

## AVATAR

By Lenny Lipton

On December 16<sup>th</sup> I watched Jim Cameron's *Avatar* in the Mk2 cinema on the banks of the Seine at Porte de Bercy in the middle of the Bibliothèque Nationale complex. A couple of hours before, Bernard Benoliel and Laurent Mannoni of the Cinémathèque Française, had picked me up at Charles de Gaulle Airport and we decided to see *Avatar* which opened in France two days before it's opening here. I was invited by the Cinémathèque to give a talk during their 3D film series of screenings. When I sat down to watch *Avatar* in the Mk2 Theater, I must have had three hours of sleep in the previous 24 hours. I was beginning to go into a jet lag fugue, and watching *Avatar* under these conditions was like watching a dream world in a trance.

I saw the film wearing The Xpand shuttering glasses, more popular in Europe than here. I have affection for the system since I invented its precursor, the original CrystalEyes. When I say I invented it, I can't take all the credit because my colleagues at StereoGraphics (or our vendors) created the IR link, designed the electronics, and created the appearance design, but I invented the basic drive scheme and the electro-optical shutters that made it work.

So forgive me if I am especially critical of the Xpand eyewear. The first thing eyewear should do is stay put on your head. These kept falling off mine. However, the optical quality was good and the picture looked fine. But then again the eyewear may have been falling off my head because I was nodding off.

I realized how much of the film I had missed the other day when my wife, Julie, and I went to the Fox lot to see a screening of the film in the Zanuck Theater. There were big chunks of it that I didn't remember. The Zanuck Theater used an XL ZScreen, which recaptures polarized light. I began the project of designing the XL ZScreen with Matt Cowan of Real D, and when Real D purchased ColorLink the project got turned over to them. Projection of *Avatar* at the Zanuck Theater was superb.

On the way home my wife Julie critiqued the movie. I'll try to capture the gist of the conversation.

"The movie is both sexist and racist," she said.

"How so?"

"It may have been beautiful to look at but that native girl was no girl – she's a guy jumping around the jungle. This is a homoerotic love story."

"It's like Sheena Queen of the Jungle, or Nyoka. I loved those jungle girls," I said.

"They are men, like the blue catlady. She fought like a man warrior, acted like a guy – she was a guy as far as I am concerned."

“You didn’t think she was sexy?”

“Ha!” she said. “The dialog was ridiculous. The love affair between the avatar and the alien lady was typical male macho bullshit. People like Jim Cameron, like to play with guns and toy soldiers. They have a lack of sensitivity to women. ”

“Cameron, it seems to me, shows a lot of respect for woman and has some strong women characters in his films.”

“The Na’vi are an example of pure racism. This strange mixture of Rousseau’s noble savage and the cliché view of American Indians mixed with the idiotic Hollywood vision of African savages is unpalatable and ridiculous.”

She was unusually vituperative, and quite angry with the film because of its bloody conclusion. “This is nothing but a succession of endless violence that teaches people the wrong thing about how to settle conflicts.”

“What do you do if you have an implacable foe who wants to kill you?”

“Cameron should have presented a different problem with a different solution.”

“But you liked the 3D, right? You said it was beautiful.”

“It was beautiful to look at, but I didn’t think much of the 3-D, which I took for granted.”

A wise man once said that happiness (if not bliss) in marriage can best be achieved by agreeing with your wife; or I would say a second-best is not disagreeing. Julie said something interesting about the love affair between our avatar Jake and the alien lady -- that it was more moving than the relationship between Kate Winslet and Leonardo DiCaprio in *Titanic*, which she considered to be a formulaic soap opera relationship. Julie is a mild mannered person but *Avatar* got her blood boiling.

