

The New York Times

ARTS AND LEISURE

Sunday, May 11, 1975

Holograms: They Seem to Float in Air

PEGGY SEALFON

Though holography—practically a stepchild of photography—is still considered to be in its infancy, it has already shown very definite indications that its growth may well reach gargantuan proportions in the not-too-distant future. Until recently, holography had unfortunately been confined to scientific laboratories because of the need for expensive, specialized equipment, but startling new breakthroughs in the making and viewing of holograms have finally made it possible to bring these mystifying three-dimensional creations out into public view. In fact, not only are there several places around New York City currently displaying holograms, but there is even a school where interested individuals can actually learn how to make their own holograms.

A hologram is a completely three-dimensional picture of a subject recorded photographically. Viewing a hologram, however, is a very different experience than viewing a photograph. If you look at an 8x10 photograph from a distance of say, 20 feet, you can still determine that there is a two-dimensional image to be seen (even though you may not be able to make out exactly what that image is). Not so with a hologram. From 20 feet away, an 8x10 hologram looks like nothing more than a blank sheet of clear plastic.

It isn't until one moves closer to the normal viewing distance of two to three feet that one sees an image on this sheet of plastic (it is actually a sheet of processed photographic film which contains the image). But, unlike a conventional photograph,

this image is remarkably rendered in an ethereal, truly three-dimensional form that seems to be projected out in space, either in front of or in back of the emulsion.

Stranger yet, as one moves to the right or left of this almost ghostly floating image, another view of the subject is revealed just as if one were moving around the real subject. For instance, in looking at a hologram of a magnifying glass held in front of a globe, the viewer is actually able to use the magnifying glass so that by moving his head to view the image from varied angles he can actually see different portions of the globe magnified under the glass.

Though it may seem like the work of an eerie supernatural force, holography is a phenomena that can be explained by understanding the nature of light. Technically, a hologram is made by illuminating a subject with a special type of light source, called a coherent light (this is a monochromatic light in a single wavelength in which all waves also are "in step with one another"). The source of coherent light is a laser beam, and by using mirrors and a beam splitter the light is then split into a reference beam and an object beam.

The reference beam is directed onto a photographic film and the object beam is reflected off the subject onto the same film. Where the two beams meet or overlap, a light interference pattern is formed and it is this that is recorded on that photographic film. When the film is processed and a beam of coherent light is passed through the film, a totally

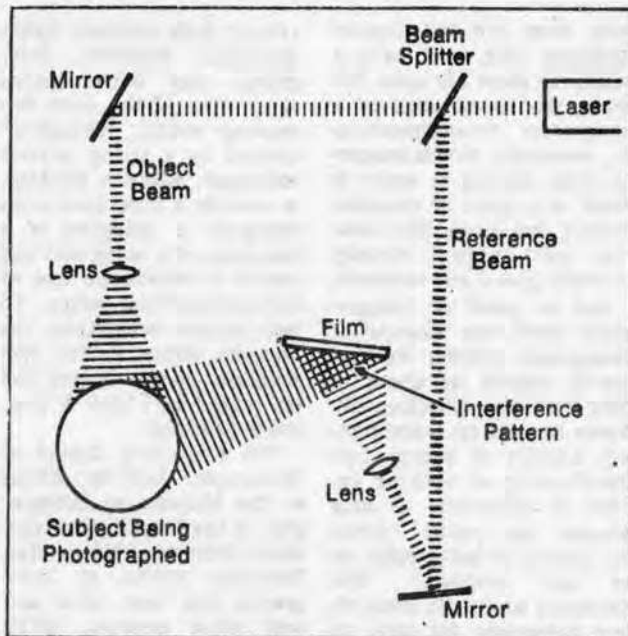


Diagram shows how a hologram is made.

three-dimensional reconstruction of the original subject occurs.

The technique for holography was originally conceived by British scientist Dennis Gabor in 1948, but because the necessary coherent light source was unavailable in abundance at that time, holography underwent an incubation period until 1960 when the laser was developed. Today, just 15 years later, though a laser is still necessary to make a hologram, there are now several types of holograms that do not require a laser for viewing them: these can be seen by properly directing an ordinary incandescent light onto their surfaces from the proper angle.

Suddenly, incredible new applications for holography are being realized . . . and pursued. Stress analysis to

determine structural flaws in material and an efficient data storage system (which may outdate traditional microfilm) are just two possible uses. In addition, mass production methods may eventually put holograms into the hands of the consumer in the form of album or magazine covers, as labels printed right into the plastic on shrink-wrapped packages or stamped right into a record. Ecologically, this could mean tremendous savings of dwindling resources like papers and vinyls, since the need for separate labels or wrappers would be minimized.

Considering these ever-increasing capabilities, it seems hard to deny holography's potential. Yet, some people may dismiss the entire notion of holography as some sort of passing fad that, like the

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hula hoop and the Captain Midnight ring, will have a relatively short life span. For them, the simple idea of a completely three-dimensional, seemingly phantasmagoric, form lurking in space in front of a piece of emulsion sounds too much like some "far out" magical trickery to really give it any credence.

But as proof of holography's merit, the Museum of Holography (MOH) has recently opened its doors in New York City. Director Jody Burns has put an extraordinary amount of energy into coordinating an exciting exhibit of holograms to help educate the public "about the nature of holography as an art medium." The museum's bookstore even offers holograms for sale, as well as pertinent literature. (The ever-expanding Witkin Gallery—one of New York's oldest photography showcases—has recently exhibited a hologram from the museum's collection.)

