

Time-Lapse Photography

Behind the Magic

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What Is Time-Lapse Photography?

- It is the use of a sequence of still images to capture the passage of time, capturing objects/events that would take minutes, days, weeks, or even months to change and replaying them as if they would occur in seconds.
- As such, it is a dramatic storytelling tool

What Time-Lapse Photography *Isn't*

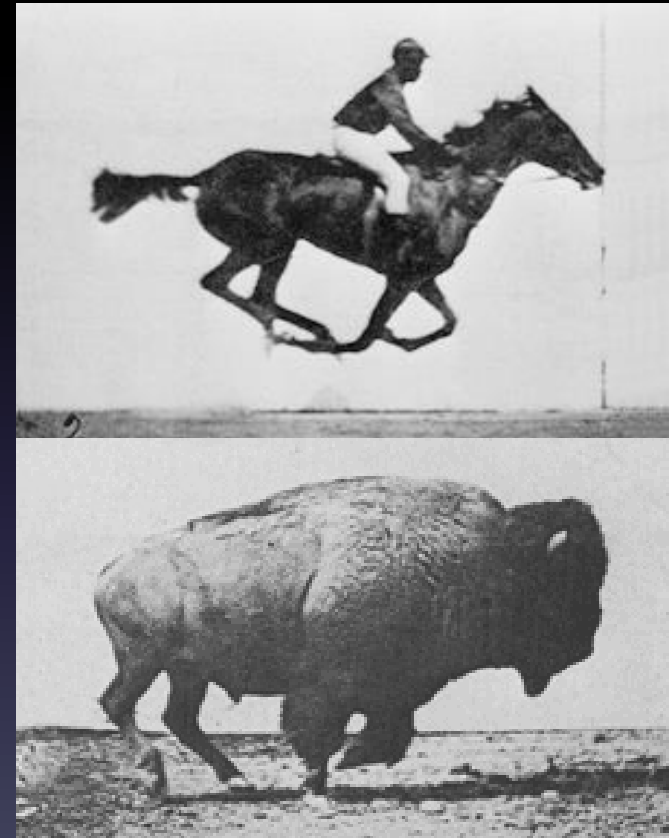
- It is not classical stop-motion photography.
- It isn't slow-motion/high-speed photography.

Time-lapse Technical Nitpick

If you want to be grammatically correct, it's "time-lapse", not "timelapse" or "time lapse"

Brief History of Time-lapse Photography

- In 1872, Eadweard Muybridge, landscape and war photographer, was hired to settle a bet on whether or not all four of a horse's hoofs left ground at same time while on a trot.
- It took him five years to developed a technique and the equipment that allowed him to quickly capture multiple image frames sequentially
- After many trials and errors, in 1878 captured one frame demonstrating conclusively that all four hooves of a horse were fully airborne during a trot.



Brief History of Time-lapse Photography

- Muybridge continued studying animal and human locomotion with his banks of cameras for the University of Pennsylvania, shooting over 100,000 images in the mid 1880s.
- Time-lapse as a separate technique, however, did not appear for another decade
- In 1898 German botanist Wilhelm Pfeffer reimagined Muybridge's work and created the first time-lapse film of a tulip plant opening. This was the first time one could witness something that happens over a numbingly long period of time occur in just a few seconds.



Classic TL Subjects

- Clouds, weather
- Traffic (car, city, boat, airport activity, etc)
- People (individuals, groups, crowds, downtown, beach, climbing, etc)
- Flowers (opening, closing)
- Rotting fruit
- Melting ice, melting snow
- Baking (cookies are a favorite, you often see this in commercials)
- Demolition/construction
- The night sky (stars, Moon, Milky Way, aurora, etc)



Examples You May Have Seen

- Clouds, storms in movies and tv shows – e.g., Discovery Channel's *Planet Earth* and *Frozen Planet* (esp segment 'Finger of Death')
- Title sequence of series *House of Cards*
- The night sky (esp aurora sequences)



Basic/Minimal Necessities for Time-lapse Photography

- Camera
- Intervalometer (*some cameras have this built in*)
- Tripod (something heavy-duty, solid, *not rickety*)
- Patience (*lots of patience!*)
- Motivation/Dedication



Camera Considerations

- What do you want to do with your camera.
- Where do you want to take yourself with your photography (just time-lapse exclusively, or more?).
- What is your budget.
- What particular features are important in a camera.

