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LEONARDO WEB RESOURCES

LEONARDO WEB SITES

Leonardo On-Line, Leonardo Electronic Almanac and Observatoire Leonardo des Arts et des Technosciences are three related Leonardo web sites with the common goal of presenting the work and ideas of artists and researchers working with science and technology.

Leonardo On-Line

Leonardo On-Line (<http://mitpress.mit.edu/Leonardo/>) is the free web site of the nonprofit organization Leonardo/the International Society for the Arts, Sciences and Technology. This web site contains information about all of the organization's projects—for example, *Leonardo*, *Leonardo Music Journal*, the Leonardo Book Series, and the Leonardo Awards Program—as well as information about our special projects, calls for papers, editorial guidelines and so forth. This web site also acts as a gateway to other Leonardo web sites, including LEA, OLATS, the Leonardo Digital Reviews web site and *Leonardo Music Journal's* web pages.

Leonardo Electronic Almanac (LEA)

LEA (<http://mitpress.mit.edu/LEA/>) is a monthly subscription-based web journal published by Leonardo/ISAST and the MIT Press that features material contributed by artists, scientists, educators and developers of new technological resources in the media arts. The LEA web site also houses the Leonardo Electronic Monographs (see list below). LEA is password-protected and available by subscription or as a benefit of subscription to the print journal *Leonardo* and *Leonardo Music Journal*. LEA access includes access to on-line versions of the print journals and access to the Leonardo Electronic Archives.

OLATS

Observatoire Leonardo des Arts et des Technosciences (OLATS) (<http://www.olats.org>) is the free web site of Association Leonardo, a collaborating organization of Leonardo/ISAST. The

OLATS web site, mostly in French, is dedicated to information, key works, artists' ideas and studies in the field of art related to techno-sciences. Some of OLATS' key projects are: Afrique Virtuelle (Virtual Africa, involving exchanges between African and other artists), Pionniers et Précurseurs (Pioneers and Pathbreakers, on-line documentation about pioneering technological artists), Space Art (documentation of the annual Space and the Arts Workshops) and the publication of colloquium papers.

LEONARDO ELECTRONIC MONOGRAPHS

The Leonardo Electronic Monographs series (<http://mitpress.mit.edu/e-journals/Leonardo/isast/monographs.html>) seeks to address the need for in-depth scholarly discourse through the publication of texts or hypertexts addressed to specialized scholarly audiences. Interested authors should send E-mail to <leo@mitpress.mit.edu> and include: proposed title, abstract and sample section of the monograph.

Frank Malina, Artist and Scientist: Works 1936–1963

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Editor's Note: This monographic study was written in 1963 and is republished online without modification. In it, the author, who had worked in collaboration with the artist, tries to assess the fascinatingly rich personality of Frank Malina at some length before analyzing his artistic achievements to 1963, 5 years before he founded Leonardo and 18 years before his untimely death.

The foundations for Malina's double personality as scientist and artist had already been laid in childhood. His scientific personality can best be determined by looking at his main activities in the field of engineering and natural science: rocket propulsion, astronautics

and geophysics. His artistic personality can be characterized not only by his constant introduction of scientific observations and theories into his artistic experiments but also by the fact that he tried to grapple with problems and relationships such as those between figurative and abstract art, daylight and artificial light, virtual and real movement, and geometrical, surrealist or realist subject matter.

Frank Malina's artistic venture is characterized by a long period of incubation and struggling for ideas, culminating in about 1953 in a breaking away from the traditional two-dimensional (2D) medium. This was followed by a series of experiments in tension, transparency, electric light and movement, which were introduced at certain intervals in his works. However, Malina often conducted parallel research in the different media and systems that he had elaborated, and it is therefore important to keep in mind that the chronological order often overlapped the logical order based on the technical inventions and aesthetic preoccupations. There is also a certain persistence of the same subjects throughout Malina's career. In fact, the period between 1936 and 1953 was dominated by his desire to introduce a certain symbolism and subject matter from modern science—that is to say, technical objects as well as scientific ideas—into his art. This starting point was briefly intellectual, as would be expected of someone whose mind was used to participating actively in the rearrangement of sense data.

The turning point in his artistic research was marked by Malina's interest in the third dimension: his studies in tension were about to start. This was the transition from the period of contemplation and trial to that of research and synthetic realization.

When in October 1953 Frank Malina had his first one-man show, he exhibited side by side his 2D works, constructions in which the application of materials, string, rope, wire and wire screen had been used to create pictures with the character of colored relief and structure.

But a much more important step had been taken at that point: Malina had

obtained a certain transparency by the adoption of materials fitted into a multi-planed arrangement. He further enhanced the plastic possibilities of his work not only by the use of color for painting strips, but also by his squeezing oil paint through the interstices of the wire meshes.

A last element was introduced by Malina in this phase of his use of transparency and multi-planed media in the form of moving fields of lines, or what he called the “fringe effect.” As the observer moved, multi-concentric circles would radiate in an unexpected manner in different directions. This “virtual” movement in the work contrasts subtly with the geometric pattern of the wire meshes and gives an added interest to the sensation of transparency.

The difficulties Malina encountered while experimenting with layers of wire meshes and his constant concern with transparency and illumination had a salutary effect on him when one day in 1954, in desperation, he placed the layers of mesh in front of an electric light bulb and, to use his own words, “saw a new world.”

