Abstract

“The Heavens Declare” is a 2D animation featuring the Star of Bethlehem traveling amongst the stars. The star interacts with other constellations including the Big and Little Dippers, Orion, Ursa Major, Leo, and Gemini as it travels to its final destination. This thesis takes an in-depth look at my process of developing and producing the animation. It will cover where I gathered my inspiration which includes the idea origination, music, and the skills I wished to demonstrate. I will outline how I created the visual concepts such as the storyboard and animatic, which defined the project’s direction. I will also demonstrate my planning process including how I evaluated and organized all the jobs that were required to make this animation and how those jobs were broken up into a production pipeline. Finally, this thesis will go over several obstacles I encountered during production and the solutions I used to overcome them. The result was growth in my digital as well as time-management skills, but also a piece of animation I hope will bring joy to others and celebrate my faith.

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Ms. Cantrell

Honors Thesis

Reflection of “The Heavens Declare”

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Inspiration

The inspiration for this project came after my initial project concept did not work out as I was unable to attain the proper music license. While searching for music for the second idea that featured four warriors in a medieval fantasy setting, I came across a

different piece that made me think of a starry night sky. I became inspired with the concept for the final project and began searching for music that fit that project's criteria. After being inspired by that piece I also typed up a paragraph with the general story for the project to help me get a clear vision of what exactly the project would include.

As I continued to think of the stars and constellations the phrase that came to mind was a scripture verse: Psalm 19:1. This verse says "The heavens declare the glory of God; and the firmament sheweth his handywork." I am a Creationist which means I believe God created the universe - and the stars are one of my favorite works of art He has made. I have made a few brief animations taking inspiration from the constellations but I really wanted to make a longer, more challenging piece centered around this concept. Once I came across the music and immediately visualized stars, I knew this was the piece to pursue this theme.

When I was searching for music, I was looking for something that had a slight melody so that the star's movement could shift directions along with the melody, almost like it was dancing. I also did not want any loops within the music since it could seem redundant in a piece of this length. Another reason I did not want loops is because I find that several loops in music give a sense of cheapness to the music, as if the musician cut corners by looping sections instead of creating new content. Using music with looped content is useful when you do not know how long the song will run, such as music playing in the background of a videogame. For an animated short film, however, I did not feel this was the best fit. The music track also needed to have a magical, sparkling ambiance to match the look of the twinkling stars and the fantastical experience of living constellations. I noticed several of the samples that had this feel

used things like rapid high notes on a flute, incorporated jingle bells, piano, chimes, and/or bell trees. I also wanted there to be the occasional more defined note to provide obvious cues for smooth transitions when the star is shifting from one area to another. After searching through several music tracks, I eventually settled on a stock piece entitled “Christmas Wonder”. I purchased the synchronization license from Pond5 so that I could legally add it to my animation and have the final animation publicly posted to my portfolio. It was particularly important to me to acquire the proper license as it respects other artists and gives them the pay they have rightfully earned, as well as shows a future employer who views my portfolio that I have followed the correct licensing procedures. This is not the first time I have had to go through the process of acquiring a license and I foresee this becoming a regular part of my creative process.

There were several skills I wished to demonstrate on this project. First off, I wanted to show that I understand the planning process and production pipeline. I also wanted a project that used more hand-drawn animations as several of my other projects used more puppet-rigging and shape-layer animations than hand-drawn works, which is why the characters in the final piece are mostly hand-drawn. I also wished to demonstrate proficiency in Adobe After Effects. This led to several layered effects, shape animations, animated cameras, and other effects in the final piece. Rotoscoping was something I also wished to undertake, and therefore this was used in the dance sequence of the piece. The music, scripture, and skills to be demonstrated all played a role in the inspiration for this project.

Visual Conceptualization

The second step in creating “The Heavens Declare” was gaining a clear concept of what the final piece would look like. I started by listening to the song I was considering over and over again, mentally visualizing several scenarios within the music. Once I had mentally envisioned which constellations would be featured and in what way, I typed up a google doc of each constellation and its general movement. From there I re-ordered them based on which constellation would fit best with the transition planned for the previous constellation. For example, The bear/Ursa major and lion/Leo animations did not have major movement and were very brief, therefore the star being shot from Orion’s bow could quickly fly past these animations and still catch the whole movement in the shot. However, the Gemini’s dance would have been cut off, so instead it was planned for afterwards. After creating this written list the constellations that did not fit in with the transitions were removed. Next I marked each animation’s start and finish times in the music next to that animation’s written description in the google doc. (See Figure 1.)