Camera Considerations, con't

Consider shutter wear. Time-lapse will *significantly* impact the lifespan of a shutter. You can try camerashuttercount.com to see where your camera's shutter is at. (after one year of time-lapsing my first Nikon D7000 had a shutter count over 97,000)

Composition and Prediction

Composition

- As with all photography, composition is important.
- Foreground objects can enhance – or obscure – a TL activity in the background.
- Rule of Thirds applies as usual (and should be broken as needed).
- *Plan* your shots/sequences! Arrive and set up early.

Prediction

- How will or might the TL subject change over the sequence? (very difficult to guess in many cases!)
- How fast will the subject change/motion take?
- How will the light change during the sequence?

RAW vs JPEG? – The Pros

RAW Pro

- Contains ALL the pixel data for an image; no compression loss.
- Allow for easy adjustments in post-processing, and allow syncing settings in batch with no data loss.

JPEG Pro

- Significantly smaller (3-10x or more) than RAW files.
- Adopted as standard and can be displayed almost immediately pretty much anywhere.

RAW vs JPEG? – The Cons

RAW Con

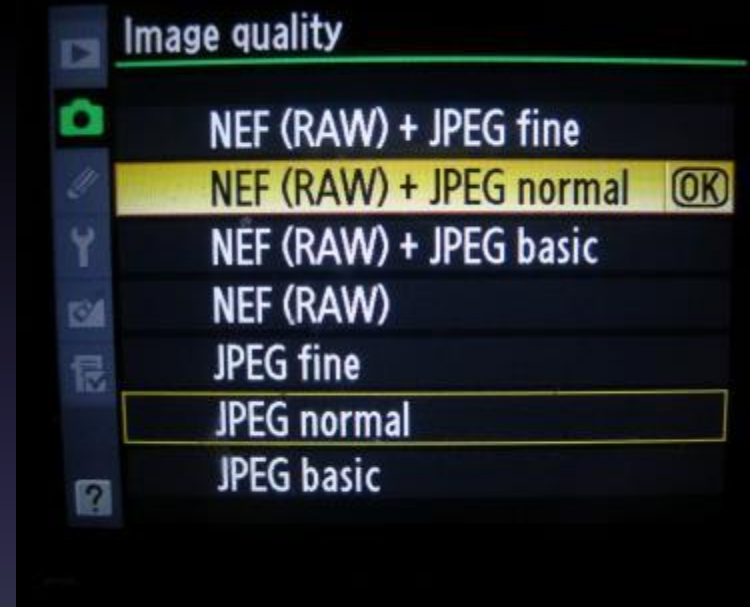
- Files are HUGE. Take up a LOT of space, either on the camera card or on the computer. May need several cards or external hard drives to hold all the files over time.
- Formats are proprietary to each manufacturer. Difficult to always be able to display quickly w/out some processing.

JPEG Con

- Considered a 'lossy' format – every time an image is saved, there is compression and data loss.
- One-time interpretation of camera data (white balance, exposure setting, etc). Cannot be re-outputted like RAW.

RAW vs JPEG?

- JPEG is great for learning on. It also allows you to quickly, within minutes, generate a basic TL sequence to review or show others.
- RAW allows for much more flexibility and control in post-processing, to “get things right”. If you have the space, it pays off in the long run.



Selecting a TL Interval

- No two scenes are alike
- No two subjects are alike
- Too long an interval = jumpy, stuttery, jerky video
- Too short an interval = subject motion changes too slowly



Some Baseline Intervals

1 Second Intervals

- Moving traffic
- *Fast* moving clouds
- Drivelapses (TL sequences from a moving vehicle)



1-10 Second Intervals

- Sunsets & sunrises
- Slower moving clouds
- Crowds, people
- Boats at anchor in harbor
- Moon and Sun near horizon
- Using a telephoto
- Hyper-lapse/walk-lapse/stop motion time-lapse

Some Baseline Intervals

15-30 Seconds

- Moving shadows
- Sun across sky
- Night sky (astro-lapse)

Longer

- Flowers opening/closing
- Fast growing plants (90-120 seconds)
- Melting ice
- Long-term construction projects (5-15 min)



Length of Video Segment

- Better to over-shoot than under-shoot. Can always trim back an over-long sequence.
- Ideally 8-15 seconds of video is good. Much less, just gets interesting as scene ends. Much more, could be boring after a while.



