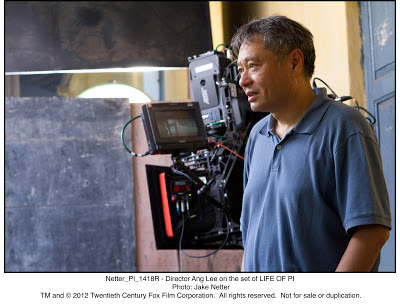
**https://www.flickeringmyth.com/2013/02/ocean-of-possibilities-making-of-life/**

**Ocean of Possibilities: The Making of Life of Pi**

FEBRUARY 24, 2013 BY [ADMIN](https://www.flickeringmyth.com/author/admin/) [1 COMMENT](https://www.flickeringmyth.com/2013/02/ocean-of-possibilities-making-of-life/#comments)

[***Trevor Hogg***](mailto:trevor@www.flickeringmyth.com)***chats with visual effects supervisors***[***Bill Westenhofer***](http://www.flickeringmyth.com/2013/01/image-conscious-conversation-with.html)***and***[***Guillaume Rocheron***](http://www.flickeringmyth.com/2013/02/image-conscious-conversation-with.html)***about their Academy Award winning work on Life of Pi…***

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“If I was a numerologist I would be upset because I missed by 10 days being on the project for 3.14 years,” jokes Bill Westenhofer who served as the visual effects supervisor for**Life of Pi** (2012).  “In August of 2009 Ang [Lee] came to Rhythm & Hues and asked the question of whether a digital animal or character looked more or less real in stereo.  We didn’t know the answer to that so he asked for us to do a shot of Aslan from the first **Narnia** [2005].  Ang wanted it rendered in 3D but didn’t want to change a thing.  Keep the fur the way it is and render without any bells and whistles.  We did that and all agreed it did look more real.  It had an extra sense of presence and being able to see more detail that helped with the experience.  A couple of years later, there was a summer where we went out to dinner Ang confided in the fact that I had followed his instructions exactly.  He was already impressed enough with the lion but also by the fact that I didn’t try add more detail to make it look better.  The fact I did what Ang asked helped him to trust us.”  Westenhofer has worked on number of animal based movies projects such as **Babe: Pig in the City**(1998), **Cats & Dogs** (2001), and **The Golden Compass** (2007) which won him an Academy Award.  “We had done digital animals in the past and tried to make them look as real as possible but then they get up to sing and dance and do something that emphasizes the fact that they’re not the real thing.   But here was a chance to make a tiger and make it be a tiger.  We had the best chance ever to fool our colleagues that what they were seeing wasn’t real.”

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| Bill Westenhofer |

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“Ang did previs the film so he spent a year working with Halon, a previs company, figuring out from the moment the ship sinks to all the way to the beach,” states Bill Westenhofer.  “Every shot was planned ahead of time.  He followed that closely during the shooting because of the logistical challenges of doing this.  Even though we weren’t in a real ocean the fact that we were on water at all in a tank it was still challenging.  To have what Ang planned was helpful to me and the whole crew.  We developed a pretty good relationship over time.  I had to get use to a lot of times he would ask for a “melancholy sky.”  Ang would use adjectives like that and you had to figure out what he meant.  It would be translating the artistic.” Ang Lee (**Crouching Tiger, Hidden Dragon**) had a different perspective about the cinematic adaption about a boy who loses his family in shipwreck and survives to tell to the tale.  “Ang talked about technical things but finished on opening day by saying he wanted to make art with us.  What was cool about this was I appreciated the chance to make art with visual effects which you don’t always get a lot of times.  Especially, when you hit the ocean the principle photography was a guy on a boat in front of a blue screen.  Everything else that is in there is what we added.”  The natural elements had a fundamental role to play.  “In regards to films there are not a lot of times where you spend this much continual time right at the surface of the water.  Even **Titanic** [1997] has water shots but then you go inside the boat.  But this was out there on a raft sitting on the surface.  Ang wanted the water to be as much of a character as the animals.  The water and sky were essential to set the mood on the scene and that had to be visually interesting as possible to keep the audience entertained throughout.”