Subsequently, I began storyboarding each main movement within the piece in Photoshop. I made sure to make the image pieces organized and in different layers to make changing items easier, but also to speed up the animatic process, which was the next step. While creating the animatic, I

The Heavens Declare:
(0:00): “The Heavens Declare” Title text displays. It is made up of twinkling stars.
(0:08): On flute-flutter noise a shooting star moving from left to right disintegrates/scatters text. Star continues moving to the right then up and camera follows.
(0:10): Girl sitting as if at water’s edge. She is leaning back with one foot gently kicking back and forth with just her toes in the water, since there’s a small cliff between her and the water. Big dipper and little dipper are behind her. Star loops around and up then falls into “pond” which is made up of stars glittering like water. Girl’s head moves as she tracks the stars movement. Girl grabs little dipper and scoops it out of the water.
(0:15): Star continues moving up. Camera to zooms in on just the shooting start moving upwards.
(0:22): Albireo Bird Constellation is flying, twisting around. Star and bird are shifting from upwards to the left.
(0:25): Bird leaves screen at top and star starts to fall.
(0:28): Four definitive beats in the music begin. The star bounces along the “ground” at the archer’s feet. As it lands from the fourth beat it rolls a little.
(0:30): Archer uses left-foot to pick-up and toss star into path of string.
(0:32): Archer releases bow to launch star that has fallen in the path of the string like an arrow. Star moving sideways from left to right.
(0:36): Zooms out and star darts above bear who turns his head to look.
(0:40): Zooms under lion who is casually laying on a rock that looks like a waterfall of stars.
(0:44): Star switches from moving sideways to falling down.
(0:48): Gemini Dancing twin girls. One kicks the star to the left.
(0:54): Star’s trail disappears because star has slowed. Brightness adjusts with music.
(1:00): Star twinkles brightly on the cue in the music.
(1:04): Slowly zooms out to see it is above the stable silhouette.

Figure 1

noticed a section that seemed rather off visually. After the girl scoops up the star and sets it free, as the star is moving upwards the Apus/bird constellation circles its path. However the motion of the bird going in a different direction than the star itself looked contradictory. This looping motion of the star matched the flow of the music so well I did not wish to change the star's path, so after considering the movement I decided to have the bird do the looping motion along with the star to reinforce the circling motion. I had previously animated a looped clip of a circling bird for 2D animation class which, with some adjustments, I was able to reuse for this project. For good measure I added a second bird to this portion. I did this by duplicating the bird's animation, repositioning it, and staggering the time in After Effects.

After the animatic was done, I ran several animation tests within After Effects to make sure the twinkling effect of the lines would be doable. I successfully tested this by drawing the line, inverting the colors, precomposing it, and applying scatter, roughen-edges, glow, and brushstrokes effects. (See Figure 2 for sample process.) I also considered animating by using a star brush in Photoshop, but ultimately decided this would not only be time-consuming, but would add too dramatic of a "jitter" or "flicker" to the animation which would decrease the smoothness of the movement. I also looked into the possibility of creating a custom stroke in After Effects, like one does in Illustrator, with a row of stars, but according to my research this was not possible. It would also be more difficult to use only shape layers for the more complicated characters instead of hand-drawn. I did however test out shape-layer animation in After Effects as a possibility, but hand-drawn in Photoshop proved to be best option for most portions. Ultimately both methods were used in the final product.

