green areas fade away too quickly.

The more one subdivides the area of a composition, the richer one can make the experience of watching transitions from one shade to another. On the other hand, the labor of preparing compositions with many subdivisions obviously becomes very tedious. Since in this part of the film I did make a composition with more subdivisions, I find it an improvement over the first part. The transformation of the composition in the second part is less uniform than in the first part and the fact that one portion of the composition changes while another portion remains static adds interest to the visual experience in the film sequence. During the red portion of the sequence, one observes a suggestion of circular motion.

C. 'Rhythm'

The two series of compositions discussed in A and B above served as points of departure for the black and white series that I call 'Rhythm' (Fig. 3). The two central strips shown are series of two different basic compositions. The shape and position of some of the areas change progressively from the basic composition to the twelfth composition. The shades of grey were constant for each series. In the two previous sequences of the film, I employed 6, 12, 18, 24, 36, 48 and (less often) 72 frames to give different time periods. But these periods

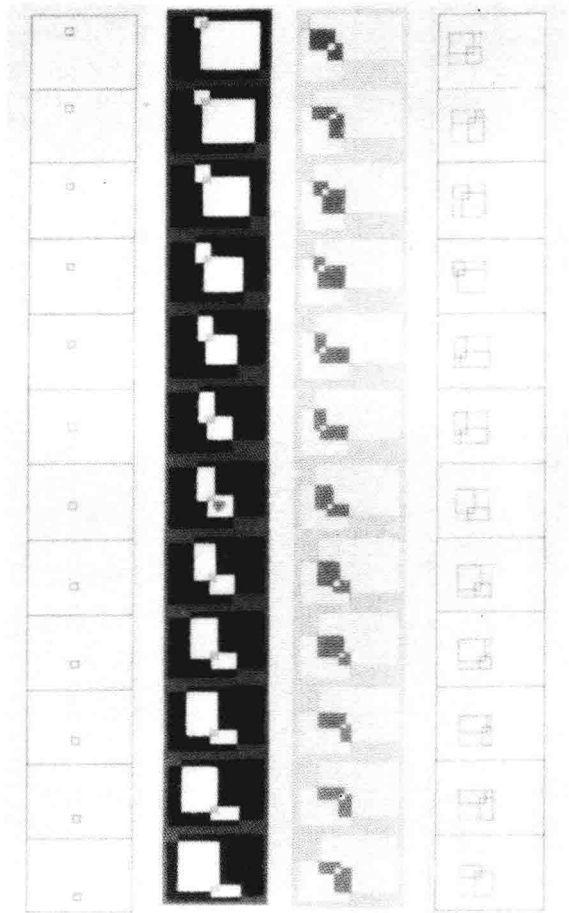


Fig. 3. 'Rhythm', gouache on paper, 32.5 × 27 cm, 1965.

are too short, even when of 72 frames, for changes to be noted by a viewer.

The characteristic aspect of 'Rhythm' (Fig. 3) is that there is independent motion of areas within the film sequence. The composition series in the left central strip will give in the sequence a downward motion of a small square of constant size; this is shown diagrammatically in the strip at the far left. It will also be noted that the two white areas change in shape to give motion horizontally from right to left in the sequence. A study of the right center strip and of the far right strip will show that a small white square will undergo a counterclockwise circular motion in the film sequences independently of the two dark grey areas. A shape in motion, changing both in size and shade, can produce striking effects that, however, to be observed require careful control as regards their duration of presentation.

IV. CONCLUSIONS

The results obtained with this film have led me to draw the following conclusions:

1. One would obtain a visual experience of greater interest if there were not uniform transitions of shape or of color from the beginning to the end of a series of compositions. Sequences in the film should