

**DIGITAL PRODUCTION PIPELINES: EXAMINING STRUCTURES AND  
METHODS IN THE COMPUTER EFFECTS INDUSTRY**

A Thesis

by

DANE EDWARD BETTIS

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2005

Major Subject: Visualization Sciences

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## **ABSTRACT**

Digital Production Pipelines: Examining Structures and Methods in the Computer Effects Industry.

(May 2005)

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Chair of Advisory Committee: Prof. Karen Hillier

Computer animated films require collaboration: blending artistic concept with technical skill, meeting budget constraints and adhering to deadlines. The path which production follows from initial idea to finished product is known as the pipeline. The purpose of this thesis is to collect, study and share information regarding production pipeline practices and to derive a conceptual definition. Research focused on selected companies in the United States which have produced at least one feature-length computer generated film and continue to produce them.

The key finding of this thesis is a conceptual definition of digital production pipelines:

A digital production pipeline must, by definition, utilize digital computing hardware and software to facilitate human work and collaboration for the overarching purpose of producing content for film. The digital production pipeline is not a structure, but rather a malleable set of components which can be arranged, configured, and adapted into new structures as needed. These malleable components are human groups with assigned task domains, and digital hardware and software systems. The human groups are normally referred to as departments or teams. The digital hardware and software systems are operating systems, software tools and applications, networks, processors, and storage. The digital production pipeline is the synergy of these two types of components into adaptable systems and structures.

## ACKNOWLEDGMENTS

I am grateful to the committee members who oversaw my thesis project. To Committee Chair Professor Karen Hillier, my thanks for her availability to advise me in every aspect of the development of this thesis project, and for her keen advice and constant vigilance to ensure that this paper meets the highest standards of academic writing. I appreciate Dr. Joyce Juntune for teaching me how to use Qualitative Research, and for overseeing my execution of that method and its documentation in my thesis. I would like to thank Dr. Frederic Parke for his suggestions on my thesis concept, his critical insights on my paper, and his recollections of industry history. He also provided important advice about communicating with the computer graphics industry.

Kyle Clark contributed significantly, helping me hone my thesis idea and giving me a basic understanding of the industry. I also would like to thank Kyle Clark, Fred Parke, and Beth Hofer for referring me to key individuals in the computer graphics industry.

Dave Walvoord helped crystallize my thesis idea by suggesting that I confine my investigation to companies that produce feature-length purely CG animated films. Tim McLaughlin reviewed my interview questions to insure that they were ethically sound for this industry. His advice was invaluable to me.

I am uniquely grateful to Dr. Rodney Hill, who allowed me to enter my undergraduate program and provided good counsel, encouragement and help throughout my studies ever since - even directing me to Dr. Juntune as a thesis committee member. Neither of my degrees would have been completed without Dr. Hill's guidance.

I am indebted to the Studio and individuals who agreed to be interviewed, especially the decision makers who trusted me and allowed me to conduct my research. This paper and its organizing themes would not have been possible without their kind agreement to participate.

Finally, I am grateful to my family for their encouragement and for providing a sounding board for my ideas.

## TABLE OF CONTENTS

	Page
1. INTRODUCTION.....	1
1.1 Problem Statement .....	1
1.2 Background .....	2
1.3 The Two Curtains.....	9
1.3.1 The Open Curtain.....	10
2. HISTORY .....	11
2.1 A Brief 'Ancient' History.....	11
2.1.1 <i>Tron</i> .....	14
2.2 Modern History of the Four Studios.....	17
2.2.1 Context for Studio Histories .....	18
2.2.2 From <i>Tron</i> to <i>Toy Story</i> .....	19
2.2.3 <i>Toy Story</i> : The First of Its Kind .....	25
2.2.4 From <i>Toy Story</i> to the Present.....	25
2.3 Current State of the Companies.....	31
3. METHODOLOGY.....	32
3.1 Overview of Methodology .....	32
3.2 Qualitative Analysis .....	32
3.2.1 Definitions .....	32
3.2.2 Rationale.....	33
3.2.3 Traditions of Inquiry.....	34
3.3 Methodology in This Paper .....	35
3.3.1 Verification.....	36
3.3.2 Summary.....	37
4. FINDINGS .....	38
4.1 The Closed Curtain.....	38
4.2 Interviews .....	38
4.2.1 Layout #2.....	38
4.2.2 Animator #5 .....	39
4.2.3 Lighter #13.....	40
4.3 Emergent Themes.....	41
4.3.1 Theme 1: "Getting the Job Done: Trust & Respect" .....	41
4.3.2 Theme 2: "Moore's War: Computer Time vs. Human Time" .....	42
4.3.3 Theme 3: "Jack of All Trades, Master of One" .....	42
4.4 Pipeline Models and Processes.....	43
4.4.1 The Traditional Animation Process .....	43
4.4.2 The 3-D Digital Production Process .....	45
4.5 Company Alpha – A Case Study.....	54
4.6 Digital Production Pipelines: In Need of a Better Definition .....	58

## TABLE OF CONTENTS

	Page
4.7 The Three Layer Pipeline Design Example.....	59
4.7.1 Layer One: Personnel Arrangement.....	60
4.7.2 Layer Two: Implementation and Managing Complexity.....	62
4.7.3 Layer Three: Optimization of Computer Systems .....	64
4.8 The Conceptual Definition .....	65
5. CONCLUSIONS.....	67
6. IMPLICATIONS FOR FUTURE RESEARCH.....	69
REFERENCES.....	70
APPENDIX A: TABLE OF FILM EARNINGS AS OF APRIL 18, 2004 .....	73
APPENDIX B: A NOTE ON CODED INFORMATION.....	74
APPENDIX C: ALPHA STUDIO LAYOUT TRANSCRIPT .....	75
APPENDIX D: ALPHA STUDIO ANIMATION TRANSCRIPT .....	125
APPENDIX E: ALPHA STUDIO LIGHTING TRANSCRIPT .....	166
VITA.....	202

## LIST OF FIGURES

	Page
Figure 1: <i>Prince of Egypt</i> .....	5
Figure 2: <i>Wally and André B</i> .....	6
Figure 3: Forest from <i>Shrek</i> .....	6
Figure 4: <i>Fishing</i> .....	7
Figure 5: <i>What Dreams May Come</i> .....	7
Figure 6: <i>Toy Story</i> .....	11
Figure 7: Stuart Blackton and His <i>Humorous Phases of Funny Faces</i> . ....	12
Figure 8: <i>Mr. Computer Image ABC</i> Created with <i>Synthavision</i> . ....	12
Figure 9: a. <i>Animated Faces</i> by Frederic Parke and <i>Animated Hand</i> by Ed Catmull.....	13
Figure 10: a. "Light on Black", b. A Backlit Film Test for <i>Tron</i> . ....	14
Figure 11: Frame from <i>Tron</i> , Generated at MAGI. Disney 1982.....	17
Figure 12: The Genesis Effect from <i>Star Trek II</i> . ....	22
Figure 13: Storyboards. ....	46
Figure 14: A Comparison between (a) Scanline Techniques and (b) Simulation.....	52
Figure 15: Company Alpha Departmental Overview.....	54
Figure 16: Alpha Production Pipeline Workflow ( Original Copyright Dane Bettis, 2004) .....	56
Figure 17: The Wave Model, the Simplest Model of Digital Production.....	58

## 1. INTRODUCTION

Computer animated films require collaboration: blending artistic concept with technical skill, meeting budget constraints and adhering to deadlines. The path that production follows from initial idea to finished product is known as the pipeline. Currently in the computer animation industry, each studio develops its pipeline independently. The purpose of this thesis is to collect, study and share information regarding production pipeline practices, and to derive a conceptual framework, as a first step toward the larger goal of developing an effective theoretical model.

The researcher will study only the making of completely computer-generated feature-length films. The research covers selected companies in the United States that have produced at least one feature-length computer-generated (CG) film and are continuing to produce them. Research findings may be applicable to animation and film work in other media as well. The research will focus on a case study of one studio that agreed to be studied via primary research.

### 1.1 Problem Statement

The purpose of this study is to examine and describe the production pipeline in depth at one studio within the context of all four studios engaged in making feature length computer animated films. The focus of the thesis is to accurately describe a generalized model of digital animation production pipelines and observe how the assets, values, and limitations of the studios and of the individuals who comprise them, affect the process of making an idea into an animated film.

The goal is to research the structure of CG animation pipelines in order to:

1. Discover how pipelines operate. Primary research, using qualitative methods, will consist of interviewing professionals within the CG animation industry and will be the most important source of information. Quantitative data collected from published documents will supplement primary findings. Four studios in the American film industry that best fit the research goals described above will be the subject of research.



2. Extract the principles of pipeline practice and development. Using qualitative analysis methods, the information obtained will be coded to protect the confidentiality of those being interviewed. The initial data analyzed will drive theory development and thus the focus of subsequent data collection.

3. Create a framework for understanding digital production pipelines.

The researcher's intent is to gain understanding of digital production pipelines and to share that knowledge with the academic community. Not yet being a professional, he does not presume to inform professionals in this industry. If any of the strategies, practices, or personnel structures observed emerge from the data as being useful, these observations will be shared solely as a useful component of academic discussion, and not as a recommendation to those in the industry.

## **1.2 Background**

At the outset of any new field of endeavor, there is a period of rapid innovation accomplished both through burgeoning understanding of the discipline, and through trial and error. Computer animation is currently in such a period: the hardware and software used to create computer graphics are still undergoing rapid development and refinement, as are the theories driving software innovations.

Since cel animation has been in existence for nearly a century, the principles of producing this art form are well established. In contrast, the processes for creating and executing a CG animated feature film seem to change significantly with each new production. The process is in constant flux because tools, hardware and software are constantly changing. New versions of commercial software packages are being released as frequently as every six months; each release adds new tools and new functionality to existing tools. Likewise, studios' proprietary software is under constant development and refinement, usually in response to the needs of current and upcoming productions.

But the unsettled nature of CG production is also due to a more fundamental cause than the rapid pace of technical development: when all work is stored in the computer, the malleability of digitally stored information brings about a significant change in workflow. Prior to the use of computers, cel animation work was linear in nature. A traditional animator could change animation repeatedly during the animation stage of production, but if the character's design was later altered, then all subsequent character animation work had to be remade by hand. By contrast, in current CG production practices, a character's appearance may be modified, to some extent, without losing the motion that has already been applied to it by the animator. Surface attributes may be changed at any time prior to rendering, and the model itself may be altered somewhat without losing compatibility with previously completed animation. As a result, changes

to finished work can often be made that would not have been attempted in the past. Directors and producers are still adjusting to these new-found flexibilities, as are the artists and content-creating professionals who work with them.

The computer also greatly increases the speed and efficiency of the animation process. Though CG animation is labor intensive, it is far less so than hand-drawn animation. As Bill Kroyer is quoted in *Inspired 3D Modeling* [4:26]:

And you slave away. I worked at Disney for a year, and I did 60 feet of film. I created 40 seconds of animation in a whole year of my life. So at that rate ... I could work 50 years and I would end up with a half hour of work... Computer Animation, on the other hand, is great because once you build a model, you've built it, and it's there. And that model looks the same from all angles, and when you move it, at least it still looks the same. So a huge amount of the difficulty and labor of hand-drawn animation has been replaced. ... if you're a good computer animator, you should be able to rip through much more footage. And we do, actually!

Kroyer's statement demonstrates that the computer has not stolen the animator's job, but instead has enhanced his productivity.

However, using the computer does not make animation an automatic process. After the story has been created, every layer of artistic expression used to convey and amplify the story must still be carefully developed and executed by the storytellers, designers and artists. Computers have been integrated through most of the pipeline from concept to final release. Though now used throughout the pipeline, the computer is possibly least utilized in the story development stage, which still seems to be ruled by pencil and paper. Yet even in this stage, while concept art is still rendered in traditional media, and the initial aspects of storyboarding are still executed by hand, computers replace the optical process for cutting together storyreels.

The storyreel, also called an animatic, is a term with two meanings. In its simplest form, the animatic is merely the story board recorded to video, properly timed with temporary sound, dialogue and music. The second type of animatic, the one used in computer animation, starts in the same manner but continues in use throughout the course of production, being updated and reviewed daily as production content is added, and gradually evolving into the finished film. [35:198]

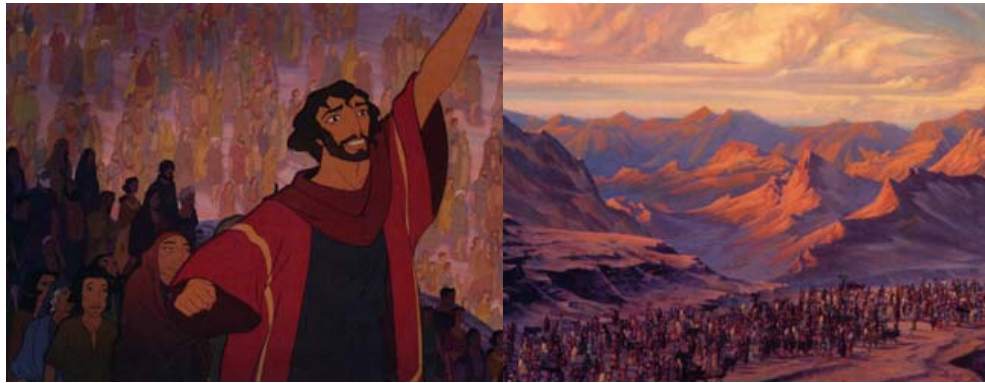
The computer has impacted all artistic choices made during production. The computer enables artists to make choices more efficiently, and provides many new options in modeling, coloring, lighting, character animation, character control, cinematography and graphic rendition. Another significant benefit that the computer provides artists is the ability to separate their tasks. Now computer-based lighting is separate from the coloration of the characters, and coloration is separate from the animation of the characters. Furthermore, lighting on the characters can be changed and refined or a mood may be fine-tuned during the animation process. The characters' performances can then be adjusted to further amplify the original mood which lighting has enhanced. In traditional cel animation, making these kinds of changes to finished animation would be prohibitively expensive.

As Winder & Dowlatabadi state in Chapter Nine of *Producing Animation* [35:241],

The main advantage to CG animation is that it is a non-linear process. Parts of... [Blue Sky's] pipeline can be separated out and worked on simultaneously, theoretically increasing the speed of production. For example, the final sets can be constructed while animation is in progress and lighting and effects are being developed for a scene. It is possible to animate the character in steps; that is start with gross body movements and add subtle enhancements later. At the same time different animators can work on a character's facial animation while its body movements are being worked on by other artists. When revisions are required on a scene, it is returned to the appropriate department to be fixed. This doesn't always mean the artist must start from scratch; they can often correct the existing artwork and the scene can continue on the path to final render and composite.

Thus, perhaps the critical difference in CG animation is that a larger number of design iterations are affordable in a production, and these iterations may continue later into the schedule. Likewise, some changes can be made retroactively to elements finished in earlier stages of production without destroying the later work which depend upon them.

In summary, compared to traditional cel animation methods, CG production is faster, significantly more flexible, and the labor is far more focused on a production's principal goal of artistically conveying the story. Likewise, new possibilities, different in nature, as well as degree, arise from the changes in the production process facilitated by the computer.



**Figure 1: *Prince of Egypt*. ([27] Original Copyright Dreamworks, 1998)**

The use of CG extras in *The Prince of Egypt* [Figure 1] provides an example of how substantially the computer has changed the way an animated film may be made. Though *The Prince of Egypt* was traditionally animated, certain elements such as the huge crowd scenes were created and rendered in CG. The challenge and its solution are detailed in an interview with crowd animator Wendy Elwell in the book *Special Effects: the History and Technique* [27:149]:

"Descriptions of the Exodus in the Bible actually mention 600,000 Hebrews. We didn't have quite as many as that, but we still had scenes with many thousands of people that could never have been achieved using traditional techniques,"

Elwell and her colleagues used two methods to create the crowd sequences in the film. "The first big crowd scenes are right at the beginning of the film, when we see hundreds of male slaves build a new temple complex," explains Elwell. "For these scenes, we build a single 3-D digital character that matched the drawn characters. He was then reshaped to create a total of 20 different characters. These were then dressed with different hair, beards and clothing so that each person in the crowd looked more unique. We then animated walk cycles - sequences of movement that can be repeated as required - so that characters could walk for as long as was needed in any scene.

The second major use of computer-generated characters was in the Exodus sequence itself. "For the sequence we made more 3-D digital models of men, women and children, as well as oxen pulling carts," says Elwell....We then rendered the characters as 2-D animation moving 'on the spot' in a walk cycle. Each of these 2-D animated characters was then individually mapped onto an invisible card called a 'sprite'."

"Using this method it was a simple case of moving the cards with the characters that they contained. We could program groups of cards to move at faster or slower rates, or to avoid bumping into other groups if they were moving too slowly. ... The largest crowd scene in the film was in the epilogue when Moses returns with the 10 Commandments. In the shot the crowd contains 146, 392 characters -- not including the oxen."



**Figure 2: *Wally and André B.* ([4] Original Copyright ILM, 1985)**

Similarly in *A Bug's Life*, *Ice Age* or *Shrek*, traditionally intractable amounts of background animation are now considered to be a necessary touch in a CG film and are seen as no more work than normal. As early as 1985, computer animation could already do background effects that would be inordinately time-consuming for traditional animators, as evidenced by *Wally and André B.* Even though the character models were primitive and the timing was poor, the background was filled with a detailed forest of autumn trees [Figure 2]. Each tree had hundreds of individual leaves, and each leaf seemed to sway in the breeze. The rendition and animation of a forest with millions of leaves would be pointlessly work intensive for traditional animators to execute, yet the task was manageable for the future Pixar programmers, who wrote software to propagate and animate the leaves automatically. [10:116] Later films have continued this trend [Figure 3].



**Figure 3: Forest from *Shrek*. ([1]Original Copyright Dreamworks, 2001)**

Furthermore, visual styles that would have been infeasible in the past, such as portraying subject matter in an impressionistic, stippled or charcoal-like manner can now be simulated in the computer, allowing for

greater stylistic expression. Short films such as PDI's *Fishing* [Figure 4] and footage from *What Dreams May Come* [Figure 5] show examples of the new forms of expression now possible in CG feature animation.



**Figure 4: *Fishing*. ([15] Original Copyright PDI, 1998)**



**Figure 5: *What Dreams May Come*. ([33] Original Copyright PolyGram, 1998)**

However, the non-linear nature of CG production can be a two-edged sword. With the possibility for endless refinement or changes in artistic direction, productive work may be brought to a halt. As an example of this effect, Kyle Clark, an animator involved in *Star Wars Episode I*, observes that an animation loses its vitality if it is reworked too often – the animator simply loses his inspiration and the performance loses spontaneity. Such a loss might be compared to an actor losing his sense of the moment after being made to re-take a performance many times. [2]

Similar concerns are cited in [35:241], where the authors state that if the schedule does not allow sufficient research and development time for creative and technical iterations in the pre-production phase, the production itself will become unmanageable and unable to move forward.

Finally, directors and producers can run up expenses by abusing the perceived infinite flexibility of this new medium. They may repeatedly change their minds or even add content up to the end of the schedule. Directorial choices that are cost prohibitive in live action filming or cel animation may also be costly in CG productions, and as such these practices may put a strain on the artistic professionals creating the film as well as increasing production costs.

As the examples above illustrate, the computer has significantly changed the art of animation. One may assume that CG studios have adopted new production methods to match the new technology in making animated films. Considering the kinds of changes that are now possible and feasible, investigating the inner workings of the studios that produce animation in this new way would be logical. However, the nature of the industry often blocks such inquiries.

On the one hand, CG film makers are proud of their innovations. They speak about their unique methods to the press and in DVDs. Several CG studios publish "making of" books which give in-depth presentations of their idea development. An altruistic exchange of knowledge often occurs at conferences such as the ACM Special Interest Group in Computer Graphics and Interactive Techniques, also known as SIGGRAPH, where the main goal is sharing discoveries with industry colleagues and others.

On the other hand, film makers can be secretive, especially concerning visual effects, proprietary software and whatever else they believe are intellectual innovations or unique practices. They seem to view their secrecy as a competitive advantage. Their reluctance to share such knowledge extends to discussions of their production pipelines.

Two key results of the current climate of thinking affect this paper: First, since production methods are only partially published, primary research is needed. Secondly, because of the current shortage of shared knowledge, no inclusive description of production pipelines has yet emerged. The professionals who deal with pipeline issues every day are experts in understanding how the areas under their control and in their studios as a whole operate. However, despite the circulation of professionals from studio to studio, no theoretical model of pipeline practices across the industry is known to exist. There are numerous examples of this incompleteness of documentation.

No book has been written on 3D movie pipeline design. The topic is given a fair, though brief and basic, thirteen page treatment at end of Chapter 9 (Production) in the book *Producing Animation* [35]. One problem is that Winder, a producer at Blue Sky Studios, co-authored the book prior to the 2002 release of the movie *Ice Age*, and her pipeline description seems to be based upon the process of making a short film,

*Bunny*. So, while the passage does give the reader some idea of how the production of CG animation differs from traditional animation, the observations are limited to its author's experiences at one studio. Winder's one-chapter description serves as a good introduction to the concept of CG animation, but fails to give sufficiently complete or detailed descriptions of the pipelines used in making CG animated feature films. [35] Another limitation is that Winder's treatment presents practices, departments, workflows, and titles specific to Blue Sky as if they were standard to the industry.

Nevertheless, public documentation has proved to be a good source of information. Though the information is not organized with the purpose of conveying what the researcher of this project seeks, when combined with primary research to give it focus and structure, the wealth of public data can be reordered and used to answer many of the questions posed in this paper.

### **1.3 The Two Curtains**

A chief concern of this researcher is to respect the intellectual property rights of the participating studio while also protecting the confidentiality of the professionals interviewed. Because the research plan included interviewing people, this thesis fell under the auspices of the Institutional Review Board (IRB), at Texas A&M. The IRB review process is designed to protect human subjects from harm; the researcher has adapted the IRB guidelines to protect the intellectual property concerns of the participating studio as well.

To further protect the confidentiality of individuals and the studio involved in this research, the findings are presented in two stages. One stage will present data cited from published sources while the other uses coded data gathered from confidential sources. Thus the presentation of this work might be compared to a stage show in two acts; one with an open curtain and one with the curtain closed.

In the open curtain section, the discussion relies solely on data collected from published sources. Pertinent information on the history, current nature and corporate mentality of each of the four companies is put forth in the Open Curtain portion of this paper.

The Closed Curtain portion presents interview findings, a case study the participating studio, and related topics. The information gained in the interviews is coded. Thus the names of people, places, processes, films and systems are disguised in order to prevent readers from knowing identities of those involved in primary research. This manner of presentation is analogous to a speaker standing in front of a closed curtain and selectively describing what is behind it.



In addition, the research protocol chosen by the researcher has made all information gained by the interviews subject to review by the studio leadership. All information deemed inappropriate for dissemination by the studio leadership has been struck from the record and does not appear in this thesis. Therefore, what is presented may or may not represent the total information that was gathered. Finally, all publicly obtained data about other companies presented in these sections will be carefully selected to avoid undermining the confidentiality of those who participated. The closed curtain portion of the paper covers section **4.FINDINGS**.

