

MEDLOW

MEDION a magazine published and distributed by the Museum of the Media

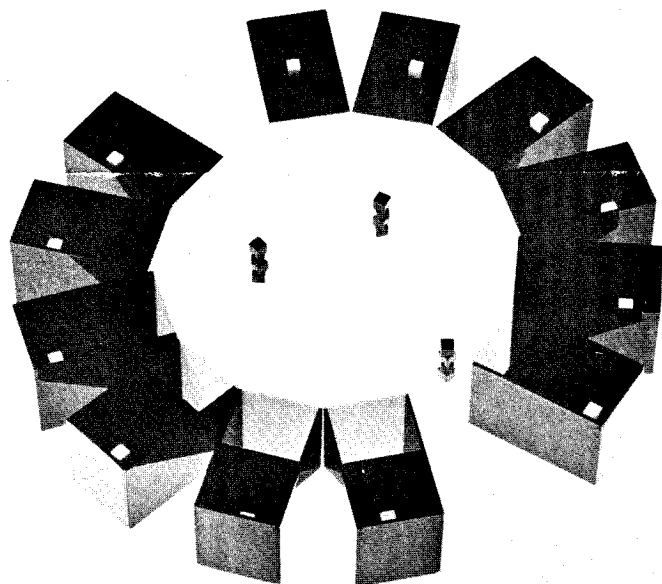
In this second issue of Medion, the editors have tried to provide the first effective sounding board for professionals in the mixed-media field. We hope that others in related communications activities will respond to the views here, and increase our number of contributing readers, which is our most important source of material.

The vast range of possibilities for mixed-media tools are daily transforming our lives. The potential of these

changes will not be fully realized unless lines of communication are established between media specialists. It seems necessary, from a professional standpoint, to make available this type of exchange. This is the purpose of this magazine.

To increase the availability of technological developments, Medion depends upon our readers to report news of exhibits, performances, and technological developments.

This is a complimentary issue of our magazine. The Museum of the Media is currently collating its permanent mailing list for Medion. If you have received our first copy and wish to continue your subscription, please fill out the coupon on the back. We would also be happy to receive and add to our mailing list anyone who would be interested in receiving our publication. Our address is Medion c/o Museum of the Media, One Union Square West, New York, New York, 10003.



1.

MUSEUM OF THE MEDIA NEWS

"The museum is developing a unique hardware-software combination which they believe will be able to communicate more information in less space, less time and with less money than any other audio-visual system."

The Museum of the Media is a non-profit organization chartered by the New York State Board of Regents to integrate new technologies into the education process. There are several contemporary principles that have influenced the museum's philosophy of education.

ONE: ENVIRONMENTAL EDUCATION

The museum basically creates audio-visual "environments." This is done by a complete system of 360 degree rear screen projections and sound systems (see diagram one). The environment will consist of a large space enclosed by two way polarized rear screening material. Each screen is approximately eight square feet. Over each screen is placed a system of speakers. On these screens will be projected visual material on a specific subject. Accompanying this will be a synchronized sound presentation.

TWO: MODULE CONSTRUCTION

A number of inherent problems have plagued multi-screen and multi-projection systems of the past. The museum desires to circumnavigate the usual problems of economy, power requirements, equipment compatibility, reliability, and coordination by developing a modular construction and programming technique (see diagram two).

THREE: NON-VERBAL COMMUNICATIONS

Through the use of varied media techniques such as x-rays, fiber-optics, thermography, microphotography, and slow motion, the museum can exhibit material in greater depth than was previously possible. The Museum of the Media will program its material in such a way that no narration will be needed to explain the subject matter. All communication

EXPERIMENT—Investigation of the Human Head

Purpose: to test and develop the optical and editing facility of the museum to be done in conjunction with the Anatomy Show.

MICRO-SCAN: 6 photographs of a micro-study of the nose from right profile over the nose to the left profile of the nose.

MACRO-SCAN: Series of 12 slides from right top of face to bottom left chin of face.

ZOOM SERIES: 12 photographs which zoom from full face to photo where the cornea covers the entire film frame.

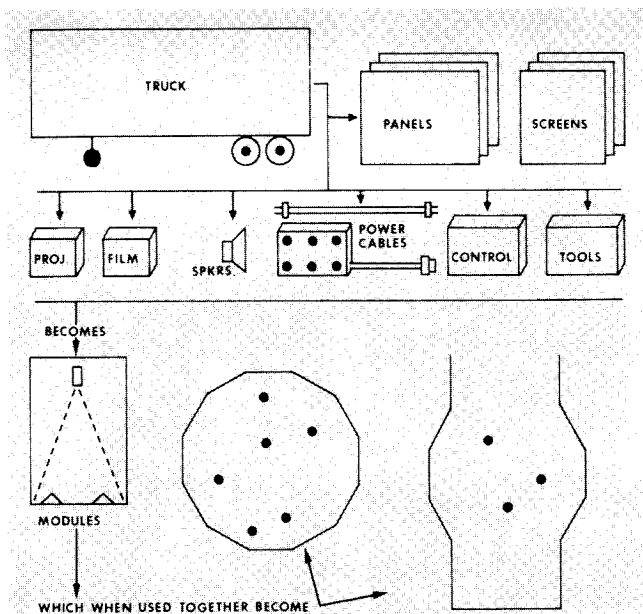
PATTERN MONTAGE SERIES: Full ear photograph of both right and left ear. Total 6 pictures.

MICRO-ROTATION: Series of 24 photographs. Micro-rotation of the head from bottom of chin to back of neck.

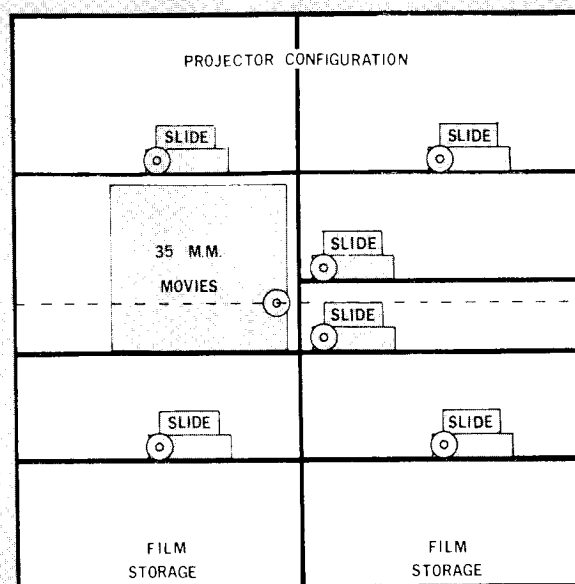
will be completely sensory. For example, instead of reading about a particular subject, the participant will experience the subject in its related audio-visual environment.