This was a moment in the artist’s career when a courageous choice had to be made aesthetically as well as technically. After experimenting intensively with translucent colored cellophane and color-light relationships in general, he opted for a technique and an aesthetic effect comparable to those of stained-glass windows. Instead of using glass and lead he chose a much freer technique: changing the wire mesh layers to form any desired shapes unhampered by lead lines. Opting for electric light was of course an important decision, because it caused Malina to break with traditional colors and he was limited to showing his pictures in conditions that resembled cinema or television. However, the gain was considerable, as he could return to directly transmitted light as opposed to light reflected from opaque surfaces as in traditional painting.

But apart from the choice of the form of artificial light and its many possibilities, including movement, the period of electro-paintings was an experimental phase that taught Malina a considerable amount about the transparency of color and the use of translucent surfaces.

The result of this research was a four-component system to which Malina gave the name of “lumidyne.” He produced the main body of his work with the system from spring 1956 to 1963.

The four parts of this system are the lights, the motor-driven movable elements (motors), a transparent plate (stator) and a translucent diffusing screen.

For the illumination, Malina used essentially fluorescent tubes and incandescent lights mounted on a back-board. No colored tubes were utilized, since the difficulties of replacement would have been too great for the future owner of this type of picture and could have induced him to alter the color disposition conceived and perfected by the artist. One of the major aims of Malina on the practical side was to find a system that had all the characteristics of light and continuous movement without having to use too complicated a means that in turn would require an expert for the maintenance of these art objects.

The main features of the lumidyne system are the judicious combination of the four (or five) elements forming the work of art; the spacing between these elements, which could become the essential factor in the final composition; and the fact that, with a very nominal power input, these narrow boxes could be hung on a wall (or, in the case of murals, worked into the wall). In fact, this cinematic art remains intimate and at a human scale, closely linked to painting in its effects and application.

The subject matter of the pictures of the lumidyne period, Malina’s principal works, is dominated by the invisible scientific world. But equal importance was now placed on color and color transformations in the use of various light sources, resulting in a variety of movements of multiple aesthetic intentions.

The ulterior visual researches of Malina, although he still continued to make pictures with the lumidyne system, were mainly concerned with the reflection of light. He had developed the “reflectodyne” system, which had considerably changed his artistic attitude. The fact that he was no longer employing paint on static or rotating surfaces—instead a surprising variety of forms was almost spontaneously created and had then to be controlled and directed by the artist—had changed the order of creation and put into a new context such important problems as the relationship between the subject matter and its formal expression. Previously, Malina had started out with a definite visual and emotional experience, so that he could speak without difficulty of the “subject matter” of his picture and

could unhesitatingly give it a title. Now he was faced with a welter of forms that took on their subject matter slowly, and the titles of the reflectodyne pictures were found only at the end of this creative process.

On the purely technical level, the new reflectodyne system was composed of four elements: the light source, a color wheel, reflecting surfaces and a diffusing screen, but this system opened up further great possibilities because music and sound could easily be integrated into this type of picture.

Even with the most modern inventions of the time, such as perfected photoelectric cells, cathode-ray tubes and other devices used for television and in cybernetics, a considerable amount of experience would be necessary before an aesthetically interesting blending of elements such as frequency (or amplitude), intensity, overtone structure and “envelope” (viz. growth, duration and decay) of the sound structure with the visual elements, such as color saturation, light intensity and frequency, lines and outlines (forms) could have been achieved and the problem of parallel composition could really be envisaged. Malina began at the time to tackle these problems with his usual serenity.

In conclusion, one could consider that apart from Malina’s main object, that of depicting or transforming scientific subject matter and emotions into artistic representations and techniques, he combined a deep, sensitive individuality that sought a direct, spontaneous expression with the cool, experimental approach of the scientist, which gives his works their particular quality and, through this association, causes them to transcend reality and fascinate the spectator.

Beyond all technical innovations and the meaning of such abstract terms as artificial light or actual and continuous movement, it is finally in the artist as a human being that we find the answer to these problems and a significant synthesis between the scientific and artistic aspects of our universe.

It is on this human level and through the multiple achievements accomplished during the course of Malina’s life that we discover the secret of his originality.

Current Monographs

Current Leonardo Electronic Monographs include:

- “Frank Malina, Artist and Scientist: Works from 1936 to 1963,” by Frank Popper

- “Pathways to Innovation in Digital Culture,” by Michael Century
- “Towards a Transformative Set-Up: A Case-Study of the Art and Virtual Environments Program at the Banff Center for the Arts,” by Michael Century and Thierry Bardini
- “Extended Musical Interface with the Human Nervous System: Assessment and Prospectus,” by David Rosenboom
- “Pour une typologie de la création sur Internet” (A Typology of Creation on the Internet), by Annick Bureauud
- “Art et technologie: La Monstration” (How to Curate, Display and Exhibit Works of Electronic Art), by Annick Bureauud, Nathalie Lafforgue and Joel Boutteville
- “Rencontres du 13 avril: Space Art Workshops,” by Annick Bureauud et al.

- “The Aesthetic Status of Technological Art,” by Jacques Mandelbrojt et al.

LEONARDO ON-LINE BIBLIOGRAPHIES

The Leonardo Bibliography Project (<http://mitpress.mit.edu/e-journals/Leonardo/isast/spec.projects/biblios.html>) places bibliographies of interest to our art/science/technology audience. Readers interested in publishing a bibliography on Leonardo On-Line should contact the *Leonardo* Editorial Office <isast@sfsu.edu>.

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- Art and Camouflage

- Art and Genetics
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