How Many Shots??

- Shooting Time Duration Calculation:
(video length) * (frame rate) * (interval) = total camera shooting time
- Calculate # frames required
- Determine interval between shots
- Calculate shooting time



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Example: 10 second video, 24 frames/second, with 5 seconds between shots = 1200 seconds or *20 minutes* of real time shooting.

Astrolapse example: 90 second video, 24 fps, 30 seconds between shots = 64,800 seconds or **18 hours** of real time shooting



Talk To The Hand

- When first setting up, take test shots.
- Once happy with the composition, camera position, exposure times, intervalometer values, etc., 'block' the lens with your hand or something for the first shot.
- This allows you to more easily find the start of a sequence when reviewing sequences in post.
- Another method: keep track of the image file timestamps. Good luck 😊



Night Sky TL Photography: Astrolapse

- Taking time-lapse sequences of the night sky can be very rewarding, and can be done with minimal additional equipment over daytime time-lapse.
- However, time-lapse of the night sky offers a host of other concerns, considerations, and challenges.



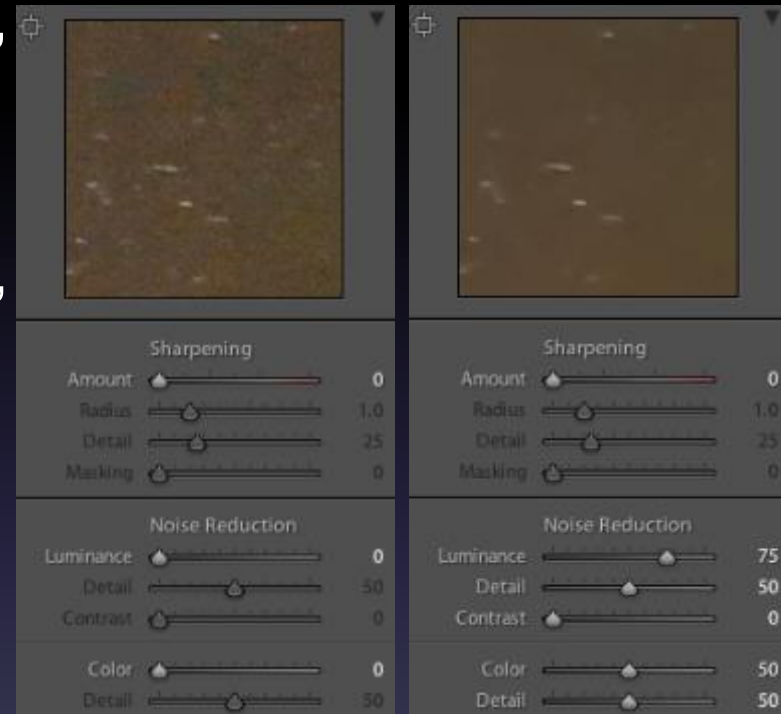
Basic/Minimal Equipment Needed

- Camera capable of time exposures
- Intervalometer (if not already built into the camera)
- Tripod, counterweights if using a dolly
- Handwarmers or other dew-prevention mechanisms
- More patience
- Even more motivation/dedication



ISO Settings and Noise

- Higher ISOs will pick up fainter stars, *but...*
- Higher ISOs generally are more noisy than lower ISO settings. Noise, however, varies from camera to camera, manufacturer to manufacturer for similar ISO levels.
- Higher humidity and/or temperature levels will yield noisier images than lower humidity/temperature levels.
- Some noise can be corrected/mitigated in post-production.



Apertures and Shutter Speeds

- Wide apertures allow more light collection in a given time period.
- Long shutter speeds allow more light collection over a period of time.



Star Trails and the Rule of 600

- Dependent upon focal length of lens.
- Exposures can be anywhere from 8 to 30 seconds w/out noticeable streaking.
- Formula:
 $600/(\text{effective lens focal length}) = \text{max time (seconds) to shoot w/out trailing.}$
- *Effective focal length* is lens focal length in mm x crop factor
- Nikon's D7000 has a crop factor of 1.5 – yields 22 second exposures before noticeable trailing occurs with an 18mm lens.