The Museum of the Media's present facility consists of a laboratory of 1250 square feet in the basement of One Union Square West, New York City. There we have installed a three screen rear projection system. Behind each screen is an adjustable rack used to align a multiple projection system (see diagram three). The projection system will consist of slide

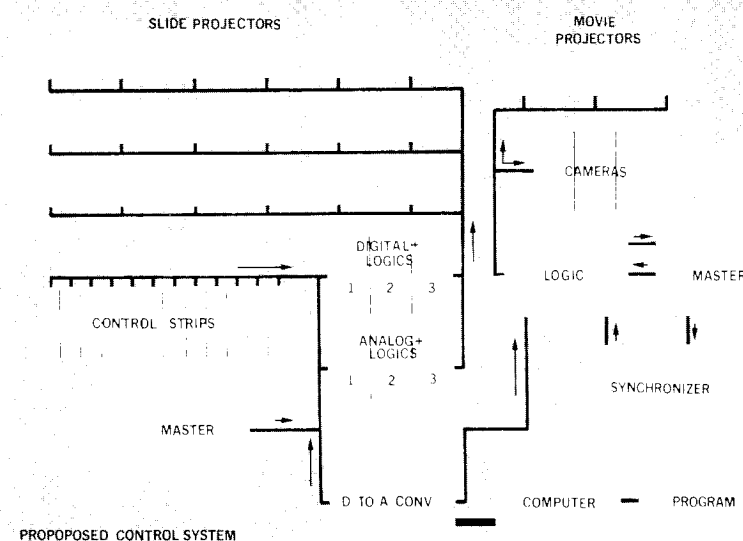
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2.



3.



4.

SOME REFLECTIONS ON MIXED MEDIA

STEWART KRANZ, PH.D., HAS OVER FIFTEEN YEARS OF EXPERIENCE IN FILM STRIP AND EDUCATIONAL TECHNOLOGY PROBLEMS. HE IS CO-AUTHOR OF THE *DESIGN CONTINUUM* AND THIS FALL HE WILL PUBLISH A SECOND ENTITLED, *THE FOURTH R*. CURRENTLY, DR. KRANZ IS MANAGER OF EDUCATIONAL SYSTEMS, PROFESSIONAL PRODUCT DIVISION, C. B. S. LABORATORIES, 27 BROWN HOUSE ROAD, STAMFORD, CONN.

During the past decade artists from many disciplines have begun a serious reappraisal of the function of their specific disciplines. As a former university art professor, this writer can report that interdisciplinary cooperation among these artists has traditionally been reserved for catalogue descriptions and administrative reveries—in actuality, the level of interaction between artists of related but distinct crafts has rarely risen above the expression of suspicious contempt. In this analogy, the university prototype has appropriate relevance to reality. In spite of the difficulties of style, craft, method, technique, function, and form, the thrust of contemporary art in this country and abroad has been to cooperative ventures between formerly distinct disciplines. Such cooperative ventures in the arts are easily traced to such superb prototypes as the Gothic craftsmen's guilds, the fresco schools of Ravenna, and for that matter, to the Black Mountain School of recent vintage. However, a significant, if tentative new element has intruded into these traditional interdisciplinary efforts: namely, the utilization by the artist of first, modern technology, and secondly of the thinking of the advanced scientist who has created the theoretical basis for this technology.

With the profound semantic impact of Marshall McLuhan, the word *interdisciplinary* has been transmuted by subtle stages into the phrase *intermedia* or *mixed media*. At this juncture in time, the phrase is far less important than the phenomenon. This writer can report that during a period of three years of intense research on this subject, he feels less able to describe the incredible dimensions of this movement than he could during the comforting naivete at the outset of the study. During this time the author has taped in depth interviews with leading scientists, artists, and engineers throughout the United States and Canada. These interviews, coupled with extensive photographic research, have led him to the conclusion that a real, if somewhat uneasy collaboration between artists and scientists is not only a reality today, but that the seeds are being sown for the creation of highly sophisticated interdisciplinary activities in the future. The work of Gregory Kepes at MIT, Billy Kluver at E.A.T. and Byod Compton at NYU indicate the high level of interest in formal interaction. The recent opening of the Museum of the Media under the direction of Ronald Globus is a further indication that this interest will be followed by a new generation.

Perhaps a brief discussion of what technology offers the artist would help clarify the avid interest he has lent to this development. If the industrial age has been concluded and the era of computer-directed technology is upon us, we must investigate the implications for the artist and the scientist.

The new third generation computers have opened the way for direct visual input into the computer memory bank. An instantaneous visual readout on a cathode ray tube confirms the programming. The areas of computer-aided design, computer graphics, computer-directed animation, and finally computer-driven visual analysis have opened the possibilities for entirely new forms of technical art.

A second impact of technology has been in the area of electronic video recording and electronic video switching. Alwin Nikolais used the chromakey electronic switching technique in a recent videotape recording for television use. He commented to the author that this synthesis of electronic switching enabled him to realize the age long choreographer's dream of conquering gravity. Coupled with electron video recording has been the corollary development with electronic audio recording. Artists such as Morton Subotnick, Gershon Kingsley, and Eric Salzman, have indicated to the author that the development of the Moog Synthesizer and similar devices have enabled the composer to literally create the particular sound appropriate to his purpose. The multi-track tape recorder has made inter-mixing of these electronically created sounds with any other input and has extended the range of the composer to the point where he literally plays his own score during the recording process.

A third significant contribution of technology to the mixed media artist has been in the area of improved visual imaging and projection systems. These systems open the possibility for multi-screen projections, intermixing of still with kinetic images, color reversal projection, and the integration between the projected image and the live performer. The great Czeck Renaissance so eloquently documented at the recent Expo 67 exhibit illustrates. The *Lanterna Majika* group, unfortunately relegated to the entertainment area of the exhibit, were the progenitors of this pioneering development. American artists such as Robert Rauschenberg, Robert Whitman, Gerd Stern, Stan Vanderbeek, and Elaine Summers, to mention a few, have extended this movement in their own work. At Expo 67, Emil Radok's *Diapolyecran* and Josef Sobota's *Polyvision* indicated the potential range of these new multiple projection systems. Recent developments in holographic or lensless photography promise the ultimate in future visual imaging systems.