The MOH, located on the second floor of a loft building at 120 West 20th Street, has a calm, mellow atmosphere. On a typical Saturday it attracts a steady flow of people, young and old, who quizzically examine the exhibit and react with surprise, awe and fascination. They tilt their heads, bend their knees or rise up on their toes to explore each hologram from every vantage point. Some incredulous viewers even wander behind the free-standing holograms—expecting, perhaps, to find a plastic cube housing the image—and are stunned to find only thin air.

The display includes transmission holograms (requiring laser illumination), reflection holograms (which can be

viewed with ordinary light), multiplex (motion) holograms, and other special types. One of the most fascinating works, "Thoughts," created by a young physics instructor, Kenneth Dunkley, is actually a third generation hologram (a hologram of a hologram) and shows a remarkable use of three-dimensional space. To help explain holography, the museum offers a free film program on the subject and on lasers at 1 and 3 P.M. every Saturday.

The New York School of Holography has its offices at the Museum of Holography. It has been in operation since October, 1973 (a San Francisco School of Holography has been alive and well since October, 1971), and has already educated some 300 students in making holograms and constructing inexpensive holographic studios. Affiliated with the International Center for Photography and the School of Visual Arts, the NYSOH has an impressive curriculum of basic and advanced courses as well as an apprenticeship program, designed for individuals who show special talents. Courses assume no technical knowledge or previous experience of any kind and emphasize "hands on" experience. A beginning student can expect to personally create five or six holograms of his/her own composition. The course book, "Practical Holography," by Chris Outwater and Eric van Hamersveld tells how to construct a studio, how to build your own equipment and how to make several different types of holograms. (The book is available from MOH for \$10.)

The setup for making a hologram requires a laser

light (obtainable for as little as \$100) and an absolutely vibration-free table — which can be a simple, but functional and inexpensive, sand-box type similar to the one the New York School of Holography uses. The NYSOH's "optical" table consists of a sand-filled plywood tray or box that rests on top of cinder blocks. The laser beam, beam-splitter, mirrors and subject, which must all be precisely aligned, rest on plastic cylinders that can be easily positioned (and repositioned) by being pressed into the sand. The process uses currently available black-and-white photographic film and processing chemistry.

According to the NYSOH's enthusiastic associate director Abe Rezny, "Holography is probably the greatest invention in photography since the invention of photography itself." For the photographer, Rezny believes that holography offers a good sense of discipline. The ideas for each hologram must be fully thought out before execution and a graphically oriented individual is forced to expand his perception to deal with a totally new concept of space.

As of now it certainly is not quite as easy for an amateur holographer to assemble a portable studio as it is for a photographer to turn his/her kitchen or bathroom into an instant darkroom, but at least the tools for holography are finally within reach, and the original prohibitive expense has been greatly diminished. Naturally, as the medium becomes more and more viable, artists are finding an irresistible attraction to experiment with its rich, untapped resources as a stimulating and innovative

vehicle of expression.

Salvatore Dali, having made a three-dimension portrait (multiplex hologram) of the strangely spectacular rock star Alice Cooper, is, perhaps, the first internationally known artist to make use of the holographic medium. As a result of Dali's involvement and his influence in the art world, the Knoedler Gallery (21 East 70th Street), an old, established and well-reputed art gallery, has become extremely interested in holography. In fact, the Knoedler is in the process of taking an enormous pioneering step into the realm of the third dimension by presenting an entire exhibit of holograms that is scheduled to open in May.

Most of the holograms this writer has viewed thus far have projected the three-dimension image behind the film viewing plane on the side away from the viewer. Not so with several of the holographic images which will be at the Knoedler. These protrude, almost threateningly, from the film surface into the exhibit room. One in particular, a frightfully realistic image of a woman's delicate hand offering a diamond ring and bracelet, hovers like an eerie disembodied spirit. I later discovered that this hologram had originally been created in 1972 as a commercial display suspended above Cartier's on Fifth Avenue and allegedly provoked one passerby to assail it with her umbrella and declare it to be the "devil's work." The extremely mind-boggling Knoedler exhibit officially opens on May 12 with a champagne gala evening sponsored by UNICEF (tickets \$25 each).

Newsday

in review/□□

NEWSDAY, FRIDAY, JULY 11, 1975

PHOTOGRAPHY

A stirring dimension

By Martin Levine

An exciting and, I suspect, historically important show has just opened at the International Center of Photography, at Fifth Avenue and 94th Street in Manhattan. It is called "Holography '75: The First Decade," and it constitutes the largest gathering ever of these uncanny three-dimensional photographs and film loops.

Esthetically, "Holography '75" hardly counts. Educationally, too, it's disappointing, although explanatory films and lectures are promised. What the show does best is simply stir the imagination, and it does that so well that it should give the technique an important boost. By the end of its second decade, holography is clearly going to be a major force in art, science and amusement. My feeling is that in 1985 people will also brag of having seen this exhibition, which runs until September.

Holography was invented in 1947 by Dennis Gabor, an emigre Hungarian scientist working in England. In 1971 Gabor received a belated Nobel Prize for his work. But it was not until the early '60s, when Emmett Leith and Juris Upatnieks of the University of Michigan introduced laser light and other refinements, that the modern hologram was born. The "decade" mentioned in the show's title is an approximation of the time that the technique has been available to the public.