### **1.3.1 The Open Curtain**

Open Curtain Research focuses on selected companies in the United States which have produced at least one feature-length CG film and are continuing to produce them. As of the defense date of this thesis, four studios meet the research criteria; Blue Sky, DNA productions, Pixar, and PDI of PDI/Dreamworks. To put the development of the four studios in context, a brief review of the roots of computer animation as an art form is provided. Thus the open curtain covers section **1. INTRODUCTION**, **2. HISTORY** and section **3. METHODOLOGY**.

## 2. HISTORY

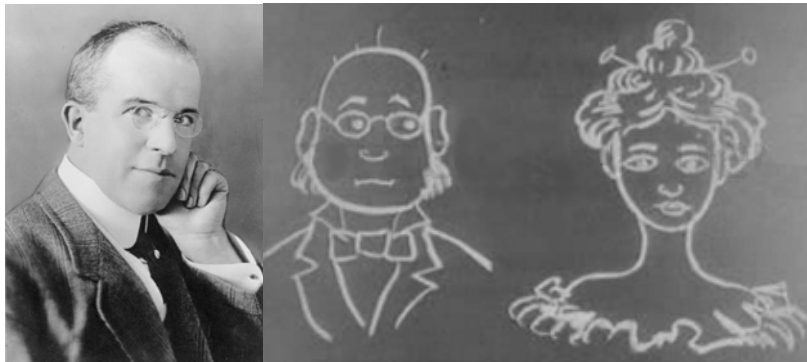
The first completely computer-generated (CG) feature length film, *Toy Story* [Figure 6], was released in 1995 and represented the successful convergence of cinematography and computer animation. A strong box office success, *Toy Story* opened the eyes of the public at large to the potential of computer animated films. However, the separate technologies and art forms that merged in *Toy Story* had been quietly developing for decades.



Figure 6: *Toy Story*. ([18] Original Copyright Pixar, 1995)

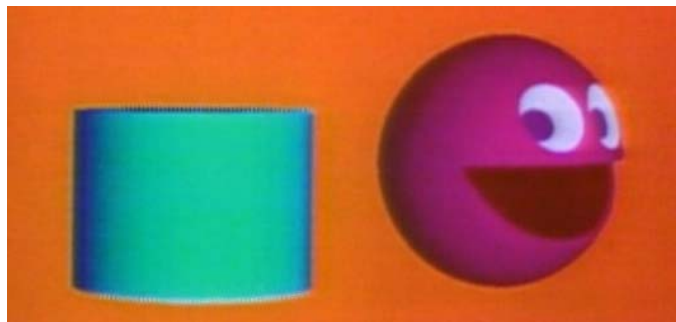
### 2.1 A Brief 'Ancient' History

Cinema, animation, and computer graphics are, for all practical purposes, creations of the last century. Motion picture technology using film was successfully demonstrated for the first time in 1895 by the Lumière brothers. Likewise simple animation, using devices such as Zoetropes, predated film by only a few decades. The first convergence was animation on film; and the first such animation was Stuart Blackton's *Humorous Phases of Funny Faces* [Figure 7], made in 1906. By 1945 the first modern computer, named ENIAC, was completed. And so the prototypes of all three disciplines were now present.



**Figure 7: Stuart Blackton and His *Humorous Phases of Funny Faces*.  
([32],[3] Original Copyright Vitagraph, 1906)**

The convergence between computer technology and the other disciplines began slowly in the mid- 20<sup>th</sup> century. According to [15:7-8], the first computer with a Cathode Ray Tube (CRT) was built in the early 1950's in order to display solutions to differential equations. By the early 1960's, Boeing employees Fetter and Bernhart created a computer animation of a plane landing on a runway by plotting 3D drawings onto paper, one at a time, and then photographing them in the traditional manner, using an animation stand. This laborious process gave way to the first interactive graphics system, called Sketchpad. Sketchpad was developed at MIT by Ivan Sutherland and allowed users to interact with simple wireframe elements using a light pen.

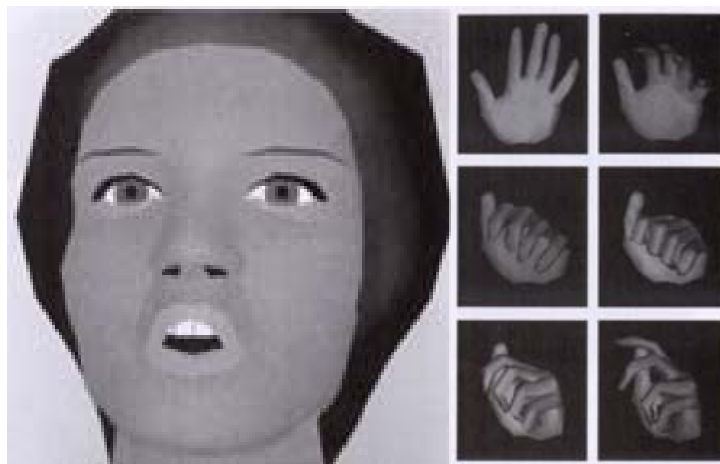


**Figure 8: *Mr. Computer Image ABC* Created with *Synthavision*.  
([23] Original Copyright MAGI, 1972)**

Artists began using computer technology for artistic expression in the 1960's. In the mid - 1960's MAGI opened for business and by 1972, was one of the first companies to use computer generated imagery (CGI) to make commercials. As an example, their first ad was an advertisement for their ability to make ads

using computer graphics as seen in Figure 8. A decade later MAGI would provide large portions of the CGI animation in the 1982 film *Tron*. Robert Abel and Associates opened in 1971, and would also later be involved in making the of *Tron* according to [23:36].

In 1972 Frederic Parke's *Animated Faces* was released; Parke had created the first facial animation generated on a computer, as stated in [15:36]. Ed Catmull followed in 1972, creating the first CG animation of a human hand, [10:95]. Parke and Catmull presented their findings at Siggraph '72 in the same lecture session. Their work can be seen below [Figure 9].



**Figure 9: a. *Animated Faces* by Frederic Parke and *Animated Hand* by Ed Catmull.  
([15] Original Copyrights Frederic Parke, 1972 and Ed Catmull, 1972)**

These early visionaries in computer graphics who foresaw its potential and wished to develop CG films were faced with the severe limitations of hardware at the time. Furthermore, computers useful for these tasks were so expensive that only universities, government agencies and a few large and forward thinking companies could afford them.

In the late 1970's Alvy Ray Smith and Ed Catmull calculated that to make a CG animated film at that time would cost one billion dollars, [10:99-100]. However they also foresaw that given enough time to develop, computer animation would actually become more economical than traditional animation. They based their prediction on Moore's Law, a dictum that computers for a given price will double in power about every eighteen months, and, conversely, that prices will drop by half every eighteen months for a given amount of computational power.

While the histories of these pioneers and their influences clearly stretch back to the early days of computing, an seminal event occurred in Disney's release of the film *Tron* in 1982. *Tron* was a major convergence of film animation and computer technology, and foreshadowed *Toy Story*. The introduction of this film is an excellent point to begin tracing the birth of CG feature animation as an art form and the story of the companies that would ultimately bring it into being. All information in the history of *Tron* (section 2.1.1) is drawn from the documentaries and commentaries of the *Tron* DVD [23] unless otherwise noted.

### 2.1.1 *Tron*

While *Tron* was not a box office success, "it is commonly recognized as a watershed event in the history of the CGI filmmaking." [34] *Tron* was the brainchild of Steven Lisberger, who worked in Boston as an animator in the 1970's. Lisberger's studio existed for artists. He and his group did experimental work for the joy of it; they made commercials to pay the bills. [23]

In 1975 Lisberger saw a computer animation from MAGI at a commercials screening show and was impressed by MAGI's flawless rendition of perspective as the camera moved through the scene. This experience would come back to him five years later on the west coast.

As Lisberger and his Boston studio continued to experiment, they developed a "Light on Black" photographic process to make slides that were totally black except in transparent areas, which were backlit with gelled lights, causing a bright visible glow in the lit regions. The resulting image appeared to be made of visible light, not merely illuminated pigments. See Figure 10a below. While backlit animation was already in use for logos and effects Lisberger was the first to create an animated character with it.



**Figure 10: a. "Light on Black", b. A Backlit Film Test for *Tron*.**  
 ([23] Original Copyright Lisburger Studios (a) and Disney, 1982 (b))

The initial test animation for this new process was a short clip of luminous satellites bouncing a starburst back and forth which was then hurled to the ground and flashed into a stylized man made of light. The figure then threw two luminous colored discs toward the viewer. Lisberger's team joked that the man was electronic and called him Tron. This visual style and the character developed became the concept that would fuel the movie *Tron*.

The event that brought *Tron* from concept into production was President Jimmy Carter's boycott of the 1980 summer Olympics. Lisberger's team had been awarded a contract by NBC to produce cartoon interstitials for the 1980 winter Olympics. After the first set aired at the winter games and was well received, Lisberger moved his team to the city of Venice, California, to have access to a larger animation talent pool to further develop his project for the Summer Olympics.

When the Summer Olympics were cancelled Lisberger and his team were left with a dilemma. Without work, the studio would have to disband; on the other hand, they were now free to develop his idea for *Tron*, which Lisberger described as a kind of electronic *Spartacus*. Realizing that this project would need a major studio to support it, Lisberger went shopping for a partner to fund and distribute the film. Disney was last on the list, but ironically this was just the project Disney was looking for.

In 1980, the Walt Disney Studios were in the doldrums. Its recent films, *Herby* sequels and *Black Hole*, their response to *Star Wars*, had not generated excitement among movie goers. Disney executives, who felt that their films were perceived as old fashioned and dull, were looking for something new and different. Lisberger provided that; *Tron* wasn't just different, it was incomprehensible to them.

*Tron* would be difficult to make and would use processes, such as the "Light on Black" technique, that had never been applied to a feature. Yet the Disney executives were impressed by Lisberger's realistic assessment of the difficulties and how to deal with them. And they could tell Lisberger and his team had a strong vision. They just couldn't understand what it was. As Dick Cook recounted of the company's eventual reaction to *Tron*, "most Disney people didn't get it, but knew it would be good."

Disney gave Lisberger a probational budget to make test footage to show what Tron would look like. Lisberger and company scrounged Disney's costume warehouse, found costume pieces left over from *Black Hole*, and brought in a champion Frisbee thrower who happened to be one of Lisberger's own employees. Their test footage showed how the Light on Black style would look in live action [Figure 10b]. It was a success; Disney executives approved *Tron* for eventual production.

Lisberger then made a second key decision: that computer animation was appropriate for this film, both logistically and conceptually. Logistically, the computer enabled animated sequences to incorporate intricate camera motion that would not otherwise be possible. Conceptually, it seemed there was no better way to portray the world within a computer than with computer animation. Four firms in the United States at the time were able to produce computer generated imagery of sufficient quality to be filmed for theatrical release: MAGI, Triple-I, Robert Abel and Associates, and Digital Effects, Inc.

All four were hired: Robert Abel and Associates provided the title graphic of the film and the animation of Flynn's entry into the computer world. Since Robert Abel's system was incapable of producing solid shaded polygons, they built objects with thousands of vectors crossing them to approximate a solid non-wireframe appearance.

Digital Effects, Inc. provided the opening animation showing a man being formed out of light and electricity. They also animated "the Bit" a floating geometric object that appears in a few scenes throughout the film.

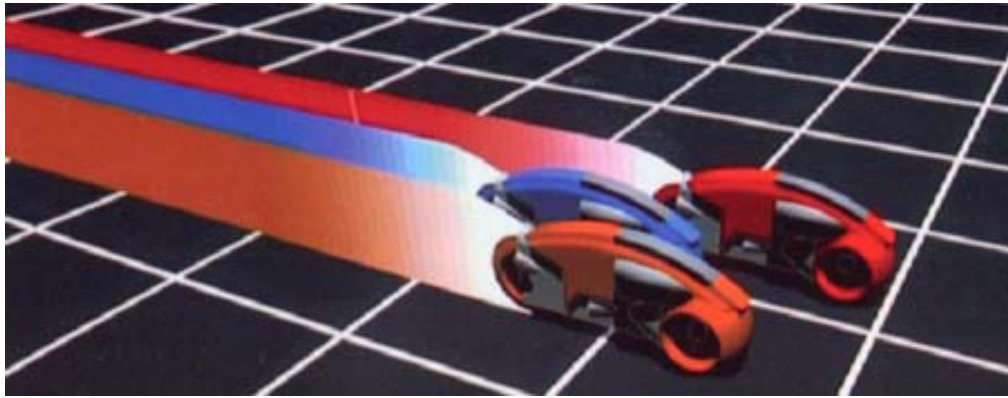
Most of the computer animation done in *Tron* was completed by MAGI and Triple-I, between whom 16 minutes of digital imagery was generated. Sixteen minutes was an unprecedented amount of CG animation at the time. An example mathematical/geometric nature of MAGI's modeling is show in Figure 11. The contributions and methodology of MAGI and Triple-I are recounted in [27:126]:

While optical processes were used to create all the films computerized characters, real computers were used to generate much of the world that they inhabit.

At this time, off-the-shelf graphics hardware and software packages were not available, so most computer graphics companies differed greatly from each other in the techniques and technology they used and the images they could produce.

The system used by Magi was favored for the production of mechanical objects like the police recognizer robots, while Triple-I worked on the more organic images such as the 'solar sailor' and the 'sea of simulation'.

The first film to make extensive and widely publicized use of digital graphics, much of the film industry treated *Tron* as test for the viability of computer-generated imagery. Although its computer animation was startling, the film's failure at the box office was proof to many that the future CGI was limited. The fact the computers had been used to re-create the world within a computer did nothing to alter people's opinion that computer graphics could only represent the artificial.



**Figure 11: Frame from *Tron*, Generated at MAGI. Disney 1982.  
([4] Original Copyright Disney, 1982)**

*Tron* did not do well enough at the box office to convince Hollywood that computer animation was a relevant new filmmaking technique. As a result, most of Hollywood stayed away from using CGI in films for another a decade (1982 - 1992), [27:33]. *Tron's* effect on the industry was significant nonetheless.

*Tron* was Disney's first sizeable foray into computer animation. Historically the first film to employ extensive CG effects, *Tron* inspired several important professionals in the field, as well as many people in this researcher's generation.

John Lasseter was an animator at Disney when *Tron* was released. Lasseter states that without *Tron* there would be no *Toy Story*, [23]. *Tron* likely inspired Lasseter to pursue his own CGI animation at Disney with the *Wild Things Test*. And three years after *Tron's* release, when Disney management proved uninterested in further use of CG animation, Lasseter moved to Industrial Light & Magic where he worked with the group that would later become Pixar. [10:110].

*Tron* also had an influence in the formation of another studio. When MAGI closed its doors in 1987, some of its expatriates who had worked on *Tron*, founded Blue Sky Studios, [15:18]. Chris Wedge, who would later be the director of *Ice Age*, was a computer animator for the tanks in *Tron*. Thus Blue Sky owes its inception and the early experience of its staff to *Tron*. [34:8].

## **2.2 Modern History of the Four Studios**

When *Toy Story* appeared, Pixar, the studio that produced it, had already been in existence for many years. Other studios during this time had also been quietly moving toward the capacity of producing fully-CG animated feature films.



To understand what these companies currently are requires tracing their histories. During this discussion of studio histories, one should keep in mind the contributions each studio has made to the development of the art of computer generated filmmaking. While technical achievements could dominate this discussion, they are not the focus of the thesis and will only be noted in passing.

### **2.2.1 Context for Studio Histories**

The early history of computer animation was equally one of innovative success in the art form, and accompanying failure to be accepted by the film industry for it. *Tron* particularly suffered in this manner; it performed poorly in the box office while capturing the admiration of a particular audience. More importantly *Tron's* audience included professionals like John Lasseter who were inspired by it.

*Toy Story* was the breakthrough that finally disproved Hollywood's belief that computer generated animated films would be box office failures. Pixar's success opened the way for other studios to gain support for their projects. The CG animation studios studied in this paper have survived in the marketplace, overcome technological barriers and industry misconceptions, and have succeeded where others have failed. These four, Pixar, PDI/Dreamworks, Blue Sky and DNA take the focus for the remainder of the history section. Understanding them serves as a background to understanding digital production pipelines.

PDI's initial contribution, via *Antz*, was to show that Pixar was not the only studio that could gain box office success. Later, with the release of *Shrek*, PDI proved that other studios could produce blockbusters and gain dominance in the market.

Blue Sky Studios demonstrated that the scale of production and organization used by Pixar and PDI was not the only viable model for producing a computer-animated film. Using a budget and staff smaller than those of its competitors, Blue Sky overcame its limitations to produce *Ice Age*, a film of acceptable production value and audience appeal. So Blue Sky's contribution was to provide an effective alternative pipeline and business model for producing a CG feature.

DNA Productions reinforced Blue Sky's lesson, working on an even smaller budget to produce their film, *Jimmy Neutron*. DNA also introduced creative marketing strategies which had not been employed by other studios. [25]

Each of these four successful studios has developed different approaches to meet their goals. Attitudes vary toward matters such as software development and target audience. In broad terms, six issues seem relevant to the success of any CGI film venture studied here:

1. Technical competence
2. Artistic/visual-communication skills
3. Storytelling capability
4. Ability to objectively and critically assess the effectiveness of their own work
5. Supportive corporate culture (respectful, collaborative, etc.)
6. Sound economic model

Strength in these six areas are factors contributing to the success of the studios being studied; weaknesses in one or more areas detract from a studio's ability to succeed. While reading the history section, readers are encouraged to note when a studio shows excellence or a lack of development in any of these areas. Likewise, readers may observe any apparent conflict between areas, or any especially supportive relationships.

### **2.2.2 From *Tron* to *Toy Story***

Of the studios being studied, PDI has existed the longest under its own name. Pacific Data Images –known as PDI– was founded in 1980 when three individuals decided to collaborate to develop a new software tool. Carl Rosendahl, a recent college graduate with a degree in electrical engineering who had spent the previous nine months working at Memorex, had the initial vision. Glen Entis, an Ampex programmer at the time, and Richard Chuang a computer enthusiast, joined Rosendahl. PDI's initial software package was a result of a collaboration between the three. Rosendahl secured a \$20,000 loan from his father, a heavy-construction contractor, to rent office space and procure a single computer [12].

What PDI had developed was a software package for the display, motion, and rendering of simple three-dimensional elements which could be recorded to video. When they showed the software at a broadcasting tradeshow they landed their first contract, to make network title animations for a South American television network. Brazilian Global Television Network paid them \$250,000 to develop network title animations. [12]

PDI's big break came shortly thereafter in 1983. Harry Marks, a former ABC executive saw the South American network titles, and contacted PDI to make new titles for *Entertainment Tonight*. The new

animated title sequence was so successful that an ABC executive offered PDI the opportunity to generate titles for all of their news and sports programs. [12]

By 1986, PDI was one of a handful of companies in the nation catering to this computer graphics niche market. The resulting revenues were substantial, averaging about \$3 million yearly, and the company's workforce grew to sixteen. In only six years they had moved from renting office space on a loan, to becoming one of the preeminent network titling companies, catering to the three major television networks of the time. [17]

Though Pixar nominally was founded in 1986, the core group had already existed as a cohesive entity since 1980. The group's early origins were improbable. Late in 1979, George Lucas needed to find someone who could employ computer technology to improve his filmmaking process. Oddly, Lucas gave his real estate manager the task of finding someone. The manager visited Stanford; there he was advised to contact a former Stanford graduate student, Alvy Ray Smith, who had gone to work at the New York Institute of Technology (NYIT). [10:101-3, 105-7].

Alex Schure, who ran NYIT, had private ambitions to become the next Walt Disney. By 1979, NYIT's computer graphics research lead by Ed Catmull and Alvy Ray Smith had been at work at NYIT for several years. The team spent large sums of money developing computer graphics techniques which they and Schure hoped to apply in making computer animated movies. Meanwhile, in another building, Schure employed a team of animators working to complete a film using traditional techniques, called *Tubby the Tuba*. For Smith and Catmull, the moment of truth came when they attended a viewing of Schure's animated film. They realized that no matter how much money he spent, Schure could never become a Walt Disney. They felt he lacked an artistically critical eye, and effectively had no sense of story. Catmull and Smith decided they would have to move elsewhere to do their work. However they had to approach job hunting with extreme discretion because in addition to his other eccentricities, Schure was paranoid about employees leaving his company to compete with him. [10:101-3, 105-7].

At that very time, Lucas's real estate manager called with an offer to hire the CG experts. Smith, Catmull and their team jumped at the chance to escape Schure, but to avoid Schure's wrath they first scattered to temporary "cover" jobs unrelated to computer graphics. By the end of 1980, the team safely reassembled at Lucas' studio, Industrial Light and Magic (ILM), just north of San Francisco. They worked as ILM's computer graphics division, first developing technology needed to complete the *Star Wars* trilogy and then making effects for other films, such as the Genesis effect for *Star Trek II* in 1982. [10:101-3, 105-7].

The Genesis effect became an important milestone in CGI, both to the industry and to the group that would later become Pixar. According to [10:106-7], Catmull and Smith enjoyed many immediate benefits working at ILM. Working in the movie industry made it easy for them to hire talented people from their own field; they quickly increased their team in quality and size. However, they faced one crucial problem: George Lucas did not understand the full potential of using computer graphics in film.

Smith's opportunity to alter this situation came about when Paramount contracted ILM to create an effect for *Star Trek II: the Wrath of Khan*. Paramount requested a scene which would show how the movie's "Genesis device" worked. Originally the idea had been to show a barren rock being bombarded with Genesis rays and then growing moss. This uninteresting and obscure way of explaining the device was discarded in favor of having ship's crew review a simulation from the ship's computer showing the effect of the Genesis device. Since the sequence in the story would be a computer simulation, executing the sequence using computer imagery seemed a natural choice, as in *Tron*. Because the rest of the company had little experience working with computers in this manner, ILM turned the project over to Catmull and Smith's computer graphics group. [10:106-107].

Alvy Ray Smith saw this as a great opportunity to get George Lucas's attention and open his eyes to the full possibility of the computer graphics medium.

Smith's storyboards portrayed an exciting scenario for the computer simulation: a ship would fly past a barren moon, and fire a missile. Upon impact, the missile would super-heat the surface of the moon, causing a firestorm which would ignite an atmosphere out from the molten rock and kick-start weather cycles. Oceans would form and life would emerge. The Paramount executives loved the idea, but Smith felt that to get George Lucas's attention, he had to go farther.

Knowing that scene's emotional quality alone would never impress Lucas, Alvy decided to show off a cinematic technique that could not be replicated by any traditional means. Smith conceived of an acrobatic continuous camera move, one that would be impossible to build or execute in live-action cinematography. See Figure 12.