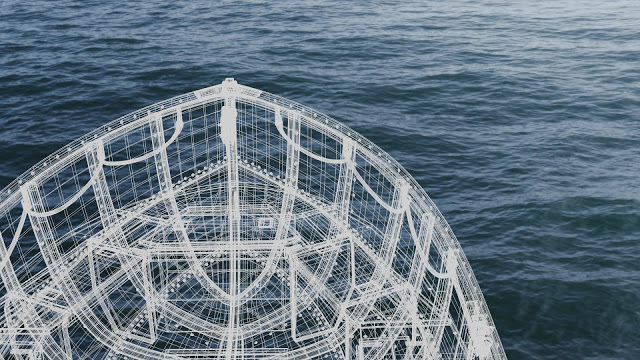
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“We did build-up a wall library but he’d say melancholy and might give some descriptions and then I would interpret that,” explains Bill Westenhofer.  “We had shots over the preparation of the film we had to shoot what is called High Dynamic Range Imagery.  We did multiple libraries, about 120 skies.  Some guy had the fortunate task of being sent to Florida for three weeks with one of our cameras and sat on the beach and when clouds would go by he would snap off a 360 view of the shot and sip Mai Tai for the rest of the time. That’s the gig you want in visual effects.  Forget supervising the whole thing I want to take a camera to the beach!”  The Man Booker Prize winning novel written by Yann Martel was not the only literary source referenced.  Ang is very methodical and research oriented.   Before the movie even started we sat down with a guy named Steven Callahan who wrote this book **Adrift**; he survived 76 days on the open ocean out on a raft.  Steven was helpful with talking about weather patterns and what you might see on the journey.  From that we built a continuity board with the script supervisor. We looked at the ocean currents in the Pacific, the weather expected on those days, and prevailing winds, and came up with our own justification for what certain things were and could fit into that move.  We knew colour and mood wise where the movie was going to go; that gave us a good start.”

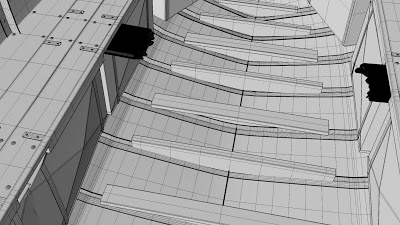
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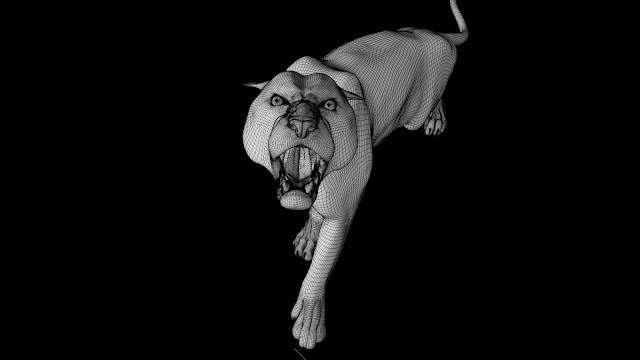
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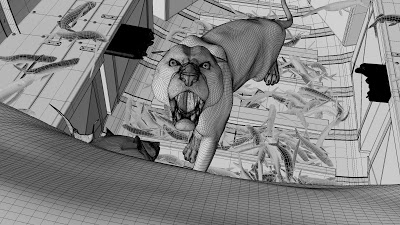
Digitally created animals feature prominently in the film.  “The only places where animatronics were used, one was when Pi [Suraj Sharma] catches the fish,” states Bill Westenhofer.  “We used half of it, the part within his arms to his nose.  We augmented the tail because the guy couldn’t get it to beat hard enough with the wire rig.  We did build a dead zebra on the boat but we ended up replacing it.”  Animal rights activists visited the production.   “We had to go through some lengths.  When questions came up we had to show that there was never a gaunt tiger, the one he pulls onto his lap is all visible.  We had to show all of the blank plates.  We did use a real tiger in some of the shots; it may be about 14 per cent of the movie.  We showed them all the clips for that.  The American Humane Society was down in Taiwan and were there supervising the tiger work we did use to make sure it was all done safely and not putting the tigers in any jeopardy.”  It is one thing to produce a CG animal; however, quite another to have it believably interact with a live-action performer.  “We do every trick in the book.  First of all I will say that Suraj is heads above lots of seasoned actors I have worked with.  In **The Golden Compass** we had animals running across the actors and that is still tough.  With Suraj you could tell him the tiger is going to be here and even if we didn’t supply him with anything you could see in his eyes he was imagining it and did a convincing job during that.  With that said we would do things.  We would put things such as highlights. Quite often my animation director would put on a blue suit, hop into the boat and be the tiger for when he’s fighting over the pole and the fish; it’s Erik [De Boer] who is catching the end of the stick, grabbing and shaking it for him so to give some resistance.  We do things like that when Suraj pulls the tiger into his lap.   We had a film version of the tiger with the head and the shoulders moulded out of our model with sand bags inside to give it the right weight and pull so he pulled that onto his lap; we replaced that with a digital version with hairs.”