"Holography" comes from the Greek for "writing" and "whole"—the latter being relevant because every part of a hologram stores a complete image; if part is destroyed, the entire picture dims, instead of a specific detail disappearing. The simplest holograms are made by recording on a photographic transparency the interference pattern between a beam of light of one wavelength that has bounced off an object and a similar beam that hasn't. When light of the same wavelength is shone through this slide, a 3-D image reconstructs

itself in front of, or behind, the plane of the film. From the right distance, and within certain angles, you can peer around the objects in the hologram.

That, however, is just the beginning. There are now holograms that you can view by ordinary incandescent light; 360-degree holograms, displayed inside a transparent plastic cylinder, that permit you to see all sides of an object; even 360-degree holograms that move. The problems of obtaining true color and images large enough for a theater, have been theoretically, though not practically, solved. Research continues on holograms for television and the printed page.

For more about the subject, contact the Museum of Holography (120 W. 20th St. [212] 929-0121). It and affiliated institutions can give you courses, sell you equipment or holograph your child's birthday party.

At the ICP show, photography center which the museum organized and cosponsors, only one exhibit suggests holography's practical uses—a gamma-ray hologram of a brain. All the other choices were made on historic or pictorial grounds. Gabor smiles from behind his desk with an eerie greenish glow. Nearby stands the first 3-D hologram, of a Chinese ceramic horse. (Its maker, Tong Jeong of Lake Forest College in Illinois, showed it off at a press preview with appropriately magicianly gestures, and promised that anyone could make the same sort of thing with only "a small laser, an olive jar and a strip of film." Jeong, incidentally, also made possible the Trimline telephone.)

Artists' holograms so far are basically novelties and experiments—like early work in photography, whose development is being closely paralleled. The 3-D movies of the Californian Lloyd Cross, however, have an attractive brashness. Cross' "Kiss" is like a luxury version of those postcards you can buy that show a geisha winking. And, to a small section of holoporn, Cross has contributed a short called "Pam and Helen." It's clear why it was "very popular" at the last Cannes Film Festival.

A Guide to Holography, The Grand Illusion

What Is Holography?

Holography is the art of capturing on film *all* the visual information available from an object. In other words, a hologram contains an accurately three-dimensional image of the object.

Holography is made possible by laser light. Laser (Light Amplification by Stimulated Emission of Radiation) is an extremely pure light source with the following unique characteristics:

- one color—all waves of laser light are the same size (wave length)

- in step—all laser waves travel side by side at the same speed

- directionality—waves travel parallel to one another without spreading.

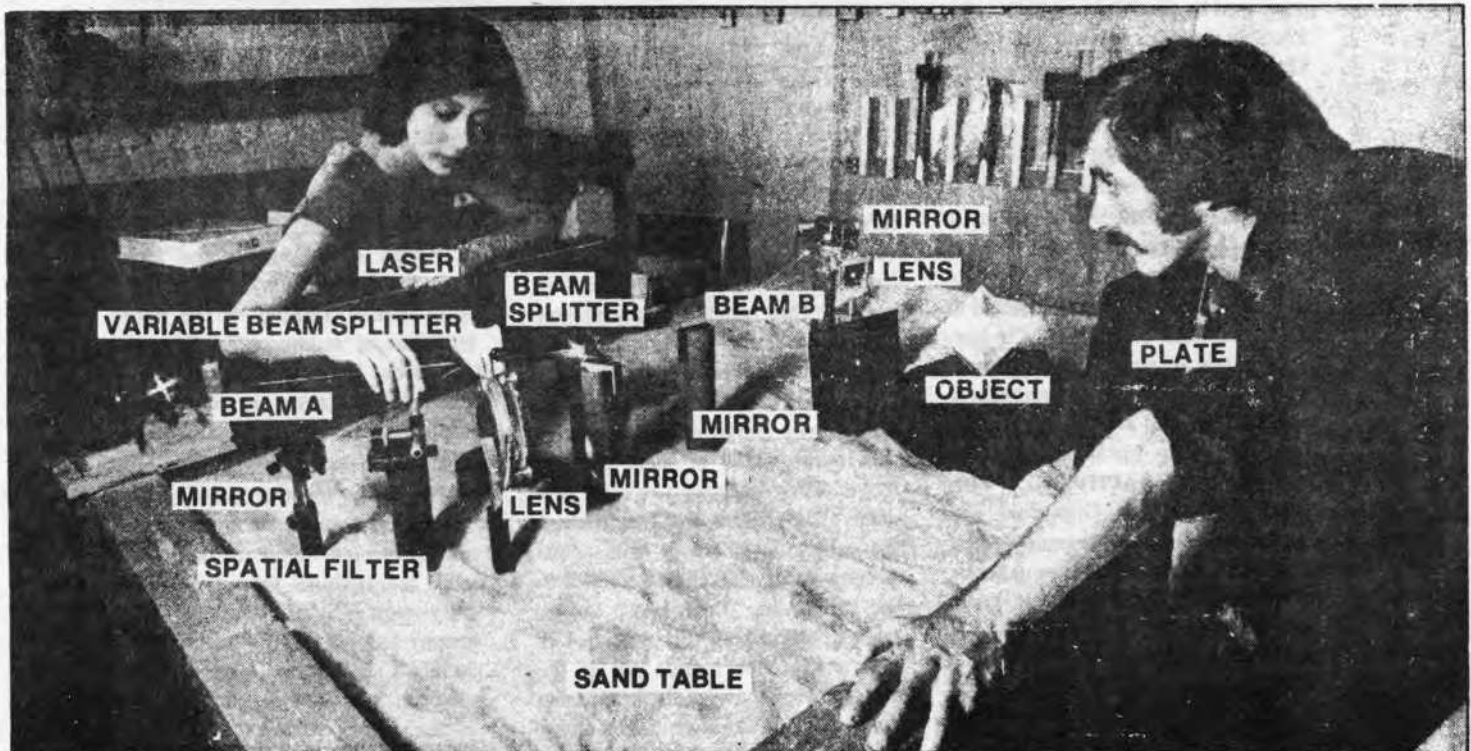
When two laser waves meet, they either reinforce or cancel each other; the result is a series of microscopic areas of light (reinforced) and darkness (cancelled). This is known as an interference pattern. A photographic recording of this pattern constitutes a hologram.