Power and Moisture Protection

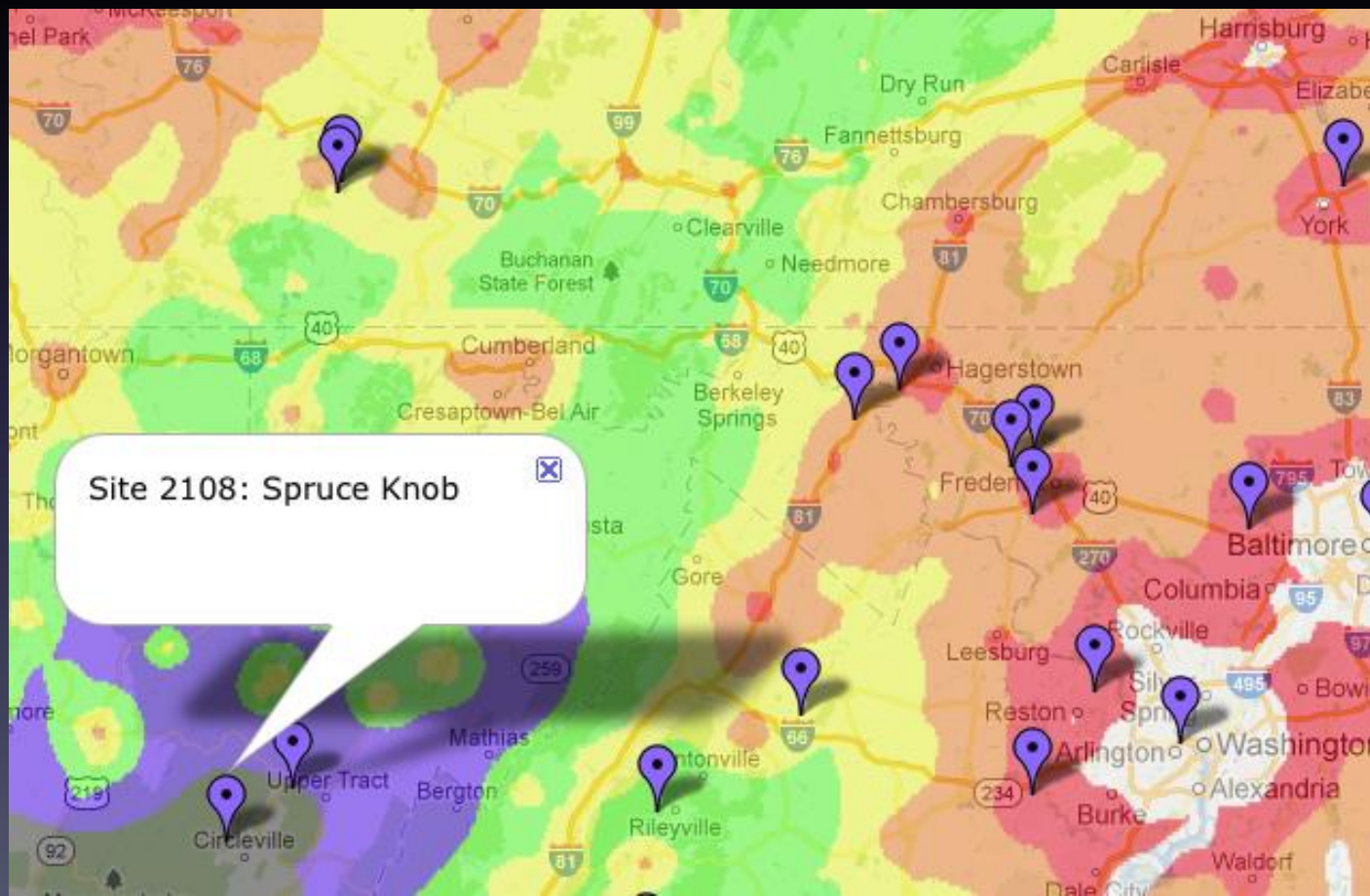
- Astro-lapse takes place over hours. Make sure your batteries can keep up! Or have an alternate power source for the camera.
- Dew, or rain, can put a real damper on your night. Consider an inexpensive 'rainjacket', or a plastic bag, for the camera.
- Handwarmers strapped to the end of the lens will do wonders to prevent dew build-up in all but the most extreme cases.