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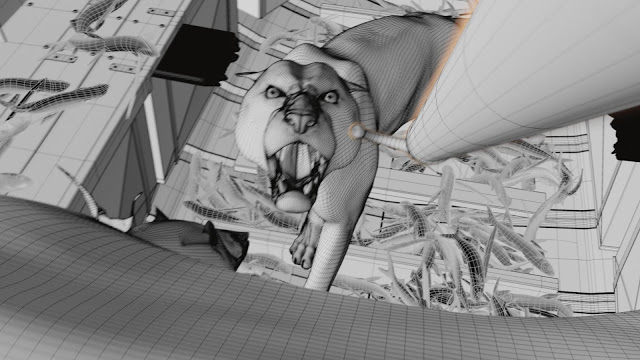
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Depicting hair realistically has come a long way in the digital realm.  “There are two technical advancements which were attributed to 15 to 20 per cent of the improvement,” states Bill Westenhofer.  “One is something called Ray Tracing when lighting the hairs themselves in the past you, it was so computationally expensive that you had to do all number of lights and big shadows.  Now computers are fast enough that we can render ray light bounces off the boat, hit the tiger, bounces back and get that whole thing working.  There is another little thing called Subsurface Scattering, especially, with clumps of white fur the light will come in one side, the hair is not completely opaque so it bounces around and you get some glow coming out the other side.  Those kinds of things add to the realism.”  Having to simulate wet fur was a significant technical challenge.  “It was one of those chicken and egg things where the position of the water will affect the way the fur moves but then there is water dripping off the fur, that water has to flow back off and the affects the surface you’re on.  It’s a mountain technical pipeline which is challenging.  There are some scenes especially during the storm where we are in the boat underneath the tarp, the boat rolls over and we see the water splashing around.  We started the shot with simulations creating a water surface and water moving around which gets handed to the animator. The animator places the tiger so you can see him; he’s floating on the surface and that gets handed back to the simulation guys to run a new simulation with the tiger as an object and that gets fed to the guys doing the fur.  Those were some of the hardest shots that we had to do in the movie.”

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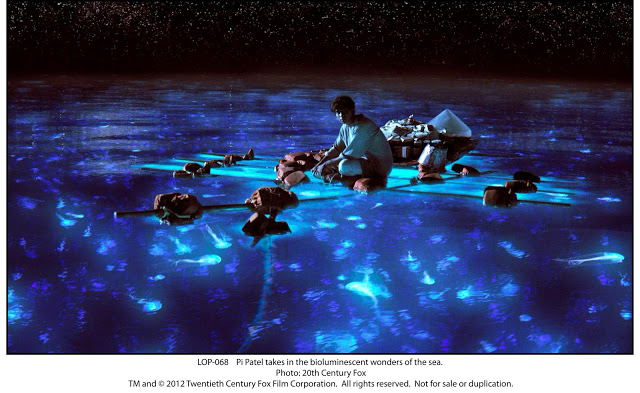
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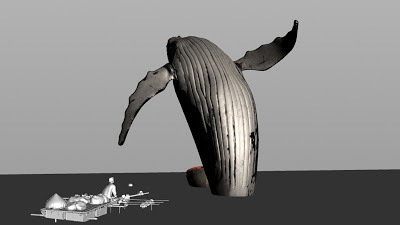
“What raised the bar on this one was having access to real tigers,” believes Bill Westenhofer.  “It was part of my calculus for deciding whether we were going to use real tigers at all because there was some debate about that.  Ang, the producer and I wanted to for a couple of things.  One, we would give ourselves a benchmark that you couldn’t hide from.  I saw some of the work early on.  We working our digital tiger, and you could look at it by itself and say, ‘That looks great.’  But when you put it side by side with the real tiger you saw we still had some ways to go.  It helped to hold our feet to the fire to make sure we delivered the real thing.  The second thing is by having real tigers there selfishly I got better reference than I ever had gotten in any other way.  For **Narnia**, for example, they paid a trainer for a couple of days for us to go capture some footage.  We got some good stuff, however, to have them there in Taiwan for eight weeks.  We got reference material of every possible thing you could imagine.  The paws moving and how they behave in certain environments.  That paid off dividends when we went to do the shots because we had whatever we were going to do with the shot.  First of all we decided what shots were going to be real and what weren’t.  We sat down with the tiger trainer and said, ‘The tiger can do this.’  We couldn’t put the tiger and the kid together in a shot for safety reasons.”  A blue screen composite was not a practical solution.  “Because this was on the water and stereo we couldn’t get the perfect alignment on the two passes without converting the whole thing in motion-control which would have killed a lot of the water interaction so we knew that wasn’t an option.”