A hologram is made by splitting a laser beam into two beams. Beam A, or the reference beam, goes directly to the photographic plate. Beam B or the object beam, goes first to the object being holographed. Then, reflecting off the object, it goes to the photographic plate where its waves interfere with the waves of the reference beam. After standard photographic processing, the photographic plate becomes a permanent hologram.

To view or reconstruct the hologram, one need only pass the

reference beam (Beam A) through the photographic plate. The interference pattern, acting as microscopic, partially reflecting mirrors, bends some of the light from this beam to reconstruct the path of the light originally reflected from the object (Beam B). The eye sees a three-dimensional object behind the plate, though the real object is no longer present.

—Luis Remesar, Associate Director, The New York School of Holography



A master transmission hologram at the New York School of Holography. Work is done on a sand table for stability.

Holograms: The Grand Illusion

*'holography is obviously related
to the tradition of studio
portraiture and still-lives.'*

BY DAVID BOURDON

In the late 1940s Dennis Gabor, a Hungarian-born British scientist, was investigating ways to improve the electron microscope, hoping to see atoms, when he inadvertently discovered the basic principle of the hologram. However, his discovery lay dormant for many years because nobody knew how to gather a powerful source of coherent light. Then, presto! the laser was invented and many physicists and engineers, as well as a few artists, began to produce holograms in quantity. Dr. Gabor went on to win a Nobel Physics Prize in 1971. During that year he posed for a holographic portrait, produced by the McDonnell Douglas Electronics Corporation in Saint Charles, Missouri. He looks uncomfortably formal, gazing toward the viewer with deadly seriousness. So what if his face is all green? (Naturally colored holograms don't exist.) At least the ingenious physicist is preserved for posterity in three dimensions, looking so lifelike that the viewer is almost tempted to reach out and touch him. The portrait is one of nearly 50 holograms, made by an international roundup of 35 scientists and artists, that appear in a fascinating, fun-filled exhibition, titled **HOLOGRAPHY '75: THE FIRST DECADE**. Organized and cosponsored by the Museum of Holography, the show fills three galleries at the International Center of Photography, Fifth Avenue at 94th Street (through September 21).

This is not the first time that holography has been given the museum treatment. The now-defunct

Finch College Museum of Art mounted a holography show, titled "N Dimensional Space," back in 1970. "Holography '75" is, however, a much bigger and more ambitious affair, jammed with intriguing three-dimensional illusions and crisscrossed by laser beams. (Remember to be cautious and do *not* look directly into a laser beam.)

Most holograms are as three-dimensional, yet as one-sided as a theatre setting. You can gaze at Dr. Gabor's face, for instance, then step to one side in order to peer at a previously undisclosed bit of nose or ear, but you can't walk behind him to see the back of his head. Thanks to Tung Jeong, a professor of physics at Lake Forest College, we now have the 360-degree hologram, which enables us to see an object from all sides. Jeong's hologram of a three-dimensional ceramic horse, about three inches tall, appears inside a cylinder (the laser beam is directed from below) and the illusion is so realistic that spectators placed their hands inside the cylinder and attempted to clutch the apparition.

As if it were not sufficiently startling to see illusory figures fully in the round, some of them actually move! The Multiplex Company produces 120-degree holograms in which the subject performs a brief action as the viewer walks from one side to the other. In "Peekaboo," for instance, an impish girl, who lies in bed, sticks her tongue out at the viewer, winks, and pulls the coverlet over her bare shoulder. Lloyd Cross, the president of Multiplex, produced

a 360-degree holographic "movie," titled "Pam and Helen." It features a good-looking pair of naked lesbians, who tentatively explore their bodies as they kneel, facing each other, on a carpet. Their miniaturized bodies, which seem to float in a clear plastic cylinder, are bathed in a constantly changing spectrum of color, and the overall effect is nearly magical.

At this early stage it's hard to tell what, if anything, distinguishes the artists from the scientists. The scientists have the edge, in terms of technical prowess, producing holograms with exceptional sharpness and clarity. But the artists (at least the ones who are not hung up on cobweb configurations) attempt to create less conventional portraits and still lifes. Bruce Nauman's two self-portraits, for instance, are primarily interesting for their wholly unorthodox approach to portraiture.

Though it is one of the latest wrinkles in photography, holography is obviously related to the entire tradition of studio portraiture and still lifes. Since the procedure for making holograms is complicated and time-consuming, compositions must be carefully calculated, leaving no room for the snapshot aesthetic that prevails in many photography circles. So far the medium is more entertaining than it is artistically expressive. But while holography has yet to find its Stieglitz or Steichen, it's plain to see that the medium will continue to lure new and talented devotees.