"The day after the premiere of *Star Trek II*, George put one foot inside Alvy's office. 'Great camera move,' he said quickly. Then he was gone. From that point forward, George's movies relied heavily on computer graphics." [10:106-107].



**Figure 12: The Genesis Effect from *Star Trek II*.  
([26] Original Copyright Paramount, 1982)**

The Genesis effect earned its place in history as an example of technical innovation: *Star Trek II* was released in 1982, earlier in the same year that *Tron* opened. It's Genesis effect has much in common with *Tron*. Both used CGI as CGI and both represented technical milestones in the use and capacity of CGI techniques. In his book [15:19], Isaac Kerlow states that:

The Genesis effect created in 1982 by Industrial Light and Magic (ILM) for the film *Star Trek II: The Wrath of Khan* is also of historical interest because it was the first visual effect shot that was created entirely with three-dimensional computer animation techniques, the longest-running sequence, and also because it is one of earliest examples of procedural modeling and particle systems animation.

In 1985, three years after the release of *Tron*, John Lasseter left Disney and joined Catmull and Smith at ILM. For his first project, Lasseter animated the stained glass knight in *The Young Sherlock Holmes*; that same year, he made a test animation called *the Adventures of Wally and André B.* (see p.6) . John Lasseter

became a major artistic influence on the graphics team he joined at ILM, and later become known as a prominent virtuoso of computer animation and storytelling.

A year later in 1986, Steve Jobs, former and future owner of Apple, acquired ILM's computer graphics division. Lucas had sold the division to finance a divorce settlement, [10:110]. Lasseter, Catmull and Smith went as part of the package. In acquiring the ILM computer graphics group, Jobs saw an opportunity for himself similar to the one he had found at the Xerox PARC research facility, [10:90-1]. At PARC, Jobs had seen and appropriated many of the components of what would become the modern graphic-interfaced PC. In the case of both Xerox and ILM, the current ownership was either unaware of the division's potential or unable to act upon it. And in both cases Jobs saw the potential and did act.

His employees named the new company Pixar and Jobs incorporated it in February of 1986. [10:90-1,113]. Intent on making a comeback in the computer industry via his new manufacturing company NeXT, Jobs paid Pixar little attention for the next nine years. Under these conditions Pixar matured as a company, continuing to develop in the area of computer generated animation, and developing a strong corporate culture. They also executed several unprofitable tangents that Jobs had them pursue.

It is important to point out that just as Lucas had failed to realize the real value of Pixar's expertise, Steve Jobs would also make the same error in judgment. While he did have the insight to buy Pixar, he wasted much of their time in the early years attempting to turn the group into hardware or software vendors.

Later in 1986, Steve Jobs decided that Pixar should make and sell graphics computers. As it turned out, the devices were too expensive and arcane to sell. This failed project was followed by Steve's attempt to commercialize Pixar's rendering software. He sought to make it the PostScript of 3D; the initial sales attempt was disastrous. In the long run, however, the right audience was found and Renderman became a valid venture. Renderman sold very well, and is the industry standard today for film-quality rendering. [10:115,143-146]

In 1987, two new studios entered the CG animation field. Blue Sky Studios and DNA came into existence a year after Jobs bought Pixar.[14], [34:4]. Both studios were founded when an economic downturn put their employing companies out of business. In both cases the newly unemployed decided to take a bold action and start animation firms of their own despite the economy. Ultimately, both studios would become able to produce feature films.

A small group of former MAGI employees formed Blue Sky Studios in February of 1987. Among them were Carl Ludwig, an electrical engineer, Eugene Troubetzkoy, a PhD in theoretical physics, and Chris Wedge, an animator with a masters in computer programming from Ohio State. As scientists, programmers and animators, their plan was to form a computer animation studio and develop powerful software to support it. Ultimately their efforts yielded *CGI Studio*, Blue Sky's advanced proprietary rendering software. Like PDI, Blue Sky paid their bills during their early years by doing commercials and feature effects work. Clients included Gillette, Rayovac, Bell Atlantic and Braun.

That same year in Dallas Davis and Alcorn formed a small company, christened it DNA Productions, and began to seek work making corporate training videos. The first efforts undertaken by DNA Productions - beyond mere survival - were to build up their skills and gradually increase the number of talented staff members. They worked mainly in traditional animation techniques, but used computers in lieu of animation stands. [14]

Between 1986 and 1995 Pixar made several important short animations: John Lasseter created *Luxo Jr.* (1986), *Red's Dream* (1987), the Academy Award winning *Tin Toy* (1988), and *Knickknack*, shown in 1989. In *Luxo Jr.*, showcased at Siggraph '87, Lasseter applied several of Disney's principles of animation, giving the lamps personality, weight and good timing to increase their appeal.

In July of 1989, with Jobs' approval Ralph Guggenheim signed a deal for Pixar to start making commercials. [10:143-147]. Their Listerine commercials were well received, especially the *Arrows Commercial* aired in 1994. [15:20-21, 24].

As previously noted, Jobs, like Lucas before him, had a limited understanding of Pixar's potential. Even after negotiating a three film deal for Pixar with Disney in 1991, Jobs continued to bemoan the cost of owning Pixar and continued to look for a way to sell it. [10:157,162-163]. He didn't grasp the value of Pixar's potential until January of 1995.

That January, Steve was invited to New York to see a preview of Disney's new films for the year. In particular, Disney was promoting *Pocahontas* and Pixar's *Toy Story*, using the main lawn in Central Park where a huge 99-seat screening-room tent was pitched. A large number of important people attended. Disney gave *Pocahontas* top billing, discussing it at great length, while the show's composer played several key songs. Then John Lasseter and Ralph Guggenheim talked about *Toy Story* for a few minutes, and afterward they screened the green army men sequence. The crowd went wild.

Pixar stole the show. As Steve Jobs observed the crowd's reaction he suddenly realized Pixar's true value, potential and importance. "Steve went bonkers, he was just so excited,' Ralph [Guggenheim] recalls.' That was the moment when Steve realized the Disney deal would materialize into something much bigger than he had ever imagined, and that Pixar was the way out of his morass with NeXT [Jobs' failed computer company].'" [10:195-197].

### **2.2.3 *Toy Story*: The First of Its Kind**

*Toy Story* premiered in November of 1995 marking a milestone in history of film, animation, and computer graphics as the first fully computer-generated feature film. Released a total of four years after Disney and Pixar had green-lit production for the film, *Toy Story* was well received by critics and at the box office. Virtually everyone seemed to form a positive impression of the film and this new medium in filmmaking. Both Disney and Pixar referred to this first film as being analogous to *Snow White* (1937); the first of its kind, a tour de force, and a lasting story which would stand on its own merits regardless of any technical discussion. [16:6]

### **2.2.4 From *Toy Story* to the Present**

While Pixar had made a milestone in history with *Toy Story's* release, Pixar would not be allowed to repeat the rest of Disney's early history and refine their craft free of competitors. In this new period of animation history, a different dynamic emerged, largely as a result of the affordability of the needed tools. A large number of talented professionals were available whose skills in the movie effects business and commercials could be reapplied to feature-length animation. The first of these rivals was only 40 miles distant from Pixar, on the south side of San Francisco Bay.

Between 1986 and 1995, PDI had been involved in titling, commercials and, increasingly, in film effects. In 1990 PDI provided special effects for its first movie, a Japanese science-fiction film called *Solar Crisis*. The film's only release in America was direct-to-video; however PDI's holographic effect for the film was well received. [24] Over the years PDI had expanded its special effects and music video businesses until title generation accounted for only one third of its total revenue. Its effects were of high quality and as time went on, PDI successfully competed against ILM, providing special effects for such films as the *Batman* series, *Terminator 2*, and others. During the early nineties, Rosendahl repeatedly proposed computer-generated movies to executives in Hollywood, but investors did not take him seriously until after the release of *Toy Story* in 1995. The mindset in Hollywood was that no one would finance an unproven type of production; those who could provide funding did not believe that a feature length CGI film could succeed. [21]



In 1995 Jeffrey Katzenberg agreed to fund PDI's effort to make a CGI film of its own, *Antz*. Katzenberg had left Disney in 1994 following a dispute with Michael Eisner and co-founded DreamWorks SKG (Spielberg, Katzenberg and Geffen). Katzenberg had been instrumental in forming and closing Disney's deal with Pixar [10:151-153,162]. He had been a carefully critical observer of Pixar, as well as their chief defender at Disney [10:212-213].

Katzenberg had also been the one who ordered that the production of *Toy Story* be put on hold in November of 1993. He made this decision to give Pixar time to work out flaws in its story [10:185-187]. Disney had used this same process with *The Lion King*, *Beauty and the Beast* and *Aladdin*. In each case, a strong story concept had lost its way during development and was in dire need of correction [19:46-49]. Because of Katzenberg's intervention on *Toy Story*, the creative team revived the story from failure, crystallized its excellent plot, and solidified its box office appeal. In April of 1994 Katzenberg approved the story changes and sent *Toy Story* back into production [10:194].

While at Disney, Katzenberg had witnessed John Lasseter's work. He must have become aware of the possibilities of 3D computer animation while working with Pixar. [10:151]. When Katzenberg left Disney for DreamWorks he may have been looking for a way to pursue CG animation sans the Disney/Pixar relationship.

As an industry professional, Katzenberg would have understood the strengths of PDI: PDI had been an independent company before Pixar became incorporated. PDI was technically strong and financially solvent, an important quality to have in an industry where the majority of early companies became extinct. Further PDI had shown its own artistic and stylistic abilities in its commercial and effects work, as well as its own animated short films.

In the author's opinion, readers should think of Katzenberg as the Steve Jobs of PDI; he hadn't founded the company nor run its day-to-day operations, but when he stepped in he helped to guide PDI toward making their first CG feature film. Katzenberg recruited and hired a large number of people to flesh out PDI's production capacity and to shape it into a studio capable of feature films.

*Antz* was released in September of 1998. Several technical innovations developed at PDI had facilitated the completion of the movie. The three most prominent innovations were a fluid system called FLU, a muscle-based facial animation system, and a crowd-control simulator. [13], [7].

*Antz* is important for two other reasons. Though *Antz* was only the second such film to be produced, one can see the advancement of technology, skill and understanding of CG production, relative to the first CG film, Pixar's *Toy Story*. Another important feature of *Antz* is that it was produced with good production value in only two and a half years, nearly twice as fast as the production cycle that has proven to be the average for CG films, at the time of this writing.

Thematically, *Antz* represented a departure from the norm of animated features, in that it targeted an older audience with adult themes and humor, framing a satire on the sociopolitical background of communism versus fascism. PDI's filmmakers might be criticized for having attempted so many conceptual innovations in their first feature film, but *Antz* achieved solid box office returns [see Table 1 in APPENDIX A: TABLE OF FILM EARNINGS AS OF APRIL 18, 2004]. This initial success encouraged DreamWorks to pursue future projects with PDI.

Though the popular press promoted the notion of a "war" between Pixar and PDI over their competing insect films, workers at the two studios seemed to ignore the rivalry the press portrayed. News sources in the San Francisco Bay area have reported that employees at PDI and Pixar often know one another and are friends; in one case a man works at one studio and his wife at the other. [28] In another example, Lasseter has mentioned that Chris Wedge of Blue Sky Studios is a friend of his [23]. These anecdotes indicate an interesting side note about the culture of 3D animation. Most professionals not only respect the work of other studios, they often are personal friends with the workers. Similar comments of mutual respect within the industry were made by those interviewed for this thesis project.

DreamWorks/SKG acquired forty percent ownership of PDI in 1996 as part of their agreement to produce *Antz*. And in February of 2000, DreamWorks purchased the rest of PDI shortly after founder Carl Rosendahl stepped down as chairman. [8]

The movie *Shrek* became PDI's defining success. Released in 2001, *Shrek* was by all measures a blockbuster, outselling Pixar's *Monsters, Inc* at the box office, and showcasing a high level of technical and visual sophistication. In *Shrek*, PDI gained its own popular, entertaining "voice" which further differentiated it from Pixar. Technically, the studio's most impressive feats were expanding the muscle simulator from *Antz* to full-body animation and for simulating clothing. As of this writing, PDI's animators have taken on more extensive portrayals of human subjects than their competitors have, and have demonstrated expertise in doing so.

Turning attention to the ongoing development of Blue Sky and DNA, further points of comparison between the two studios can be observed. Blue Sky incurred greater expenses but developed better professional tools than DNA did. From 1987 through early 90's, Blue Sky invested heavily in development of a single powerful proprietary application, a rendering system called CGI Studio. [34:4,6-7,82] One of Blue Sky's founders Eugene Troubetzkoy, who holds a degree in theoretical physics, was a pioneer of global illumination; CGI Studio is largely a result of his talents.

During its first few years of business, from 1987-1994, DNA Productions remained a small firm, occupied with making animations for corporate use by clients such as Kroger's and GTE. During the early nineties, DNA produced a series of independent adult-oriented cartoon shorts entitled *Nana and Lil Puss Puss*. The films were developed by Alcorn, the more skilled traditional animator of DNA's two founders, and were described by the popular press as bawdy. [14], [30]

By the early nineties, both Blue Sky Studios and DNA Productions had advanced economically and gained a market identity. Through the proper use of CG material descriptions and lighting simulation, Blue Sky excelled at making totally synthetic scenes appear to have been filmed as live-action. The Braun shaver commercial of 1992 shows the level of quality Blue Sky wished to attain - absolute photo realism, indistinguishable from reality. The Braun commercial was so successful that they were by-passed for an award: The jury could not tell that Blue Sky had used the computer to make the image. Thinking the shaver was photographed, the jury had judged the entry only on the titles [34: p.4-8]. During the nineties, Blue Sky expanded beyond commercials and began tackling difficult effects work, including *Joe's Apartment*, *Death Becomes Her* (1992), and *A Simple Wish*.

By 1995 DNA had adopted Lightwave software to produce 3-D computer animation. During this same time frame, Alcorn and Davis were contacted by Steve Oedekerck, director of *Ace Ventura: when nature calls*, [25]. Oedekerck had seen a character the pair had created, which they called *Johnny Quasar*. Oedekerck liked the visual style of their work. With his help, DNA developed a weekly 3D cartoon series for the Nickelodeon cable channel. During the same time period, DNA produced two Christmas specials, *Santa vs. the Snowman*, which appeared in 1997 on IMAX and *Olive, The Other Reindeer*, which showed in 1999 on network TV.

Blue Sky continued to specialize in showing computer-generated characters and excelled at lighting and rendering them to seamlessly match their live action environments. Blue Sky was responsible for the photo-realistic penguin in *Fight Club* (1999), the CG version of the alien in *Alien Resurrection* (1997), and the humming bird in *Star Trek: Insurrection* (1998).

It is also important to note *Bunny*, a short film created and directed by Chris Wedge, which won an Academy Award in 1998. Artistically integrated and beautifully realized, *Bunny* shows the level of artistry that Blue Sky is capable of when unfettered by budgetary and time constraints. The work also demonstrates Blue Sky's capability to apply photorealistic rendering to non-realistic, aesthetically-driven subject matter.

Twentieth Century Fox purchased Blue Sky in 1999. Production started on *Ice Age*, a script brought to Blue Sky by Fox. Chuck Richardson, an animation producer brought in by Fox, expanded Blue Sky's staff from 70 to 170, and moved the studio into a new facility at White Plains, New York. [34:8]

Though DNA Productions and Blue Sky are comparable so in many aspects, the differences between the them are equally interesting. Because Blue Sky Studios was started by a group of former MAGI employees, they carried with them the assumptions and mentality of the first generation computer graphics firms. Specifically, they believed that to have a successful animation studio a strong proprietary code base must be written.

The founders of DNA, however, had never been employed in any of the early graphics firms; If anything, DNA's founders worked from a traditional animation background. Thus their technical choices do not carry any perspectives held over from previous eras, when writing software was the only option. Their first works were traditionally animated. However, from the beginning DNA did use computers instead of animation stands to make its cartoons. Over time they transitioned from 2-D animations to 3-D animation, by simply purchasing commercial software. [14],[25] DNA's assessment of priorities therefore stands in contrast to those at Blue Sky.

The attitudes of the two studios also differ on hardware, though not as substantially. As a result of Blue Sky's reliance on its computationally intensive rendering software, the studio needs a larger than normal number of CPU/hours in its render farms. Images created by CGI Studio can attain a great deal of beauty and realism. Because the software is able to simulate light in a physically realistic manner, the lighting artists are able to work in ways more similar to live-action lighting. This time savings in human hours is counterbalanced by the computationally intense rendering, which takes substantially more time than other less scientific methods.

DNA, by contrast, does not put a premium on highly sophisticated lighting techniques. They use standard rendering methods instead of global illumination and, unlike Blue Sky, never attempted to make photorealistic imagery. Their work can be better described as CG cartooning.

Despite their concern for sophisticated lighting software, Blue Sky apparently never wrote a code base for animation or modeling. They use Alias Maya, a commercially available production software package, for virtually all tasks except rendering. Blue Sky's stance on software can be seen as a hybrid between the Pixar/PDI model of proprietary software, and the off-the-self model used by DNA.

The first films of Blue Sky and DNA, *Ice Age* and *Jimmy Neutron*, respectively, also serve as an interesting foil to one another. Both incorporated a more simplified visual design than PDI and Pixar used. This could be due to artistic decisions or may simply as a response to having substantially smaller budgets and staffs than Pixar and PDI. Nonetheless, both *Jimmy Neutron* and *Ice Age* proved to be profitable at the box office. Like PDI's first release, *Ice Age* was produced on an unusually tight production schedule. And as can be seen in APPENDIX A: TABLE OF FILM EARNINGS AS OF APRIL 18, 2004, both films returned good profits on their costs.

The movie *Jimmy Neutron* (December 21st 2001) was designed to be a kick-off to a weekly cartoon series on cable TV. It earned \$80 million in its domestic release. Both the film and the series proved to be very successful with their target audience.

*Ice Age* (March 15th 2002) is the story of a trek made by ice age animals to return a human child to his tribe. In execution, this journey is actually comprised of a few melancholy or atmospheric moments interspersed within a series of witty retorts, gag sequences, and visual puns. The movie earned \$176 million.

One final contrast should be noted: while Blue Sky has become part of a larger company in a manner similar to PDI, DNA has remained independent in spite of its dealings with Paramount. In this sense, DNA can be compared to Pixar: while bound by contract, both studios are independently owned.

The histories of both DNA and Blue Sky indicate that as technology changes new production methods and studio organizations are becoming possible, giving all filmmakers in this medium more options for producing CG films. In particular, while PDI and Pixar have shown the value of building a large highly specialized team supported by in-house software, Blue Sky and DNA prove that dissimilar yet profitable films can be made by smaller teams using off-the-shelf software.

### 2.3 Current State of the Companies

At the time of this writing, in May 2004, Pixar is at work on *The Incredibles*, its sixth feature film, and has recently completed *Boundin'* its 8th animated short. Pixar is probably looking for a new distribution partner since it has chosen not to renew or extend its agreement with Disney. The studio continues as an independent entity, at least 70% owned by Steve Jobs via his stock holdings, but run by its own creative staff. [20],[10:222-224]. Pixar continues to develop in-house software; both Renderman, which it licenses to others, and Marionette, which it uses exclusively for animation in its own films. Pixar continues to use some commercial software in production such as Alias Maya for computer modeling, but the majority of its work is done with its own codebase.

PDI, now known as PDI/Dreamworks has most recently completed work on *Shrek 2*, it's third feature. Between the two studio branches, (PDI and Dreamworks Animation in LA) several new films are being made, including; *Shark's Tale*, *Over the Hedge*, and *Madagascar*. PDI, like Pixar, has made numerous short films, the most recent being *Sprout*. And like Pixar, PDI maintains a mix of commercial and in-house software applications. They have recently shifted from using SGI IRIX to HP systems running Linux. [5] Unlike Pixar, they do not market any of their proprietary software. As at Pixar, most of the software used in production is in-house, about 85-90 percent in PDI's case [1].

Blue Sky is currently working on its second CGI feature film, *Robots*. The only short Blue Sky has made is *Bunny*. Now wholly owned by Fox, they have stated in [34: 8] that they "retain the creative culture and quirky style that defines their work and their commitment to technical innovation through research and development." Blue Sky's crown jewel is CGI studio, their proprietary Raytracing/Global-Illumination Renderer. The rest of Blue Sky's applications are modified commercial programs. Most of the other proprietary tools used throughout production and mentioned in their book [34] are MEL (Maya-script) programs and plug-ins that they have developed, primarily for use with Maya. This is a valid approach to software development, but is distinct from developing and maintaining a unique in-house code base, such as CGI studio.

DNA productions is also working on a second feature. In lieu of shorts they have produced a weekly CGI cartoon series, called *Jimmy Neutron*. New episodes continue to be produced and are aired on Nickelodeon. Software development at DNA primarily consists of scripting and customization of off-the-shelf software and systems. DNA remains an independent studio and company.

## 3. METHODOLOGY

### 3.1 Overview of Methodology

The researcher aimed to discover how CG pipelines operate and by using qualitative methods extract an understanding of the nature of CG pipelines from the data. Research methods involved analysis of public documents, study of publicly-available work from each company (DVDs), and interviews with key employees at the studio that agreed allow interviews. This data was studied and integrated to form the basis of this paper's conclusions.

In order to properly understand the details of the methodology and its implementation, an explanation of Qualitative Analysis is needed.

### 3.2 Qualitative Analysis

Qualitative Analysis offers a unique approach to research. Qualitative Inquiry approaches problems in a holistic manner, seeking to discover theory in response to data. This approach contrasts with Quantitative Research which tests a rigidly defined hypothesis using as few variables as possible. Qualitative research relies on the researcher, or 'human instrument', as its primary mode of data collection. It takes into account the viewpoints of humans and is often used to study human problems or systems. In keeping with its pluralistic nature there is no one official definition of Qualitative Research. The three most prominent definitions are given below:

#### 3.2.1 Definitions

1. Denzin & Lincoln, 1994 [9]:

Qualitative research is multi-method and focuses, and involves an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomenon in terms of the meanings people bring to them.

Qualitative research involves the studied use and collection of a variety of empirical materials – case study, personal experience, introspective, life story, interview, observational, interactional, and visual texts – that describe the routine and problematic moments and meanings in individuals' lives.

2. JW Creswell, 1998 [6]:

Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting.

3. Strauss & Corbin, 1998 [29]:

Qualitative research is an inquiry process that produces findings not arrived at by statistical procedures. Some of the data may be quantified, but the bulk of the analysis is interpretative.

Qualitative research is carried out for the purpose of discovering concepts and relationships in raw data and then organizing these into a theoretical explanatory scheme.

### 3.2.2 Rationale

The rationale for conducting qualitative inquiry was stated by J.W. Creswell in 1998, [6]. If the research question is best posed in terms of *how* or *what*, then a qualitative approach is appropriate. A second indicator of which research method is preferable can be found in the presence and clarity of variables and theories. In a quantitative study variables are usually easy to identify prior to beginning research. In quantitative research, the theory or hypothesis that drives the study exists beforehand and the purpose of the study is to prove or disprove the hypothesis. In a qualitative study, theories or a hypotheses may be vague or undefined prior to beginning research, and salient variables are not clearly identifiable.