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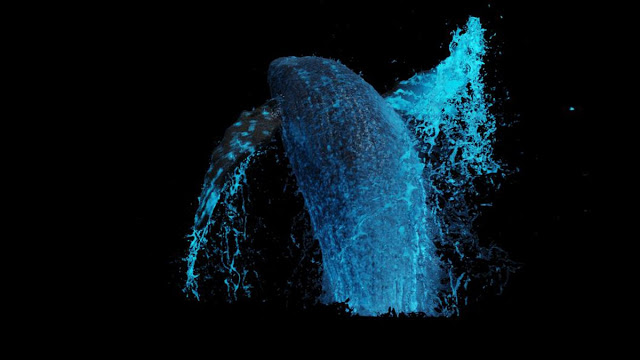
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“It’s tempting to make the tiger look at Pi to sell your point and then you do an animal folly,” observes Bill Westenhofer.  “We went through all of these hours of footage we had and selected a clip or a series of clips which made sense for the scene and would base our action on that stimulus.  It kept a lot of the imperfections the animals might give.  There is also a part of the technology you can make it real by a lot of minute attention to detail like when the paw gets placed down there is a shake that goes through the arm and the fingers twitch.   Having the footage to look at to better adjust it was critical in making it look real.  If we didn’t have the reference and tried to do that in the past we would animate something and say, ‘We know it’s not right. We need to jiggle some.’ Without a good reference point you’d guess and it would be okay but when we scrubbed through the frames and saw what it really does that was what made the difference to make this more real than we have ever done before.”  The director was the central figure in ensuring that visual effects assisted rather than overshadow the storytelling.  “That comes down to working with Ang.  It has to feel like a tiger.  You get a sense that the tiger is placed in the environment as much as anything else.  Coming out and discovering he is surrounded by ocean a tiger would be as uncomfortable as Pi would be.  It is about making him feel like he is part of the same narrative that is going on as Pi.  We weren’t doing a lot of ‘Ra!  Ra! Look at me!’ kind of things.  We wanted to keep him naturalistic and feel like he is a real tiger in the place.  If it was a tender moment where you are trying to look at Pi we would make sure that there was nothing in the background that is distracting and we saved that for the big wide reveals.  Quite often to enhance the story, we looked at the skies references and found something that would help convey an emotion for the situation.  One of my favourites is when Pi has survived the shipwreck, he’s floating and the orangutan comes on, the hyena is there and he finally realizes that nobody is going to come to get him.  Pi bangs on the side of the boat and starts calling for help.  I had some reference that we had shot that the whole crew went out a coaster guard cutter that Taiwanese government had allowed us on.  There was a moment where the sea started to calm down and there is a little bit of openness in the clouds that created the beautiful silver patina on the surface; using that in the background conveyed a sense that it was beautiful but felt so desolate and lonely that you could sense through the imagery that Pi is starting to despair.”

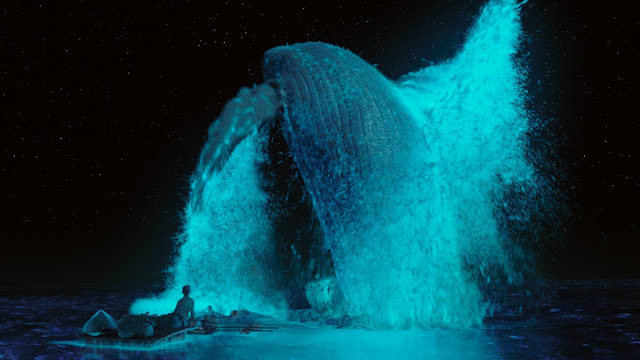
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“We pushed the envelope on some things such as the amount of luminescent on the whale but it still had to be grounded,” states Bill Westenhofer.  “Sometimes you have to be careful.   If you push too far even if you’re rendering it real it’s going to take you out.  Ang had ideas what the lifeboat would do and there were times we had to pull him back.  You could create the boat flipping over end or something.  It was an early previs that had something like that and we looked at it and said, ‘We can render this and try to make it as real as possible but the audience is going to know that didn’t really happen.’  In a way, you want to keep things as real as you can to help the audience to accept it without having to take a huge leap of faith.”  The number of visual effects shots found in the **Life of Pi** is deceptively small.  “There are 690 shots which by today’s standards sounds low. There are only 960 shots in the entire two hour runtime.   Ang for a number of reasons wanted to do it in 3D.  You wanted to avoid too much when you have to also because there are a lot of slow moments. There are a lot of long shots. There are more 2000 frame shots in this film than I have worked on in my entire career to that moment.”