Holography Comes of Age

JOHN GRUEN

HOLOGRAPHY '75: THE FIRST DECADE (International Center of Photography, 1130 Fifth Ave.): Even as photography is entering its most extraordinary renaissance, with photographic exhibitions everywhere, the new medium of holography is emerging as an art form which the general public is still relatively unaware of and uninformed about.

In the late sixties, and early seventies, a few galleries began showing these strange, chimeric works which tricked the eye into believing that it was seeing three-dimensional forms when, in fact, all it was looking at was a sheet of clear plastic. Through scientific magic, the images on this sheet assumed a reality so life-like that it was impossible to believe that space could be toyed with in so wondrous a manner. Nevertheless,

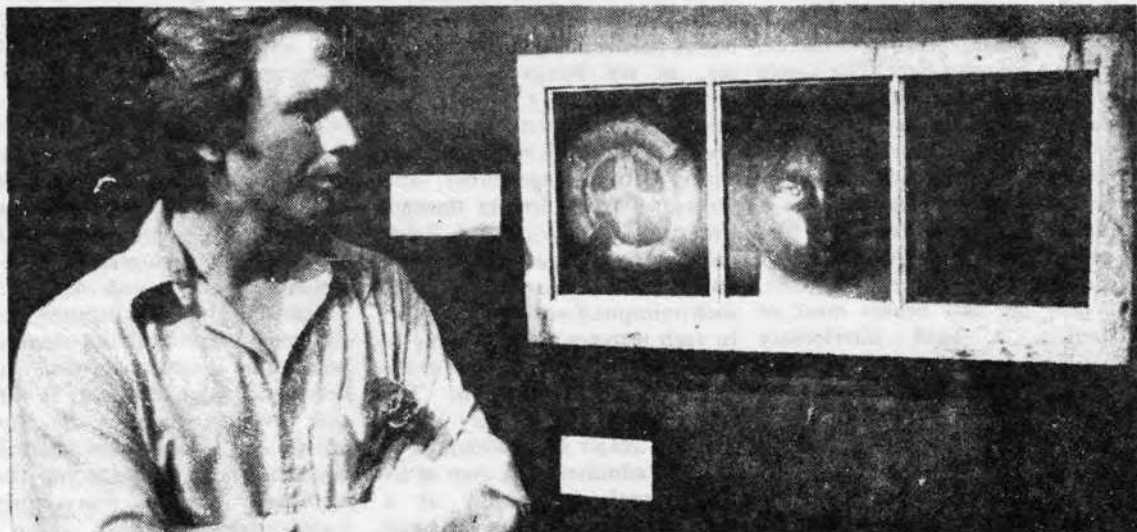
as one peered at these holograms, the third dimension came spectacularly into view. Faces, figures, objects, et al., seemed incredibly real, and, what is more, seemed to move as one moved or shifted position.

In the intervening years, the art of holography has made considerable strides. Quietly, yet industriously, its practitioners have refined and simplified the production of holograms, experimenting with basic concepts and materials, and opening schools for the study of holography. In New York, there is even a Museum of Holography (located at 120 West 20th Street), and an attendant school within the museum, open to the layman and professional.

The present exhibition offers a survey of holographic experimentation, and, for all intents and

purposes, the show could be called historic. Some fifty holograms by thirty-five holographers from five foreign countries and fifteen states are on view—each a triumph of scientific research, but only a very few worthy of being called works of art. Indeed, the makers of holograms seem far more interested in noodling and tinkering with their new-found toy, leaving its esthetic possibilities alarmingly at bay. So enamored are they of the science involved, that the final products look, for the most part, like unimaginative samplers for a new photographic line.

Be that as it may, holography is a fantastic invention, and in time, its true artists will, no doubt, emerge. Holography was pioneered by Dr. Dennis Gabor, who invented the medium in 1947 while at the Imperial College of Science and



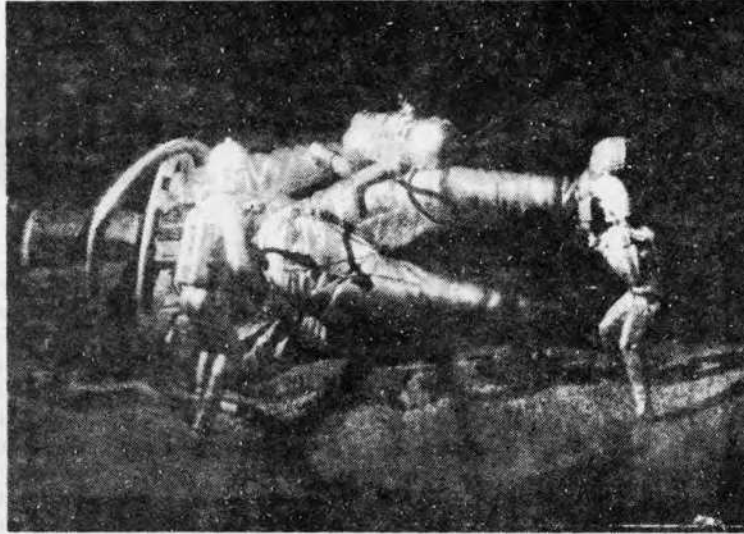
Steve Borns

Jeff Hall's "Ship Someone Stars"



ART

THE SOHO WEEKLY NEWS



Steve Berns

Jerry Pethick's "Rainbow Spaceman"

Technology in London. (He won the Nobel Prize for it, in 1971). In essence, holography deals with the nature of light. In a recent *New York Times* article, Peggy Sealfon gave as coherent and technical description on the making of holograms as any: "A hologram is made by illuminating a subject with a special type of light source, called a coherent light. The source of coherent light is a laser beam, and by using mirrors and a beam splitter the light is then split into a reference beam and an object beam. The reference beam is directed onto a photographic film and the object beam is reflected off the subject onto the same film. Where the two beams meet or overlap, a light interference pattern is formed and it is this that is recorded on that photographic film. When the film is processed and a beam of coherent light is passed through the film, a totally three-dimensional reconstruction of the original subject occurs."