At this point, several key philosophical stances intrinsic to qualitative inquiry need to be discussed. First is the concept of the human instrument: this idea embodies the supposition that the researcher is the primary instrument for collecting data as opposed to measurements from tools or the output of sensory devices. The second concept embedded in the idea of the human instrument overlaps several other philosophical stances found in qualitative analysis: that is the position that human perception is its own reality.

Human perception as reality encapsulates certain axioms. The first is that an individual's perceptions are intrinsically important and that qualitative inquiry should emphasize the study of a person's individual experiences, perceptions and responses as well as their behaviors. Secondly, this approach takes into account the biases and limitations in human observers, especially in the researcher. In its most tame interpretation this philosophy acknowledges the limitations of human perception, yet values the understanding that can be gained by recording thoughts and experiences for their own sake. In its most extreme and postmodern interpretation, this concept promotes the idea that objective reality is not merely obscured by the limitations of perception but that objective reality is generated to some extent by the observer's perception of it.

Another important philosophical stance of qualitative analysis is to value relationships between members of a system over statistical or mathematical relationships. In a related vein, qualitative analysis puts a premium on holistic research which involves collecting multiple forms of data from a variety of sources.



This contrasts with quantitative research which attempts to measure a carefully defined set of variables in a mathematical manner. For example, in this researcher's study, data was collected in the form of notes taken at interviews, audio recordings of those interviews, transcriptions of the interviews, images, newspaper articles, books, DVD commentaries, and the films produced by the all studios studied. These multiple sources afford the qualitative researcher a collage of perceptions and facts from which to draw theories and cross examine ideas.

Another element important in the qualitative tradition is the use of a highly verbal, highly narrative form of reporting. A qualitative study is meant to read more like a novel than a statistical report.

### 3.2.3 Traditions of Inquiry

In qualitative analysis there are five predominant traditions of inquiry, as stated by Creswell in 1998: a biographical history, a grounded theory study, a case study, a phenomenological study, and an ethnography.

A **life history** is the study made of an individual and his experiences as told to a researcher or found in documentation or archival material. It aims to uncover the multilayered context of a person's life as well as to position the subject within the larger historical context surrounding his or her lifetime.

A **grounded theory** attempts to create a theory in response to data collection. Some of the aspects to be reported in a grounded theory inquiry include the central causal conditions, strategies, conditions in context and consequences.

A **case study** is considered to be the study of a bounded system conducted over time, through detailed in-depth data collection. The enclosed systems needs to be bound in time and place. The purpose of a case study is to show different perspectives on a problem, process or event being studied within the bounded system. This was the predominant method employed by this researcher because it best fit the nature of the thesis project.

A **phenomenological study** is conducted to study an occurrence as it is experienced by several different individuals, and explores the structures of consciousness in human experiences. The key element to be discovered by such a study is the central underlying meaning of the experience, also called the essence. The essence is derived from individual descriptions.

An **ethnography** strives to describe and give interpretation to a cultural group, a social group or system. An ethnography involves examining the group, learning patterns of behaviors, customs and ways of life. The ethnography aims to study the meanings of behavior, language and interactions for the purpose of creating a holistic portrait of the group.

### **3.3 Methodology in This Paper**

The researcher's intent was to discover how CG pipelines operate and to use qualitative methods to extract an understanding of the nature of CG pipelines from the data. Research methods involved analysis of public documents, study of films from each company, and study of interviews with key employees at the studio that participated in primary research.

The first step in primary research was to approach the studio and request permission to conduct research there, via on-site interviews. Next, the researcher, in consultation with the company, identified individuals to interview who were suitable to the requirements of the study. This researcher requested interviews with department heads in order to gain information from individuals with authority and experience. Selection of positions to interview was biased toward departments that directly collaborated with the largest number of other groups in their studio. The researcher chose to interview the department heads of Layout, Animation and Lighting at the studio, because these positions best fit the above criteria.

The researcher interviewed three individuals, called subjects in qualitative inquiry. Consistent with the methodology of Qualitative Research, the researcher asked open-ended questions pertaining to the subject's insights on and experiences in the computer graphics industry. Subjects were asked about various topics relating to the process of computer generated filmmaking. Their insights into the production pipelines at their studio formed the key focus of the interviews. On average, each interview lasted one and a half hours.

Qualitative methods were then used to examine the interview data in addition to public documents, resulting in a report of the emergent themes. This data along with some quantitative information, has allowed the researcher to develop descriptive pipeline models, to make observations, and to formulate a conceptual pipeline definition.

All research data collected via interviews was coded for the sake of confidentiality and objectivity. A protocol was set in place to manage coding and all other aspects of confidentiality, as required and approved by the Institutional Review Board (IRB). Data collected from the interviews was coded, replacing recognizable names of people, companies, films and systems with code names such as Animator

#3, Company Zed and Film XI. This code naming is consistent across all companies discussed by those interviewed. Therefore, if two people both refer to the same movie it will be called the same code name in each case.

The researcher submitted coded copies of interview transcripts and a copy of the thesis document to studio leadership for review prior to publication. Studio leadership at that point was responsible to strike out any portions of the interview-based data that they did not wish to have made public. After reviewing the document, the studio authorized the researcher to use the remaining data in the thesis.

Next, the researcher categorized information by topic, and synthesized patterns found in the data into emergent themes. The researcher then combined qualitatively gathered primary data with all other data as puzzle pieces to build an understanding of the nature and structures of a pipeline and to cite trends and relationships that were observed. As a result, in the final sub-sections of this thesis, the researcher describes basic models of various workflows, presents a case study of a specific CG pipeline, and finally offers a general conceptual definition for all pipelines.

### **3.3.1 Verification**

Qualitative research is verified in eight basic ways, according to [6], [11] and [22]. The first process is called **prolonged engagement**. It consists of persistent observation, taking time to build trust and to learn the culture. In practical terms, this means studying one subject in its environment and doing so for an extended period of time. The purpose of this approach is to avoid drawing interpretive conclusions from a shallow understanding of the subject at hand. This researcher engaged in prolonged engagement and persistent observation by conducting several interviews with key employees on site at their place of work, and by spending months combing through transcripts of these interviews, as well as the supplemental information gained from public documents.

The second principal of qualitative verification is called **triangulation**, which is a method used to find meaning by corroborating evidence from several different sources. This researcher engaged in triangulation by verifying the statements made in any given source, such as an interview, with supporting facts from other sources, such as the other interviews, newspaper documents, books or information found on DVDs.

The third method is called **peer review** or debriefing, in which the researcher's findings, methods and documentation procedures are reviewed by other researchers in the field. This researcher has engaged in debriefing by submitting his work to his thesis committee members for review.

The fourth method for verification is called **member checking**. Member checking involves taking analysis and interpretation of what the participants said back to the participants for verification. This researcher has engaged in member checks in accordance with the IRB protocol by allowing those interviewed to review their transcripts for accuracy.

**Clarifying researcher bias** is the fifth qualitative research verification process. Because qualitative analysis intrinsically contains within its philosophy the concept of human viewpoint and the researcher as the principal instrument, a disclosure of researcher bias is a necessary element of qualitative reporting. In the case of this researcher, research biases will be mentioned as the topics they pertain to are discussed.

The sixth qualitative verification procedure is termed **rich thick description** and is peculiar to qualitative analysis. In practice, a rich description is a narrative reporting of the facts that give the reader an almost journalistic experience. The purpose of this thick narrative is to allow the reader to determine whether or not the findings can be more widely applied because of shared characteristics in the data.

The seventh method for qualitative research verification is called **negative case analysis**. Negative case analysis involves revising the hypothesis to fit all cases or testing for rival hypotheses. This method of verification is not germane to the kind of qualitative analysis that is being undertaken by this researcher, and has not been used in this thesis.

The eighth and final qualitative research verification procedure is termed **external audits**. In external audit procedures, the research is reviewed by a consultant who examines whether the process, findings, interpretations and conclusions are actually supported by the data. For this thesis, peer review by the thesis committee eliminates the need for an external audit. Nonetheless, in keeping with proper qualitative procedures, the original interview transcripts are included in the appendices of this thesis.

### **3.3.2 Summary**

In summary, while the whole of this paper is formed and influenced by Qualitative methodology and the case study method in particular, certain sub-sections in this paper stand out as being the most prominently qualitative in their delivery. Please refer to section **4.2 Interviews** through **4.3 Emergent Themes** and **4.5 Company Alpha – A Case Study** for the most prominent use of qualitative inquiry and reporting.

## 4. FINDINGS

The key finding of this thesis is the discovery of a conceptual definition of digital production pipelines. To arrive at this conceptual definition, both public documentation and primary research will be presented and discussed. To support the researcher's progression of logic interviews, descriptions of two workflow archetypes, and the Alpha Studio pipeline will precede a discussion of the conceptual definition.

The conceptual definition is that:

A digital production pipeline must, by definition, utilize digital computing hardware and software to facilitate human work and collaboration for the overarching purpose of producing content for film. The digital production pipeline is not a structure, but rather a malleable set of components which can be arranged, configured, and adapted into new structures as needed. These malleable components are human groups with assigned task domains, and digital hardware/software systems. The personnel groups are normally referred to as departments or teams. The digital hardware and software systems consist of operating systems, software tools and applications, networks, processors, and storage. The digital production pipeline is the synergy of these two types of components into adaptable systems and structures.

The remainder of this section will be spent preparing for, supporting, and explaining this definition.

### 4.1 The Closed Curtain

Research in this, the coded, portion of the paper organizes information relevant to pipeline principles extracted primarily from the interviews at alpha studio. Therefore, from this point on the paper will rely on coded primary research, supplemented with published data that does not interfere with maintaining the confidentiality of Alpha studio.

### 4.2 Interviews

Beginning in the fall of 2003, the researcher conducted a series of three interviews in accordance with the protocol approved by the IRB. The interviews lasted approximately one and half hours each. All the interviews were conducted using a series of open-ended 'Grand Tour' questions designed to elicit the broadest and most thorough answers. Each interview is briefly summarized below. Full text transcripts of the interviews are included in the appendices.

#### 4.2.1 Layout #2

The first interview was conducted with Layout 2, who was the head of layout at Alpha studio. The interview occurred on-site at the studio in a conference room. In order to become better acquainted with

Layout 2's viewpoint, the researcher began the interview by asking him how he came to his current position of employment.

Layout 2 started his trek into computer animation while he was in college in the late eighties. He was studying graphic design and took an on-campus job with the instructional support group that generated visual aids for professors. As this occurred prior to the ascendancy of Power Point, one of the main tasks of the group was to generate slides for lectures. One of his clients, the head of Public Relations for the university, requested that Layout 2 make some school promotional videos to run during football games. After Layout 2 had completed several jobs for him, the client suggested that Layout 2 apply for a position at a local post production facility. This was the first of many times that clients or co-workers would make Layout 2 aware of the employment possibilities his skills afforded him. Each time Layout 2 would find better work, work that would ultimately lead to his position at Alpha studio.

Initially he applied for a job as a non-character animator at Alpha. Ironically, he was given a job in lighting, an area where he felt his skills were weakest at the time. After completing his first major project at the new studio, Layout 2 proposed the creation of a separate Layout department. Studio executives accepted his proposal, and made him head of the new department. After having served in that capacity for some time, he decided that he missed "getting his hands dirty on the pipeline" and he opted to take the lead technical position in layout, which he described as being equivalent to being a grip in live-action filming.

Layout 2 and this researcher then covered the gamut of the interview protocol, discussing all relevant topics. The discussion even included his thoughts on the failure of *Final Fantasy*, which is not coded because the studio which produced the film no longer exists. The interview was very productive and yielded a good understanding of the pipeline at Layout 2's studio overall and the role of the Layout department in particular. For more about this see section **4.4.2** The 3-D Digital Production Process and **4.5** Company Alpha – A Case Study.

#### **4.2.2 Animator #5**

Of all the individuals interviewed, Animator 5 followed the most specialized path to his current employment. His career began with his graduation from an animation school, after which he landed a job working at a studio that practiced both traditional and computer animation. He soon discovered that the studio had little work for traditional animators. Finding himself under-tasked, he made friends with one of the computer animators and asked to learn how to program and use animation software.

According to Animator 5, the computer animator took him under his wing and taught him how to understand and use the software. He also taught Animator 5 how to program since the ability to write code was a requisite skill for computer animation at the time. As soon as he learned the new skills, Animator 5 abandoned hand-drawn animation altogether in favor of computer animation. Following the traditional practice of apprenticeship still used at that studio, Animator 5 rose over time from assisting senior animators to becoming an associate animator. He then moved to Europe, where he undertook as many as 14 commercial productions a year. While making commercials he learned all the disciplines needed to produce a project from initial bid to final tape. This impressive level of facility is not uncommon in the animation field, especially among those who produce commercials. Animator 5 next became an art director for another company and then returned to the United States to work for Alpha.

At Alpha he quickly became a senior animator. During this time he and a small group of coworkers began to experiment with character animation, and officially formed a character animation team shortly thereafter. Animator 5 identifies this as a turning point in his career, because from that point forward, he focused solely on character animation instead of technical issues. Animator 5 was later promoted to the helm of the animation department, as department head and supervising animator for Movie-I.

Animator 5 clearly articulated and discussed several emergent themes. Though the interview with Animator 5 focused primarily on the animation department, he gave an excellent description of his studio's pipeline as a whole. His discussion of relational dynamics gave a better understanding of how teams operate and how they should.

#### **4.2.3 Lighter #13**

Lighter 13 started by studying fine art in college. During her senior year she realized that she probably would have difficulty earning a living with a fine art degree, so she switched to studying computer information systems. After graduating, she worked as a COBOL programmer, but when she moved, she found that only defense contractors were hiring for COBOL positions. Preferring other employment, she came across an advertisement for a computer animation position, and was hired. Unfortunately, she was put to work colorizing old movies instead of animating.

Lighter 13 tested to enter the company's animation department, was accepted, and animated a season of a Saturday morning cartoon series using a 2D computer process. Then, as she would frequently say of her career during the interview, "we all got laid off".

Next she went to work at a computer game company. She was assigned to work on tile-based games, and was told she could make anything – but was only given 16 colors and a total of 100 possible tiles to work with. About that time, the company bought four SGI workstations. Lighter 13 got acquainted with the machines, "and I thought hmm, this is what I'm gonna do, I'm gonna do this now, this looks like fun. After a couple of weeks my boss came in and asked, 'what are you doing?' And I said this is what I'm gonna do now, this looks like of a lot of fun..."

Using the SGI workstations, she helped create a CD-ROM game similar to *Myst*. Lighter 13 modeled, surfaced and lit two of the three worlds in the game. However, the company did not promote the game well, and the game was unprofitable, so "they decided not to do that anymore and laid us all off..." Lighter 13 decided that she no longer wanted to work on video games.

However, her work on the CD-ROM game did have a positive repercussion. When she applied at Alpha, she included images from the game on her demo reel. She discovered that an individual in the lighting department had just finished playing that game, and had decided that his department needed someone who could light in that style for their upcoming project. In hiring Lighter 13, they hired the very woman who had created the lighting style.

At the time of the interview, Lighter 13 was head of the lighting department. She told the researcher that her generalist background, especially her programming experience, has helped her understand and correct problems her lighters encounter. In her interview she expressed and reinforced several themes touched upon by Layout 2 and Animator 5.

### **4.3 Emergent Themes**

Consistent with the methodology of Qualitative Inquiry, the researcher has combed through the interview material to discover which themes emerge from the perceptions, interactions and experiences of the individuals interviewed. Ideally, this scrutiny should produce a holistic understanding of the interactive dynamics present in the Case Study, which in this research, covers Alpha Studio. The reader is encouraged to look through the transcripts to gain a richer understanding of the themes presented here.

#### **4.3.1 Theme 1: "Getting the Job Done: Trust & Respect"**

This first theme emphasizes the critical importance of fostering a climate of trust and respect in the studio. The best work occurs when the director trusts artists to execute his vision, and workers trust the director to handle the big picture, and follow his instructions even when they don't fully understand them. In this working environment, workers collaborate well with peers in other departments, understanding the limits



and capabilities of other groups. The supervisor acts as a buffer between his workers and the rest of the studio when needed.

A negative mentality arises if a director or supervisor doesn't trust his crew to do their best. Lighter 13 recounted that everyone worked best when they had a common understanding of their vision, goals and each department's limits well enough to avoid making unreasonable requests of other groups.

Animator 5 further emphasized that productivity is enhanced when workers are valued as creative, capable artists, and not viewed as little more than computer operators. Within this context, a better level of work may result when the director sets specific goals but allows the artist some freedom in choosing how to execute those goals. Animator 5 observed that building this kind of work environment is largely the responsibility of management. He pointed out that the most common way to demotivate and demoralize an animator is to micromanage him or allow him to believe that extra effort and diligence is irrelevant and will not be rewarded.

#### **4.3.2 Theme 2: "Moore's War: Computer Time vs. Human Time"**

A second important theme that emerged from study of interview data was the impact of the continually increasing speed and efficiency of computing resources. Supervisors in both Lighting and Animation commented on the impact of increased computer speed. Computer speed already seems to be sufficient for Layout. The computational needs of this department seem to increase at a slower rate than computer power increases. It seems that Layout has never experienced a resource shortfall. Therefore, it would appear that computer speed has not been an issue on Layout 2's mind.

In Lighting, increased speed has made it possible to get the job done faster, so computer speed is a relevant issue, and is improving. However, Animation finds that each new project's complexity seems to expand at a rate greater than the increase of computing power. This dynamic keeps Moore's Law from helping in Animation as much as it has in Lighting and Layout. On a different issue, both Lighting and Animation felt that work in their departments would be enhanced if the communication between the two departments could be better supported by the pipeline. They felt that more energy needs to be devoted to making the interface between acting (animation) and lighting closer to what occurs on film so that the actors (animators) can see the set, characters and lighting while they work.

#### **4.3.3 Theme 3: "Jack of All Trades, Master of One"**

Finally, a third theme emerging from the interview data highlights the tension between generalism and specialty. At the studio studied, the researcher noticed many instances in the careers of the three

interviewees where a generalized diversified background was beneficial to the studio. These individuals were able to draw upon the strength and insight gained through broad experiences and were able to apply those skills developed beyond their specialty to provide leadership in their departments.

Lighter 13 spoke most clearly about this dynamic, stating that her work as a lighter and a manager of lighting has been greatly enhanced by her background in programming. In particular, she finds that the programming mentality, as well as specific programming knowledge, allow her to troubleshoot technical problems that occur in her worker's lighting assignments. Likewise, this broad experience has helped her communicate better with technical support personnel and other departments.

Layout 2's experience also shows the value of being versatile in that he applied for an animation job, was given a lighting job and invented a layout job. His broad background has clearly served him and his studio well. Lastly, Animator 5 demonstrated his own facility and wide-ranging mastery of computer graphics in his personal history. The interview did not reveal specifically what benefits this broader skill set has provided his current studio; it seems clear from the interview that he was hired specifically for his mastery of animation. However, his all-around proficiency highlights the fact that knowledge of multiple fields does not come with the price of mastering none. As a counterpoint, it should be understood that studios have the right to expect true mastery in at least one skill set from any prospective employee. Nonetheless, as these individuals demonstrate, a broad skill set and versatility combined with a strong specialty benefits the studio and the worker.

#### **4.4 Pipeline Models and Processes**

This section and all of its subsections will cover information on production processes starting with the most general and culminating in a description of a real studio. Sections 4.6 – 4.8 cover the discussion of a conceptual definition, which may also be thought of as an abstract generalized framework.

##### **4.4.1 The Traditional Animation Process**

In order to give a basic understanding of the origins of the 3D digital production pipeline, the traditional cel animation process will first be described. The classic traditional animation pipeline for feature-length films, as exemplified by Disney Studios, consists of the following steps, [31],[35:159-208, 211-238]:

First, the script is prepared, edited and revised. The script is then storyboarded. The bulk of story development for the film occurs as the storyboards are rearranged, redrawn and redone. In parallel to this process, the Art department develops the visual look of the movie, designing the graphic language, color palette, characters and locations via conceptual drawings.

After the Story team is satisfied with the development of the storyboard, the sketches are photographed on an animation stand and played back as a story reel. The story reel times out each image from the storyboard to the appropriate amount of time that the shot or action will take to occur onscreen. Temporary dialogue, music and effects are mixed on the sound system and played back in synchronization with the story reel. Based on their own reaction to the reel and feedback from others, the story team will then develop and implement necessary changes in the storyboards. This process will then repeat itself until the story reel communicates the story in an effective, convincing and satisfying manor to those who review it.

After the story reel is complete, a shot list is generated and the Art department develops background drawings needed for each scene and shot. A shot is basically any number of consecutive frames viewed from the same camera; a shot always ends on a cut. A sequence is a group of shots occurring in the same time and place, such as the pound scene in *Lady and the Tramp*, which is at least one sequence long. At this point, dialogue for the entire film is recorded by the voice actors. Often videos of the voice actors are taken during recording, to be used as a visual reference for the animators. This is especially helpful in capturing facial expressions, small mannerisms and nuances. These become all the more useful in cases when the actors and their mannerisms are well known. The dialogue is then edited together to form a continuous dialogue track for the entire movie. Any sounds or music for which the animator must animate to, are also edited onto the track.

The animators are given the character drawings and schematics needed in order to draw and animate their character. They commence animating the shots assigned to them. Once the character animators finish a shot it can be given to effects animators if any visual effects such as water or fire need to be integrated into the shot.

After all animation for the sequence is approved, the drawings from the sequence are sent to Ink and Paint, where they are transferred to acetate and painted.

Once painting is completed and painted effects have been executed, the shot is filmed on an animation stand. This process involves laying out the background, the various mid-ground components, the character and effects animation cels for the frame, and then exposing recording it on film. This process must be repeated for every frame of every shot for the entirety of the movie.

At this point, corrections that need to be made to the final film, such as editing or color adjustments, can be done. Any further sounds needed are now generated on a Foley stage while the animation is playing on

a screen. Music is also generated at this step, by a hired band or orchestra. If needed the film may be projected during the recording session. As a final step, audio engineers mix the multiple sound, voice and music tracks together while watching the film. The audio and film will then be mastered, duplicated and distributed for theatrical release.

Although the explanation for traditional animation is rather straightforward, its execution takes impressive amounts of skill and problem-solving from all involved, especially the animators. Not only does this process take a great skill, it also takes incredible amounts of manual labor, and an exacting degree of patience to execute.

The principal shortcomings of traditional hand-done animation are its linearity, its labor intensiveness, and the limited ability of the camera to track into the depth of the screen space. The principal strengths of traditional animation are the expressive qualities possible when every action of the animator is communicated in a hand drawing, and the ability to use a variety of compositional and drawing devices only possible in two-dimensional drawings. Such devices include perspective misconstructions or purposeful perspective errors that would not be practical to make in three dimensions, like Escher's ever-repeating stairs or a forced perspective that would fall apart in 3D as soon as the camera moved. Lastly, the background and other artwork in the final film may easily be made in a variety of traditional painting media such as colored pencil, pen and ink and watercolor. Though these can be beautifully simulated in the computer, executing the work in natural media maximizes the leverage of a traditional artist's talents, freeing him to work directly in his medium. However, these beautiful renditions are not practical or feasible for use on the animated elements in the film, such as characters.