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Rhythm & Hues Studios was the main visual effects vendor on the movie.  “We went with MPC for the storm sequences. A lot of it had to do with their work on the Pirates movie.  They had done a lot of heavy simulation water work which was critical for doing the ocean in the storm sequences.  They also did some animal work.  We went with BUF for the tiger vision sequence where we see the sun through the water and the sperm whale turned into an amalgamation of different animals and breaks apart; that whole sequence had a journey of its own.  It started as a watercolour idea.  BUF is very good at a lot of abstract visual effects work.  They were a great company. It went more toward surrealistic side but it was beautiful and pretty.  The actor who played Pi had to go from healthy self to get really skinny.  We did go through a diet and training regiment to get Suraj as thin as possible but Ang wanted him to be a little skinnier once he got to the island and the Mexican beach.   Lola VFX did the same stuff they did with **Captain America** [2011] to make the actor skinny. Crazy Horse did some of the matte painting work in India. Some of it was for symbolic insertion.  For other things, Ang had an expert who lived in Pondicherry, India as we were shooting in the real place. There was a moment where we started to roll on this one particular shot.   A road that had been paved and it was supposed to be a dirt road; we had to dress it with the Art Department so the visual effects had to replace with dirt. Ang wanted the authenticity there.  yU+co is generally a title company but they did some of the montages in there where we see Pi and he is going through various things.  We did multiple imaging which hasn’t been used a lot in 3D movies to date where you do a 3D collage of different takes. It was something we had seen in 2D some of our research which was really nice.  That added some extra spice to the montage sequence.”

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| Guillaume Rocheron |

“At the start of the summer of 2010, the script was still being worked on and the previs was on-going,” states Moving Picture Company VFX Supervisor Guillaume Rocheron.  “I had a meeting with Bill Westenhofer, the studio visual effects supervisor, and we discussed the sequences that we would be involved in.  We did do it in the past some fairly large scale effects work with a lot of calculation involved.  The Shipwreck Sequence and the Storm of God Sequence were a good fit for us; those were two sequences that weren’t involving Richard Parker [the Bengal tiger].   They were minutely complex in terms of technology and to put together so it was a perfect chunk of work to give to us.”  The man behind the camera knew what was needed to tell his story.  “The entire section of the movie that happens on the ocean had been done through previs so Ang was already fleshing out the shots he wanted.  We did a lot of research to take the previs and translate it into something that looks photo-real.  For Ang, it was important to treat the ocean like a character.  He wanted to be able to treat the waves as character animation.  We spent a lot of time figuring out technology and everything that makes an ocean look real.  Unfortunately, you don’t find a lot of footage of a big ship or a little lifeboat in the middle of the Pacific Ocean and that giant storm.  What you have to go with mostly descriptions of what those sea conditions are like.  We used, for example, the Beaufort  scale which describes different levels of storms and sea conditions.  We knew that in such storms the waves are 800 feet long, 50 feet high and there is a period between 12 and 14 seconds between each wave. We know that the wind is blowing at 70 miles per hour so it makes a lot of spray and white water.  There is a lot of rain everywhere and then we took those few minutes of footage we found. The storms were not that big but they were interesting to see the complexity of the water and what the characters think of the big storm in the middle of the ocean.  We put that all together and presented that to Ang because it was important to ground everything we were doing into reality.”

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“Ang is meticulous in making sure that whatever he is putting into a movie or whatever he is showing there is a reason for it and there is a sense of reality,” states Guillaume Rocheron.  “We had to do the same thing.  As I mentioned earlier Ang treated the ocean as a character and we did the same thing by doing a character study.  How does an ocean move?   What does it look like?  What can we make it do?  What is real?  What would make it look unreal?  After that we agreed on the common language and look with Ang and Bill, we need to find how to make that.  We need to develop the technology to be able to do all of these things.  One of the reasons we got involved six months before the principle photography started was so we could flesh out the technology and what was achievable and how we would do it.  Things that we needed to shoot and how we would shoot it.  It was a long time trying to figure out what such oceans are looking like and then how we would actually do it and put it on the big screen knowing that everything will have to be in 3D.  One of the main challenges was to embrace the 3D format and immerse the audience into the footage. Ang decided to use long takes. Very often these action sequences are intense sequences you have a lot of fast cuts. It’s fast paced.  It’s hectic and puts the audience in a certain mood but you don’t really see what’s happening.  Ang went the opposite way. If everything goes that fast in 3D out on the Ocean and with all that complexity it is going to be hard to watch.  Ang slowed everything down so the audience has time to look at everything.”