Those knowledgeable about such technical matters will be endlessly intrigued, and will want to know more about it. For those of us who want their magic and eat it too, the holography show is merely a prelude of what the art form could ultimately yield. I mean, a dildo in three-dimension, jutting out at you, is pretty yawn-provoking, as are holograms of two bosomy girls doing a sexy come-on number. A fisherman standing in a pond and lifting his reel is no great shakes of an image either, and grotesque masks leering through waves of rainbow-colored lights don't really engage or hold one's attention. There are too many of such uninspired works in the show. In each instance, we stop only to marvel at "the way of it," not at the marvelous totality of it. The absence of fertile imagery is the exhibit's major flaw, although it must be admitted that even at its most banal, holography as a technical device is never less than

arresting.

There are a few superb examples on view that make one wish for more esthetics and less technology. Dr. Gabor's own self-portrait is a remarkable study in a face-to-face encounter with what seems a living person. A figure in a bizarre contortive position is both theatrical and phenomenological. A hologram of a man distorting his face is equally striking. There are other good images to be seen, and they raise fascinating questions: Can holograms be enlarged and used, as, say, stage settings? Can holography be applied to motion pictures? Will holography ultimately render the camera obsolete?

Standing mid-way between the still photograph and the movies, holography seems destined to become a major art form. It can only progress, however, by true artistry—by holographers who will have the vision to transcend the medium's already marvelously transcendent attributes.

The New York Times

ARTS AND LEISURE

ART VIEW

HILTON KRAMER

Holography— A Technical Stunt

Sunday, July 20, 1975

There is always something disconcerting in the spectacle of immensely sophisticated technology—which artists sometimes call “science”—serving as the vehicle for some perfectly trivial conception. Depending on the character of the result, such discrepancies between means and ends tend to induce either laughter or anger or—what may come to the same thing—a woeful sense of wasted opportunity. In art, if not always in life, we expect method and medium to bear some meaningful or intelligent relation to an accomplished result. There is a difference, after all, between the laboratory and the exhibition gallery—between, as Picasso once put it, seeking and finding.

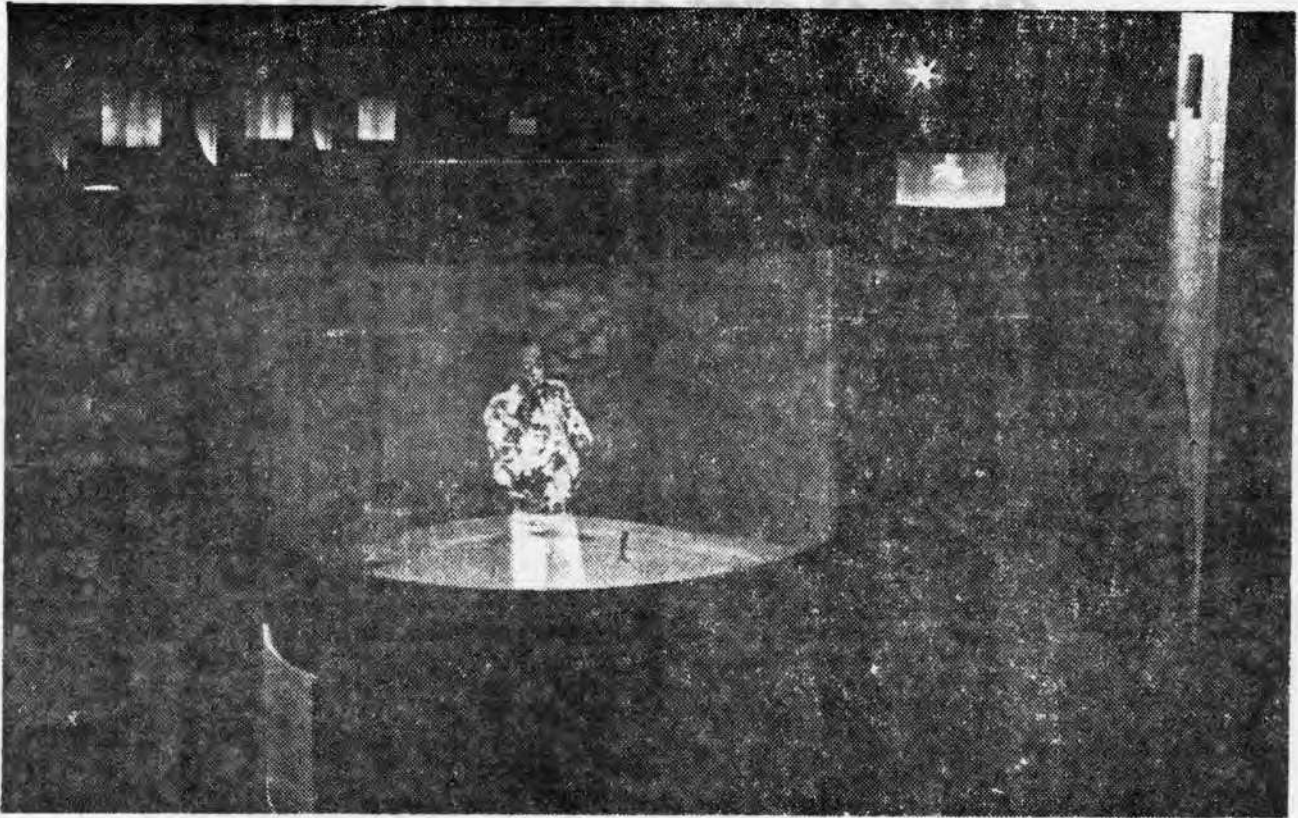
This is a difference that has been wholly lost, however, on the organizers of the “Holography '75” exhibition, now occupying the second-floor galleries of the International Center of Photography. The esthetic naiveté of this show must really be seen to be believed. No mere description could begin to do it justice. Images of a stupefying innocuousness, ranging from peep-show porn and low-grade beer commercials to the even more ludicrous parodies of so-called “serious” art, are unrelieved by the slightest trace of esthetic intelligence. A more dismal demonstration of the distance that still obtains between advanced technological invention and the serious artistic mind could scarcely be imagined.

