EXPLODING THE FRAME: Seeking a new cinematic language.

In cinema as we know it, there is a language of filmmaking which has developed (wide shot, close-up, over the shoulder, stage line, moving shots, static shots, effective edit points, sound cuts, music cuts, etc.) which we all use, even as we bring our own individual styles to making films. As far as I can tell, all of these working rules are dependent on the image being shown within a frame. It is the common frame of reference for all of our work in film or television.

The new 70mm gigantic screen film, with projection screens 60 to 80 or 90 feet wide and 3 to 5 or 6 stories tall, and with film frames 5 to 10 times the area of 35mm film format, has created cinema projections where we can't see the edges of the frame. The whole group of giant screen film formats have one thing in common: the gigantic images extend the edges of the projected film image to the edge of our peripheral vision or even beyond it. I believe we are not just talking about bigger films here, but a new cinematic world. It is a frameless view, an unframed moving image medium. I think the language of the gigantic screen cinema is still being invented, and I believe it is different from what we, both filmmakers and audiences, have come to know and understand.

While we are inventing this language, I think there is a key technical issue to consider throughout the production of gigantic films: all of the filmmaking tools which we use to create these giant screen images - the storyboards, cameras, viewfinders, editing machines, workprint projectors - look and work just like the tools we have become experts at using to make framed movies, to make small screen films. The idea of redefining the filmmaking tools for giant screen filmmaking is at the heart of this paper. I spent the summer of 1989 on a fellowship doing research to explore the similarities and differences between small screen filmmaking and giant screen filmmaking. I define small screens as any film or video image where we see the outer frame as part of the image. I did this fellowship research just after I had completed producing and directing my first Imax™/Omnimax film[1].

I consider myself a third or fourth generation giant screen filmmaker. This whole field of large film format goes right back to the beginning of the movies, but it really became technically viable with the creation of the Imax rolling loop projector, built for the 1970 World's Fair in Osaka, Japan. Moving images created from 70mm 15 perforation wide frames could be projected solid and steady at 24 frames per second on gigantic screens. In the last twenty-five years, this field of production has grown broadly, supported in large part by an extensive group of large screen theaters [mostly Imax and Omnimax theaters] in science museums around the world. Now what might be considered fifth and six generation filmmakers are joining in the production of these films, and theaters are spreading to all sorts of venues and these projection systems are now an expanding part of the motion picture business.

I think one of the quickest ways to describe this new cinematic world comes from Roman Kroiter, one of the founding members of the Imax Corporation and a first generation giant screen filmmaker. Roman suggests putting a cardboard box over your head with a rectangular shaped hole cut out from its bottom. Look through that rectangle. That is the view of the movies, of TV, of small screen cinema as we have come to know it. Then take the box off your head. That's the gigantic screen view. Unframed cinematic visual space.

I'd like to expand that frame of view. Imagine watching a film shot on a TV set. Imagine it's an image taken from a helicopter flying over the scenery tilting left and right. What effects of motion do we feel when we watch this shot on TV? The horizon line that grounds us is the floor where the TV is sitting. The movement is seen as happening inside the TV box - beyond the screen. But what happens when we see an aerial - that same aerial shot - projected on a massive screen five stories high and 80 feet across, where there is no outer frame,

[1] The terms Imax, ImaxDome and Omnimax are the names most associated with the gigantic screen format and are trade names from the Imax Corporation, the largest manufacturer of these 1570 projectors and cameras. In 1997, the Imax Corporation received the sole Technical Achievement Academy Award™ Oscar™ for the creation and continuous advancement of this unique format. Other companies are also manufacturing projectors and cameras for giant screen theaters.

where the image extends beyond our peripheral vision? Our horizon line, the visual horizon which completely fills our view, is now the horizon line inside the image, and when it tilts, we feel as though the whole theater is tipping and tilting - like the theater is moving. What is the difference from the TV shot? The horizon line in the gigantic unframed image becomes our ground, our floor, rather than the floor supporting the TV, and the perceptual experience moves onto the audience's side of the screen.

