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October 10, 1985

Seminar Notes

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Stephen Benton
MIT/Polaroid

Rene Paul Barilleaux
Museum of Holography

William Paul
MIT

WHAT'S THE MATTER WITH 3-D ?

William Paul - MIT

Paul focussed his lecture on "what was wrong with 3-D in the past", particularly in the '50s. He said a few years ago there was renewed interest shown by show business in 3-D films. This enthusiasm was spurred on by the success of the Western called Comin' At Ya!(1981). The only current plan for a 3-D film a is short subject costing 12 million dollars, to be shown exclusively at Walt Disney World. He said it was interesting to note that 3-D having failed once more in movies in the '70s had again returned to the fairground where it always seems to have its bigger successes. During the years 1952-1955, 46 feature films were made in 3-D. However he said, that was not the first time 3-D had been in theatres. There had been some experimentation in the '20s and '30s. The reason commonly given for the advent of 3-D in the early '50s was the decline in theatre going audiences following the introduction of TV. He suggested another way of looking into the phenomenon of 3-D in the early fifties as the outcome of an aesthetic development that had been taking place in the previous fifteen years or so. It had begun with the attempts of Walt Disney's technicians to crreate a sense of depth in the flatness of a cartoon through a device known as the "multiplane" camera, which created a pronounced separation of objects in the image and made it possible for the camera to move through the drawing. Soon after, live-action films began to use "deep focus", a photographic style that emphasized depth in the image. Neither of these devices produced true 3-D, yet both crreated a sense of dimensionality that had not been seen in the movies before.

Though Hollywood Studios were not initially interested in 3-D, they were goaded into it by the fortunes of a couple of independent companies, one producing an independently made feature in 3-D, the other producing a feature-length travelogue in Cinerama. However there was a problem that most outlets (theatres) were reluctant to make the necessary technological changes required for 3-D film screening, because of all the uncertainities associated with this new field. This problem was further compounded by the competing technology "Cinerama". Cinerama actually appeared before 3-D, and consisted of an ultra-wide screen projection system that utilised three projectors projecting an image covering a 146 degree viewing area on to a deeply curved screen. Though Cinerama was not actually stereoscopic it was often referred to as a 3-D process. It had something of an illusion of depth, but could not create the sense of different planes of action as in 3-D. The two systems were viewed in somewhat different ways, creating a strikingly different impact on the observer/audience. Cinerama had the effect of drawing the observer into the image, whereas 3-D made it appear that the show was moving towards the audience. 3-D he said had the critical difference that it played on the passivity of the audience.

Almost from its inception 3-D feature films could point with hyperbolic lucidity to their two-pronged attraction, terror and sex. These he said are the elements Hollywood normally considers perfect elements of exploitation films, i.e. films that are made quickly, cheaply, and with a sensational element that can draw large numbers of people in to the audience. Paul pointed out that 3-D productions over the susbsequent years bore this out. Of the 46 3-D films 16 were Westerns, 19 were suspense films, 5 war, and 4 science fiction films - all exploitation related. There was some complaint at the time that bad movies killed 3-D, and Paul maintained this contention overlooked the fact that sensationalism itself was always the primary appeal of 3-D in feature films.

Paul then commented on the 1971 3-D film called 'The Stewardesses' which was again a sexploitation film. This film made so much money that 'House of Wax' was re-released and a number of other movies went into production in 3-D at that time. 'House of Wax' when it was first made was the first film from a major studio to come out in 3-D. Paul said that 'House of Wax' was probably not the best film shot in 3-D; in his opinion Alfred Hitchcock's 'Dial for Murder' probably deserved that honor. However he said 'House of Wax' had unique and ruthless manipulation of 3-D effects. He also went on to emphasise the importance of stereophonic sound in enhancing the 3-D effect. In this context he claimed that the spacial effect of sound was well used in the film 'House of Wax'. To illustrate the features of this film he went on to relate its story. Although 'House of Wax' was commercially successful, its grosses fell below initial expectations because not enough theaters could be found to play it in 3-D. The problem was that large numbers of theaters did not want to equip themselves with technology they felt (rightly as it turned out) might be outmoded in a few years. Also, there were frequent audience complaints about the glasses required for 3-D. What finally did 3-D at the time was the enormous success of CinemaScope, and ultra-widescreen system something like Cinerama. Unlike Cinerama it was not shown on a deeply curved screen, but it had the advantage of a fairly simple technology that did not require major modification of theaters. The economic constraints of exhibition, then, helped establish CinemaScope as a mainstream technology, but it was also absorbed into standard filmmaking practices because it could, in effect, become "invisible", essentially unnoticed by patrons once the change to widescreen had been established as the screen used in theatrical exhibition. Because of the glasses patrons had to wear, 3-D in the past could never achieve this kind of invisibility, which it needs if it is to succeed in the future.