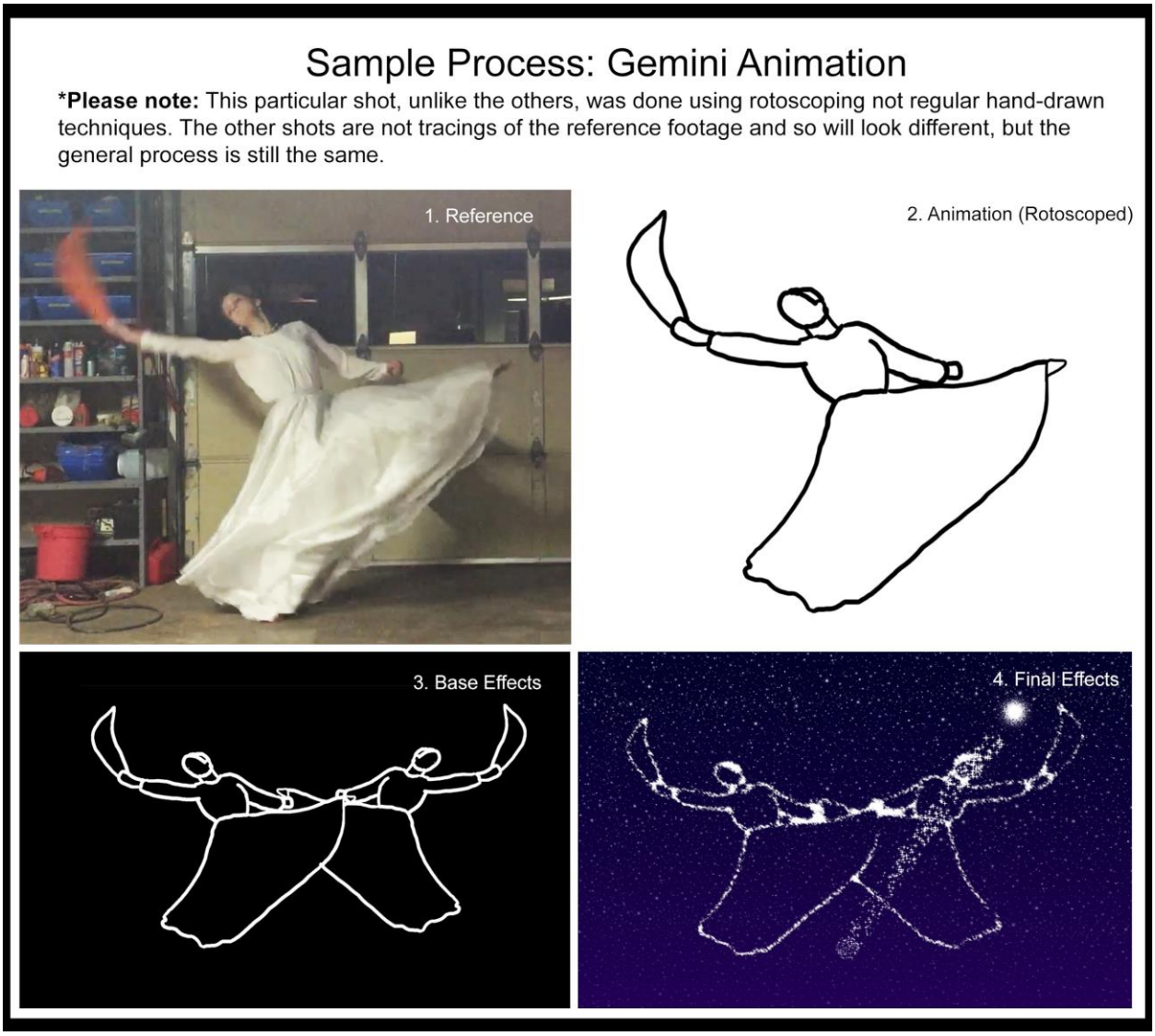

Figure 2

Before starting on the final animations I brought the animatic to Ms. Cantrell. She suggested some solutions to an issue I was having with needing the camera to track the star throughout the animation, but also being able to stop following the star in some areas. Her idea was to use a null in After Effects with both the star and camera attached, then animate the null for the tracking portions. This would allow the star and camera to be moved in the same way, as if the camera were tracking the star, but also allowed the star to be animated separate from the camera for the portions in which I

needed the camera to be still. She approved of the overall concept and gave me the approval to proceed. I then switched my focus to creating a detailed to-do list that would later become my production pipeline.

Production Pipeline

A key portion of my creative process was making a production pipeline so I would have a clear plan and be able to accomplish this project in the time allotted. In order to evaluate how many jobs were needed I would normally start with the parts in each shot in the animatic. This piece, however, was unusual in that it was all one shot. I therefore divided it up into sections using each character or group of characters that the main star comes into contact with as their own sections. Each section had its parts, such as background and characters, and those parts had multiple stages of creation. The background, for example, had to be created in Photoshop, then have animated effects applied so that the stars were twinkling - therefore two different stages: painting and animation. After writing the parts of the sections into a list, I broke-up that list into two categories: still images and animated portions. In addition I made lists of still image reference needs, such as images of lions and bears to study their physiology. I also wrote down my reference footage needs. I filmed what reference footage I could (girl with dipper, dancers, archer) and what I could not I studied from watching YouTube videos (movements of the animals). Upon completing the list of needs I began to organize that list into a timeline.

The timeline was broken down based on how long I estimated a job was going to take, and then placed in order of importance. Animations would take longer than the

backgrounds, since the main background was a seamless texture, and the others were simply scattered stars designed to give a sense of a solid surface beneath the character. The animations then were allotted much more time in the schedule than the backgrounds. To divide the animations by length, they were given approximate measurements of how many frames of which they would consist. These estimates were made using both the length of time that section would be visible in the animatic and how long it takes to do that motion in the reference footage. The longer animations naturally were allotted more time than the shorter animations. Animations were also given more or less time based on how complex the movement was, as well as how much detail was in the object or character moving. The longest of the hand-drawn animations also had the most complex motion - which was the girl who moves her foot back and forth in the water, reaches out to take the big dipper, scoops up the star, and watches it as it rises to the next section. The Star of Bethlehem was animated within After Effects using keyframes, but needed much more time allotted as it had three layers of separately animated effects that needed to be applied to get the final look. This is how I determined the scheduling timeline.