I believe that this sensation - this audience sense of movement - is at the core of developing a new cinematic language for frameless filmmaking. I have concluded that, for the sake of consistency, the sense of audience movement needs to be applied to everything seen and experienced in any gigantic screen film - not just flying shots. The movement sensation of the theater must be accounted for throughout a frameless film, in shots and from shot to shot. Either the audience is having a first person experience or it isn't. This idea represents a complete shift of approach in filmmaking, where the audience experience is the first order of focus, where all of the action occurs on the audience's side of the screen.

In accounting for the sensation of movement, the filmic experience has moved from passive, from being held in a frame, to active, to becoming the engulfing reality with the audience present within the filmic events. In frameless film the audience becomes the main character in the film.

The idea that all the film events are happening on the audience's side of the screen is a complete reversal in design and composition from standard production. And it is from this new filmic outcome that the creative work of filmmaking takes a radical turn. From the moment I, or any of us, get an idea for a gigantic screen film until it is showing in such a theater, every production tool we use along the way has a frame around its image. The sketches, the storyboards, the cameras, the editing machines, all present images seen within frames. These tools are all practical and cost-effective for filmmaking, but throughout production the entire film crew must dive through those constantly present frames and be on the other side where the viewing audience's frameless experience will occur.

All of the filmmaking equipment we use during production gives a view that is like putting that cardboard box frame cutout back over our heads. All through the stages of production we see small framed images. Not only are the images framed, but also if the cardboard box were a camera or editing table, I would be seeing an image that is greatly reduced in size, compared to its projected size on the giant frameless screen. Working rule #1 for me throughout frameless film production is that the massive size of the projected image must be considered first and foremost, and that every aspect of the production must be reverse-designed, reverse-engineered from how the image will appear and be perceived when projected on the gigantic screen.

For the giant screen frameless film, everything in front of me is a part of the shot. I have changed my former style of making a telescope-like circle with my hand for rough framing to holding the back of my hand flat across my nose. This view gives me a clear sense of the design of a frameless shot. (I noticed this framing method while yawning one day.) This technique helps me unframe my shots for the entire production team.

I have made a rule for myself that everything should be perceived as in focus from the foreground to the mid-ground. For images on the gigantic screen, I think that out-of-focus foreground imagery creates cues of falseness for an audience. In the real world, we can focus at will on any object, close or far. The frameless space of giant screen cinema can almost seem like the real world, and filmmaking artifacts such as soft foreground focus can work against the illusion.

In the American Cinematographer Manual, the section on depth of field reads, "The depth of field of a lens is the range of acceptable sharpness before and behind the plane of focus obtained in the final screened image. It should be understood that the determination of depth of field involves a subjective sensation that requires taking into account the condition under which the final projected image is viewed." [Page 161, 7th Edition]. Depth of field is inversely proportional to the size of the projected image, and becomes foreshortened as images are projected larger and larger. The depth of field is an artifact of the optics of the lens and is only viewable through the camera to a degree. The technical specs of lenses need to be used for judging the actual available focus.

I think that any camera movement [dolly, pan, crane, etc.] is actually perceived in a giant screen theater as magical audience movement. A technical question arises about how fast objects can move on the screen, or how fast can the camera move, and still create the illusion of movement? Movies create the appearance of motion from lots of still frames being projected so fast that we don't perceive the blanks between the frames. This persistence of vision is also tied to the screen size. There is greater image displacement on the gigantic screen, and "persistence of vision" breaks down if the camera or object moves are too fast.

On the huge screen, camera movement and people movement can easily translate into a dreadful strobing jitter, because of the amount of image screen shift between individual film frames. For camera movement, I estimate, from discussions with my colleagues in the giant screen film community, that a good camera panning rate to be 1° of arc per second. Such movement can seem interminably slow on the set and will create a move that looks just right when projected on the giant screen. The challenge for controlling the rate of moving objects is more demanding, mainly because the simplest of movements - such as human arms swinging while walking - can translate into a broken blur when greatly enlarged in projection. Being aware of this giant screen design constraint is the first step in getting rid of such unwanted artifacts.