#### **4.4.2 The 3-D Digital Production Process**

Only nine years have passed from the release of *Toy Story*; the 3-D digital production process or pipeline used for CG animated feature films is still in its infancy. However CG animation shows a surprising level of developmental maturity when one concedes that only twelve films have been made in this medium (five from Pixar, three from PDI, and one each from DNA, Big Idea, Blue Sky, and Square pictures).

This maturity of expression is due to several factors:

Computer animation has inherited a large number of useful concepts and practices from traditional animation and live-action cinematography. Artists using digital processes can draw upon techniques that have been developed over the years in computer science as well. And more recently, many CG artists have developed their skills creating computer animation in shorts, commercials, and special effects for live-action cinema. Finally, since the CG pipeline is a digital software system, it is inherently more flexible

than systems built upon mechanical hardware. As a result, people are able to adapt new solutions almost as soon as they discover problems.

In the forthcoming description the main pipeline will be covered first, followed by explanations of how the supporting teams contribute to the efforts of main departments. This division, while somewhat arbitrary, facilitates describing the flow of work in a more linear fashion. Also, this description is an aggregate between public data and Alpha studio, and in both cases, neither detailed technical nor implementation data was available to the researcher.

### The Main Pipeline

This description is generalized and does not specifically represent the pipeline from any particular CG studio. Each studio's pipeline will vary somewhat from this description.

At the beginning of any pipeline, a script or story concept is delivered into the first two departments simultaneously: the Story department and the Art department. In the Story department the script or story concept is developed with attention to structure, plot, timing, character development, and all other time-based issues. Meanwhile, the Art department focuses on developing the look and feel of the movie, its visual style, and its character design. Art also fleshes out concepts suggested by the script or story concept. Their work includes designing and developing sets, locations, and props in 2D using traditional media or digital paint tools. Art also produces color scripts, which are similar to storyboards but usually executed as pastel paintings, with one or two paintings per sequence. At the end of the development process, the Story department releases a final set of storyboard drawings [Figure 13], which are given to the editorial department to be made into an animatic. At this stage the Art department passes its work on to Layout.



**Figure 13: Storyboards.**  
 ([31] Original Copyright Disney, 1967)

The Editorial department then takes the storyboard drawings and times them together with dialogue, sound effects, and music, to generate an animatic. An animatic is basically a sketch of the movie's timing where each storyboard image represents a single shot. Complex motion or camera moves are represented with a set of drawings per single shot. The shots are timed out with the audio to provide an estimate of how many frames will be needed per shot.

As the animatic is refined and revised, it may gain or lose shots, and certain shots may become merged. When the animatic is approved as complete, the pipeline process becomes more fully digital and less linear.

Now the animatic is handed off one sequence at a time to the Layout department. Input from the Art department consists of designs and blueprints for the sets, while the Modeling department supplies refined models as needed. Layout receives a heterogeneous flow of data from the Art department, Story department, and Modeling department, but outputs content that is homogenous; files describing shots in the film. Each team in Layout will work on a single sequence until it is completed.

What Layout does at any company is effectively called blocking. Layout artists will first assemble a rough version of the set, and will pose and position stand-in versions of the characters. Layout will also attempt to replicate the position and motion of the camera for each shot as it appears in the animatic. At any studio a good deal of translation and adjustment is involved in converting storyboards to blocked sets. At some studios layout teams are also involved in set dressing, or in inventory control. The one constant in all layout departments is that the animatic is translated into three dimensions. Layout will always pass on information showing the camera's position and motion for each and every shot. In general, Layout is also responsible to pass along assembled sets and character blocking information.

In a broad sense, the next stop on the pipeline is the most universal: the Animation department. Each sequence is assigned to one animation team in the department. In any given sequence there are normally more shots than there are team members. Therefore, the sequence is divided up, with each team member being responsible for a certain number of shots in the sequence.

The actual processes and procedures undertaken to complete animation in each studio may differ, but final results are the same. As each sequence is completed by its team, the content proceeds along the pipeline from Animation department.

The process changes somewhat in Lighting, the next department on the pipeline. Before the lighting teams begin work, a few talented lead lighters from each team will receive key shots. For any given sequence there is a general time, place and mood: it is the job of the Lighting department to communicate those features to the audience through the use of light. The lead lighter's job is to translate the vision of the director and the art department into digital lighting for one or two key shots per sequence. After the lead lighters establish the look of the lighting for their sequence, the rest of the team will apply that look to every shot.

In the simplest and broadest sense, Lighting can be thought of as almost the end of the production line. Once a shot leaves Lighting, it can be rendered. Rendering is the process of simulating, however stylistically or realistically, the effect of light interacting with the objects in the scene, recorded by virtual camera. In a sense, computer animated films are made in reverse. In CG productions, the editing occurs before the acting, the set lighting occurs after acting, and images are recorded by the camera at the end of the production process rather than at its beginning. The process is not a perfect reversal, but for those used to working in live-action, it is severely inverted.

At it's very simplest, work flows through the CG production pipeline as follows; Art and Story feed to Layout, Layout feeds to Animation, Animation to Lighting, and so on. But it takes far more than this to complete a film.

While the secondary departmental structures vary more significantly from film to film and from studio to studio, much of the functionality that provided remains constant. A general listing and description of these include:

### **Modeling Department**

Modeling is a common and necessary task. While the tools may vary from studio to studio, there are a few common techniques for generating models. First sculptors create physical mock-ups of the characters – just as 2D animation studios use as desktop references. The sculptors usually seem to be part of the art department and should be considered part of pre-production.

In the 3D pipeline, once the appearance of a character is finalized the sculptors create a model in a neutral or "roadkill" pose. This sculpture is digitized into the computer system. Digitization can be done by laser scanning or more commonly using a digitizing arm. A digitizing arm looks like a vehicle assembly robot and tracks the 3D location of its tip by constantly recording the rotation at each joint of its arm. Graphite lines are traced over the contours of the sculpture to build a grid of rectangles. Three factors influence how

the lines are drawn on the sculpture: data density, limitations of the geometry type used, and the need for topology to align with deformation paths.

Simple models can be made from scanned drawings, but for complex models, such as characters the process of 3D digitization reduces the initial modeling pass from a one week task into a one day task. [34:19] (not coded – this method of modeling is quite common in the industry).

Once data from sculpture is in the computer the modeling department will refine and correct this data into a model of the CG character. For character models there are two basic mathematical description methods used to store data; polygons and spline based methods. Other methods, like subdivision surfaces, can be thought of as having hybrid characteristics while some, like volumetric data and particles, are not used on characters. Different artistic approaches are needed to respond to the inherent strengths and weaknesses of either data type.

The basic work flow is to sculpt a character, digitize it, correct the model on the computer, test the model (perhaps with the Rigging department) and reiterate whatever steps in the cycle are needed until the model works. In this case, working means that the model accurately represents the character's appearance and uses a structure and method of description that is computationally efficient to deal with. Furthermore the model must have the proper topology, location and density of surface edges so that the model can deform in a realistic manner when control structures are applied to it in the Rigging department.

### **Surfacing/Shading Department**

The title of this department varies from studio to studio, but the purpose remains the same. At every studio a group is tasked with taking the computer models of the characters, props, and sets, and defining the way in which light will interact with their surfaces. They achieve this by creating and using algorithmic material descriptions called shaders which define how a surface should react to light and the camera. Shaders may define any visible property a material possesses; color, roughness, reflectivity, translucence and so on. Shader properties can also be governed by texture maps to give another form of artistic control. Texture maps are image files that supply the shaders with surface-space variant information to drive the shader's variables.

Surfacing artists also maintain libraries of the materials they have created as well as maps that have been applied to previous objects. In this way, whenever a new object comes to them with material needs similar to those they have already made, they can reapply that material to the new object, simply adjusting it's properties as needed. Depending on how the studio is structured, this group may constitute its own



department, be a team within a department, or just consist of a few talented individuals. The point in the pipeline that surfacing is applied varies from one studio to another and from one film to another.

### **Effects Department**

When a studio needs visual effects or technical solutions to artistic problems the Effects department (or its equivalent) will be called upon. Examples of work by Effects include producing dust, fire, fog, magical effects, physics simulations and crowd effects. They also produce subtle touches not normally associated with effects work in traditional animation, or live-action projects. Their work might include programming background elements to automatically animate, such as the clover forest in *A Bug's Life* or the flowing river and waterfall in *Ice Age*. Depending on the needs of the show, a special team may be assembled for the exclusive purpose of solving a particular problem. For example, if the studio is doing a movie that involves a large number of crowd sequences, these scenes might be given to the Effects department, or the studio might form a crowd animation team. The effects team receives one sequence at a time, but only for those shots and sequences in which effects occur.

### **Rigging/Character Setup**

Depending on the studio, the character-rigging task may be given its own department, or alternatively could be a team within another department. The rigging artists on the pipeline receive character models. Each rigger takes a model and builds a skeleton within it, then binds the skeleton to the skin of the character.

Once the character has an internal structure to drive its motion and deformation, each rigger then sets to work attaching controls to different parts of the model's internal and external structure. Some of the controls are not tied to the joints or surfaces of the character, but instead act as remote controls over lower-level control devices. The rigger will then likely lock non-control components. Only the controls are given to the animator, allowing him the freedom to do his work, unencumbered by unintended interaction with the character data. Once the rigging department is finished, models leave the department fully articulated and ready for the animators to use.

### **Research and Development Department**

The last auxiliary department in most studios is a Research and Development team. R&D is responsible to investigate new ways of solving problems, to create new tools, effects, programs or processes and to develop them into software for future studio use. The R&D team is tasked with solving problems anticipated in an upcoming production. A hypothetical example being "we're going to be dealing with wet fur for the first time, figure out some way to efficiently represent and control it in the computer".

Individuals in R&D are the inventor's-inventor, finding generalized solutions to problems that the rest of the studio may not even yet know exist. This researcher has discovered that, contrary to popular opinion, whether a studio uses proprietary software does not matter. All studios that value research and development will inevitably write tools and solve problems. Taking a clever solution and making it into a Maya plug-in is as valid as forming that solution into a new module of the studio's proprietary applications. The relevant question is not whether the software is proprietary but whether the development team's solution is efficient and effective.

### **Dailies**

Daily reviews or dailies are a cornerstone of the animation process, enabling the director to review and steer each departments' efforts. Though not a department, dailies are a common attachment point for all content-creating departments, where the director ensures that the film remains 'on-vision'. Dailies also serve as a part of the production team's strategy to keep the film on schedule. While the details may vary, the broad strokes are rather constant: work completed one day will be reviewed the next morning, the director will request changes and the process will be repeated. For any artist this review must continue for a given work (such as a shot or model) until the director approves or "finals" the work, stating that it is finished.

However dailies do not always occur on a daily interval – instead a semi-fixed number of meetings may occur over a varying amount of time. Under this scheme, a Layout department would only have four conferences with the director: a introductory meeting, a first, second, and final review. Approval would normally occur by the fourth meeting.

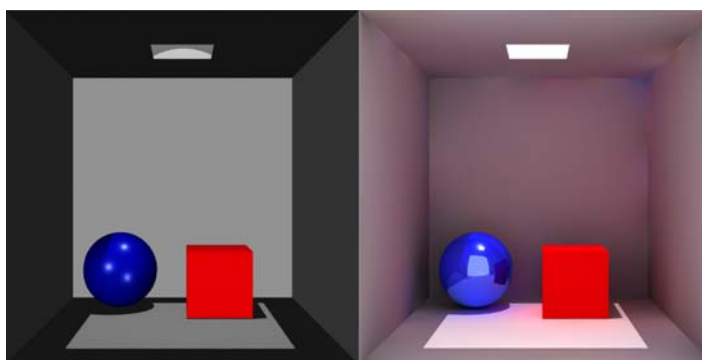
Mentioning the work quota is essential to the discussion of dailies. Every artist has a schedule to meet, generated from the production schedule and work inventory. For the rest of this paragraph Animation will be used as the example for the discussion of the work quota. For every sequence, the shots are divided up among the animators and each animator is expected to return a certain number of feet of animated film per week. This form of measurement is a holdover from the days of cel animation where 16 frames of work literally equaled one foot finished film. In addition to having his work reviewed and changes recommended by the director, the animator's progress is also assessed in terms of quota to ensure that each animator is being productive and that the film remains on schedule. If the quota is not being met there are several options; the animator may be assisted by his supervisor, or in a worse-case scenario his work may be reassigned to ensure it gets completed.

The main issue at dailies, from the author's own experience, is that time usage is critical and work must be presented to the director, or any person with review authority, as promptly and efficiently as possible. Once again the automation provided by the computer is very beneficial. During dailies, the person being reviewed should explain what needs to be explained quickly, if anything needs to be said at all, and should not offer excuses or waste the director's time. In counterbalance, the director needs to be concise and insightful with his remarks, not dwelling too long on any person's work, so as to stay on schedule.

Dailies can often consume nearly half of the director's work day. The same is often true for department heads, who not only attend their own dailies meetings, but may also individually review work with each artist in their department. On top of this, department heads often attend staff meetings and dailies for other departments. And some even have their own quotas to meet.

### Rendering

While each studio handles rendering differently, there are several key commonalities. The need to render output from one's work is universal. All studios share the need to view work-in-progress and so all of them possess ways to render work with varying degrees of resolution and refinement: rough, shaders only, lit and fully done, and so on.



**Figure 14: A Comparison between (a) Scanline Techniques and (b) Simulation.**  
( Original Copyright Dane Bettis, 2005)

There are several ways to categorize differences in a studio's approach to rendering. First it can be categorized by the basic algorithmic approach, which will either attempt a physical simulation of light or use a scanline approach. In both cases the lighting team tends to refer to their work as 'painting with light' but this seems to be a slightly more accurate statement for those who use scanline methods, which are built on the idea of simple object-to-light relationships. See Figure 14, in which the author has employed Alias

Maya to render a scanline image (a) and an image using photon mapping and ambient occlusion (b). Renderman is an example of a scanline-based renderer, though it can be extended to simulate global illumination. In simulation software, such as raytracing, radiosity and photon mapping, complex interactions occur between multiple objects and lights to give a more physically accurate simulation of illumination. Several of the effects generated by simulation are now being implemented in scanline renderers or more often approximated by non-simulation methods that return similar results, such as ambient occlusion.

A studio's choice of solution is important, because it determines their time use in lighting. If a simulation method is used as the primary means of lighting a scene, the lighter is able to work more like a live action lighter - at least in theory. A time savings for the lighting staff may be expected, because many of the nuances which are hand-made in scanline-lit scenes occur automatically in a simulation-lit scene. Examples of these nuances are reflections, refractions, color bleed, and bounced light which can all add subtlety and realism to the lighting, as shown in Figure 14 b. There are two trade-offs for these benefits: first the computer must spend time where the artist saved it, solving computationally intense equations to model the lighting effects. Second, because of the complex interactions simulation models, it can be difficult to make minor adjustments a predictable way. Scanline based rendering/lighting has only one notable short fall – every effect, every detail, every subtlety of the lighting in a scene must be designed manually by a lighting artist. The benefit is that scanline systems lend themselves to totally predictable artistic control and faster render times, but at the expense of extra man-hours being needed to light a scene. Think of the trade-off in terms of a solution being either primarily surface artist and lighter intensive or primarily computationally intensive. Ideally the less intensive part of the process should save time and money.

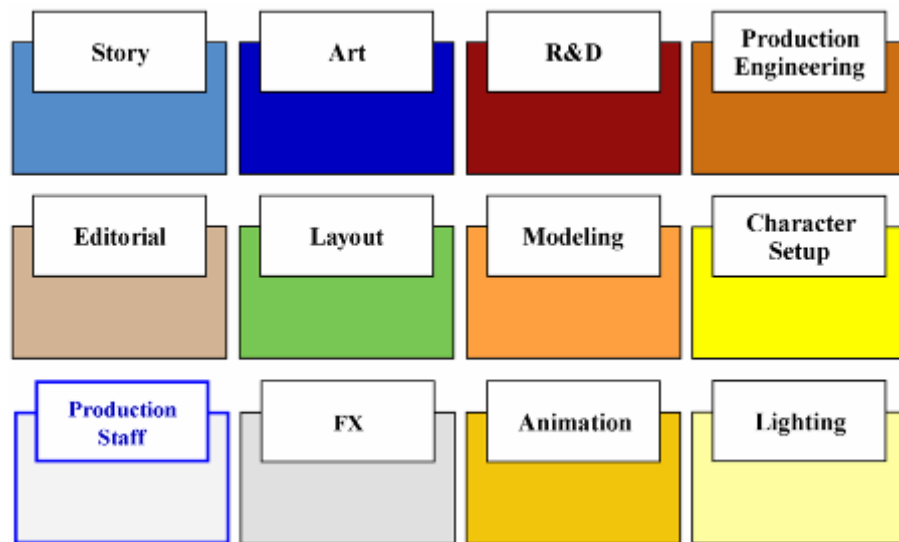
Hybrid approaches seem promising in the near future; to be able to setup most of the lighting quickly by using a simulation, or by faking a simulation, and then wield the predictable control over details that scanline methods allow. And as hardware continues to drop in price for a given computational capacity, simulation will continue to become more affordable, not only in terms of CPU-hours but man-hours as well.

Another notable difference between studios is the presence or absence of a Rendering department. The advantage of maintaining a department is that quality control becomes more centralized for rendering tasks. However each department does add to the manpower overhead at a studio; the absence of a department could result in lower production costs if the rendering tasks are still adequately addressed within the remaining departments.

Render wrangling is another fairly common feature among studios. One can observe this job title in the credits of many films. The wrangler's task is, at its simplest, to watch over frames as they render at high resolution and make sure that if any thing goes wrong, such as a computer crashing, the problem is dealt with quickly. This is an important issue since frames can each take hours to render, and the computer resources should not go to waste on generating flawed frames.

The key issue in rendering as it is in the rest of the pipeline is to make deliberate choices based on a clear understanding of the needs of the project, the strengths of the studio and the circumstances that the pipeline must respond to.

#### 4.5 Company Alpha – A Case Study



**Figure 15: Company Alpha Departmental Overview.**  
( Original Copyright Dane Bettis, 2004)

Figure 15 shows departments for Studio Alpha. Alpha Studio is the coded name given to the studio that agreed to allow primary research, as seen in section 4.2 Interviews. This section of the paper presents a case study of this studio, focused on giving the reader a concrete experience of the process of making a CG film.

Alpha Studio takes about four years to complete a given film; this time is about average for the industry. For this example there are about 30 sequences, 1300 shots, 60 unique characters and 35 unique locations (these numbers are approximate). For every department, sequences are the basic unit of work that is handed off from one team to another, with some exceptions such as Modeling and R&D which produce non-shot content. However non-shot content must also be tracked. While reading this section, referring to Figure 16 will be useful for understanding this pipeline.

The art and story development work in CG preproduction is done the same way as in traditional animation. Yet, as the reader can note in Figure 16, the rest of the pre-production pipeline is unique to this process. Output from the Art department is sent to the Surfacing group, the Modeling department, and Layout department.

Strictly speaking, the Story department outputs only to Editorial, in the form of storyboards. However the Story and Art departments act in close collaboration with one another, under the direction of the producer and director. As a result, it may be helpful to think of these two departments as actually doing two aspects of a single task; both developing the visual experience of the movie. The Story department is concerned with the film's temporal aspect. The Art department is primarily concerned with the film's physical aspect, its sense of place and style of design. The concerns and responsibilities of these two departments overlap, because both focus on the visual presentation of the film's characters and plot.

The Art department hands a set of character drawings and maquettes off to the modeling department. Maquettes are small-scale physical sculptures of characters to be modeled in the computer. Some maquettes are generated in a specific pose for reference purposes but for each main character there is at least one maquette set in a neutral pose which is sometimes called the Leonardo pose, the crucifix pose, or as one animator called it, the "roadkill pose". Art also sends plans and drawings to Modeling for construction of the props (all non-character items) and sets. Occasionally, objects with highly complex surfaces, like a mountain or an important tree will be built as a maquette and given to Modeling.

The Art department also sends conceptual drawings of characters and props to the Surfacing group. The Surfacing group develops surface shaders and texture maps and applies them to the corresponding objects made in Modeling, using the drawings supplied by Art. Lastly, the Art department sends conceptual drawings and blueprints of sets to the Layout department.

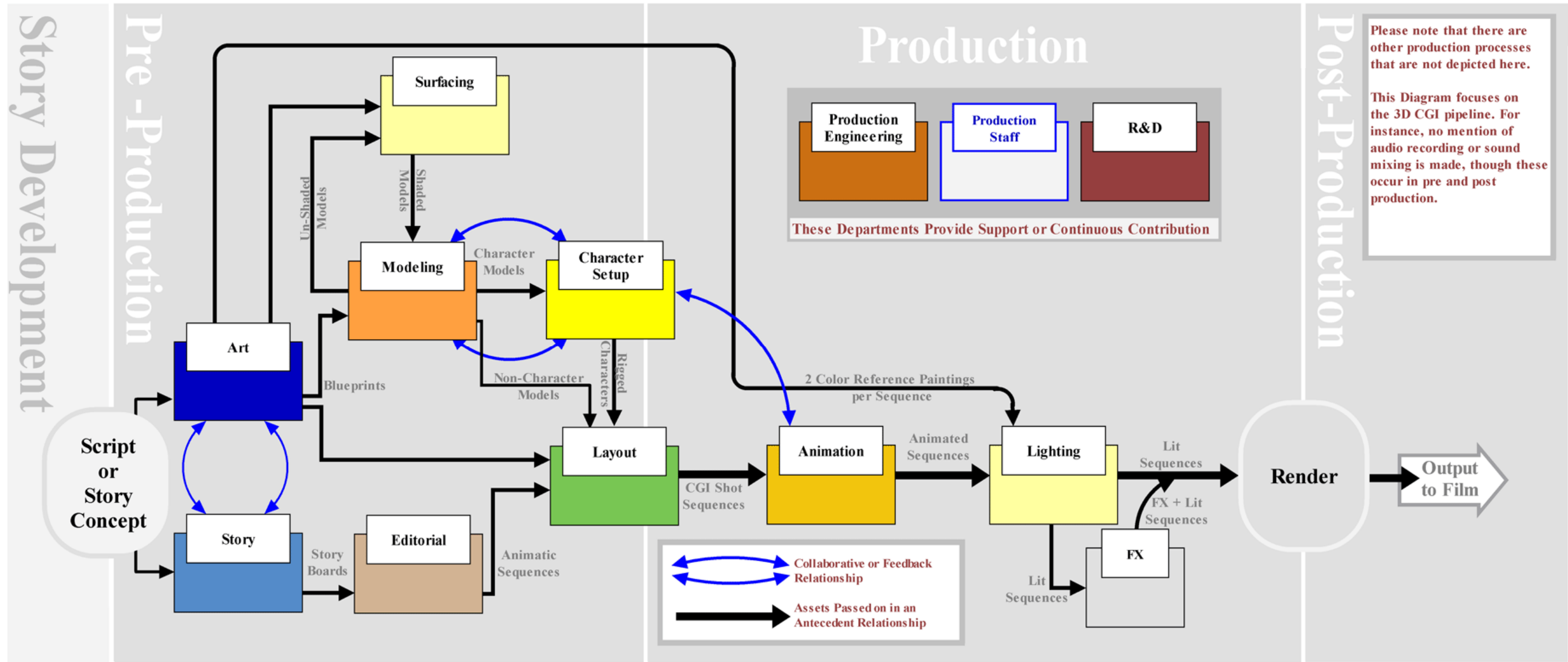


Figure 16: Alpha Production Pipeline Workflow. ( Original Copyright Dane Bettis, 2004)

The Story department outputs storyboards to the Editorial department, where Editorial scans them into the system to create a story reel or animatic. As in traditional animation, the animatic is generated to time the different storyboard elements and synchronize them with temporary dialogue, sound effects and music. This is done to give an estimate of the duration of the film's shots and to judge its pacing. The initial pass of the animatic is made of the entire film, and continual refinements are made both to the film's overall structure and to individual shots and sequences. During this stage of development, the producer and his associates in the Production department work with the department heads to determine which shots and sequences should be worked on first in production. To make this determination the producer considers how difficult the shot will be to complete, how important the sequence is for setting the tone of the film and which shots will be needed for promotional purposes, such as movie trailers.