Given these new tools, what significance can we attach to their use by the artist. In this writer's opinion, the impulse to employ the computer, electronic visual and audio devices, and multiple imaging systems, has risen from both a conscious and unconscious desire on the part of the contemporary mixed media artist to involve the spectator more deeply in the experience of his work. The entire environmental art movement implies this preoccupation. The recent exhibit entitled "Options" at the Chicago Museum of Contemporary Art was spectator activated. Much of the work at the classic exhibit at MOMA entitled "The Machine" suggested the importance of new spectator involvement. It was even more apparent at the E.A.T. Brooklyn Museum Show.

CRT'S AND MULTI-IMAGE DISPLAY

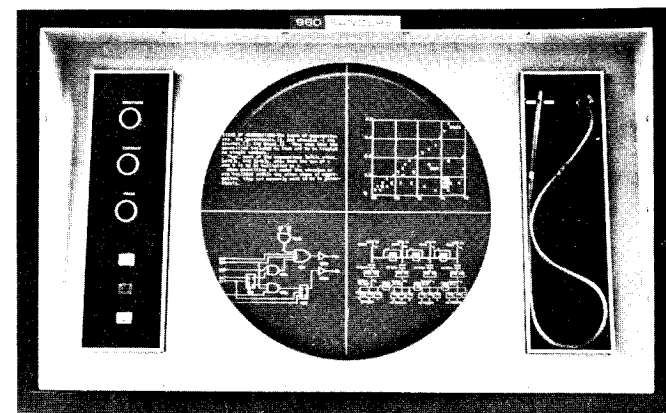
Manufacturers of computer display equipment are starting to realize the value of multiple image display systems. Sanders Associates, Inc. has developed a Cathode-Ray Tube (CRT) output for a computer that can display more than one image at a time. Previously, displays of this kind have been almost impossible because of equipment interfacing and programming difficulties. The Sanders ADDS/900 System has overcome these problems. Comparative display systems can prove to be of great importance in the learning process. For centuries, multiple images have been displayed on blackboards and murals. The CRT system promises to be a significant improvement over older methods of display.

A second impulse for the mixed media artist has been a kind of Futurist impatience with traditional art. In a recent interview with the author, Les Levine indicated a genuine suspicion of what he called "museum art." The tradition of the artifact of residual culture being enshrined in a Neo-Greek temple is an anathema to many mixed media artists.

A third motivation for the mixed media artist is to increase the sensual involvement of the spectator. The recent exhibit at the Museum of Contemporary Crafts in NYC is designed primarily as an environmental tactile experience for the spectator.

Perhaps we can ask, as some critics have indicated, is this movement merely a monstrous dadaesque mockery of Art and a not too subtle put-down of the spectator? Or, does it reflect the beginning of a totally new synthesis of art and science? This writer favors the latter premise. It is always dangerous to prognosticate about the future of any movement in the arts, particularly when a large segment of critical thought hardly accepts this movement as worthy of such a designation in the first place. In essence, the contention here is that the movements toward a continuing synthesis of art and science is already inexorable. The argument in favor of such a conclusion stems from a fundamental prognosis for our culture; our lives have encompassed the revolution from the necessity for functional work in order to survive to the realm of custodial activity so that the society may remain ordered and hence survive. In such a near-future society, the very meaning of human activity will undergo a profound transformation. In its most frightening form, the new society may include an intellectual scientific elite who will govern the benign masses with the active cooperation of the political elite. The function of "work" will be custodial. An alternate scenario more palatable to this writer is that the near-future society will begin to utilize the full potential of each area of human activity. Computer information banks will up-date the scholar minute by minute. The artist and the scientist will emerge as the most creative and significant societal members. With an active inter-action with technology, true collaborative works of science-art will emerge. Perhaps the Museum of the Media will project holographic images of the ancient protagonists of this collaboration admiring their work: Robert Rauschenberg and Billy Kluver will be standing shyly in front of "Oracle." Multichannel sound will record their thoughts for a mildly amused audience. They will see this first-effort with the same whimsy we today watch the experiments of the Wright Brothers, or the early motion pictures of Lumiere. In this future society,

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COMPUTER COMMUNICATIONS BIOLOGICAL COMMUNICATIONS
LIGHT SOUND SOUND LIGHT TACTILE EVOLVING VISUAL
EFFECT ELECTRONIC MEDIA SPEED FIBER OPTICS DIRECTION
MOVEMENT COLOR THEATER RESEARCH LIFE SPIRIT TECHNOLOGY
LOT FAMILY NINE INFORMATION PARTICIPATION ART STASIS
INVOLVEMENT MONEY HARDWARE SOFTWARE MARSHALL FEEDBACK
TURN ON TURN OFF ON OFF LIGHT INFERNAL LIGHT SPACE
INFERNAL LIGHT SPACE MATERIALS SYSTEMS NAKED PROGRAM
CHANGE COOL HIGH EYE EAR HI VOLTAGE EXPERIMENT MAN
EXCHANGE SENSUAL ENERGY LAND CAPITAL BUSINESS STROBE
ALPHA TELEVISION TRANSPARENT EDUCATION EQUIPMENT
DESIGN DREAM TELEPHONE DISCIPLINE FLOURESCENT MAN ON
LEODESICS THOUGHT ENVIRONMENT LANGUAGE POPULAR PLASTIC
SEE COLLECTIVE CONTROL TAPE OPEN AFFECT PSYCHOLOGICAL

INFERNAL LIGHT

THE VISUAL UNSEEN

MR. HARLEY PARKER TAUGHT AT BLACK MOUNTAIN COLLEGE AND ONTARIO COLLEGE OF ART (COLOR AND DESIGN). HE WAS CHIEF DESIGNER FOR ROYAL ONTARIO MUSEUM. LAST YEAR HE WAS A PROFESSOR AT FORDHAM U. WITH MARSHALL McLUHAN. PRESENTLY MR. PARKER IS A RESEARCH ASSISTANT AT THE CENTER FOR CULTURE AND TECHNOLOGY AT THE UNIVERSITY OF TORONTO.

"The effect is the thing that counts, not the sensuous facts"—
Heinrich Wölfflin, *Principles of Art History*

Notes toward a grammar of presentation for museums

The area of testing audience reaction to design solutions in the museum is a relatively untouched field. This is not to suggest that the design solutions in other areas of our life are in much better shape. We simply do not have a grammar of presentation. When a museum hires a designer, it is usually on the assumption that he will add certain elements of good taste to the presentation, even though there is no proof that such an addition is useful in terms of communication. The contemporary awareness of the ways in which the techniques of communication structure audience responses could well be enhanced by the accumulation of scientifically verified data. This would undoubtedly result in an appreciation of museum presentation as a unique art form. As Herbert Bayer says in the preface to *Exhibitions and Displays* by Erberto Carboni: "If we review the plastic arts as mediums of communication we find them, in a traditional sense, limited to certain accepted rules. Experimental thinking has in some instances broken through these barriers but even architecture, often looked upon as the synthesis of all plastic arts, is confined to a more or less rigid framework of principles. In the design of exhibitions, there has evolved during the last thirty years, often springing from architecture, more often though from painting and the graphic arts, a new discipline. The universal application of all available plastic means, more than anything else, makes exhibition design into an intensified and new modern language."