What is holography? It is a form of lensless photography, invented in 1947 by Dr. Dennis Gabor, that employs laser light to produce three-dimensional images of the most startling illusionistic “reality.” Since Dr. Gabor's discovery was first published, others have gone on to extend the holograph—or the hologram, as it is sometimes called—to a circular, 360-degree “screen” so that the image imprinted on the photographic plate appears to “move” as we move around it. In the present exhibition, which includes the work of 35 holographers, both types of holographic image—the “flat” and the circular—are represented, though there is little to choose between them so far as esthetic interest is concerned.

The physical dimensions of holography are small: most of the flat prints measure little more than a few square inches, and the circular prints are roughly the size of a cake platter. Their color, moreover, is atrocious. There is said to be a lot of work now going on in what is called “natural color” as well as black and white holography, but what we get for the moment are what holographers are pleased to call “rainbow hues,” which is a comical euphemism for the kind of sleazy, acid reds, blues and greens we used to find adorning juke boxes and still find in the cheapest kinds of picture postcards. Perhaps some genius is waiting in the wings to make something memorable of this combination of peep-show realism and juke-box color, but he is nowhere in evidence here.

• • •
What is worse, however, is what might be called the “culture” of holography. It is, to judge by the present exhibition, a gadget culture, strictly concerned with and immensely pleased by its bag of illusionistic tricks and completely mindless about what, if any, expressive possibility may lie hidden in its technological resources. There are, to be sure, a few “artistic” attempts here at abstraction and pop art and the familiar neo-dada repertory, but these are even more laughable than the outright examples of kitsch. Much of the work in this show has, I gather, been produced not by “artists” but by physicists professionally involved in holographic technology. The physicists appear to favor objects out of the local gift shop, whereas the “artists” do their shopping in provincial art galleries, and both, it seems, are much taken with television commercials. It is difficult to know which is the more repugnant: the abysmal level of taste or the awful air of solemnity that supports it.

For “Holography '75” is being offered to us as nothing less than “an event of historic importance.” It even claims to be the “first” show of its kind—which is unkind to the “N Dimensional Show” of holography that the Finch College Museum of Art mounted several years ago.



S. Borns

"Sam Rivers" by Selwyn Lissack —a 360-degree, white light multiplex hologram

Reviewing that exhibition, my colleague Grace Glueck wrote that it had "all the esthetic kick of a postcard from Montauk," and "Holography '75" certainly marks no discernible esthetic advance. It will be said, of course, that holography is still, both technically and esthetically, in its infancy—an argument that brooks no quarrel. But the place for such infancy is the nursery, not a place of public exhibition, and the welcome given this unfortunate, amateurish show by the International Center of Photography raises some serious questions about the purpose of this new institution.

The Center was established by Cornell Capa less than a year ago—in November, 1974. Describing itself as the city's "first museum devoted exclusively to photography," it has already mounted eight exhibitions, representing the work of more than 40 photographers, some celebrated (Henri Cartier-Bresson, W. Eugene Smith, et al.), some still obscure. It seemed, at the start, to have a point of view, favoring social reportage of the sort that gave to the great photo-journalists of an earlier generation their special sense of mission and their special glamour. But this point of view was founded from the beginning on a curious paradox. The age of photo-journalism has clearly come to an end. It survives, to the extent that it survives at all, as something marginal to the mainstream of serious photographic endeavor. The great picture magazines are gone, their function having been effectively usurped by the television screen, and the surviving corps of photo-journalists has been obliged to turn to the museum, the gallery and the expensive art book for their new public—a public more likely to judge their work by detached esthetic standards than by the old criteria of front-line communication.

The very notion of a museum devoted to the photography of social reportage implied that a significant

shift had taken place in the way we looked at such photographs, but the center has always been a little diffident about articulating that shift—a little reluctant, perhaps, to acknowledge it as a *fait accompli*. It shies away from any conscious esthetic program, and from the standards such a program would entail. Orphaned from the history of social action and mass-media communications—a history that reached its zenith in the exploits of war photography—it yet retains a certain nostalgia for that bygone era, and seems to regard the new estheticizing tendencies in photography and in photographic thought as some sort of denial of photography's true purpose. It seems reluctant, in other words, to face up to the fact that it is a museum and not a magazine.