Rene Paul Barilleaux - Museum of Holography

Barilleaux presented a survey of industrial and commercial applications of holography as well as the artistic use of the medium. It was a visual presentation detailed as

follows, with slides to describe each application/use.

1. Industrial and commercial applications.
    a) Interferometry - for such applications as examining mechanical weaknesses and stress points in aircraft propeller and turbine blades, aircraft tyres etc.
    b) Display holography used for the following.
        - Photography/portraits
        - Architectural images
        - Holograms of museum objects (replication of the object)
        - Store window displays
        - Security uses
        - Give-aways and souvenirs (for corporations that want to present a high-tech image)
        - Advertising
    c) Holographic optics - used in supermarket scanning disks.
2. Artistic uses of holography.
    a) Replicate reality - similar to sculpture and painting in traditional art.
    b) Substitute reality
    c) Create reality - portraits
        landscapes
        still life
        abstract images
        combination pieces

Stephen Benton - MIT/Polaroid

Benton began by questioning the assumption that there was something wrong with 3-D. He said that 3-D is important, unfortunately it had been trivialized by what has happened. He proceeded to discuss what was right with 3-D, what had been wrong, and what they were going to do about it.

3-D he said was an important part of our mechanism for dealing with reality. It begins with the very essense of a human being's vision, namely, three dimensional vision (stereoscopic vision). He said that though an individual's vision is heavily reliant on stereoscopy, we had lived in a flat culture for so long (it is at least a 150 years since the invention of photography), and we have learnt to make very good flat photographs that satisfy our needs. Benton then used slides to describe the structure of binocular vision. He said that it was a very fragile system and commented that there are 6% or 7% of us who don't have double vision. He went further to say that one estimate had even claimed that 17% of us had some flaw or defect in our 3-D vision. 3-D can be established by cues other than double vision, cues that are used by people with monocular vision. He then listed the cues for depth perception.

Monocular - 1. Overlap (the most powerful)

2. Object size (memory effect)
3. Perspective (converging lense, angle)
4. Texture density
5. Gradations of light and shadow
6. Color and haze
7. Focus
8. Motion parallax

Binocular - 1. Convergence of eyes (triangulation)
2. Fusion of image differences

All the above cues plus the cues from an individual's two eyes have to be consistent in order to give a reliable estimate of space. Any conflict between the two can be very uncomfortable.

He pointed out that what was important about 3-D is our ability to triangulate and find differences between the two images in our eyes. It requires a resolution in each image that is much higher than we normally think of putting in a photograph or TV image. If this kind of high resolution is not there for those fine measurements, then the system breaks down and the image appears like a 'cardboard cut out'. This requires an enormous bandwidth, and that has been the problem with 3-D, since it requires an expensive system. As a result what most of the world has gone to (instead of holography) is a two view stereo, which is a cheap substitute. The real 3-D effect would depend on the observer getting a different view in each eye. He said that it is not so easy when one gets to a theatre or some other presentation situation. The two options available are, either to create the two images where the observer is or where the screen is, (and aim different views to each eye) so as to create the 3-D effect. Most of our experience has been with viewer aids of one kind or another.

Benton then traced the history of 3-D development going back about 150 years to Charles Wheatstone who invented the stereoscope which was further developed by the work of Sir David Brewster. He also mentioned the invention of a device called 'Swan's Cube' in 1865 which did not require the wearing of any special glasses. In the history of 3-D two methods have been used to create the required two images. These are a) segregating the image by time, using shuttered glasses (used in the movie theatres in 1924- New York), b) separation by spectrum, using colored glasses. He noted that 3-D movie experience had shown a very cyclical pattern.

Benton claimed that the glasses weren't the problem. The difficulties experienced with 3-D were related to perceptual and aesthetic issues. There have also of course been the technical problems, where originally films were recorded on two cameras which made splicing and editing very difficult. This was followed in the '60s and '70s by the recording of movies on a single strip of film. Though this made the 'shooting', editing, and screening easier, the films were observed to be very dark. He noted that in the Soviet Union, 3-D films had been a fact of life since World War II. By and large they are conservative, fairly relaxed 3-D movies that tell a story. In the '80s Disneys commissioned a system using twin 70mm cameras to make the film

'Magic Journey'. This required a set of polarized glasses, but made of high quality plastic so they were more comfortable to wear and less obtrusive than earlier 3-D glasses. The impact of this production was felt earlier this year in Japan at the Expo '85 where there were four 3-D movies.

In closing, he summarized the general views of 3-D. (i) Shabby movies, fuzzy postcards (of people who blink or do something similar) etc. (ii) Fantastic vision from Disney which uses a refined version of stereoscopy instead of holography. Looking to the future he commented that there was plenty of scope to develop some of the old 3-D techniques, and scope for the use of new holography. With reference to lenticulars, he said that they looked very impressive with high resolution images, but there was still room for further development of high resolution images and also the plastic sheets that were used for these lenticulars.
