

Communicating Color From Set

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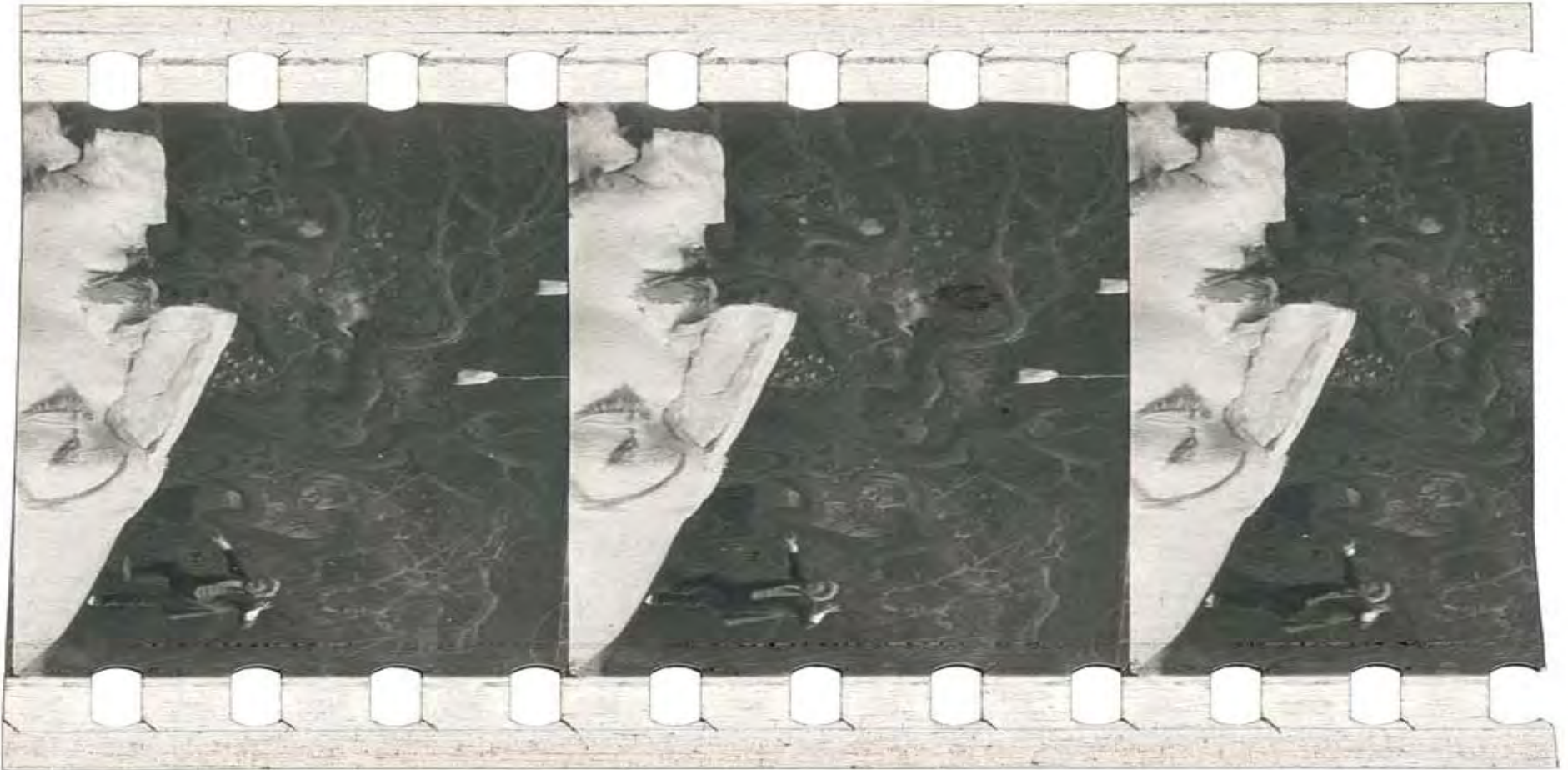
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Motion Picture Color





Motion picture color

- Color Management
- Look Management

What Makes Up a Production?