Seeing the film on the massive screen really is different than even seeing it on the biggest regular screen. In the editing room, details which will be plainly seen on the giant screen are just not visible, including nuances of performance, camera platform jitter and camera starts and stops, and sometimes whole parts of a shot. It is important to make 70mm contact prints and to screen as much material full size as the budget will allow. The 35mm workprint printed down from the 65mm negative or a video transfer will not give the information necessary for filmmakers to really know what the final scene will look like.

Film making artifacts like depth-of-field details are not really visible in the editing room. While watching the film on an editing machine with a 20 inch screen, the image will appear to have more apparent focus than when it is projected on a screen which is 80 feet across and 60 some feet tall. I project the 35mm workprint copy of the film as large as possible as often as possible. I have ruled out using non-linear video for editing gigantic screen films, except for making a first rough, test edit, because it does not enough image information about detail or steadiness in video to really see what's in a giant screen shot. A particular phenomena which I have found most interesting in frameless screen filmmaking is that cuts/edits from one image to another, rather than making a new image appear to the audience, can create a sense of an instant subtraction of the key object. On the editing table, the new incoming image may appear only an inch away from the outgoing image, but it can be 10 to 20 feet away when projected on a full size giant screen. It can appear that the thing that the audience is looking at just disappears when the incoming object is partway across the giant screen. This is the reverse of the way we expect new shots affect the audience.

The giant screen theaters all have grand six-channel stereo-surround sound systems. I have hardly mentioned sound, but it is not an afterthought. In fact, I think the sound tracks for these films should be designed first and then the pictures built to it. The power of the sound track drives the gigantic pictures. I have heard it said that sound is 50% of the giant screen film. I disagree. I think that picture and sound together create a 100% experience and neither exists without the other.

After working almost exclusively in the Imax/ImaxDome-Omnimax 15 perf (perforation) 70mm and Iwerks 8 perf 70mm film formats for the last 13 years, I still find it necessary to get into a theater at least once a month to see films projected full size. The size of the screens is really challenging to keep in mind. Sometimes I notice a five-story tall building on the street and my memory is jogged into recalling the magnificent scope and size of the gigantic screen. Even with experience, it is easy to underestimate the vastness of the screen surface.

It is a challenge and a necessity to see old films made in these unique formats, and it is a must to see them on giant screen. There is so much to learn from the over 60 films already made for the giant screen, such as framing, angles, focus, editing, sound design. It is getting harder and harder to see the older films in the theater, and there is so much to learn from every film that fits a gigantic screen. For working in the frameless film format, I have recently added the term "Designer" to my "Director/Producer" credits to take into account how I am creating the architectural experience of every shot and sequence for the audience as well as creating

the filmic experience.

Exploding the frame off of the film image raises so many interesting and exciting questions about the cinema language to use in this new medium. Do any of the common rules of cinema work? What is a close-up in the gigantic cinema? What is a wide shot? Is there a "reverse angle" of the current scene, an image we see so often in TV and feature films? How do we create sound with the appropriate spatial sense? What is a sequence on the giant film screen? What happens to cuts from wide shots to close-ups, when there is no frame to contain the images? Where can people or any object enter and exit on the screen? TV or feature film sequences can visually bounce around inside the frame because it holds the images. No such safety net exists with the gigantic screen's frameless visual space.

There is such a list of questions about this expansive cinema yet to be answered, and it is quite logical to ask these questions now. If we look at the first twenty years of the movie business, there was no formal or even informal language of the screen. As the newness of movies wore off, a language of cinema was needed and it grew out of the work. The giant screen format is now only a little over twenty years old, and I think we are in that same place historically with the frameless giant screen, as it seeks its own language.

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Bibliography: Clarke, Charles G. ASC and Walter Strenge ASC, Editors; American Cinematographer Manual, American Society of Cinematographers, Hollywood, CA 4thEd. c. 1973.

For some inspiring ideas on creating the new cinematic language for this frameless film format, I recommend: Rudolf Arnheim's book on art The Power of the Center: A Study of Composition in the Visual Arts [University of California Press, Berkeley and Los Angeles, CA. c. 1988], and his now classic text Film As Art [University of California Press, Berkeley and Los Angeles, CA c. 1957] originally written in the 1930's and continuously in print for over 60 years [Over 75 years now, in 2008].