Because I had other school projects that had to be completed alongside this animation, I made some back-up plans and modified the original concept so that I could finish this piece on time. One such way I did this was to know which characters absolutely had to have animation (The main star, the girl with the dipper, the dancers, the archer) and those which could remain still images if needed (The lion and bear). I also didn’t have to fill in the color of the animations as these were outlines, although I did have to do some masking in After Effects when two characters would overlap.

Animated lines that may not be perfectly clean were not as obvious due to the scattered star effect, therefore not as much time had to be spent on clean up. Another way to make the most of my animated frames was by using loops. The lion's tail swinging was its own loop, and his ear twitching was a separate loop that was started and stopped at different times so not to be continuous like the tail's motion. Planning for loops, the omission of coloring, and creating backup plans helped me make the most of my time during the production process.

Problems and Solutions

The final topic I wish to discuss is the problems I encountered during the actual production process and the solutions I used to overcome them. I quickly realized a generic font for the credits simply would not match the feel of the piece, nor cooperate easily with the twinkling effects due to the smooth, straight edges of the lines. Free fonts are available online, but I also wanted a unique font that could double as my opening logo. The solution to this issue was to create my own font, and although happy with the final result, this added more work I was not counting on when planning the timeline for this piece.

An additional issue I discovered was that the background was repetitive, due to the fact that it was a seamless, repeated texture. To break up the visual monotony, I added a feathered mask on purple solid to appear as a gradient then placed those layers on top of the star background layers. This gave the effect that it was slightly brighter towards the bottom of the night sky which gave the impression the sun had just set while adding more variety to an otherwise repetitive background.

Another challenge was created when the twinkling effects I had created in After Effects varied dramatically with even miniscule changes in line thickness. This meant the thicker lines of the archer's animation looked very different than the thinner lines of the Big Dipper animation. This also meant that variations in drawing thickness between frames of the same animation caused some frames to show up abnormally bright and others not at all. The solution was to thin the lines of the animation overall or add keyframes on the effects themselves to change based on the changes in line-thickness.

A third issue I encountered was the particle effects used on the main star matched natural movement. This in itself was helpful in several shots, but for some shots the star's trail needed to be thicker as it was supposed to appear as if it was moving at a higher speed. The solution was to create an extra comp that had an explosive-style particle effect on a loop, parent that comp to the star, and add a teardrop mask over it. The teardrop mask was animated to only show a slice of the circle at any given time, giving the illusion of a particle trail, while adding more control over the trail thickness. When this extra high-velocity particle effect was not needed, I simply lowered the opacity of the second particle trail's comp. These were some of the issues encountered and their solutions during production of the animation.

After bringing the first completed version to Ms. Cantrell she suggested adding in more easy-ease on the camera in After Effects as it looked rather stiff. She warned against letting the background look like it is moving so I needed to adjust some of the camera angles as well. She also suggested cutting the transition at the end with the star and the nativity, opting for having it zoom out, which kept it as one continuous shot. I proceeded to implement these corrections prior to final submission.

Conclusion

“The Heavens Declare” is not only a demonstration of my skills, but a very personal project to me. While my inspiration came as an offshoot of a failure of another idea, the ideas flowed from a newly discovered piece of music. The process of visually conceptualizing this piece began with repeatedly listening to the song and mentally visualizing the content, to typing up lists, to the storyboard, animatic, and lastly advisor critique of the animatic. The asset needs were listed in detail and broken up into a schedule to be adapted into a full production pipeline - a pipeline specifically designed to be doable within the allotted time available by planning for loops, the omission of coloring, and creating backup plans. Lastly this thesis explained some of the challenges that arose during the production process and how they were solved, such as realizing a custom-made font was needed instead of a generic font to match the feel of the piece, or how the visual monotony of the repeated background was broken up using a purple gradient layer. Other solutions included using effects keyframes to make the varying twinkle effects more consistent, and a separate, masked comp was used to thicken the particle trail in high-velocity motions of the star. After bringing the first completed version of the animation to my advisor for critique, the recommended adjustments were made. While I was able to play on several aspects of my original skillset, I also had to expand on those skills and push myself to learn some new ones during production of “The Heavens Declare”.

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