- **Pre-Production**
- **Production**
 - Onset
- **Post Production**

Pre-Production

- Story boards
- Concept art
- VFX Pre-Visualization

Pr

- Lights, Camera and Action
- The image is shaped by a combination of digital control and changing the lighting onset
- Dailies



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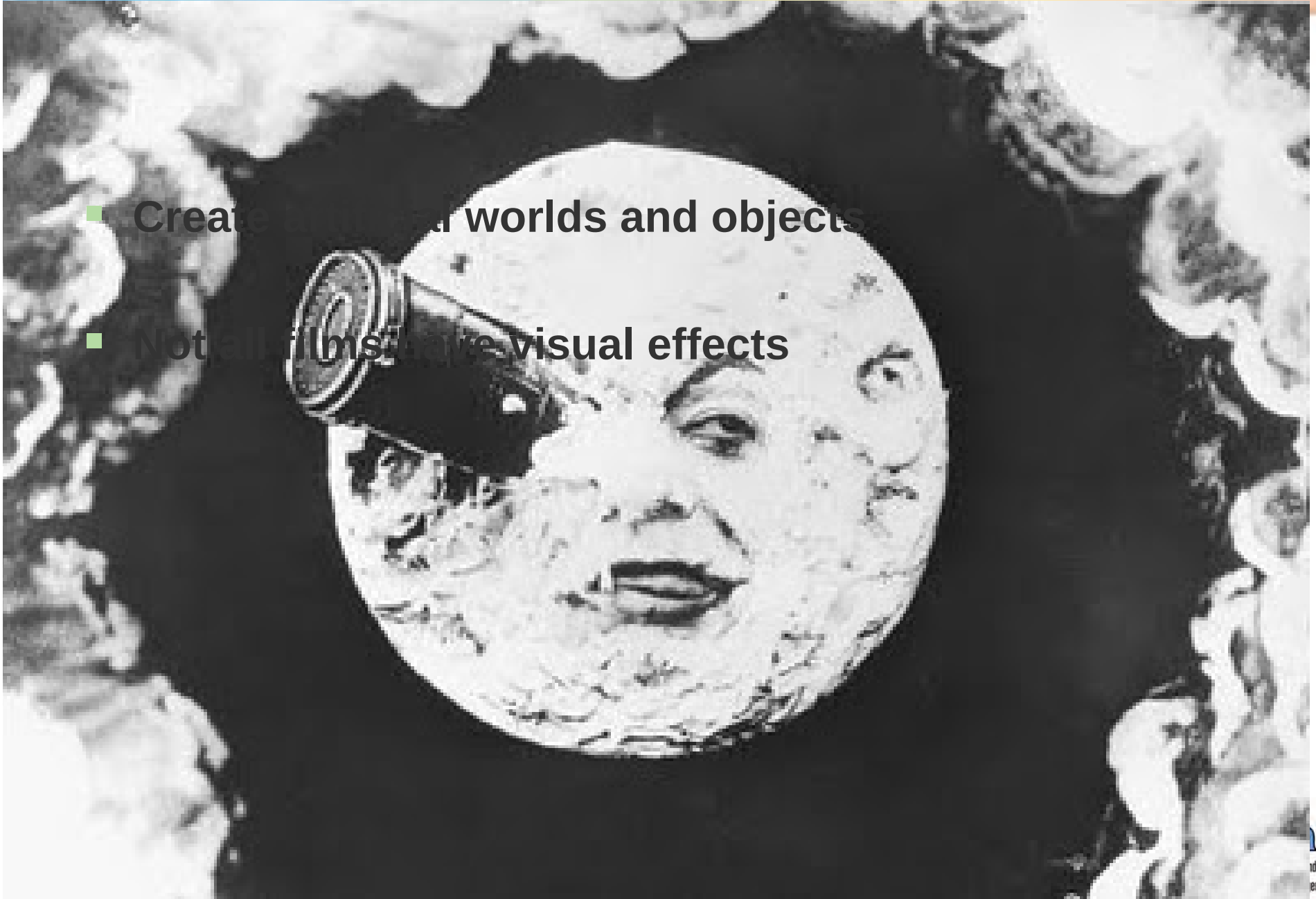
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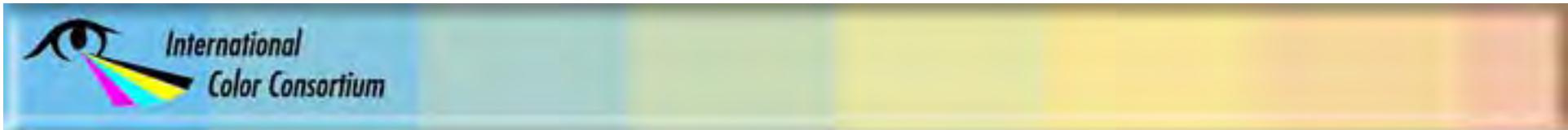
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- Takes the various takes of a movie and combines them to best tell the story
 - Making dailies media
 - Editorial temporary cuts will represent the movie until the digital finishing step