For a given sequence there are 20 to 80 shots, which will make from one to four minutes of finished film. In Production, a sequence will start in Layout where a team will take about two weeks to execute it.

After Layout finishes, the sequence is then handed off to Animation. Each team works on one sequence at a time, spending approximately eight weeks to complete it. Within every animation team each animator will be given about eight shots to work on, and each animator has a quota to finish of about one shot a week. All animators are assigned quotas, even the supervising animators carry a nearly full quota per sequence.

When animation on the sequence is complete, Lighting takes over and assigns a team of lighters to each sequence. Lighting also takes about eight weeks to finish work on the sequence, but this department follows a different procedure. Two lead lighters are assigned to the sequence before the rest of the team. The lead lighters are each assigned a key shot by their Lighting Sequence Supervisor. The lead lighters complete these shots using color production paintings received from the Art department as a guide. The key shots establish the look of the sequence for the rest of the lighters. The shots are then divided among the whole team and executed. Unlike Animation, Sequence Supervisors in Lighting do not have quotas of their own, but they do occasionally pick up a shot when needed.

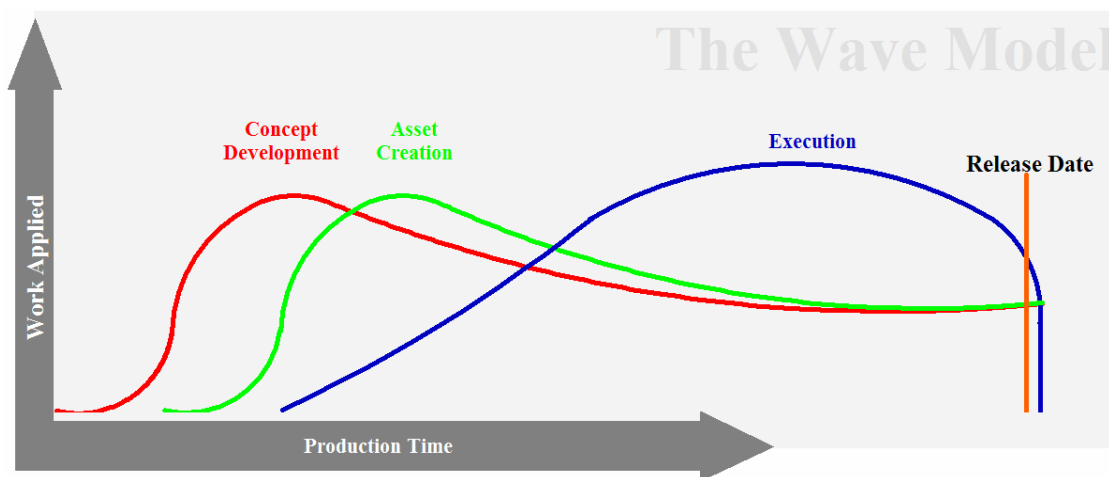
When Lighting is finished, the shots which need effects are given to the Effects department (FX).

From layout to rendering, a single sequence at Alpha takes about one year to produce. This time does not include the pre and post-production time needed. All told, a single 90 minute motion picture takes about four years to complete, from pre-production to release.



However keep in mind that Alpha, like other studios, has more than one film in the pipeline at a time. Having overlapping production cycles allows Alpha longer development time in pre-production and enables the studio to release more films in a given period of time. For a more in depth look at this information refer to the transcripts located in the appendices.

#### 4.6 Digital Production Pipelines: In Need of a Better Definition



**Figure 17: The Wave Model, the Simplest Model of Digital Production.**  
( Original Copyright Dane Bettis, 2004)

Describing a pipeline in more universal terms than a list of departments is a necessary first step to making a sound definition of digital production pipelines. The first abstraction is to divide all work into three basic phases; concept development, asset creation, and execution [Figure 17]. These stages overlap to a high degree. For example, once concept development (story and art) has progressed sufficiently, modelers, surfacers and riggers may begin their work creating data for the animators, lighters and the layout department to work with. However concept development and refinement continue until the end of production. Yet no particular arrangement of departments is needed for the wave model to be correct.<sup>1</sup>

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<sup>1</sup> Please note that the wave model is not to scale, nor are the slopes of its curves - it is meant to illustrate the basic nature of these relationships.

Due to the inherent flexibility of a digital production system, its structure may be constantly adapted, and always in a state of flux. Ideally, the pipeline structure should respond to the requirements of any given film, and should utilize the strengths of the available manpower and digital technology.

Thus a definition of CG production pipelines must transcend cataloging existing or possible structures and workflows. It must describe them in terms that are as universal and broadly applicable as possible. Though no claim is made that the definition arrived at in this paper is perfect or ultimate, this definition is, in this author's opinion, a novel and sound starting point for further research.

Perhaps the best way to arrive at a definition that can be used as a conceptual framework for pipelines is to explain the process of structuring a pipeline for a new film. In this example every effort is made to simplify the discussion, to avoid caveats, and avoid inserting the author's particular value judgments. This process will consist of a series of decisions made using value judgments; however the author will merely state what issues each decision weighs, and not suggest what the best outcome to that decision would be.

#### **4.7 The Three Layer Pipeline Design Example**

In this example the reader should assume that he works for a studio that produces CG animated films, like the studios discussed in this thesis. Assume that the reader has just been put in charge of defining the Company's production pipeline for their next film. It is important to note the following scenario is meant to lead the reader into the author's definition, not to serve as a concrete example of how work is done in pipeline development. Nor is this scenario meant as an example of the ideal pipeline design process. And while this example involves the design of a pipeline for a particular purpose, the reader should keep in mind that the intended result of this example is to gain the understanding needed for the concise definition found at the end of this section and summarized in the Conclusions section.

To begin, the hypothetical studio has a standing pipeline, and retains the workforce that was present during the making of the previous film. Assume that the pipeline used was functional, as the film was released within acceptable time and budget restrictions.

There are three layers of the pipeline, which for sake of clarity ought to be considered in the order they are given. The first layer examined is the standing manpower at the studio. Every current group in the theoretical studio's standing production pipeline has a particular number of people who are responsible for a given domain of tasks.

#### **4.7.1 Layer One: Personnel Arrangement**

##### **Division and Assignment of Manpower and Task Domains**

The first question to ask it is this: For each group's given task domains are there any sub groups which perform work that is sufficiently distinct from the main group's tasks that the two should be separated? For example if the layout department is responsible for inventory control, should it continue to be? Or should inventory control become its own department? Likewise, if the modeling department is also building character control systems, should that task be separated into a rigging department?

The inverse of this question should also be asked. That is, "Are there any departments whose task domains dovetail or overlap to such an extent that it would be preferable for them to form a single group?" For example, should the Surfacing department become part of the Modeling department, since they both involve manipulation of the models? Or should the surfacing department be made part of the Lighting department?

Another issue is whether or not responsibility and manpower for a task domain should pass from one group to another. Perhaps inventory control would be better handled by the software maintenance team than by the Layout department. And, for that matter, perhaps a transfer of manpower is not necessary, only a transfer of responsibility for the task.

##### **Creation of New Task Domains**

Once the issues involving the division and assignment of existent task domains are settled, the next issue to deal with is the assignment of new task domains. This may be needed because the current or upcoming film calls for work to be done that does not fit any of the responsibilities of the existent teams. For example, a movie script calls for massive crowds, which is something our hypothetical studio has never done before. Perhaps a new kind of physical simulation is needed, or another particular achievement which nobody at present has experience with.

To resolve this issue there are several options:

First a new task domain may be assigned to the existing department whose strengths best match the new task. An example of this would be giving a new kind of physical simulation to either the Research and Development department, or to the Effects department. The second option is to define a new special-purpose team to tackle the problem. This team can be constituted from a collection of people throughout the studio whose skill sets collectively form the best match for attempting to solve the problem. Or, of course new manpower may need to be hired. Something else to keep in mind is whether or not this group

needs to be temporary or permanent, though this decision does not need to be made up front. As a solution to the problem is reached, it will likely become apparent whether the new group needs to continue.

### **Assigning Personnel**

Once the task domains are properly assigned to different groups of people, it is important to assess whether any of the groups need additional people to more effectively execute their work. Or perhaps the group does not need as many as it currently has. Manpower surpluses or deficiencies in a group can be addressed by reassigning people to a group needing manpower, provided that their skills overlap the group's task domain. Hiring or firing employees is obviously a more weighty decision than reassigning them within the studio.

### **Collaboration Loops**

Once the groups and their assigned task domains have been satisfactorily defined, the second major issue at this stage of defining a pipeline is to properly determine the desired relationships between departments. For example, while the Art and Story departments engage in very complementary work, the author has not yet observed any studio in which these departments have been merged. Despite the variations that exist from one studio to another, every studio's equivalents of the Art and Story departments work in close collaboration with one another. This sort of relationship, which will be called a collaboration loop, does not involve a passing of film assets (such as images, models, or animation) from one department to another. Rather it involves inter-influence between two groups. For example, as art defines the look of the characters in the film, the artists in the story department will adapt their rendition of the characters to match.

This influence is bidirectional: a change in the Story department might generate a shift in the work the Art department produces, such as introducing a new location. Perhaps Story introduces an action in an existent location which requires redefining a location's physical attributes. For example, if the story originally called for a cave, and the Story department later stages a chase in that cave, the Art department would need to redesign the cave, enlarging it to a cavern with sufficient complexity and space to allow characters to chase one another.

### **Feedback Relationships**

A feedback loop is like the collaboration loop, except that digital assets are passed from one group to another. An example of this kind of relationship between departments would be the feedback relationship between modeling, rigging, and animation. Within this loop, the goal is to generate characters that look and move the way they should. Rigging is primarily responsible for setting up the controls and systems

which will enable the character's motion. During development, Rigging will periodically pass the rigged models to the Animation department to be tested, and will then adapt the character setup based on Animation's feedback. Or, the Rigging department might also contact the Modeling department for a change in the models topology in order to solve a problem with character setup.

### **Antecedent Relationships**

Another major type of relationship which departments may have with one another is an antecedent relationship, where one department relies on the output of another to generate their work. As an example of this relationship the animation department depends on having sequences delivered to it, and the sequences must already have cameras, sets, rigged characters, and some models present in them in order for animation to proceed. As was shown earlier with the wave model in Figure 17, the nature of the digital production pipeline gives a studio a great deal of flexibility in setting up antecedent relationships. For instance lighting can precede or follow animation as well as occurring in parallel with it on a shot by shot basis. Therefore only a few antecedent relationships are purely necessitated by the nature of asset creation. The rest can be implemented based on what the designers feel best serves the needs of the film, the nature of their studio and its employees. Or these relationships can be arranged based upon what might be the most conceptually straightforward workflow.

### **Review and Approval Relationships**

At this point it is important to note that in addition to peer relationships, a class of managerial relationships also exist. Specifically the director and the production staff maintain a review and approval structure which involves all the groups in the studio that contribute content to the film. The implementation of dailies, production schedules and work inventories require the existence of review and approval relationships. However these structures, while technically part of the pipeline, lie beyond the purview of this thesis.

This concludes the first layer of the pipeline's design, the task/manpower layer. The demarcation between the next two layers is as not sharply defined, but concern relationships between man and machine. The second layer is implementation and automation of the first layer into digital computer systems. The third layer addresses computational optimization of the digital systems at the most fundamental level.

#### **4.7.2 Layer Two: Implementation and Managing Complexity**

The second layer of the pipeline design is the implementation layer. In this layer the digital technologies are built, programmed, purchased, and configured to implement the personnel structure and workflow defined in layer one.

In particular, digital technology can be used to automate all workflow procedures which are not germane to content creation. For example, an animator should not have to concern herself with what happens to her animation, or where it goes, once she finishes her work for the day and saves it. The digital pipeline should take care of this for her. Her finished work should simply appear in the next morning's dailies reel for review by the director. Likewise whenever a modeler needs to update a model he should only concern himself with correcting the model, not with propagating the new geometry into all the files that will need it. The pipeline should achieve this for him.

Not only should digital technology automate the tracking and transmission of assets for the film, the digital systems of production pipeline can also be used to enforce the policies set for the studio. For example in Studio Alpha, only individuals in the Layout department have access within the computer system to move or change a virtual camera. Alpha decided that the layout department should have sole authority, under the director, for camera control. Therefore this policy was implemented into the studio's software. Whatever the policies of a studio are, the digital technology of the production pipeline should implement and solidify these policies.

An important issue becomes apparent at this point in the discussion; that in both automation and policy enforcement, a balance must be struck. At one extreme, when policies and automations are insufficiently implemented, a user must occupy himself with carefully understanding and executing proper procedure. A lapse of attention or a mistake could easily introduce problems into the system, such as a new file overriding an old one instead of being saved as an incremented version of itself. Further, without sufficient policy implementation, tracking where the problem originated would be difficult. Nor would the studio know how the problem occurred since any user could potentially have been the culprit, and the file system would not necessarily be able to monitor this.

At the other extreme, if automation or policy enforcement is too rigid or overdeveloped, the user may find himself in a frustrating situation whenever nonstandard situations arise in his workflow. In this situation, if lighting must always follow animation, a lighter would be in a frustrating position should he need to pre-light a scene prior to animation. He would either need to request that the files or permissions be manually altered by the system administrators to allow him to do what is needed, or he might attempt to bypass or trick the system into allowing him to accomplish his task. Looking at these two extremes, the importance of striking a balance between automation/enforcement and system flexibility should be clear.

These implementations can be obtained in many ways. First, policy can be enforced in the user access privileges of the operating system. The automation of asset transmission and management can be implemented by scripts that pass information from one program to another, or by asset management applications. While any combination of approaches may be used in concert, implementation details are not the focus of this paper, will not be focused upon.

In addition to automating the transmission of work and enforcing studio policies, the digital technology layer of the pipeline can be used to streamline the workflow within a department for a user. At its simplest, the ideal interface for an animator is very different from the ideal interface is for a modeler or lighter. These optimizations of user interface and programmable workflow, can and should be built into the software. In the case of off-the-shelf software, optimization is achieved through selection and configuration of products available on the market. For in-house software it may involve either re-configuration or re-coding.

#### **4.7.3 Layer Three: Optimization of Computer Systems**

At this point, the second layer is complete and software has been selected, configured, or created to implement the transmission and storage of film assets, enforcement of policies, and the streamlining of workflow at the studio. Now the discussion moves to layer three. If layer one is manpower, and layer two is digital implementation of policies, then layer three is the algorithmic optimization systems. Having already defined the desired workflow, division of labor, and human collaboration structures in layer one, and having implemented these designs in layer two, the computer hardware and software now have their tasks and processes clearly defined.

In layer three the issue at hand is adapting the systems to best execute their assigned tasks. There are two basic cases to consider: new software needs to be acquired or written to accomplish a task. Alternately existing program code may be optimized to better perform a given operation. The same logic can be applied to hardware: new equipment may be needed, or a more optimal arrangement of existent resources may be all that is required.

For example, a method for simulating foam is needed. It is now necessary either to find an application or plug-in which can generate the needed CG foam, or to devise a means of generating foam with the current programs. Or, it may be best to research and develop a new program, application or plug-in to make foam. Issues such as budget, expertise and manpower will influence this decision. It should also be noted that this decision-making process usually seems to be a responsibility of the production management team. Also these decisions would have been mostly made over the course of the first two layers.

Likewise, existing software could be optimized, such as optimizing the algorithm used to render images. While this optimization would not directly affect the workflow arranged for lighting, an improved rendering algorithm would result in a meaningful increase in efficiency. Rendered images could be reviewed more immediately and more often. To implement this change using in-house software, it is only necessary to re-code the relevant portions of the program. For commercial products, software may either be selected, or re-configured for better efficiency. Sometimes requesting code modifications from the program vendor is also possible.

Such increases in speed from optimization, would contribute to producing a film on time and within budget. Increases in efficiency can transform workflow in another way. If a lighter is able to see the effects of his lighting in real time, he will light his shot in a fundamentally different way. Such real-time feedback in modeling already allows models to be created that would not have even been attempted during the time of *Tron*, before modeling was interactive.

Thus all three layers of pipeline design, implementation and optimization have occurred. As a result, the supposed studio is now enabled to make a better hypothetical movie than its previous one, with better production value, scheduling and budget.

While in this scenario the studio's priorities governed pipeline design and implementation, the process will often work in reverse. Limitations in hardware or software may force workflow adjustments, rather than a desired workflow dictating hardware and software. While a pipeline is the result of many influences, the next iteration of the pipeline may reverse this relationship, and influence it's external situation to change. While available software may have dictated a certain workflow, those designing the pipeline may choose a new workflow for the next iteration and thus find new software that better serves their goals.

#### **4.8 The Conceptual Definition**

A digital production pipeline must, by definition, utilize digital computing hardware and software to facilitate human work and collaboration for the overarching purpose of producing content for film. A digital production pipeline is not defined by its structure; its structure is merely a manifestation of its influences. Ideally, chief among these influences should be the needs of the film, the values of the studio, the strengths of their manpower, and the software/hardware legacy of the studio.

A digital production pipeline is not a permanent structure, but rather a malleable set of components which can be arranged, configured, and adapted into new structures as needed. These malleable components are



human groups with assigned task domains and computer systems to support them. The human groups are normally referred to as departments or teams. The digital systems are operating systems, software tools and applications, networks, processors, and storage. The digital production pipeline is the synergy of these two types of components into adaptable systems and structures for the purpose of producing a film.

The pipeline concept can be thought of as a malleable Lego constructor set, in which even the pieces themselves may be pulled apart, merged, interchanged, or replaced. The structure resulting from these components, flexible and dynamic in its operation, can be understood as a unique expression of the production situation that it was created in. And ideally the pipeline should be a conscious, practical and efficient response to the situation that birthed it.

## 5. CONCLUSIONS

This research was motivated by the lack of a plausible generalized explanation of what CG pipelines are. The goal of this paper was to fill this gap. Secondary goals were to provide the findings in a context that would be accessible to the educated non-specialist, and to provide a coherent starting point for further research in this area.

Traditional academic research was conducted using accessible data in the public domain: reading, citation and integration of published material, including investigating the history and the development of CG animated films. From reviewing the history, many of the dynamics that currently exist are noticed and better understood. However, due to the limitations of the public data primary research was necessary.

Because of the heavily human and relational nature of the dynamics being covered, qualitative methodology was necessary to collect, categorize, and understand the data used in this thesis. Because primary research was needed and because an existing studio agreed to be studied, a case study methodology was used to collect data. Data coding was employed to protect the confidentiality of the participating studio and the subjects interviewed. Information thus gained could have been collected in no other way. The core of this primary data is a set of three interviews which the researcher conducted with key professionals involved in using and shaping their studio's pipeline.

Emergent themes were drawn from close study of the recorded interviews. Assessment of both the academic and primary research was then integrated to produce generalized principles of production pipelines. These themes highlight the important pressures and dynamics of human behavior within the studio studied. While the details would doubtless change from company to company, the researcher believes that the patterns found here apply to most CG studios in some form.

The first theme deals with relationships and indicates that a person needs to have a clearly defined role, the freedom to contribute within it, be held accountable within realistic bounds. The second theme deals with the issue that increasing computational power is a benefit, but it does not affect all workers in the same way. It appeared to be unimportant to Layout, a significant boon to Lighting and a frustrating mirage to Animation. Finally, the third theme notes the tension between generalism and specialty. The studio studied showed a synergy of the two. A diversified background provided the strength and insight to apply the skills developed in a specialty for use in leadership of a specialized department.

These dynamics and pressures proved helpful in identifying the influences that shape the pipeline, and thus directly support the development of the conceptual pipeline model, or definition.

In conclusion, the researcher found that a CG production pipeline was neither merely process nor product, but rather a set of resources with constraints with the purpose of creating a film. Having collected information from different forms and sources of knowledge, the researcher synthesized these findings to form a case study model of a CG production pipeline. From this model, he created an abstract conceptual definition of the CG pipeline as the use of existing resources and constraints in response to the needs of system users for a particular project at a particular time.

A digital production pipeline must therefore, by definition, utilize digital computing hardware and software to facilitate human work and collaboration for the overarching purpose of producing content for film. A digital production pipeline is not defined by its structure; its structure is merely a manifestation of its influences. Ideally, chief among these influences would be the needs of the film project, the values of the studio and its management, the inherent strengths of their manpower, and the software/hardware legacy of the studio.

A digital production pipeline is not a permanent structure, but rather a malleable set of components which can be arranged and configured, and adapted into new structures as needed. These malleable components are human groups with assigned task domains, and digital hardware and software systems. The human groups are normally referred to as departments or teams. The digital hardware and software systems are operating systems, software tools and applications, networks, processors, and storage. The digital production pipeline is the synergy of these two types of components into adaptable systems and structures for the purpose of producing a film.

## 6. IMPLICATIONS FOR FUTURE RESEARCH

Some aspects of the findings of this paper were limited by the fact that only one studio was studied using interviews. Also, since the time this study began, several more CG movies have come out and several 'new' studios will join the list of those making completely CG feature films. If this study were to be repeated in three years with increased interview participation from other studios, the researcher would expect to see a clearer, more detailed picture of the findings discovered in this paper. Nevertheless, since the four studios represented in this study have relatively long histories of CG animation prior to making their first full-length film, discoveries made from studying them will probably remain representative of the industry for some time to come.