I have a relationship with both Jim Cameron and *Avatar* that stretches back over several years. Years ago I got a call from a woman who said, “Jim Cameron would like to speak to you,” and I said, “Jim Cameron the filmmaker?” She said yes. Cameron had called me to thank me for writing my books on filmmaking, which he said provided the basis for his filmmaking education. I told him that I thought he was my best student. Both of us were interested in the stereoscopic medium, and we began a conversation that has run for some time. I showed Chuck Comisky, who was Cameron’s stereographer on *Avatar*, the ZScreen running on a DLP projector eight or nine years ago, and presented this as a solution for stereoscopic theatrical projection. At that time I had an article published in the *SMPTE Journal* that said the same thing, and indeed my work is the basis for not only the Real D projection system (the ZScreen) but it’s a part of every other DLP system: I was the first person to make a field-sequential stereoscopic system that ran flicker-free.

I should explain that when I go on like this Julie will say, “Yes, but did you achieve world peace?” – which is the equivalent of the guy who stood next to Caesar as he rode his chariot in a Triumph through the streets of the Rome saying: “Caesar, thou art but a man.” But I digress.

My own feelings about *Avatar* have been shaped by occasional visits to Cameron’s studio to see the work in progress, and in a few conversations with him about stereoscopic aesthetics. I saw the first bits of the film before it was fully rendered at Weta in New Zealand. With *Avatar* I think we’ve gone through the Uncanny Valley to the other side. In *Avatar* the characters’ facial expressions, especially with the eyes, make important dramatic points of a subtle nature, which is something new. In Playa Vista, in one of the hangars where Howard Hughes built the Spruce Goose, and I watched Cameron directing his actors using performance capture. Since many people who are reading this have undoubtedly seen *Avatar* you realize that it is a blend of live action and performance capture and computer-generated imagery.

I don’t agree with Julie’s assessment but I can see the truth of where she’s coming from. I can see how somebody would say what she said about *Avatar*. It’s a complicated work, bound to be taken differently by different people. Cameron and I were exposed to the same science fiction stories, it would seem, and what he has produced on the screen is an amalgam of the kind of science fiction I loved as a boy in stories by Robert Heinlein, Isaac Asimov, Doc Smith, Arthur Clarke, Frederick Pohl, and others. I loved the idea of going to a distant planet and exploring it, and *Avatar* is about that. The concept of the avatar may have first been used in a novel by Algis Budrys, *Rogue Moon*, about a guy on Earth controlling his avatar on the moon. There are pieces of *Avatar* that remind me of so many things but out of it all comes a wholly realized vision from a sincere and deep place – and in the hands of an artist, it works.

It’s obviously a film about the ecology, and it’s a film about American militarism and the destruction of cultures; it’s a film about multinational corporations and the rise of the corporation’s unlimited, unbridled power unchecked by society unable to control their inhumane, merciless and unprincipled behavior. *Avatar* is about the world we live in today. One of the first things we learn is that the hero, a wounded marine who is a paraplegic, doesn’t have proper health care. He can’t get the use of his legs back unless he flies to the planet Pandora and completes this mission. He starts off a gung-ho advocate of our crazy experiment in democracy and capitalism, and the use of force. (His brother, we learn, at the outset, was killed in a robbery – so 150 years in future crime is rampant.) This thoughtful film is not a piece of militaristic jingoism. The battle scenes are great and they do go on and on but they emphasize the horror of an army using advanced weaponry against people using bows and arrows.

It is a romantic film and it supports the idea of the triumph and transcendence of love. That love conquers all is a mystical belief that is not supported by my observations. But on Pandora love is transcendent. And if it doesn’t happen here on earth why not give love a break on an alien world? The Gaia principle infuses the Pandora, in which life is one coordinate giant organism, and that’s another one of Cameron’s romantic notions.

This film is both a piece of left-leaning humanistic propaganda and an example of Heinleinian militaristic sci-fi. Not all that unusual a mixture – witness the out of sight *Starship Trooper* (Paul Verhoeven utterly subverts Heinlein’s militaristic message). We live in a democracy, not a democracy, because a division of the right leaning media conglomerate, News Corp. allowed Cameron to make a vociferously anti-corporate, anti-militaristic, pro-environmental, three-hundred-million-dollar-movie.