- Create new worlds and objects
- Not all films have visual effects



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- Uses very skilled artists and highly specialized to allow for fast and detailed color alteration
 - Happens after most of the editing and Visual Effects are finished



Artistic vision is the driving force

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- **Concept Artist**
 - Pre -Production
 - **Director of Photography,**
 - Production onset and near-set
 - **Editor and VFX supervisor**
 - Post
 - **Finishing Artist**
 - DI the finishing step

Capturing Color

- Modern digital cameras capture wide gamut high dynamic range imagery unique to each camera
 - The images by default appear low contrast
- There is no standard



or

- The encoded signals from the camera are meant to be viewed through a visualization
- Each camera has a unique visualization to render a pleasing image
- Custom versions transformations are sometimes made

or

are represented by rgb

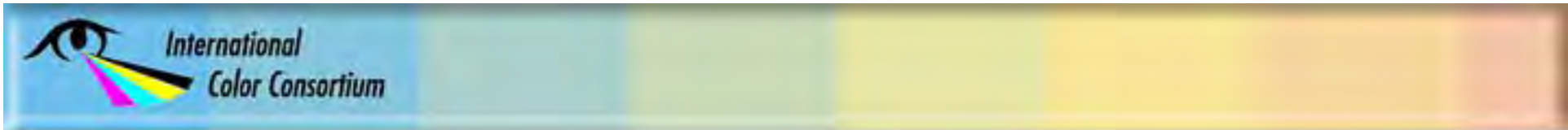
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Theater is the Target the Set is the Canvas

- The target viewing environment is a dark theater
- The source imagery is created and evaluated on a brightly lit set
- All through the process images are evaluated in mixed lighting environments





Lets make some color

Pre-production

Production

Post Production

VFX

Editorial

Digital Finishing

Pre-Production

- Standard graphics tools and reference photography are used here
- ICC profiles can be used to apply visualizations if known
- Little other support for color management

Onset Color in Production

- In evaluating the quality of on set lighting
- Communicating the DP's wishes in the final color
- Compensating for poor lighting conditions



Onset Color in Production

- VFX
- In main route
- Making



Tools for Creating Onset Looks

- Camera tools
- ASC-CDL based systems
- 3d Lut based systems
- Onset coloring systems

Manufacturer Based Systems

- Closely tied to the camera
- Have a variety of styles of working
- Not concerned about workflows
- Proprietary and not compatible with other tools

ASC-CDL

- The ASC part stand for the American Society of Cinematographers
- **Widely adopted**
 - The most portable of all of the formats
- **Published well defined**
- **Limited operations**

ASC-CDL

- Difficult to implement *correctly*
- The image math is well defined but not the colorspace
- Still widest adopted onset color transport format
- Works well when all the i's are dotted and t's are crossed

Lut Based Systems

- Conceptually similar to the ASC-CDL model
- Uses a more advanced set of color controls to generate 3d luts to represent color corrections
- Not all tools along the motion picture production chain support the use of 3d luts
 - There are also many different lut formats

Onset Coloring Systems

- Specialized products designed for onset color with finishing in mind
- Very powerful allowing a wide range of color transformations onset
 - This includes geometric transformation

Onset Coloring Systems

- Locked in workflows require finishing on the same system that the project was started on
- propriety can have trouble with editorial and vfx workflows

Transporting Color

How does the look that was set get transported?

- Frame Based Metadata
- EDL from editorial
- CCCcolor correction collection

Editorial

- Video based systems
- Editorial tools do not supports luts
- Material must come with 'Baked In' color
- Can Pass ASC-CDL information to VFX and Digital Finishing



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Visual Effects

- The application of on set can support ASC-CDL as well as some lut based color from on set
- Visual effects has a highly complex and capable set color management tools
- There is a large mix of viewing environments and display technologies

Visual Effects

- Need the onset color data to create WIP, Work in progress, clips that can match with dailies
- Artistic visualization tools

Digital Finish

- **ASC-CDL**
 - nearly universal support on a shot by shot basis
- **Some manufacturer color looks tools are supported**
- **Onset digital color systems**
 - Perfect integration with the system they are designed to match with



Wrap Up

- The movie production environment is a highly demanding color managed image processing workflow
- Tools created for the management of color are very manual and require a great deal of attention to get right
- Color management support is not consistent throughout the production process

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