

HOLOGRAPHY - AN INTRODUCTION

Holography is more than a new dimension. It is a new sense. It is sight sharpened, acutized. It is an elaboration of perception. In much the same way that our approach to painting has changed dramatically following cubism, our entire apprehension of visible objects takes a quantum leap in discernment following holography.

More than the flat height and breadth of an object perceived, holography adds to it the dimension of space, the depth, revealing more of the universe surrounding the object. Isolated objects reproduced holographically swim in space. It is an almost mystic achievement. Objects are more of what they are. Every dimension, every state of material life has been faithfully and proportionately reproduced. A chair, a body, an object exist in the full expanse of their height and breadth and depth. It is the square squared into the cube. It represents a revolution that shatters every concept and aspect of our traditional representational visual traditions.

Unlike painting, print, photography and other traditional flat plane mediums, holography is the nearest to sculpture in the presentation of the natural dimensions of any existence portrayed. Gone forever are the framed two-dimension representations of three dimensional objects that exist in flat perspective and static relationships. It has begun to change our ways of seeing. It is causing us to re-evaluate our visual traditions. It will lighten the load on our imagination to look into, beyond and around an object. Holography now does this for us as no two-dimensional medium can. Before holography when we looked at a photograph, a painting or a print of some living or inanimate object, we saw it outlined on one plane with the illusions of space and movement created by the use of mathematics, color and surface relationships.

The rest of this existence in a space was left to our imagination. Objects reproduced holographically can be viewed and are themselves totally three-dimensional. They can be seen from any angle and a sophisticated change in relationships is noticeable when viewed from different positions. They exist in the reality of space.

Holography has been called the most revolutionary visual medium since the prehistoric cave paintings. It carries us well beyond the traditional visual literacy based on the flat plane or surface, bordered, bottomed and focused on one static surface, giving the eye but one visual path to follow. Materially our involvement with reality idealistically abstracted has been and for the most part still is through sculpture and environmental works. In the graphics we are most informed and rewarded by realism and super realism. Now thanks to science and technology we have another open door--holography.

GALLERY 1134

FINE ARTS AND HOLOGRAPHIC RESERACH CENTER

Contributors

HOLOGRAPHY: TECHNOLOGY AND ART

Gallery 1134

20 May - 3 July 1977

Andaloro, Anthony	untitled	transmission holograms
Benton, Stephen	ENGINE # 9	reflection hologram
Benton, Stephen	HOLOGRAPHY	white-light transmission hologram
Berkhout, Rudie	"MILKSHAKE"	transmission holograms
Berkhout, Rudie	"ALMOST WHITE-LIGHT"	white-light transmission hologram
Billings, Loran	"INTO ONE"	laser light environment
Bjelkhagen, Hans Poem: Hans Weil	"SIOLENCE"	transmission hologram
Bjelkhagen, Hans and Ake Sandstrom	"TOMORROW"	white-light transmission hologram
Boesche, John A.	"2 INVESTIGATIONS"	words, photographs, transmission holograms
Campoli, Cosmos and Tom Cvetkovich	"APROPOS FORTHE SHOW"	reflection hologram
Campoli, Cosmos and Tom Cvetkovich	"BEE THEATRE"	transmission hologram
Claudius, Peter	"DR. EINSTEIN'S CHESSBOARD"	multiplex hologram
Cvetkovich, Tom	"THEATRE ALIF"	diffraction gratings/ sculpture construction
Diamond, Mark	"HOLO DALI: CRYSTALIZED"	transmission hologram
Dunkley, Kenneth	"THOUGHTS"	transmission hologram
E.R.I.M. scientists (USA)	TRAINS	transmission hologram
Gardiner, Bob	"THE WORLD'S FIRST HOLOGRAPHIC SCULPTIMATION"	multiplex hologram
Gaventa, Deborah	"THE TRANSITIONS OF LIGHT/ LIFE; and the void is not empty"	laser and sunlight installation