In these notes I intend to discuss various concepts pertinent to the organization of a grammar of presentation. That this cannot be a definitive discussion will become apparent as we begin to survey the multiple implications of the field. My attempt therefore is to find an approach rather than a solution.

Good design is good communication. This statement stresses rejection of the idea that art is a decorative element imposed on the already functioning unit. The very concept of the decorative as it existed up to the end of the nineteenth century is a misapprehension based on the visual, literary—the lineal storytelling concept of the Renaissance. It was at this time that the dualism between Fine and Applied Art was born. The considerably less fragmented Middle Ages has little tendency to create differences where none existed, at least in the sister arts of book illustration and decoration, for as David Bland points out in a *History of Book Illustration*: "In the medieval mind, however, it may be doubted whether there was any distinction between the two." However, as the Middle Ages died, the inevitable differences exposed under the specialist bias of the Renaissance was, of course, interpreted solely in Renaissance terms. The decorative, the two-dimensional, was relegated to a role of relative non-communication solely because its data about the world did not correspond to visual reality. That this dichotomy between the world as it is known synesthetically and as it is understood visually, did exist, is proven by the fact that we still stress this split in our traditionally organized art schools where painting and design are carried on with little or no liaison between them. The contemporary art schools, in too many instances, still do not understand that the trend of the twentieth century is away from the eye in isolation and toward a unification of sensibilities with a concomitant stress

upon the communicative abilities of the formal or structural factors of art.

It is important to note that we must always examine any *a priori* concepts which we bring to design problems so as to recognize when they are merely our cultural appliques—habitual responses to badly understood problems. That so many people today regard the designer as the man who ties the ribbons on the already packaged gift is due to the fragmentation of a unified artistic understanding, generated by print technology, and the application of this fragmented point of view in so many of our industries where the "stylists" decorate the designs of the engineers. An architect recently told me that there is a very strong feeling abroad in his profession that there is a necessity for a much closer liaison between architects and engineers. In fact, he went so far as to say that we should stop producing architects and engineers and start to produce "Master Builders"—a remark startlingly evocative of the Middle Ages.

In design for scientific purposes the above dichotomy does not exist. Can it be that the reason for the successful use of designers is that some of the techniques of science rub off on them? The designer in such a situation is forced to add to his artistic and intuitive grasp that understanding which is based on proven empirical data. While the essence of science is the repeatable experiment, in most areas of design there is insufficient data available for the designer to predict success or failure. It would seem that the sooner we arrive at measurable data for design and planning, the sooner we will be able to use designers intelligently for the creation of environments which are conducive to the proper development of man. I hasten to forestall the objection that design cannot be wholly dependent upon measurable data by pointing out that no artist has ever been limited by a knowledge of the efficacy of his approach or his tools. Furthermore, the designer will never be in a position of having sufficient data. His every insight will merely open up new horizons, the understanding of which will demand more data. There will always be the need for the intuitive grasp.

I believe that one of the primary errors made in the course of the formulation of exhibition design is to consider that communication via the printed word takes precedence over that engendered by the design of the presentation. Or, to put it in another way, the design elements are merely expected to fortify the verbal exposition. Today, both written exposition, with its essentially linear structure, and contemporary design, which is essentially nuclear in structure, must work together. It can be expected that each will modify the other. For example, in a design format where the all-at-onceness of tribal organization was stressed one would expect to see this idea recognized, not only in terms of label content, but in the very syntax of the copy. It is only by such a tight inter-meshing of the disciplines that we can hope to communicate successfully.

In the museum world the failure to arrive at a working relationship between the designer and the scholar often results in the latter taking over the designer's role. The scholar feels that he must control the design in order to prevent its modifying what he wishes to say. All too often he backs himself into the corner of mediocrity and, at best, good taste. With the scholar's training in lineal exposition he tends to impose this mode upon the organization. He does this even though it is quite evident to anyone who appreciates contemporary art that non-verbal modes of exposition today depend on immediate all-inclusive involvement of the senses of the audience rather than on the lineal repetitive mode which tends to put the audience in a very passive role.

NOTE: THIS IS THE FIRST PART OF A THREE-PART SERIALIZATION OF AN ARTICLE ON MUSEUM PRESENTATION. PREPRINTED FROM *EXPLORATIONS*, A PUBLICATION OF THE GRADUATE SCHOOL OF THE UNIVERSITY OF TORONTO.

Theater of Light and Mixed Media

Opera is mixed media. There is good opera and bad opera. Mixing more media doesn't make for better opera. Only more confusion, less relevance, less substance. A great opera director selects from a wide variety of elements and finds new meaning in their successful fusion.