Location, Location, Location

http://www.jshine.net/astronomy/dark_sky/

At higher ISO settings, horizon glow from cities 100-200 or more miles away can be easily picked up by the camera, even if the light domes look dim to your eye.



‘Advanced’ Night Sky TL Sequences

- Dolly unit (e.g., *Dynamic Perception Stage Zero Dolly*)
- Pan/tilt mechanism (e.g., *Celestron “Sky-Watcher”, Astrotrac, or similar*)
- **Batteries!** (for dolly, pan/tilt gear, extra for camera)



Hyperlapse: put a little motion in your video

- Dolly Lengths (variable)
- Cart speed ($\sim 0.22''$ - $0.35''$ good ballpark for 10-15 second time-lapse video on a 6' dolly)
- Angle (horizontal/traverse, vertical/climb, in between)
- Counterweights for tripods if on uneven ground



Hyperlapsing

- Need some kind of foreground object(s) to work with.
- Having a dolly with no foreground objects to also move is kinda pointless.
- The closer the foreground object(s), the more effective it/they are in the time-lapse sequence.
- Pan/tilt systems can work without foreground objects, but said objects add to the sequence.



TL Lessons Learned (i.e., Experience Teaches...)

- Make sure you have your battery, and/or extra batteries
- Make sure all your batteries are fully charged
- Make sure you have your tripod(s)
- Make sure you have your 'advanced gear' together and with you
- Make sure you have enough space on your SD card(s)
- Make sure SD cards are not locked
- Make sure your camera strap is tucked away
- Don't forget handwarmers
- Auto-focus – OFF!!
- And finally, don't forget your camera!



Post Processing Considerations

- Brightness/Contrast
- White Balance
- Noise Reduction
- Cropping, resizing
- Batch Processing, syncing changes



Post Processing Software Options

- Lightroom
- LRTimelapse
- Adobe After Effects
- Photoshop
- GIMP
 - batch processing is difficult to achieve
- Paintshop Pro
 - Unsure about batch processing options



You Have Your Photos – Now What? Putting It All Together

- Time Lapse Assembler (for Macs; very basic, no transitions, music syncing, etc)
- iMovie (Mac) or Windows Movie Maker
- Quicktime 7 (*Quicktime X is NOT backward compatible!!!*)
- VirtualDub (Windows)
- Adobe Premiere Pro or Elements (expennnsive!)
- Final Cut Pro (somewhat expensive)

Music Resources

- Vimeo Music Store (~\$2/song ave, includes single use license)
- Free Music Archive (freemusicarchive.org; licensing varies)
- Soundcloud (soundcloud.com; requires registration)
- Production Music (freeplaymusic.com; licenses **expensive**)
- Simon Wilkinson (bluemask.com; ~\$15 US/song track with single use license)
- Musicloops.com (kinda expensive at \$10-50, royalty free)
- Bands with whom you are friends

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Video Sharing Resources

- **Youtube** - *very popular, wide distribution*
- **Vimeo** - *wide distribution, quality better than youtube but not as popular; for the more 'discerning' individual*
- **Flickr** - *limited distribution*
- **Facebook** - *limited distribution*

Misc Resources

- *Time-lapse Photography* – Ryan Chylinski (\$15 pdf download at LearnTimelapse.com)
- *Timelapse – An Introduction to Still Photographs in Motion* – Dave Delnea (\$5 pdf download at craftandvision.com - \$4 if you use TIME4 before March 23rd, though)
- Timescapes Digital Time-lapse forum (forum.timescapes.org/)
- Kessler Filmmaker Tools (kesslercrane.com)
- Dynamic Perception dollies and controllers (dynamicperception.com)

Online Resources

- Facebook Groups – *We Love Timelapse and Time-Lapse Photography*
- LinkedIn group – *Time Lapse Photography*
- Vimeo.com – has a number of time-lapse groups and channels

Inspirational Resources

- Randy Halverson's videos
(dakotalapse.com)
- Tom Lowe's *Timescapes* (timescapes.org)
- Norwegian Terje Sorgjerd
(vimeo.com/terjes and
facebook.com/TSOPhotography)

*“Making fantastic imagery is infinitely more about using your brain and creativity than it is about the tools and equipment you have at your disposal.” –
adventure photographer Corey Rich*