Jeong, Tung H.	HORSE	cylindrical hologram
Jeong, Tung H.	INTERFEROGRAM	transmission hologram
Jeong, Tung H.	"SEE NO EVIL, ..."	multiplex hologram
Jeong, Tung H. and Hal Snyder	CATHEDRAL	computer generated integral hologram
Jeong, Tung H. and David Wender	"COUNT 'EM AGAIN..."	transmission hologram
Jeong, Tung H.	"TIME AND SPACE"	transmission hologram
Lacy, Lee	MIKE ROYKO	multiplex hologram
Lacy, Lee	DRACULA	multiplex hologram
Nemtzw, Scott E.	"CRÈME DE MOTION #3"	reflection hologram
N.I.K.F.I. scientists (USSR)	LION	reflection hologram
M.I.K.F.I. scientists (USSR)	RUSSIAN JEWELRY	reflection hologram
N.I.K.F.I. scientists (USSR)	HOLOGRAPHIC MOVIE FRAMES	transmissions holograms
Núñez, Ruben	"RED SUN"	reflection hologram
Núñez, Ruben	"title F"	reflection hologram
Núñez, Ruben	"EXCAVATION MIRROR"	reflection hologram
Núñez, Ruben	"CELESTIAL MIRROR"	reflection hologram
Pethick, Jerry	"SPACEMAN"	white-light transmission hologram
Rallison, Rich	LITTLE WATCHES and WATCHPARTS	dichromate reflection holograms
Rhinehaart, R.	PORTRAIT OF DENNIS GABOR	transmission hologram
Silberman, Rick	"GYROSCOPE"	reflection hologram
Stephens, Anait	"SPHERE AND COLLAGE"	reflection hologram
Stephens, Anait	"SPACE GRAFFITI I"	multiplex hologram

Walter, Will

PORTRAIT OF PUM III

white-light transmission
hologram

Zabka, Britton

"THE FIRST 360° CELL
ANIMATION"

multiplex hologram

Zabka, Britton

"THE KNIGHT SHOT"

multiplex hologram

HOLOGRAPHY

HOLO- /hō-lō-/ COMB FORM (ME, FR. OF, FR. L, FR. GK, FR. *holos* WHOLE): COMPLETE.

-GRAPHY /g-ra-fē/ n COMB FORM (L -GRAPHIA, FR. GK, FR. *graphein*): WRITING OR REPRESENTATION IN A (COMPLETE) MANNER OR BY A (COMPLETE) MEANS.

ORIGINALLY CONCEIVED BY DR. DENNIS GABOR IN 1947 AT THE RUGBY ELECTRICAL CO., SCOTLAND. FIRST PROPOSED AS A METHOD OF IMPROVING ELECTRON-MICROSCOPY.

A HOLOGRAM IS A COMPLETE REPRESENTATION, RECORDING THE FULL DEPTH QUALITIES AS WELL AS THE RELATIVE BRIGHTNESS OF A SCENE.

LASER

LASER//lā-zər/ n *Light Amplification by Stimulated Emission of Radiation:*

A DEVICE THAT UTILIZES THE NATURAL OSCILLATIONS OF ATOMS FOR AMPLIFYING OR GENERATING ELECTROMAGNETIC WAVES IN THE VISIBLE REGION OF THE SPECTRUM.

A SOURCE OF LIGHT WHICH IS FREQUENCY COHERENT (MONOCHROMATIC, ALL WAVES ARE THE SAME LENGTH), SPATIALLY COHERENT (UNIPHASE, ALL WAVES ARE IN STEP), AND COLLIMATED (PARALLEL, IN A TIGHT BEAM).

FIRST OPERATING LASER REALIZED IN 1960 BY DR. THEODORE H. MAIMAN AT HUGHES AIRCRAFT CO., CALIFORNIA. MADE PRACTICAL OPTICAL HOLOGRAPHY POSSIBLE.