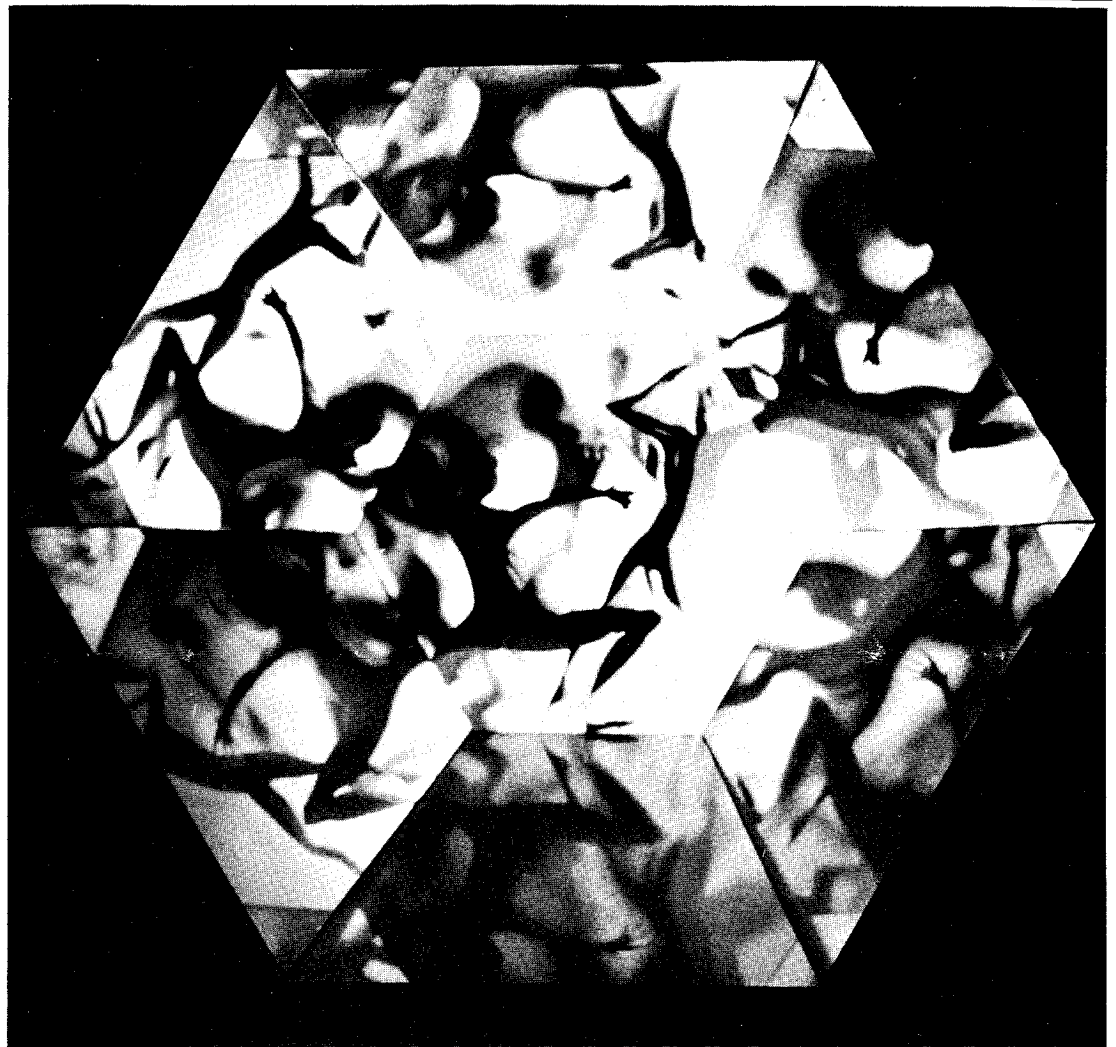
Mixed media is plugging in different kinds of projectors . . . sometimes as many as the fuse box will hold. By itself, "mixed media" is a display at Willoughby's. As a palette of varied light sources it can be used for works of substance or superficial bombardment. The terms "mixed-media," "intermedia," and "media-mix" imply only an acceptance of simultaneous imagery.

Random montages from computerized banks of slide projectors as art would be like soldering bronze to canvas stretchers and hoping for the best. Art begins with ideas, concepts. If an idea calls for ten simultaneous images of a girl's smile, then the more controlled the synchronization, the better the result. If the idea begins with the number of available projectors, the result can be no more than an almanac of meaningless information used in a speed reading course.

Jackie and I are very involved at the moment in our Theater of Light. It is a laboratory for the building of ideas, a repertoire of light works. The compositions are explorations, questions. They are concerned with light as a medium unto itself . . . light as the clay, the pigment, the matter to be shaped and formed. A theme is conceived, a system of notation is arrived at, performance is rehearsed, timing becomes more precise, chance is all but eliminated, interpretation gains freedom within a visual score and the concept is more fully developed and evolved.

"Mixed media" can sell soap, give more frenzy to a dance floor, hype a rock group, be a backdrop for traditional theater as "avant-garde," give more commercial appeal to a dance group, turn a fox-trot palace into an "environment" or do any number of things. A lot depends on whether the ideas were conceived by an artist or by a technician. There is a difference. Nine different brands of oil paint never make a painter an artist. Pollock mixed his media and knew what he was doing. A lot of people dripped paint after him but all they got were dirty floors.

Having new means available doesn't mean using them all at the same time. If Canal Street is the grooviest art store in town, a lot will depend on whether people buy what they need for a specific project or whether they arrive back at their studios with things that look good but have no real use for their work.



JACKIE CASSEN AND RUDI STERN ARE LEADING ARTISTS IN LIGHT ENVIRONMENTS AND SCULPTURES. THE PAIR HAS EXHIBITED IN MANY MUSEUMS, AND FOR CONCERTS, TELEVISION PROGRAMS, THEATER, OPERA, BALLET, AND ENVIRONMENTS BOTH HERE AND ABROAD.

PULSA BOSTON DEMONSTRATION REPORT, OCTOBER 8 TO 27, 1968

The intention of the Pulsa Boston show was to present an experimental demonstration of public environmental art on a large scale to an urban population. In downtown Boston's Public Garden, fifty-five xenon strobes were placed underwater in the four-acre pond, and fifty-five poly-planar speakers were placed above water around the pond's perimeter. These output devices were programmed differently each night using elements of analog and digital computers, a punch-paper tape reader, a signal synthesizer, and magnetic tape.

The Pulsa environment was specifically designed to provide a situation of organized light and sound activity. A city such as Boston consists of a vast complex of energized, moving phenomena contained in a static grid of routes and structures. At night in particular, the fixed nature of the environment, its monolithic buildings and rigid roadways, both illuminated almost entirely by unchanging point-source lighting, contrast sharply with the ceaseless flow of lights and sounds through the city. "T.V., films, the complex interplay of urban sounds and lights, and experiences such as driving on highways at night through darting streams of automobile headlights, have involved our culture in areas of new perception. The Boston show, literally consisting of high-speed pattern change, multiplexing, and audio-visual non-synchrony makes meaningful and pleasurable these experiences which are constantly present in our daily lives" (Pulsa Press Release). The purpose of the Pulsa environment was to integrate new tech-

nological activities which characterize the functioning of the city with the city's physical structure.

As an experiment in this new area of urban environment, the Pulsa show was a marked success. Running for twenty consecutive nights, the show was viewed at length by thousands of the city's inhabitants, most of whom came without interruption of their daily activities en route through the park and paused to examine the unique phenomena displayed there. The interviews conducted by a Signs/Lights analyst indicate the nature of their personal responses. More important, however, than their feelings about what they saw and heard is the fact that they were exposed to a new kind of experience which has opened up a new expectation from their surroundings.

For both ourselves and Signs/Lights the Pulsa demonstration was a meaningful learning experience. Each of the twenty different programs was evolved from conclusions reached during the previous night's presentation. Extending this exploration beyond the framework of the Boston show, we are now examining other deployments of the materials from Boston in a non-urban winter landscape in association with new programming concepts and techniques.