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“MPC has done only a bit more than 100 shots but those 100 shots take up 12 minutes of screen time,” notes Guillaume Rocheron.  “For us, that was one of the main challenges more than the technique of 3D itself.  Producing 3D images the hardest more than this was that you have a long time to pay attention to the details.  We have two shots in the Shipwreck Sequence.  The underwater shots where Pi looks at the sinking ship and realizes that he’s losing all of his family and then he comes back up to the surface and finally manages to get back onto the lifeboat so we have two shots in that sequence that are back to back and each of these shots are one minute long.  Over two shots we make two minutes of film.  It makes it difficult because over one shot you have a long time to look at everything.  To cover 12 minutes of film from my experience on movies I have been working on you generally split that between 200 to 360 shots and here the average shot length was probably three times longer than what we were used to doing in general.”  The project provided Rocheron with a unique creative opportunity.  “You can’t put a kid in the middle of a storm in the middle of the Pacific Ocean and you can’t put the kid in a lifeboat with a tiger.  If you don’t do visual effects then you can’t tell the same story.  Ang is a story driven director.  What was great for us in terms of the visual effects was that we were part of the filmmaking process.  Ang needed us to not only make a bigger explosion or dramatic action sequences but he needed visual effects to be able to tell his story. That’s why it was all about helping him to tell the story of the film and making art instead of purely making images. “

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“Ang had a survival expert who had been himself in a shipwreck and stayed out on the ocean for 70 days or something like that,” states Guillaume Rocheron.  “It was interesting because he was gave us a lot of advice.  The ship sinks because it is not align with the waves anymore and when you’re down in the water this is the feeling you get.  It was great to give us that extra information to make it feel real because it’s more the feelings and certain moods than the mechanics behind how the ocean is working. For us to base everything we do on something that is real.  It is that rule when you make computer graphics you have a lot of license to do whatever you want.  You start with a blank sheet and you can be like, ‘This is how we want the ocean to be.’ At the end of the day what we are trying to do with anything we do is to make it as real as possible and it is to reproduce reality.  This is going to sound a bit strange but we say often, ‘There is nothing more real than reality.’  Anything real we find and can use as a reference, a guide and as a target.  That’s why everything [footage, descriptions] we could find were key in making the images work.  For us making **Life of Pi** was an interesting challenge because producing that ocean with that complexity I don’t think it has been before to that level.  It was interesting with those long shots where you have time to look at every single detail.  One thing that was interesting it is not only being able to produce photo-real looking images. The technology involved to produce those images is huge, the logistics involved, the software, and the simulations; that’s why I always say, ‘Lets always aim for those bits of reference.’ Because no matter how much technology you use or how many people you put at it and how many people are looking at the problems, at the end of the day you should never forget that your goal is to match reality and then tweak it for the director. This was a key for us.  There are a lot of beautiful skies or crazy storms but when you look at everything it is a film shot entirely in a wave tank.  It is never in the ocean.  Everything that is in the film exists.  There is something like this in nature.  You should look for it.  You will find reference photos or descriptions of everything in there. It’s just been beautified for the film because it’s about making art and pretty images but everything is based on reality.”

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“One of the hard things was not only did we have to simulate the ocean but we had to put all of those animals into the shipwreck and the Tsimtsum,” states Guillaume Rocheron.   The big ship is always digital. There are only small deck sets for when Pi is on it. Often we had to full digital shots because as soon as you get too wide and can see the lifeboat is moving up and down with giant waves there was no way to shoot that in the tank.  It was managing all of that complexity having digital versions of Pi, the lifeboat, the zebra, 15 animals, the big Tsimtsum, all of the ocean, and put them together to make a complex sequence and pretty looking images.”  Seamlessly blending the various elements was no small task.  “That’s the challenge.  Making sure that everything is integrated. We develop our technology to be able to treat the ocean like a character which meant being able to art direct the performance of the ocean instead of relying purely on fluid simulations.  Instead of pushing the fluid simulation button and going, ‘Lets see what this going to give us.’ It was like everything was carefully animated by animators so we would have animators animating the ocean surface.  Once we had the ocean surface we would animate boats on it.  Once we had the boats we would animate the animals on them.   Once everything was animated together we went, ‘This is the layout of our shot. This is the animation pass of it.  Now we can take that animated ocean and run big fluid simulations on top to make it beautiful and move like it’s real.’   But we would end up changing what was animated.  If a wave hits itself against a part of the boat at a certain moment of the shot it is going to end up doing this.  You can keep working your character animation. It’s getting that look. Once you have your simulated ocean we’re going back to the animation of the characters to refine the additional detail [like all of the spray and white water].”