It was inevitable, I think, for such an attitude to come to grief sooner or later, and the worst appears now to have happened sooner than expected. The "Holography '75" exhibition dramatically underscores the center's refusal to confront the difficult esthetic problems that a museum specializing in photography is now obliged to deal with. An esthetic void is always vulnerable to the romance of technology, and this is all that the present exhibition offers us. It thus remains to be seen whether the Center, which opened last fall with so much promise and so much fanfare, is prepared to make a serious contribution for the new photography scene or is interested only in exploiting it.

"Holography '75: The First Decade" at the International Center of Photography, 1130 Fifth Avenue, through Sept. 21. Open 11 A.M. to 5 P.M. Tuesday through Sunday; closed Monday.

NYSOH

New York School of Holography 120 W 20, nyc, ny 10011/929-0121

HOLOGRAM - from the Greek words, 'holos' (complete) and 'gram' (message).

WHAT IS A HOLOGRAM?

Holography is generally known as laser photography which uses laser light to make and view 3-dimensional images called holograms. The process itself is referred to as holography, while the 2-dimensional photographic plate or piece of film is referred to as a hologram (not to be confused with a 'holograph' - defined as a document such as a last will and testament handwritten by the person whose signature is attached). In a hologram, the image is seen in true 3-dimensions with either a monochromatic or rainbow effect. This image manifests such vivid realism that the viewer is tempted to reach out and touch the objects of the scene.

A BRIEF HISTORY

Holography was invented in 1947 by Dr. Dennis Gabor while at the Imperial College of Science and Technology in London. In 1971, he won the Nobel Prize for his brilliant invention of this new civilizational tool. From 1947 to 1963, holography remained unresearched and unknown to most of the scientific world and to the general public. In 1963, Drs. Leith and Upatnieks of the University of Michigan were able to implement Dr. Gabors' theories through the use of the newly invented laser (1960 - T.H. Maiman - Hughes Aircraft Company) to produce the first successful optical hologram. Almost a decade later, in 1971, the San Francisco School of Holography opened its doors and holography came out of the laboratory and into the classroom.

In October 1973, the New York School of Holography (NYSOH) began its operations and has taught over 400 students how to make holograms and construct a holographic studio. Now anyone interested in learning the art of holography can do so easily and at minimal cost, at the East Coast's only Holography School.

WHY HOLOGRAPHY?

Holography brings our 2-dimensional world of communications into the magic of the third dimension. Holography can work for you on several levels: You will develop a foundation for understanding the phenomena of light and optics you will acquire a meaningful and educational skill that can become a potentially limitless career in the untapped field of holography. Professionals and students in photography, audio-visual communications, publishing, advertising, media, architecture, interior design, theatre lighting and set design, creative arts, computer graphics, engineering, physics, chemistry, medicine, in fact any field requiring visual creativity, will discover real applications which will be beneficial in your profession or course of study. But more important, you will have learned about one of the most important civilizational tools of the 20th Century.

NYSOH WOULD LIKE TO INTRODUCE YOU TO HOLOGRAPHY. IF YOU HAVE NEVER SEEN A HOLOGRAM, OR IF YOU WOULD LIKE TO BRING YOURSELF UP TO DATE ON THE CURRENT STATE OF THE ART, WE SUGGEST YOU STOP BY THE INTERNATIONAL CENTER OF PHOTOGRAPHY, 1130 5TH AVENUE (AT 94TH STREET), TUESDAY THROUGH SUNDAY, 11 TO 5 PM. ADMISSION IS FREE, FREE FILM PROGRAM EVERY SATURDAY, ON THE HOUR. (FILMS ABOUT HOLOGRAPHY AND LASERS).

NYSOH FALL 1975 CURRICULUM

Basic Holography	6 weeks 4 hrs. per/wk. \$180.00 Registration Limit - 8 students
Advanced Transmission I	6 weeks 4 hrs. per/wk. \$180.00 Registration Limit- 8 students
Rainbow I	6 weeks 4 hrs. per/wk. \$180.00 Registration Limit - 8 students
Rainbow IIA Color Holography	6 weeks 4 hrs. per/wk. \$180.00 Registration Limit- 8 students
Rainbow IIB Multiplex Holography	6 weeks 4 hrs. per/wk. \$180.00 Registration Limit - 8 students
Dichromate Holograms	5 weeks 8 hrs. per/wk. \$800.00 Limited Registration - 3 students
Multiple Imagery and an Introduction to the third Dimension	12 weeks 2 hrs. per/wk. \$180.00 Limited Registration - 15 students
Holographic Design (aesthetics)	12 weeks 2 hrs. per/wk. \$180.00 Limited Registration - 30 students
History and Applications	10 weeks 2 hrs. per/wk. \$150.00 Limited Registration - 30 students
Special Seminars	To be arranged.

Call or write NYSOH for information about the following programs: Intensive Basic I Weekend, Custom and Individual Instruction, Theory seminars on the Physics and Mathematics of Holography, and Light Perception, Travelling Lecture/Demonstrations, Industrial Research Tours, Laser Safety Classes, Laser Special Effects for live and filmed purposes, Equipment and Studio Rental.

The phone number at the School is: (212) 929-0121