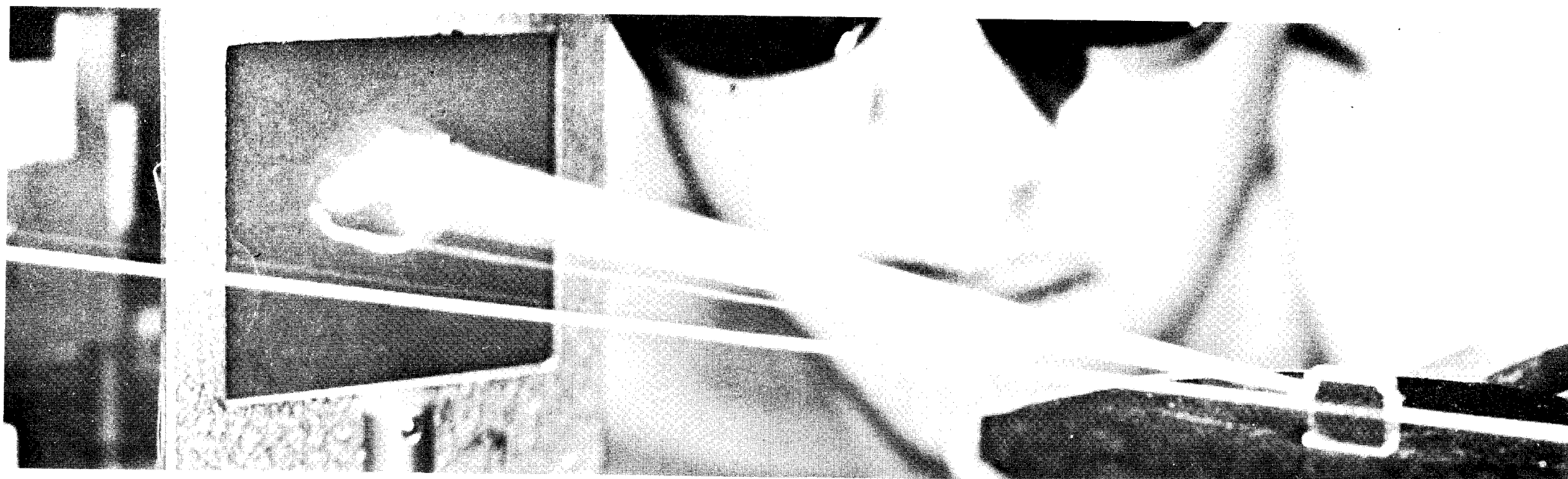
Aside from experimental purposes the Boston show was the first public art work to embody an installation scale and systems approach that reflect and relate the kind of scale and systems that are beginning to appear in cities today. The success of the demonstration lay in Pulsa's conviction that public art must treat all parameters of the urban and technological environment as potential media for artistic expression in order to introduce these concepts on a large

scale into the cities of the future.

Pursuing further the ideas which led to the Boston show, we are interested in designing and programming new kinds of non-static urban lighting and sound. This intent pertains not just to aesthetics but also to orientation through illumination, organized sound, information display, and other means. We want to collaborate with architects, park designers, highway engineers and city planners. The entire human environment is increasingly in the hands of these individuals, and it is therefore critical that they be supplied with ideas based on research into the aesthetic effects of perceptible energy within specific environments.

Our notion of collaboration with planners of new environments would involve a systemic approach to the total entity being designed. Our intention would be to program the various sub-systems which comprise the vital skeleton of the designed entity in such a way as to emphasize its non-static, interactive nature. Traditionally, architects have provided reliquaries within completed designs for imposition of totalitarian objects by artists. A new attitude can only be effectively realized by a totally new collaboration entailing interactive exchange between groups of designers and artists from the first stages of planning. We hope to evolve new forms of living experience which are based on the knowledge that the structures within which man functions should not be fortresses which exclude the external world, that in fact they are the interacting systems through which his life is made possible. These new environmental systems would focus awareness both within and outside the actual structures by utilizing information from natural forces of the

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J. T. La Macchia of Bell Telephone Laboratories reconstructs a holographic image stored in a lithium niobate crystal.

UP TO 1,000 HOLOGRAMS CAN BE STORED IN ONE CRYSTAL

A crystal, smaller than a lump of sugar, can store as many as 1,000 different holograms, scientists at Bell Telephone Laboratories have discovered.

Holograms—photographic records made through a form of lensless photography—are generally known for their ability to reproduce 3-D images. But an equally important potential use of holograms derives from their capacity to store enormous amounts of information.

The single crystal used as a new holographic material—lithium niobate—shows promise for temporarily storing as much as 1,000 times more digital or pictorial information than conventional holographic materials. Such an "optical memory," from which desired information could easily be retrieved or erased, is of great interest for possible switching applications in the Bell System network. In the Bell Labs experiments, a single, cubical crystal of lithium niobate is placed on a rotatable platform. Functioning as an ordinary holographic plate, the crystal re-

records the complex interference patterns of light waves as one laser beam is split into two parts, one of which shines through a transparency of the object or page being stored (object beam) and strikes the crystal. After a hologram is formed through the one-centimeter thickness of the crystal in one direction, the crystal is rotated a fraction of a degree for each new hologram to be stored.

A lithium niobate crystal can store holograms because a suitably intense laser beam can free enough electrons in the crystal to set up an internal electric field. This field causes a change in the refractive index of the crystal—a change in the speed at which light travels in the crystal as compared to its speed in a vacuum.

Because this refractive index change varies with the intensity of the laser light hitting the crystal, the crystal can record intensity variations of a reference beam interfering with an object beam in much the way that an ordinary holographic plate does. The difference is that a holo-

graphic plate records this interference pattern as permanent changes in its transmission properties. These changes are produced by chemical changes in the light-sensitive silver compound on its surface.

With lithium niobate, the interference pattern is recorded as semipermanent changes—capable of being erased by heat—in the index of refraction through the thickness of the crystal. Holograms stored in a lithium niobate crystal can be erased simply by heating the crystal to 170 degrees C.

The same crystal can then be used again and again for storing new holograms.

THE WORK ON THE NEW HOLOGRAPHIC MATERIAL BY BELL LABS RESEARCHERS J. T. LAMACCHIA, F. S. CHEN, AND D. B. FRASER IS DESCRIBED IN THE CURRENT ISSUE OF *APPLIED PHYSICS LETTERS*.