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“You put the lifeboat in the wave tank and start rolling the waves,” remarks Guillaume Rocheron.  “You have the camera filming the action but between different takes the wave pattern is going to be slightly different so the lifeboat is going to go in a slightly different place and the camera needs to go to different spots to follow the action properly.  It is hard to control.  On-set you start putting rigs and cables and things like that to try to control it as much as you can. But this is the difficulty of working with water because it’s a moving set, it’s constantly moving. Every single take it is going to move slightly differently.  When you are on firm ground on a set you can put marks on the ground to make sure that everything is exactly the same every single time.  This analogy is the same when dealing with big oceans in CG.   Fluid simulations are trying to simulate what real water would do and real water would do something slightly different if you change the parameters every single time.  It’s our work to be like, ‘How do we not change way it hits the ship every single time we change the parameters?’  Ang asks us, ‘Can I have this wave a little bit bigger?’  You’re going to have to program the fluid simulation to say, ‘The third wave is going to be bigger.’ But then you’re going to have ripple effects on everything.  What we did was being able to animate the water surface and control the simulations to be able to give that art direction possibility for Ang the same way on-set you would rig the lifeboat at the bottom of the tank so it would stay on the spot between every single take.  We would do the same sort of thing where, ‘The wave is going to hit the side of the Tsimtsum at frame 24 and at frame 46 there is a second wave hitting and the wave you see at frame 150 is 47 feet high and needs to stay up to make the composition of the shot nice and tells the story that Ang wants.  You want to be able to keep the parameters and art direct on top and simulate the movement of the water without changing those key things; this is the complicated thing dealing with large simulations but at the same time making it art directable for a director.”

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“When you see something on the screen there is nothing automatically animated,” says Guillaume Rocheron.  “Whether we do a character or a breaking wall, we control every single aspect of the images we want to produce.  For me, as a visual effects supervisor I want to be able to provide the director with full control.  If he asks me, ‘I need that wave to hit five frames later because it doesn’t work with the actor’s eye line.’  I need to be able to do this.  I need to be able to animate everything.  We’ve been wanting that possibility of keyframing every single wave because this is ultimately what makes those shots doable.  It is a daunting thing because we keyframe all of these things and then run those big simulations on top of everything to make things look real.   But for us this is our guarantee that we have actual control and do what Ang is after instead of relying on the computer to give us random simulations and hope that one of them will do what Ang’s after.  It’s all about trying to control your end result.”  The cinematography of the movie was a major asset when producing the visual effects.   “The photography of **Life of Pi** is one of those things where you see that Claudio Miranda [**The Curious Case of Benjamin Button**], the DP, did a fantastic job.  The whole ocean section of the film is shot in a wave tank surrounded by blue screen. We could do a visual effect, extend the ocean, making it look like it’s the ocean and put in the skies Ang wanted.  When you look at it you don’t think, ‘Oh, yeah.  It’s shot on set.  The lighting looks a bit artificial.’ Good lighting is key for us to be able to make our images look real because if something is not lit nicely it is even more work for us to make it look real.  That’s one of those things the lighting on **Life of Pi** is absolutely stunning and it was a fantastic base from us to work from.”