In the future, if further trends in pipelines are discovered and the value of these trends can be assessed, then it might be possible to form hypotheses about ideal pipelines which could later be tested to see if improvements in pipeline practices resulted. Such experimentation is beyond the scope of this thesis. Nevertheless, the conceptual definition developed through this research may provide a framework for others to start from, in studying pipelines and assessing trends. Further, the conceptual definition may be an aid to researchers hypothesizing which of changes to pipelines would be most desirable.

This research was purposefully limited in scope to exclude studios in other nations and those which create CG effects for live action films, or other media. Further research could be done in these areas to study differences in work flow brought about by national culture or medium of work, such as live action or cel animation as opposed to purely CGI endeavors.

Another avenue of inquiry would be to further research the history and development of the CG pipeline. This path would require a reconstruction of events from document analysis and the personal experiences of those involved. The results could add to the knowledge of computer graphics history. A short treatment of this history occurred in the paper to give a background to understand the companies studied.

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## APPENDIX A

### TABLE OF FILM EARNINGS AS OF APRIL 18, 2004

All monetary figures in this table on purely CG films are derived from [www.the-numbers.com](http://www.the-numbers.com). All monetary figures are in millions of US dollars. The term G/E represents Gross divided by Expenses, and can be thought of as a "bang-for-buck ratio", where larger numbers are better. Specifically, the equation  $G/E = (\text{US Gross})/(\text{Budget} + \text{Marketing})$ , is used where all terms present. Any films lacking sufficient information will not have a G/E calculated.

**Table 1: Film Earnings as of April 18 2004**

Released	Movie Name	US Gross	Budget	Marketing	Net	G/E
05/30/2003	Nemo	\$ 340	\$ 94	\$ 40	\$ 206	2.54
05/18/2001	Shrek	\$ 268	\$ 50	\$ 30	\$ 188	3.35
11/02/2001	Monsters Inc	\$ 256	\$ 115	\$ 50	\$ 91	1.55
11/19/1999	Toy Story 2	\$ 246	\$ 90	\$ 35	\$ 121	1.97
11/22/1995	Toy Story	\$ 192	\$ 30	\$ 20	\$ 142	3.84
03/15/2002	Ice Age	\$ 176	\$ 65	\$ 30	\$ 81	1.86
11/20/1998	Bug's Life	\$ 163	\$ 45	\$ 25	\$ 93	2.33
10/02/1998	Antz	\$ 91	\$ 60	-	-	-
12/21/2001	Jimmy Neutron	\$ 81	\$ 25	-	-	-



## **APPENDIX B**

### **A NOTE ON CODED INFORMATION**

Please note that the list of code words used in the interviews is referred to as the code key, and is used to decode the transcripts back to a non-confidential state. The code key is available for any researcher wishing to rigorously verify this paper's sources and findings. To be given access in any way to this confidential data, a written request must be made to this paper's author who will then contact the participating studio. Both the studio and the author must then agree that the information should be shared and in what way, otherwise no access to the code key will be provided. The researcher would like to stress, at this point, the extreme unlikelihood of access being granted to 3<sup>rd</sup> parties and dissuade any casual inquiries from being made.

**APPENDIX C**

**ALPHA STUDIO LAYOUT TRANSCRIPT**

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1 Dane: [REDACTED] we're going to be  
2 interviewing layout uh, personnel and this is Dane Bettis and  
3 I'm now just testing to see if this equipment works. Thank  
4 you.  
5  
6 [paused ... picks up mid-way into ice-breaking conversation]  
7  
8 Man: [REDACTED]  
9 [REDACTED] Good for you. So when do you graduate, next  
10 May?  
11  
12 Dane: Yeah. This upcoming May  
13  
14 Man: Okay.  
15  
16 Dane: Pretty cool.  
17  
18 Man: Yeah. Thinking about interviewing here?  
19  
20 Dane: Well yeah. I'm thinking interviewing at a lot of places and  
21 having already met some people from last summer ...  
22  
23 Man: Here at Alpha?  
24  
25 Dane: Yeah. Uh, Animator-5 and uh, Layout-1....  
26  
27 Man: Oh, they went over to your, that, that summer program  
28 thing?  
29  
30 Dane: Right. to that summer class  
31  
32 Dane: So I got to work with them and that puts a face on it, you  
33 know it's one thing to hear about people making movies and  
34 hear about corporate culture but when you hang out with  
35 them and learn from them its like okay  
36  
37 Man: Sure. It makes a big difference  
38  
39 Dane: Yeah  
40  
41 Man: So fire away.

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

42  
43 Dane: Alright. I guess long and short of it, we've already said a  
44 little bit about it, but how did you come to be the [head of]  
45 layout?  
46  
47 Man: Um, you want my tenor here or kind of what led up to cause I  
48 know your questions were like how I got in the industry....  
49  
50 Dane: Right. Kind of both.  
51  
52 Man: Okay. Um, I was at University-1 and at the time this is back  
53 in 90, 91 actually kind of 89ish and there weren't a lot of  
54 computer graphics stuff out there and Macintosh just kind of  
55 eased into you know desktop publishing and at the time. who  
56 used to own it? Genographics system was the original  
57 computer system. It was real expensive, it was like a half of  
58 million dollars and you could only do like quick(?) -shaded  
59 polygons, no textures and it took like nine hours to render a  
60 single frame at video res so it was like really, really slow and  
61 then Panasophic(?) bought them out well I was working on, I  
62 was in a graphic design curriculum through the college of art  
63 and one of the campuses I had a student worker job which is  
64 the department of instructional support and development and  
65 they were responsible for a lot of instructional aids via like  
66 um, kind of graphics to show in the classroom of charts and  
67 things that help the instructors in the different classes around  
68 the campus, kind of help teach anywhere we, there were  
69 video films, we had film library and so mainly I did a lot of  
70 sign graphics for the, for the you know for some teachers  
71 and with this specific computer system we started doing  
72 slides and like, it was like the high-res slide on campus so  
73 they were mainly tasked but this was kind of a round when  
74 lotus 1-2-3 was just starting to be allowed to put slides and  
75 there weren't really, there were no graphic capabilities so uh,  
76 one of my clients when I was a student worker was actually  
77 uh, the uh, head of media relations at University-1 that like if  
78 you're watching an University-1 [vs.] University-2 game on  
79 Saturday on CBS they show you know little fifteen to thirty  
80 second commercials about each campus well and was with  
81 public relations and his responsibility was to do public  
82 relations type things so I started working for him, did a couple

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

83 of slide jobs for him and then one day he said hey there's  
84 this great company off site that they do video post production  
85 and you know there's a job opening for a paint box artist and  
86 I think you'd be great. So I went over there and interviewed  
87 and uh, well I was offered an internship and I worked for  
88 free for like six months uh, at the nightshift. It was crappy  
89 hours. I didn't know anything about video or you know this is  
90 a super high end system, it was a million dollar system, it  
91 was a CMX-Aurora system so, I'm trying to remember what  
92 it's called it wasn't literally a paint box I think was Aurora-  
93 paint is what it was called uh, and ran on a sun sparc station  
94 so I didn't know anything about Unix and all my classes in  
95 college were all art related, not technical. I had taken some  
96 programming classes and didn't really think I would go down  
97 that direction, I was always more creative so I started at  
98 Small-Studio-1 and like I said I was doing night paint-box  
99 stuff and getting really good at painting chrome logos and  
100 that's mostly all my clients were car, car spot owners that  
101 we'd do car commercials. It was like you know cheesy  
102 logo's and just everything in chrome and all 2-D and it was  
103 all 2-D paint box so uh, I figured I got <inaudible> something  
104 I decided this is like a really cool industry to be in. After six  
105 months I got hired full time uh, so I was on the night shift  
106 from like six to one in the morning and uh, I focuses more on  
107 the job than I did on my schools work so um, and I decided  
108 to learn everything about video under the hood because I  
109 was working at a post facility where we actually would go  
110 out, shoot a commercial, and run sound and come back and  
111 edit it and I would do graphics for it and put it all together....  
112

113 Dane: Right

114

115 Man: You know I'd see my work on TV so it was kind of cool.

116

117 Dane: Oh, yeah

118

119 Man: Um, we bought one of, I think the first ten and I'm not sure  
120 weather that's totally accurate uh, wave-front systems in the  
121 country. Uh, Wave front 1.0 it was the first, it was, I, it was  
122 one of the initial 3-D software, you know, third party  
123 packages to come out for consumer and uh, we had one of

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

124 the first systems I think in the county, in the south defiantly  
125 and uh, we had an operator it was all, there was no gooeey  
126 (GUI) to it, it was all typing and to type all the coordinates  
127 and build polygons and draw your shapes, it was pretty  
128 brutal and uh the guy that was running it quit and the lady  
129 that ran the full time, the day shift got promoted to the 3-D  
130 operator and then I got promoted from night shift to day shift  
131 so uh, balancing going to school full time and having a full  
132 time job was kind of fun but my boss was really supportive  
133 and it turned out some of my instructors at the college were  
134 actually my clients at the video house so I'd go to class and  
135 they would say hey you're excused from class, why don't  
136 you go work on my stuff at Small-Studio-1, so all the other  
137 students kinda were jealous, I had this really cool...

138  
139 Dane: Yeah

140  
141 Man: Kind of glide by thing through college but I worked really  
142 hard you know and just because my instructor said you need  
143 to work extra hard because I'm cutting you slack you in class  
144 and I don't want the other students to think you're getting  
145 preferential treatment so I worked extra hard to make sure  
146 that I was earning my own "A", I wasn't getting it for free so  
147 um, I did that for about a year and then the lady that was  
148 working the 3D box quit and moved to New York and so then  
149 I got promoted to the 3D box and taught myself how to use it  
150 and at that point wavefront 2.0 had come out so there was a  
151 GUI with it. So it wasn't as painful to use but I had been  
152 playing around with it a little bit at night...

153  
154 Dane: Yeah

155  
156 Man: Learning some of the commands and kinda how to do it I just  
157 thought that was defiantly like the wave of the future so I did  
158 that, four and a half years later I ramped up the department  
159 pretty quickly; they hired a full time paint box operator which  
160 expanded our graphics division from one to four people... I  
161 was the 3D manager and gotten really good at doing logos  
162 and sitting in a really souped up facility down in Louisiana,  
163 we had some of the state of the art equipment in the county.  
164 Uh, my boss was on the International television production

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

165 society board, he's the president so all the manufacturers of  
166 any cool piece digital equipment were throwing it at him and  
167 hey we'd like you to test this out and tell us what you think  
168 about it also we had one of the first digital editing suits in  
169 Louisiana, actually in the South.  
170  
171 Dane: Uh like an NLE?  
172  
173 Man: I'm sorry  
174  
175 Dane: some, something of an NLE, a non-linear  
176  
177 Man: Uh, actually we had the first D1 suite, the first D1 I guess  
178 format suite and digital audio in the south so we were  
179 starting to have clients come down from LA from NY and  
180 from Miami to come to Louisiana to cut their stuff cause we'd  
181 have some real nice equipment and ironically enough my  
182 boss brought in a tape on day and showed me and it was  
183 short-video-1 that Alpha did...  
184  
185  
186 Dane: Right  
187  
188 Man: And uh, he goes this is what real effects are you know and it  
189 was kind of like in my face and then I started really looking  
190 outside of Louisiana to what was really going on in the  
191 industry. And I saw Terminator just came out and all this  
192 really killer stuff was going on and the abyss, I realized it  
193 wasn't gonna happen for me just staying in Louisiana so I  
194 needed to kind of look outside so after being there for four  
195 and a half years I went to a company in Miami called Small-  
196 Studio-2 and the were doing, they were almost, every other  
197 month they were on the cover of Post Magazine, Post is a  
198 trade a magazine for the video production graphics industry  
199 and animation so I kept seeing this company every time,  
200 every other month featured on the cover and they were  
201 doing high profile work, I'm like that's what I want to do. I'm  
202 tired of only car logos and little things that are never making  
203 it on TV you know, so I went and interviewed with them and  
204 they hired me as a 3D animator and there was a small

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

205 graphics group, actually there's like seven people in the  
206 group...  
207  
208 Dane: Um-hmm  
209  
210 Man: And most of our work was Latin American, Mexico so we  
211 dealt with, most of our clients were Brazilian or Mexico and  
212 so all of this stuff we were doing was for Mexico or Brazilian  
213 TV so uh, it was kind of weird because my parents were like  
214 hey what are you doing and I'm like well you got to go to  
215 Brazil to see it cause it'll never make it on US air so it was  
216 like, it was like Coke commercials for Mexico and like for  
217 Pepsi and things like that and there was one big candy  
218 manufacturer that we got their uh, their logo is a little lizard  
219 guy so we said it wasn't character animated it but we did  
220 some CG integration with live action so that's mostly all the  
221 type of stuff. We didn't do any all CG commercials....  
222  
223 Dane: Right  
224  
225 Man: So uh, I stayed there for a little bit, for three and a half years  
226 and I just kind of got really tired of doing you know flat Latino  
227 kind of work and it was just that the hours just horrific and  
228 uh, mainly because of the fact that most of clients were  
229 foreign by the time we bid out a job and by the time it got  
230 awarded they, there was, they had to wire their money  
231 directly to us because the value of the crisero, the value of  
232 the peso would drop and change drastically. If the client  
233 waited to long....  
234  
235 Dane: Right  
236  
237 Man: They would actually loose money on the job so as soon as  
238 they got the money they'd wire it to us so the deal would be  
239 done and then literally if they said yeah three days to  
240 animate you had three days to animate, you didn't have a  
241 second more so whatever, whatever you had in three days  
242 had to ship so it was kind of brutal I mean you know there  
243 wasn't really anywhere for me to go there so they had just  
244 hired on a director of animation and uh, I didn't really see  
245 any other thing for me to do so I actually remember this day



Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

246 like it was yesterday; I worked for Ad-Agency-1 which is a  
247 huge advertising agency in New York. We did a commercial  
248 for a Glade rug and room deodorizer and I had to do a  
249 particle animation and I cranked it out in like two days and  
250 had to model [a] vacuum cleaner and did this particle system  
251 with rugs and it was, for like a ten second graphic you know  
252 that's gonna appear in a thirty second spot. The director  
253 said what are you doing playing around with these guys you  
254 should be in the film industry and I just didn't even think  
255 about it, you know I didn't even think so I started doing some  
256 research, did about nine months worth of research and I  
257 came up with five really big houses, it was ILM, Alpha at the  
258 time RezO-n-8(? resonate), Boss Studios and then Digital  
259 Domain.  
260  
261 Dane: Yeah  
262  
263 Man: And I sent all my resumes to all those guys and I got  
264 immediate nibbles from ILM and then Alpha and my first  
265 interview was with ILM and their commercial division and it  
266 was a really big company, it was like three hundred people  
267 back then now it's like a thousand or something and then  
268 Alpha was like sixty people, so I interviewed at ILM and then  
269 the following week I came back and interviewed at Alpha  
270 and uh, Alpha actually made me an offer first and then ILM, I  
271 got an offer from them four hours later and I picked Alpha  
272 mainly because of the size of the company, it was a lot  
273 smaller and I saw more opportunity for personal attention  
274 and personal growth and my main reason why I specifically  
275 targeted ILM and Alpha was that at the time, Vertigo,  
276 Houdini, there was like at least seven different 3D packaging  
277 that were out there and this was back in 95...  
278  
279 Dane: Right  
280  
281 Man: So I wanted to do stuff that other people couldn't do and I  
282 wanted to find a house that had priority software cause  
283 that's kinda the way it was happening so that's why I  
284 specifically targeted uh, I didn't really consider myself a  
285 character animator so I never considered Delta....  
286

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

287 Dane: Right  
288  
289 Man: And that's mainly what they specialized in at the time....  
290  
291 Dane: Right  
292  
293 Man: So uh, I got an offer from Alpha and actually in four days it'll  
294 be my, actually five days will be my eight year anniversary....  
295  
296 Dane: Wow  
297  
298 Man: So I've been here for eight years and uh, started off as an  
299 effect animator in lighting and I worked on uh, short-video-2  
300 in the third dimension which was a large format uh, project  
301 that multiple houses were working on. Uh, I don't know if it's  
302 still showing in New York but I think it's still showing in  
303 Australia, so it was a stereoscopic large format film....  
304  
305 Dane: Uh, the [with] Character-1  
306  
307 Man: Yeah. Yeah. So, have you seen it?  
308  
309 Dane: No. But I've seen short-video-2 so I can imagine something  
310 its derived from.  
311  
312 Man: It was, it was in 3D stereo, so we had to render both eyes a  
313 left and a right eye could be projected and so uh, that was  
314 an interesting experience because when I interviewed they  
315 said what's the best think that you do and I said motion and  
316 cameras and they said what's the worst thing you do and I  
317 said lighting and my first staffing job was lighting and I'm like  
318 did you guys listen to what I said you know so it's like  
319 freaked out for the first three of four months because of its,  
320 I'm not a lighter you know it was just kind of my forte was  
321 motion and compositing, and I kind of started to get into our  
322 software and when I started here I wasn't a programmer and  
323 I didn't think like a programmer and it took me about a year  
324 to catch onto how our software works and it's a very C-like in  
325 structure...  
326  
327 Dane: Right

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

328  
329 Man: It's all a lot of typing. Uh, now we have a lot of GUI's, back,  
330 back in 95 when I started we didn't....  
331  
332 Dane: There's a lot of scripting then  
333  
334 Man: A lot of scripting. At them time we have over eight hundred  
335 tools that you know you just wind up batch them together to  
336 generate a model and then generate a picture from that so  
337 uh, I kind of started working on some commercial stuff; I  
338 worked on a couple of Character-2 commercials and I went  
339 to Chicago and supervised the shoot and integrate him into  
340 live action and then came back and I was the lighting  
341 compositor and the technical director and I kind of, we had a  
342 small crew; two animators and I was a lighting animator and  
343 uh, it went really well and I kind of really found what's under  
344 the hood in our software, what, how pipeline worked and I  
345 was staffed as a sequence technical director with one other  
346 guy on Movie-I and at the time we really didn't have a  
347 pipeline so uh, I was the lead sequence TD on Movie-I and  
348 then after Movie-I I kind of saw the need for a layout, specific  
349 layout tactical director for the department because the way  
350 our pipeline is set up we feed inventory to all the other  
351 groups and so I basically wrote my own job description and  
352 pitched it and management said yes, it's a great idea so I'm  
353 was the lead, the layout technical director for Movie-II and  
354 uh, I actually got promoted to the lead technical director for  
355 Movie-VII but that job kind of fell on the way side of the story  
356 land so it's back on City-7 in story so I kind of stepped down,  
357 because this project wasn't green lit and uh, there were  
358 other opportunities to be a lead TD on Movie-III and on  
359 Movie-VIII and it just didn't really like being up at that high  
360 level; it was too many meetings, I was delegating everything,  
361 I wasn't getting my hands dirty down in the pipeline...  
362  
363 Dane: Right  
364  
365 Man: I wasn't going to do any hands-on stuff so it wasn't really for  
366 me and I kinda asked to go back into layout with the TD so I  
367 am currently Layout technical director on Movie-III and  
368 Movie-VIII at the same time so it's a little crazy but it's fun.

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

369  
370 Dane: So, so we're looking at then is that they get real good  
371 making commercials and then they invent their pipeline as  
372 they go on this first feature, it's a different kind of animal.  
373  
374 Man: What, what had happened was uh, the short-video-2 actually  
375 I think the first big project that Alpha did was Character-3,  
376 um for the short-video-4...  
377  
378 Dane: Yeah I remember that one  
379  
380 Man: So I can't, like my first week here was when they finished  
381 and wrapped on that so it was a great time to start. There  
382 was all this hype, I think that was the first project Alpha had  
383 done where there's was that many shots involved and then  
384 the next thing we had done was the short-video-2 project so  
385 that there was, it was a lot of people working on the same  
386 show and multiple people working in the same shots. And  
387 one time you had an effects animator, a motion animation,  
388 and a lighter working all in the same shot. We didn't have a  
389 revision control system so we were stepping on each others  
390 work uh, and then kind of happened is one of our character  
391 technical directors, Man-12, uh revamped all of the, he didn't  
392 do it solely, couple other people CharacterSetup-2, who's  
393 now our director of character technical directors uh, she and  
394 some other key players as well as Man-3, Man-29 kind of  
395 looked at the problems and how we animated and work flow  
396 and said well if we're gonna do like commercials then a full  
397 like thirty second commercial we need kind of a pipeline so  
398 the first test pipeline was with the Character-2 commercial  
399 and Man-12 and CharacterSetup-2 and Man-29 I think kind  
400 of worked through the system and kind of got it uh, to a  
401 really good point. Well uh, back in the day when you worked  
402 on a commercial there was a technical director staffed for  
403 each commercial and depending on how well the character,  
404 the technical director knew the pipeline in our software either  
405 had fun on the job or it was the worst job in your life because  
406 it was set up poorly. well you know we kind of started  
407 adopting this Character-2 set up as a pipeline, as a template  
408 to start a job and the Movie-1 pipeline actually grew from that  
409 and it's kind of, it's kind of evolved over the years but that

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

410 was like the originating pipeline design uh, from a work flow  
411 standpoint for a directors structure file-naming conventions,  
412 it was very intuitive, it was a very easy to navigate, the shot  
413 structure made sense uh, people got in it pretty quick and  
414 were productive so we expanded on that to build the Movie-I  
415 pipeline and then after we made Movie-I we had post-  
416 mortem and then we decided, looked at inefficiencies in the  
417 pipeline in the work flow, where were we spending and  
418 wasting time and then we rewrote the pipeline basically in  
419 between Movie-I and Movie-II and uh I was on the pipeline  
420 development team for that and mainly because layout was  
421 the first on in the pipe, that you know we found a lot of  
422 problems up front as to what were kind of snags so uh, and  
423 then after Movie-II was over we kind of revamped the  
424 pipeline again, we used that for short-video-3 and then we  
425 kind of tweaked it again for Movie-III and actually we're  
426 making significant changes now for the Movie-VIII pipeline  
427 so with each iteration of the pipeline comes some, some  
428 level of inefficiency because there's the old adage that you  
429 know as computers get faster we continue to throw more  
430 crap at them, so just when they get faster we throw you  
431 know really, really complex problems at them so it's just  
432 gonna uh, I think that check and balance will always be  
433 there with our technologies so...  
434  
435 Dane: Right. And also just figuring out to keep people from uh  
436 having to do things that aren't relevant to what they need to  
437 do.  
438  
439 Man: Right. Exactly.  
440  
441 Dane: So the early pipeline was sort of a thing where everybody  
442 had a technical liaison like uh, if I'm an animator I'd have in  
443 my department a technical director to make sure I was able  
444 to keep in with the flow of things or...  
445  
446 Man: Uh, pre-Movie-I pipeline no, there was one technical director  
447 for the entire show so if you were on a Character-2  
448 commercial there was one TD that was responsible for the  
449 entire job so if there was one shot -easy, if it was all 40 shots  
450 or something crazy like you know twenty or thirty shots that

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

451 one TD is responsible for every shot going through the  
452 pipeline and that was from set up rendering, they had motion  
453 animators just animating the Character-2, they had lighting  
454 animators just lighting the Character-2...  
455  
456 Dane: right  
457  
458 Man: But you were responsible for pulling all the components  
459 together and shooting it out tracking everything and making  
460 sure it was the right version and all that. Um, we didn't have  
461 a revision control system uh, for the pipeline until Movie-I  
462 and then one of our TDs, our senior TDs wrote a revision  
463 control system called RCS-1 and that allowed for multiple  
464 users to work on multiple shots at the same time you know...  
465  
466 Dane: Right  
467  
468 Man: And we revamped that after Movie-II and we came up with  
469 RCS-2 which is a production environment revision control  
470 system so RCS-2 is the only difference data-base driven,  
471 RCS-1 wasn't.  
472  
473 Dane: Alright. So you go in one day, they don't like one aspect,  
474 they do like another you can roll back one aspect in case  
475 you....  
476  
477 Man: Exactly  
478  
479 Dane: Yeah. That's pretty good. Uh, is it uh, you know don't be uh,  
480 more specific than you feel comfortable with. You do  
481 understand how this stuff gets scrubbed before I get to do  
482 anything with the it, right? this interview all gets to text and  
483 then the folks upstairs where ever they are makes sure it  
484 clean...  
485  
486 Man: I'm leaving it up to them to edit  
487  
488 Dane: Good deal, that's exactly what I want, I want people keep  
489 their mind open and say share interesting stuff, uh without  
490 breaking any of that or worrying about it I guess, what uh,  
491 could you describe how something starts off, flows from like,

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

492 as it's coming into layout and heads that way and you know  
493 you can focus more heavily on layout since that's where you  
494 are or as much detail anywhere else as you feel like  
495  
496 Man: On the whole pipeline or just layout?  
497  
498 Dane: Well the whole pipeline but focus on layout first since no one  
499 else is gonna know this as well as you are, I mean I talk to  
500 an animator and a lighter later so  
501  
502 Man: uh kind of the initial way that that layout works is we're kind  
503 of dependant on arts, on story and art. Um, and the story is  
504 written by the writers, we tend to not have any contact with  
505 that but the story board animators actually, the story board  
506 actually artists, excuse me, read the script and they story-  
507 board out the sequence in traditional thumbnails  
508  
509 Dane: Um-hmm  
510  
511 Man: And those are actually pitched to the directors and if those  
512 are in a good enough state then they're actually, the  
513 storyboards are scanned into the computer by editorial and  
514 editorial gives us an animatic or digital storyreel....  
515  
516 Dane: Right  
517  
518 Man: As layout and that's kind of, there's scratch dialogue in there  
519 sometimes the actors dialogue is recorded first. Uh, if we  
520 can't get uh, Voice-Actor-1 then somebody here or  
521 somebody down in City-7 will record a scratch track as a  
522 placeholder until we can get audio time to record Voice-  
523 Actor-1's voice so all of the dialogue and the lines are  
524 recorded up front and we animate to that. So we get an  
525 animatic or a digital story reel and that is a blueprint for  
526 layout. So our job uh, layout is actually split up into two  
527 departments, we have rough layout, we have final layout....  
528  
529 Dane: Okay  
530  
531 Man: Um, rough layout's job is to very quickly usually within less  
532 than two weeks is to get exactly the emotion and the flow of

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

533 the picture and the image and the dialogue what's in the  
534 animatic in the computer, uh cause often time what looks  
535 good on 2D looks like crap in 3D...