TECHNICAL NEWS

Tactile Communication Through Low Frequency Sound

Sounds of the sub-sonic region (less than 50 cycles per sec.) have been used to create certain emotional states of consciousness in music for thousands of years. One can actually distinguish sub-sonic sounds of sufficient intensity by transmission through the skin. We have all experienced feeling low frequency sounds. Sometimes the clothing vibrates in sympathetic vibrations with low frequency sounds. Sub-sonic sounds are felt through the feet especially if the floor vibrates efficiently. Solids are also a better transmitter of low frequency sound than gasses are. Intensity plays a primary role in human receptivity of sounds. One hundred decibels seems to be the lowest limit of intensity for feeling sound. Drums, organs, and speakers all produce low frequency sounds. Unfortunately, it is difficult to produce high intensity sounds without very large resonant chambers.

"Smell ads" have been created by the 3M Co. One side of a full-color page in *Advertising Age* showed

a jar of pickles and a basket of ripe oranges. Pasted to each ad was a small piece of paper tape that said "Scratch this pickle . . . then sniff!" Scratching the surfaces yielded "Microfragrances" which smelled like the products pictured. The 3M Co. said "this is a whole new concept in printed advertising. It involves millions of microscopic capsules of "the true fragrance." it brings the reader "one step closer to the buying decision."

Mercury Can Create Amoeba-Like Forms

Place: Mercury (20–50 grams) in a watch glass
Cover: with 30 ml. of water
Add: 4 drops of sulfuric acid
Place: iron nail in the solution touching the mercury

The Mercury will dart back and forth for 30 minutes.

The shapes formed by the mercury create interesting patterns which can be projected on an overhead-type projector.

Scientific American Nov. 1968 page 149.

360 HOLOGRAM

See the three dimensional display at the General

Motors Building at 59th Street and Fifth Avenue. The display consists of four separate holograms of a stage coach and an automobile. The viewer can walk around the display and see the subjects from all sides.

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instantaneous visual, audio, and pseudo-physiological communication will enable a hopefully enlightened mass culture to experience, in a total environmental synthesis, the meaning and import of the science-art experience. As for the proponents of the science-art syndrome, the near-future will undoubtedly lead to an extremely high level of functional cooperation between the artist and the scientist.

NOTE: THE AUTHOR IS ANXIOUS TO HAVE ANY MATERIAL FROM INTERMEDIA OR MIXED MEDIA ARTISTS AND SCIENTISTS. IF YOU HAVE PHOTOGRAPHS, SCHEMATIC DIAGRAMS, DESCRIPTIVE LITERATURE, OR OTHER INFORMATION ON THIS MOVEMENT, PLEASE SEND IT TO THE ADDRESS LISTED ABOVE. HE WILL INCLUDE A LISTING OF ALL SUCH MATERIAL IN THE APPENDIX OF HIS FORTHCOMING BOOK, *ART, TECHNOLOGY, AND VISUAL ILLUSION*, AND REFER TO SELECTED ITEMS IN THE BODY TEXT.

MUSEUM CRITIQUE

MET OPENS CONTROVERSIAL "HARLEM ON MY MIND"

The Metropolitan Museum of Art, in association with the New York State Council of the Arts, opened a massive display on Harlem. Tracing the growth of the community from the turn of century to the present, the exhibit guides the viewer through the cultural history of Harlem in chronological order by means of photographs, slides, closed-circuit television, and audio-recording, including some photographic murals as long as fifteen feet. ■ As the viewer enters the exhibit, he is confronted with a large screen that graphically announces, through two slide projectors on a dissolve control, that "Harlem is the Cultural Capital of Black America." The visitor proceeds through a maze of a dozen rooms of mounted photographs that display Harlem, its inhabitants, its streets, and its culture. In several photomontage rooms, slide projectors flash on to one-way overhead screens. The exhibit also contains two rooms with slide projectors and sound. The first has eight screens with flashing projectors that circumnavigate the room with information about Harlem's culture and music. The second room is a portrait gallery of contemporary community leaders. ■ The Metropolitan succeeds in moving its visitors through the architectural space and in exposing them to a vast selection of material. However, the exhibit fails to create a space or environment that captures the essence of Harlem. The visitors are often detached from the visual exhibit because they observe the culture from the outside instead of experiencing it from within. The absence of color photographs removes Harlem from a colorful, vibrant community to a cold black, white, and grey study. The exhibit also creates an aesthetic distance between the viewer and the content through a lack of spontaneity or humor. ■ The New York State Council of the Arts should be complimented on their continuing effort to make the museums in this state contemporary. This should be the beginning, not the end, of the use of multi-media techniques in museums. Although the display techniques in this show are crude and inflexible, they demonstrate that contemporary means of communication can make visual exhibits more relevant and immediate. ■ Two important lessons can be learned from this exhibit. Museums should not invade communities, societies, or cultures. They should receive as much assistance as possible from the subject they are investigating. This will increase objectivity and avoid some of the unfortunate controversy which victimized the Metropolitan. The second lesson is a technical one. Mixed-media should be employed as a communication technique, not only as an adjunct or display technique. The Metropolitan exhibit was a visual display, not an environment. Slide projectors and sound served to create only two-dimensional space. The chronological ordering seemed to structure and categorize Harlem instead of making it a living, organic element. Mixed-media exhibits should be composed with both the techniques and its effects in mind.

PRIMITIVE ART EXHIBITED

The forms of audio-visual display—moving and still slide projection and integrated sound—as utilized in the installation of *Religious Art of the Upper Sepik River, New Guinea* at New York's Museum of Primitive Art are rightly subordinated to enhancing the visitor's experience of the art. The success of this show reflects the intelligent use of complex mechanical design and electronic systems. ■ The exhibit, which runs through May 11, includes about eighty ceremonial masks, instruments, sculpture, and recordings of native ceremonies. The rituals of initiation, head-hunting, and yam-harvesting are arranged in separate rooms with a corresponding sound tape of the actual ceremony. The art

objects were collected and organized by Douglas Newton, Curator of the Museum of Primitive Art. Arthur Dunkelman, who programmed the show, has previously collaborated with kinetic artist Len Lye and has worked at the Electric Circus. ■ In this exhibit, the viewer does not separate the primitive art content from the form it takes as an environment. It is important, therefore, to distinguish the contributions that different media make in terms of the overall unity of this show. The atmosphere of a native yam-harvesting, for instance, is effectively recreated by an awareness of the specific forms of music plus a display of the instruments recorded and the appropriate sculpture through visual projection of their images and an audio output of their sounds. ■ In the final exhibition gallery, Mr. Dunkelman has created a jungle environment out of modern materials and technology. The entire space of this square room is filled with hanging metal wires and reflective plastic strips. As the spectator enters, he activates a slide and sound program. Scenes in the life of natives are projected through wires and plastic on to the white walls from a central floor to ceiling instrument cylinder. ■ The sound in this final gallery is a six-track stereo composition by Eric Siday: two tracks of foreground music and two tracks of background music with inaudible commands from an R. A. Moog Sequencer. These commands provide for the slide changes. This synthetic music is analogous in tempo and suggestiveness to the primitive rhythms heard in other galleries. The tactile experience of walking in this room bears a direct relationship to walking through the total growth of a jungle. ■ The high degree to which these control techniques make the art material more appreciable to the audience is due to the fact that outside, in the streets of New York, the same techniques are constantly restructuring our perceptions by means of advertising and related visual and kinesthetic phenomena. The technology behind the intrusive visual world of 42nd Street has here been reconditioned and reoriented into an environment conducive to our private experience of the art object. This is not art seen in terms of electronic systems, but electronic systems used as direct channels for our moving towards a larger response to the art of a primitive culture.