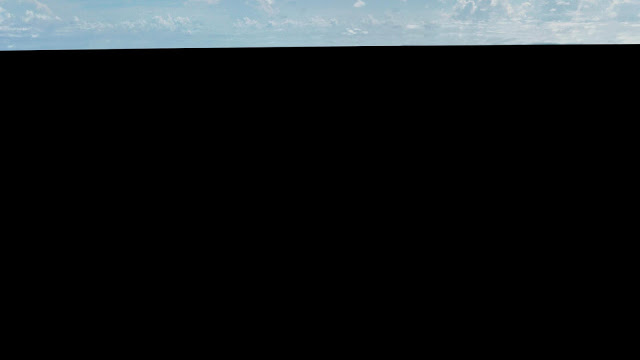
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“We shot a handful but not many shots with Rhythm & Hues,” states Guillaume Rocheron.   “There were some shots where you would see Richard Parker in the lifeboat; it would be pretty big in frame so we would create a CG ocean, make plates and give that to Rhythm & Hues so they could animate the tiger in there.  Sometimes we were exchanging back and forth because our water had to interact with their tiger so there was a lot of back and forth to make that work.”  Maintaining a unified look was achieved by way in which was divided between the different visual effects vendors.  “Every time you see an ocean that looks stormy, it’s a big storm or every time you see the Tsimtsum that is a MPC shot. Every time you see Richard Parker this is a Rhythm & Hues shot.  The look is consistent this way.  Some shots we have to blend things together.”   The technological trend sweeping over Hollywood was seen as a useful storytelling tool.  “The 3D plays two roles.  It immerses you more because you get that sense of depth and you feel really immerse into the film. The fact that Ang uses long takes to showcase everything and is reinforcing that feeling [that the audience] is immersed in the 3D. This is one of the successes of the 3D aspects in my opinion.  Often 3D is not used right.  You have fast cuts and all those sorts of things.  The 3D is cool but hard to watch because your brain does not have time to register and appreciate it. Ang has done something interesting by having some fairly slow camera movements and long takes so you could fully appreciate it in the 3D format.  Ang didn’t shoot that movie as if he was shooting a 2D film.  It is shot completely differently; that’s what makes it such a unique visual experience as well.  You haven’t seen something shot that way before.”  Rocheron remarks, “I love the shots where Pi goes underwater and swims down. The ocean is raging over him and big crashing waves.  You see all of those bubbles.  He goes further down to avoid being trapped in the crashing waves.   You get that pure view of the ship being completely submerged and sinking down.  It’s a long shot and we worked on it for months but the visual result is great and emotionally strong.  It’s a beautiful shot.”

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“The biggest challenge was to blend live water into 3D, especially, with stereo because there is no hiding at all,” reveals **Life of Pi**Visual Effects Supervisor Bill Westenhofer.  “Adding to that we had a custom tank built in Taiwan. There were some qualities about the ocean that Ang wanted to capture that all the existing wave tanks couldn’t recreate.  One was he wanted to avoid the bathtub effect.   A typical wave tank you put a wave generator and they bounce off the wall and make chopping swells.  It’s good for storm stuff but doesn’t work for open ocean work we needed so the wave breaker went in.  We wanted to create that open ocean flow that slowed up and down a large volume of water. We had a company that does theme park wave tanks come in and build a system that is as close as they could to recreating that.  We managed to get a four foot swell and fourteen second current which was as good but Ang wanted it to often feel even bigger.  We ended up having to artfully take the scenes of the tank and map that onto our digital ocean that had the bigger swells. To find the way to blend the edges where the flow of the digital water started to change and finding ways to take the waves that were moving through the foreground in the real wave and have that continue into the stereo.  We had to develop our tools to map frame by frame when different wave peaks were going by and load that into our curves for the macro surface and work on the fine details to get that to match up right.  All that would get us to 85 to 90 per cent of the way there and finally in the composite we would often have to make little adjustments in the stereo depth.”

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As for whether 3D will become an accepted cinematic tool like sound and colour, Bill Westenhofer remarks, “I don’t know.  It will be interesting to see how this plays.  When I first started telling people I was working on this movie and I said it was being shot in 3D their initial reaction was, ‘Why is that 3D?’  What they are saying the preconceived notion of 3D is that has to be an event film.  It’s got to be explosions or Avengers [2012] within the frame.  Ang wanted to give the best shot to show that drama can be enhanced by 3D; that was his goal. From the smaller responses I have read it seems to be taken in much of the way he hoped.  It will be interesting to see how that is accepted by the public and whether or not they do ask that question.  I suspect that there may be something like that at the time when colour was being advanced.  Why does this movie have to be colour?  Colour is more ubiquitous with movies perhaps.  This will be a good test to show whether there is an appetite for the public for 3D as drama and adding to the film versus an event.”  A particular scene stands out to Westenhofer.  “You will see at the end of the film Pi lands on a floating island which is covered by 60,000 meerkats. There was a lot of hand animation. That was some of the last stuff we did on the film so by then we had been working on this picture for a year. We had a lot of fun cracking ourselves up with little things hidden in the background. What was cool I saw Suraj at the New York Film Festival; it was the first time he had seen the movie.  Of all the things Suraj talked about he was most blown away by the meerkats. To him you’re standing up in a tree swatting at air.  He’s like, ‘I swatting at air and now I’m covered by meerkats.’  It was fun to hear his reaction to that.”

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***Many thanks to Bill Westenhofer and Guillaume Rocheron for taking the time to be interviewed.***  
 ***Make sure to visit the official websites for***[***Life of Pi***](http://www.lifeofpimovie.com/)***,***[***Rhythm & Hues***](http://www.rhythm.com/home/)***, and***[***MPC***](http://www.moving-picture.com/)***.***  
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"Ocean of Possibilities: The Making of Life of Pi"