A SELECTED CHRONOLOGY OF HOLOGRAPHY

- 1947 - DR. DENNIS GABOR, A RESEARCH ENGINEER AT THE RUGBY ELECTRICAL CO. IN SCOTLAND, CONCEIVES THE THEORY OF A TECHNIQUE TO USE COHERENT LIGHT TO IMPROVE THE RESOLUTION OF ELECTRON MICROSCOPE IMAGES.
- 1948 - GABOR MAKES THE FIRST HOLOGRAM, AN "IN-LINE" TRANSMISSION TYPE, USING A FILTERED MERCURY ARC LAMP AS A LIGHT SOURCE.
- 1949/
1959 - ALTHOUGH LIMITED IN THEIR INVESTIGATIONS BY THE LACK OF A COHERENT LIGHT SOURCE, SEVERAL SCIENTISTS IN THE U.S.A. AND U.K. CONTINUE TO INVESTIGATE HOLOGRAPHY. AMONG THEM: ALBERT BAEZ, JAMES DYSON, H.M.A. EL^oSUM, MICHAEL E. HAINE, PAUL KIRKPATRICK, EMMETT LEITH, T. MULVEY, GORDON ROGERS, AND GEORGE W. STROKE.
- THE THEORETICAL CONCEPTS FOR THE LASER ARE DEVELOPED INDEPENDENTLY BY DR. CHARLES H. TOWNES OF THE U.S.A., AND A.M. PROKOROV AND N. BASOV OF THE U.S.S.R. IN 1964 THEY BECAME THE JOINT RECIPIENTS OF THE NOBEL PRIZE IN PHYSICS.
- 1960 - THE FIRST OPERATING LASER, A PULSED RUBY TYPE, IS CONSTRUCTED BY DR. THEODORE MAIMAN AT THE HUGHES AIRCRAFT CO. RESEARCH LABORATORIES IN CALIFORNIA.
- 1961 - TRION INSTRUMENTS INC., FOUNDED BY LLOYD CROSS, SELLS THE FIRST COMMERCIALY PRODUCED LASER TO TEXAS INSTRUMENTS.
- Y.N. DENISYUK OF THE U.S.S.R. DEVELOPS WHITE-LIGHT REFLECTION HOLOGRAPHY.
- 1962 - LEITH AND JURIS UPATNIEKS AT THE UNIVERSITY OF MICH., UTILIZE AN OFF-AXIS RADAR IMAGING TECHNIQUE WITH A LASER LIGHT SOURCE TO CREATE OFF-AXIS TRANSMISSION HOLOGRAMS.
- 1965 - STROKE AND HIS COLLEAGUES AT THE STATE UNIVERSITY OF NEW YORK, FURTHER DEVELOP AND PROMOTE DENISYUK'S REFLECTION HOLOGRAM TECHNIQUE.
- 1966 - DR. T.H. JEONG OF LAKE FOREST COLLEGE DEVELOPS THE 360° CYLIDRICAL HOLOGRAM.
- L.D. SIEBERT OF THE CONDUCTRON CORP. USES A PULSED LASER TO CREATE THE FIRST HOLOGRAM OF A HUMAN SUBJECT.

- 1967 - T.A. SHANKOFF AND KEITH PENNINGTON OF BELL LABORATORIES AT MURRAY HILL, N.J. DEVELOP DICHROMATED GELATIN AS A RECORDING MEDIUM FOR HOLOGRAPHY.
- THE FIRST OF MANY HOLOGRAPHIC MOVIE SYSTEMS ARE DEVELOPED BY IBM, TRW, BELL LABS AND OTHERS.
- 1968 - DR. STEPHEN BENTON OF THE POLAROID CORP. DEVELOPS THE WHITE-LIGHT "RAINBOW" HOLOGRAM. THIS TECHNIQUE MAKES THE DISPLAY OF HOLOGRAMS EASIER AS ANY POINT WHITE LIGHT SOURCE, EVEN CANDLELIGHT, CAN BE USED.
- 1970 - THE FIRST SHOW OF HOLOGRAPHY IN AN ART CONTEXT IS HELD AT THE CRANBROOK ACADEMY OF ART.
- 1971 - GABOR IS AWARDED THE NOBEL PRIZE IN PHYSICS FOR HIS DISCOVERY OF THE PRINCIPLE OF HOLOGRAPHY.
- THE FIRST SCHOOL OF HOLOGRAPHY OPENS IN SAN FRANCISCO UNDER THE DIRECTION OF CROSS.
- 1972 - CROSS AND DAVE SCHMIDT DEVELOP INTEGRAL HOLOGRAPHY INTO THE MULTIPLEX HOLOGRAM, CREATING THE FIRST VIABLE TECHNIQUE OF INTEGRATING MOTION INTO HOLOGRAPHY, AND FORM THE MULTIPLEX CO. FACILITY.
- 1973 - JEONG AND HAL SNYDER AT LAKE FOREST MAKE THE FIRST INTEGRAM OF A COMPUTER GENERATED FILM. THIS IS ALSO THE FIRST CONTINUOUS INTEGRAM OF A SCENE GREATER THAN 350"
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- 1974 - BENTON INVENTS A NEW DEVELOPING TECHNIQUE FOR REFLECTION HOLOGRAMS THAT IMPROVES RESOLUTION AND IMAGE BRIGHTNESS.
- 1975 - BENTON MODIFIES THE WHITE-LIGHT TRANSMISSION TECHNIQUE TO MAKE ACHROMATIC (BLACK AND WHITE) IMAGES.
- 1976 - THE MUSEUM OF HOLOGRAPHY IS GRANTED A CHARTER BY THE STATE OF NEW YORK AND OPENS IN NEW YORK CITY UNDER THE DIRECTION OF ROSEMARY JACKSON.
- NIKFI SCIENTISTS IN THE SOVIET UNION DEMONSTRATE A MASS AUDIENCE HOLOGRAPHIC MOTION PICTURE SYSTEM, SHOWN DURING THE XII CONGRESS OF UNIATEK IN MOSCOW.