THE "FEEL IT" SHOW

The Museum of Contemporary Crafts has made an important attempt to stimulate different combinations of senses which have become increasingly fragmented in the course of Western civilization. The "Feel It" show was conceived and put together by two Swedish architects, Gustaf Clason and Eric Sorling with the help of the Swedish Institute. ■ To experience the exhibit the visitor must interact totally with his environment rather than stand restrained and respectful, letting his eyes and head do all the work. He must enter a medium of thin, transparent Polyetenstrips which hang from the ceiling in a mass dense enough to impair his vision to the point where he must reach out to guide himself, but light enough to allow him free movement throughout the environment. ■ It is as if once our conventional means of orienting ourselves in space (that is by focusing on the limits of the space and the objects contained within it) are rendered meaningless by an environment where those limits are obscured and where there is no empty space as we understand it, dormant ways of perceiving come into play. The element of surprise is restored. One perceives an object only as one approaches it, or even bumps into it. And one must walk all the way around it, touching it, before the impact of its whole presence becomes clear. ■ At the "Feel It" show the visitors, the art objects and the environment merge into an organic whole where differentiation coincides with experience rather than preceding it.

MUSEUM NEWS

The Museum of Modern Art displayed, on February 5, an exhibit on "Optical Effects in Film." The purpose of the show was to demonstrate the "creative abilities and inventiveness of the craftsmen in the optical field." A wide range of visual material from television, movies, commercials, and displays was exhibited.

Perhaps the most striking aspect of this exhibit was the condensation of the Expo '67 multiscreen presentation on to a single screen. One of the notable displays was "Control," a film by Animated Productions, which demonstrated the great range of the New Oxberry Special Effects Printer. "Pas de Deux," an experimental film by Norman McLaren, displayed a strobe effect to accomplish multiple exposures with staggered synchronized points. The informative show displayed many optical effects including wipes, overlays, matting, split images, and photomontage.

The Los Angeles County Museum of Art has initiated a program in which artists will work on projects of their own choice with funds, materials, and technical advice provided by America's largest industries. Claes Oldenburg is paired with Walt Disney Productions; light artist James Turrell will collaborate with Life Sciences Division; Robert Rauschenberg will be working with Teledyne, Inc.; Larry Bell will work with the Rand Corporation. Over twenty artists and industries are expected to participate in the program.

The Studio Museum in Harlem is presenting an exhibit of Afro-Haitian art. The show was organized by Leon Chalom. It includes music taped at Haitian ceremonies and slides depicting various aspects of the island's culture.

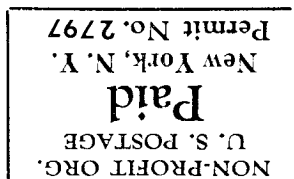
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external world such as atmospheric and planetary occurrences on a day to day and seasonal basis. This information would be dynamically related to the functioning of systems for light, sound, water, heat, traffic flow, communication, maintenance, information, entertainment, art, associated electronics, etc. through computer technology.

Recent progress in computer hardware and programming indicates that during the next ten years artificial intelligence in the form of computer subsystems will become an integral part of buildings, highways, cities, schools, and even homes. The first task of such intelligent sub-systems will be the regulation of such mundane functions as traffic, heat, light, plumbing and food. These activities will be controlled initially by simple fixed programming techniques modified by human intervention in response to changes in larger environmental contexts, and in uses of living and working spaces. As intelligent sub-systems become more sensitive to larger environmental contexts, and the deeper subtleties of human needs, that is, as they become more intelligent, they will begin a dialogue with the natural and human environments within which they function. Living and working spaces will then become organic entities that will change as humans and the natural environment evolve. Artists will be involved in the conception of such living and working spaces by making the systematic intelligent behavior of such environments abstractly manifest to people interacting with them. This integration of systems underlying the human environment would imply not only new kinds of aesthetic involvement with the new intelligent architecture, highways, and cities, but also a new unification and knowingness for human existence.

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Museum of the Media

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projectors and 35mm motion picture equipment. The museum is presently constructing a thirteen foot manual control console which will switch 600 amperes of power. The console is designed to manually control the projector's focus, illumination, advance and reverse functions for individual and groups of projectors. Eventually this control system will be automated by a digital type computer (see diagram 4). With this facility the museum will edit, synchronize, modify and coordinate the visual material into a form which can be accepted into the Modular Museum format.

There are certain interesting advantages to this modular environmental exhibition technique. One: an entire educational center can be readily and economically produced. Two: the non-verbal nature of the exhibits permits an international distribution of educational programs. Three: for the first time, culturally and economically underprivileged communities can support their own cultural center.

Because of the versatility of environmental media techniques, the museum plans a wide range of exhibits. The first exhibit will be a comparative anatomical description of the human head. Other exhibits planned include a study of the Amazon River Basin, color, and insects.

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EQUIPMENT NEEDED (GIFT OR LOAN—Contact Ron Globus, Director)

PDP-8L Digital computer	1—one inch Buhl lens
PDP-8L Multiplexer	slide copier
3—35mm movie projectors	Movieola
4—two inch Buhl Lenses	8 Ektagraph slide projectors

SERVICES NEEDED BY THE MUSEUM

Audio engineer needed to supervise the Museum's Audio Media Department
Models—all ages for human head exhibit. Contact Stanley Shaffer, Director of Photography
Photo developing service. Contact Stanley Shaffer, Director of Photography
Librarian—to supervise Museum library. Contact Ron Globus, Director
Writer—to become a Staff Editor of our magazine, *Medion*. Contact Ron Globus, Director

MONIES NEEDED FOR SPECIFIC APPROPRIATIONS

\$2,000 for control panel	\$350 for three Pola-Coat screens
\$300 for two projector racks	\$300 for a slide storage rack

All donations to the Museum of the Media are tax deductible