Every man's a critic but I know more about stereoscopy than the daily reviewers who are still emerging from the fog of red-blue cardboard eyewear. A major issue I have with the Cameron's compositional approach in this film could turn out to be important for the future of stereoscopic aesthetics. This has to do with the concept of orthostereoscopy. In its most rigorous form – which is entirely impractical, to tell you the truth – the stereoscopic projected image would be isomorphic with the visual field. If one applies the ortho concept to 2D projection situation it doesn't work either. I've written a column about it elsewhere, so I won't belabor it.

Cameron does something interesting. There are a number of flat shots in *Avatar* – flat as a board, usually long shots, that play like painted backdrops. They usually play behind the stereo window, or screen surround. It happens in the opening shot of the spaceship against the gas giant. I think I know why Cameron did it: He did it because that's exactly what you would see. If you were looking at a spaceship or moons hovering in front of a planet – given the human interaxial when you are looking at things that are hundreds of thousands of miles away – they would look flat. But in a stereoscopic movie, suddenly having shots that look like they're painted backdrops I think diminishes the effect. The orthodox point of view is to accept the notion of orthostereoscopy and to at least approximate it with zero differential parallax. But I think it would have been more fun to have the spaceship hovering with some parallax above the surface of the planets. I would have added some curvature or volume to the planet. One danger is that using this approach some people may experience the shot as appearing to be models or miniatures.

With shots that would normally have no stereopsis in the visual world and hence no parallax information on the screen, do you give them the stereoscopic depth cue? I argue that you should, because when you are looking in the visual field, depth is created by all kinds of cues that aren't stereoscopic, but also by your ability to move your head and other factors that I don't understand. In the visual world you cannot perceive the flattening of the background in the same way that you see it when you look at a stereoscopic movie. When you look at distant vistas they don't look like they're painted backdrops, for whatever reasons. When you do look at a distant vista handled the way Cameron has, it does look flat – and so it needs some treatment, some exaggeration if you will.

He does this again and again in the film for distant shots of jet copters flying over the jungle, in which there is little or no differential parallax information. I say differential because the value of parallax for all corresponding points is the same because the left and right images are simply laterally shifted to push the image behind the surround. I realize that Cameron has created something which is more nearly isomorphic with the visual field, but I would prefer exaggeration which I think would have been in keeping with the nature of the story and its visual style.

I know from talking to Jim that he's opposed to the floating window concept. Most of the action in this film takes place from the plane of the screen back into screen space. However there are a number of shots where objects (people) are played into theater space, but they don't appear to be played into theater space because they're not handled as off-screen effects. They are simply played that way to enhance the depth range, which is required because the parallax budget from the plane of the screen to stereo-optical infinity is only a couple of inches. Off-screen it's almost an order of magnitude large. What Cameron has accomplished in terms of orchestrating the depth effects is an example of remarkable modulation and a first for the live action cinema. The standard for stereoscopic composition and ease of viewing for animation has been set by Phil McNally of DreamWorks Animation and Rob Engle of Sony Pictures

ImageWorks in films they have supervised during the last five years, and Cameron sets the standard for live action.

But I think the guy who has taught Jim Cameron the most is Jim Cameron.

I have read that there are some people who were not comfortable looking at *Avatar*. I am an expert on stereoscopic displays, and I can tell you that there are two possible reasons for this: bad projection, or these people have anomalous stereoscopic perception. You repeatedly see people in the blogs and online talking about the breakdown of convergence and accommodation. The breakdown of convergence and accommodation, as I've said in another column elsewhere, doesn't apply for images on a big screen in a big theater – and they certainly don't apply for the low parallax values that Cameron used in his carefully composed shots in *Avatar*.

In any event, *Avatar* is a wonderfully interesting film. It re-creates an alternative world. Perhaps the best way to describe *Avatar* is that it's a trip, and if you get on board it's fun. Tomorrow I'm going to see it for the third time at the Directors' Guild with my kids. Julie's staying home.