536  
537 Dane: Oh yeah

538  
539 Man: a lot of times forced perspective is drawn on some of the set  
540 composition, the scale is off a little bit you know in relation to  
541 the set design. Uh, while the crazy thing about all this is that  
542 it all works in parallel, it's a non linear process...

543  
544 Dane: Yeah.

545  
546 Man: it's kinda nuts, but it's actually fun. Uh, while kinda all that's  
547 going on we have a dedicated modeler inside of rough layout  
548 and his job is to build what we call rough layout sets. He  
549 works uh, all the modeling is actually done inside of Maya,  
550 and he builds the pre-viz sets or the rough sets, if you will  
551 working under the direction of the production designer and  
552 art directors. he gets traditional plans and blueprints and he  
553 builds models to scale and puts in as much detail as, you  
554 know is warranted. He also works under the direction of the  
555 head of layout. The head of layout works in a traditional live-  
556 action sense as the director of photography so my job as the  
557 technical director for the group is to over see the group both  
558 rough layout and final layout on the technical aspects. So I  
559 would be like a grip or, or a technical director basically for  
560 logistics so anything technically related to the pipeline in the  
561 process of how layout get a model to a picture through the  
562 pipeline, any kind of hooks or snag or any feature requests  
563 implementation or changes kind of falls under my, my role.  
564 Uh, uh once the rough layout sets are built, they're built their  
565 built inside of Maya and then we have a custom Mel program  
566 that actually converts a Maya scene file to a Alpha  
567 proprietary scene file and then a rough layout animators  
568 animate in nothing but Alpha software so we have our own  
569 animation interface called AnimationTool-1 uh, and it's a  
570 kinda spreadsheet based kind of like Excel and also has a  
571 time-curve editor in it so, depending. Some of the old school  
572 guys uh, like Animator-6 and I think Animator-5 uses the  
573 spreadsheet a lot, some people just use the curve editor but



Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

574 with it, however you feel comfortable working that if it's there  
575 so you can either use one or the other or both....  
576  
577 Dane: Right  
578  
579 Man: Depending on your style. Uh, once the rough sets are built  
580 they go to the rough layout and rough layout then begins  
581 setting up the virtual sets, setting up the cameras, the  
582 blocking, puts in the like the rough sets are built so using the  
583 animatic as a guideline of the story reel what we start  
584 building each individual shot. The story is broken down into  
585 three traditional acts like a traditional theatrical screen-play  
586 and each act is then broken down into a sequence and kind  
587 of like a sequence of any major uh, change that a character  
588 might go, undergo they kind of split it at a sequence and  
589 layout works on sequences at a time so, once a sequence  
590 kind of comes down storyboards are then broken down into  
591 individual shots so that's how layout deals with it and the rest  
592 of the company and the rest of the departments deal with it  
593 at the shot level, but we work on sequences at a time so uh,  
594 like I said layout usually has a week to two weeks, rough  
595 layout does, to crank through and block out, set up all the  
596 cameras, set up all the characters. Uh, the characters are a  
597 little different uh, there's a separate department, the  
598 character technical directors...  
599  
600 Dane: Yeah  
601  
602 Man: They're responsible for putting the character rigs on the  
603 characters and getting them ready for production. because  
604 layout in the first group kind of in the official production  
605 pipeline, the character, final character rigs generally are not  
606 ready for production...  
607  
608 Dane: Right  
609  
610 Man: they're still working on a deformation systems and all that,  
611 that the dynamics, hair, clothes simulation stuff, excuse me,  
612 so layout actually, we set up our own version of the  
613 characters called uh, just called layout characters...  
614

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

615 Dane: Right  
616  
617 Man: They are very low polygon models just that are, we just use  
618 for blocking  
619  
620 Dane: cut along so they just, non-deform?  
621  
622 Man: They make, yeah there's no deformations, they're all  
623 polygonal based there's a simple skeleton as opposed to like  
624 Character-4 skeletal structure is very complicated; it's a very  
625 watered down skeleton, just for simple posing and that's it  
626 uh, so that's what rough layout uses. Uh, rough layout's  
627 focus is on creativity and on injecting cinematography, or  
628 cinematic aspects into the film. trying to, their job or, they're  
629 cinematographers and they work very closely on in the lead  
630 of the head of layout which is like the DP in the traditional  
631 sense....  
632  
633 Dane: Right  
634  
635 Man: Uh, so under the supervision of the head of layout the rough  
636 layout animators are more on the creative side, as film  
637 makers so they concentrate on the camera and on the set up  
638 how the scene is composed...  
639  
640 Dane: Right  
641  
642 Man: Yeah. The aesthetics to make sure there's balance, there's  
643 design, there's a lot of thought that goes into I'm not just  
644 going to push in because I feel like pushing in here is an  
645 intentional moment, it might be an intense facial shot of  
646 Character-4 or something that motion goanna happen and  
647 you want to capture that expression in his face so you just  
648 push in real, a little bit. It's all intentional cinematography  
649 and that's what rough layout focuses on. Once rough layout  
650 has got the sequence to a good point where we feel  
651 comfortable and that the visuals are moving along and the  
652 editing is working well and with the dialogue then it's actually  
653 passed off into final layout. final layout will then meet with  
654 rough layout and they'll talk about anything that, any  
655 problems that they had with blocking any particular shots or

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

656 what not, and they'll hand off that information to final layout.  
657 Final layout's goal immediately is to swap out the final, the  
658 rough layout characters and just have the low polygon  
659 character rigs with the final character rigs and to make sure  
660 that the final character show up in the exact same spots for  
661 the key poses that we did in rough layout, because the next  
662 step is the motion animators come on board and they'll start  
663 doing all the character animation, lip-sync, the facial  
664 animations...  
665  
666 Dane: Um-hmm  
667  
668 Man: Uh, layout then continues to focus on camera, camera  
669 motion so uh, once we swap out the layout characters with  
670 the final characters then we also start swapping out the final,  
671 the rough layout sets with the final sets. so again in parallel  
672 the modeling team has been building models and installing  
673 them in the system they have an inventory sheet of models  
674 that we need for the sequence. So they'll start building the  
675 final high res models uh, and as they start getting installed,  
676 layout will start installing them in the final layout. Our first  
677 milestone is to prep the sequence for motion so that  
678 everything that's supposed to be in the shot is in the shot  
679 and everything in the shot is supposed to be where it is...  
680  
681 Dane: Right  
682  
683 Man: So at that point layout follows the sequence all the way down  
684 until it's rendered out of the film and it's done if at any  
685 juncture in any department, effects or lighting or even motion  
686 that the camera has to change it always goes back to layout  
687 and layout is the only department that's allowed to touch the  
688 camera...  
689  
690 Dane: Right  
691  
692 Man: For a couple of reasons. Mainly, the layout animators are  
693 very familiar with every model that's in every shot. They  
694 know all the names, they know all the shot numbers they  
695 know Character-4 is walking along the tree and if the tree is  
696 really supposed to be there. Mainly, our biggest job and the

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Interview 1: Dane Bettis & Layout 2

697 toughest job is a continuity artist so that when you cut from  
698 one shot to another, all of the sudden there's not a bush that  
699 just magically appears behind the characters and then you  
700 cut away and then the bush isn't there. it pulls the viewer out  
701 of the movie and so for continuity we want to make sure that  
702 all the objects stay where they're supposed to be from shot  
703 to shot and they don't cheat or anything like that...

704

705 Dane: Yeah

706

707 Man: Once the character animators come on board we continue to  
708 monitor the shots uh, we have dailies so each day every  
709 department meets in the screening room and we look at the  
710 previous nights work, so like tonight, well today we're  
711 animating and at eight o'clock we'll submit all of our renders  
712 to the farm, they'll render overnight and tomorrow morning at  
713 nine o'clock layout will go into the screening room, we'll look  
714 at all the stuff that we rendered last night. The directors are  
715 in there, the producers are in there, uh head of layout is in  
716 there and we actually critique from a layout aspect only, we  
717 critique the layout of the shots, is it flowing nicely and is it  
718 working.

719

720 Dane: So it would be like looking at timing and composition and  
721 camera motion?

722

723 Man: Exactly. Everything.

724

725 Dane: So rough layout is gonna be concerned with, do they have  
726 like scratch dialogue? I can only image someone like Voice-  
727 Actor-2 comes in, improvises, the timing changes, so scratch  
728 dialogue, I guess it's just a, a best guess is that's gonna hold  
729 based on ...

730

731 Man: It changes a lot and uh, we, we don't, we actually, we put we  
732 uh, we sync up with editorial so editorial is always our  
733 starting point. Uh, if it happens a lot while we're in rough  
734 layout, the editors are constantly working with the directors  
735 and the producers and CG supervisors uh, to constantly  
736 make each sequence and in the context work with entire  
737 movie so it flows well. So the timing of all those shots

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Interview 1: Dane Bettis & Layout 2

738 constantly change while they're in rough layout, while in final  
739 layout, excuse me I'm gonna sneeze  
740  
741 Dane: That's okay  
742  
743 Man: allergies are killing me today. Uh, they're constantly  
744 changing the timing of the shots so we get updates you  
745 know we may be three or four updates a day on one  
746 sequence so what layout does is we run a script that syncs  
747 our pipeline up with what's going on in editorial that way we  
748 know our shot one has forty frames in it and so does  
749 editorials...  
750  
751 Dane: Right  
752  
753 Man: And we always sync up with editorial, they're constantly  
754 sending us down changes. Sometimes we combine shots  
755 uh, sometimes we delete shots, sometimes we add shots so  
756 that, that usually happens all the way through I'd say, I'd say  
757 mid, final layout, usually after a sequence has left final layout  
758 they usually, they may delete a shot, they may combine  
759 shots but they usually rarely add shots but it's still possible  
760 they can.  
761  
762 Dane: right. So you guys don't tweak the timing, you're looking at  
763 everything inside that window of time  
764  
765 Man: Um, editorial kinda controls it, usually the head of layout  
766 makes recommendations at the rough layout stage to  
767 drastically change the sequence by adding 10 frames to the  
768 tail of a shot or deleting a shot or combining a shot, editorial  
769 and the directors have final say so as to whether or not they  
770 want to move in that direction. Uh, in final layout again, the  
771 Head of Layout receives all the layout uh, mainly the shots  
772 for the camera work to make sure that the vision that the  
773 directors had in rough layout that gets communicated  
774 throughout the final layout process mainly through the  
775 camera so the camera in itself is treated as an actor and it's  
776 a huge part of cinematography so we focus a lot of attention  
777 on it. Um, after the motion animators continue to do all the  
778 animation; they have their own animation dailies as well,

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Interview 1: Dane Bettis & Layout 2

779 they're in usually at ten o'clock so everything that they  
780 rendered over the weekend they'll look at today at ten  
781 o'clock and anything that they render today and render  
782 tonight they'll look at it in the morning so each department  
783 has its own daily it's from it's previous nights work or  
784 previous days work. Um, our next milestone in layout is to  
785 get ready for lighting. Usually lighting, wants to come on  
786 board when animation close to 50% being finalized but lately  
787 they've been coming in really early because they want to get  
788 a jump on things. Usually the first lighting team would be the  
789 lead lighters on the sequence, will ask for anywhere from  
790 three to six shots that, what we call key shots...

791

792 Dane: Um-hmm

793

794 Man: These are, these are key shots in the sequence that either  
795 have all the characters in a single shot or its a milestone in  
796 the sequence that uh, that is very important to art, so they  
797 want to lock down the look of that sequence with the lighting  
798 team pretty quickly so the lighting animators want their shots  
799 pretty quick so that they can start doing like the look of film,  
800 we already had a look of film, the look at sequence, they'll  
801 start wanting to set up shots and make sure that things  
802 render nicely, all the models are there, all the objects are  
803 there to kind of give, the direction of light, time of day, things  
804 like that like the color tone and just the mood of the  
805 sequence in relation to what's going on in the film from uh, a  
806 dialogue standpoint and a story standpoint we also need to  
807 communicate that with color and lighting so that also plays  
808 into mood and the whole tone of the film so that's very, very  
809 important so. Uh, layout will start setting those shots up for  
810 key lighting and uh, like I said it's anywhere from three to six  
811 shots and usually a couple of weeks will go by when lighting  
812 will, when lighting production meeting the whole lighting  
813 them will come on board, not just one or two people but it's  
814 usually six to seven animators will come on board and  
815 they'll, they'll break up the sequence and that will be the  
816 lighting animators for that sequence so then after we set up  
817 the key shots, a couple weeks later we'll have to set up the  
818 entire sequence for lighting. At that point we hand it off uh,  
819 to the lighting group and depending on if there's any pre- or

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Interview 1: Dane Bettis & Layout 2

820 post-effects uh, like if there's foot dust, the effects team will  
821 come on after the lighting the shots been lit um, then the  
822 layout, there's two layout animators per sequence, final  
823 layout animators and they follow that all the way down till it's,  
824 till it's rendered. mainly it's a supervisory role to kind of just  
825 make sure all the models are showing up. If a lighting  
826 animator has a problem with a shot then he goes to the  
827 lighting technical director that's on his team, if the lighting TD  
828 can't solve the problem then the lighting TD will contact the  
829 sequence animator, one of the two sequence animators one  
830 that sequence to try to hash out the problem...  
831  
832 Dane: Right  
833  
834 Man: If they can't figure it out that's kind of where I intervene and  
835 kind of you know I'm on this one, you guys keep moving  
836 ahead I'll kinda dig in and find out what's going on so I kinda  
837 oversee all the sequences in both rough layout and final  
838 layout so the lighting teams have their own technical  
839 directors who work with lighting relates problems, the effects  
840 team have their own TDs that work with effects-related  
841 problems. The motion team has there own motion TD and a  
842 motion TA which is a technical assistant, to assist all the  
843 motion animations. Uh, it's been a challenge because our  
844 teams are twice the size of what they were on Movie-II,  
845 layout is like twenty four people, it was twelve on Movie-II so  
846 my crew is bigger plus I'm working on two films.  
847  
848 Dane: Yeah  
849  
850 Man: It's, it's busy but it's really fun cause it's never boring. Uh,  
851 that in a nutshell is probably our pipeline uh and kind of how  
852 layout functions and our main goal is if we get down to  
853 lighting and the director says I need you to push in a field,  
854 that change comes back to layout, we push in a field, we  
855 check in the change and then it gets rendered so...  
856  
857 Dane: Push in a field like uh....?  
858  
859 Man: There's a field chart exactly, they got field chart in kind of  
860 common cinematography where uh, back in the day before

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861 motion-blur rendering you actually rendered on fields, two  
862 fields were interlaced into a frame so uh, when you push in a  
863 field there's a field chart and uh, you can display over the  
864 image and you can actually alter the camera and push in just  
865 a little bit, it's kind of, it's like a digital zoom but not a zoom...  
866  
867 Dane: a little bit of a fake...  
868  
869 Man: You're framing the camera closer. Basically, you're moving  
870 the entire camera closer to the subject matter in CG so those  
871 are some kinds of comments and say you know slow the pan  
872 down at the end the shot a little bit cause it's too quick so  
873 we'll be making motion adjustments to the camera uh, all the  
874 way through lighting and it's, it's common for that to happen  
875 so...  
876  
877 Dane: So you guys create the, the uh direction of photography and  
878 then you watch over everyone else's work as it goes to make  
879 sure that the camera keeps working, the camera keeps  
880 serving the directors and the continuity is maintained?  
881  
882 Man: Right. Exactly. What, what sometimes will happen is in  
883 rough layout we'll pose a character in one of the rough  
884 layout characters then when we swap out the final character  
885 uh, the, the character animator might pose the character in a  
886 slightly different manor so then depending on the pose we  
887 might get kind of a really, his hand may be out of frame and  
888 it might be kind of weird to compositionally so they might say  
889 because the character pose is final, Uh, we will generally  
890 tweak the camera so you know what I really like the pose  
891 where his hand is but can we pull out, you know pull out a  
892 couple fields so we can actually see his hand in frame as a  
893 part, an important part of the pose and the emotion of the  
894 sequence so uh, it's kind of, those kinds of changes that  
895 happen so, so we're constantly even in lighting you know  
896 there might be a bizarre shadow kind of falling out of frame  
897 and the director may say you know I want all of that shadow  
898 in frame so we'll have to kind of either boom the camera  
899 down a little or tilt down and try to get that into the frame a  
900 little bit or pull the camera out or whatnot so we'll, we'll do



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901 traditional kind of we use traditional cinematography  
902 principals in our camera work...  
903  
904 Dane: Yeah  
905  
906 Man: As far as we refer to camera moves, we treat it like live  
907 action that's kinda how we refer to it so uh, final layout has a  
908 tendency to be a little bit more technical uh, rough layout has  
909 a tendency to be more creative.  
910  
911 Dane: Right  
912  
913 Man: but we do have very creative people inside of final layout so.  
914 Uh, we're asked at times, the art department may give us a  
915 set of prints and they'll say you know what I need you to put  
916 some more rocks on the ground, Or I, they might just say  
917 you know what I need more rocks on the ground in shot five  
918 and they kind of led it up to our artistic integrity to decide  
919 where the rocks should go so that we don't break up the  
920 composition.  
921  
922 Dane: So you have also have control, some control over set  
923 dressing?  
924  
925 Man: Correct.  
926  
927 Dane: Wow.  
928  
929 Man: That's, that's pretty much uh; I kind of left that part out. It's  
930 kind of what we call when we're swapping out the final  
931 models, the rough models with the final models is kind of  
932 what we're refer to set dressing, cause we start putting in the  
933 final details of the set in addition to any of the stand-in  
934 models that were swapped out so...  
935  
936 Dane: Right  
937  
938 Man: that's like the biggest part of rough layout is set dressing so,  
939 and then from the set dressing standpoint we have to pay  
940 really good intention to, for continually because we're putting  
941 all these extra models in, in one shot, we need to make sure

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Interview 1: Dane Bettis & Layout 2

942 the show up in all the respective shots or that camera angle  
943 might reveal a part of the set.  
944

945 Dane: But um, then there's like that creative aspect if you want to  
946 have Character-4's kitchen table arranged in a way that  
947 makes sense with who his is  
948

949 Man: A lot of that direction comes from the art department and you  
950 know sometimes art will be very explicit about where they  
951 want to model and the what kind of perspective and angle  
952 they wanna see and another times it depends on the  
953 schedule, kind of how, how much art department trusts the  
954 [layout?] animators, actually it's different on each team but  
955 some animators are very trusting like you know what just put  
956 the rocks where you think they're gonna look good and it's  
957 up to us, to. the directors want a line of sight like on  
958 Character-4 so you're obviously not getting install anything  
959 that's gonna detract your eye because as soon as the viewer  
960 sees the shot you either want to see a tree and then the tree  
961 limb will actually lead down to Character-4's line of sight so  
962 everything in the shot is composed to lead the viewer's eye  
963 to where the directors wanted the action so it's all intentional  
964 composition so uh. we create lines, visual lines with, with the  
965 set dressing and even the camera to lead the viewer exactly  
966 where we want to see and we use depth of field and some  
967 other principals of cinematography to wrack the background  
968 out of focus or change the depth of field so that its  
969 intentional. We want you to look at a specific area...  
970

971 Dane: Right. Focus on the story  
972

973 Man: Exactly ...  
974

975 Dane: OK ... are there any, we've been talking mostly about layout  
976 and it seems that we're talking as we move from layout  
977 mostly about animation and then lighting, are there any other  
978 departments that you uh, really have to interface a lot with  
979 or....  
980

981 Man: Uh, layout, the thing that I like about layout is layout  
982 interfaces with every department, uh we, because we're a

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983 hub of inventory we feed everybody inventory so layout  
984 feeds motion, then layout feeds effects, layout feeds lighting  
985 and then everybody you know motion uh, lighting and effects  
986 all go directly to rendering so a lot of times we do our own  
987 renders when in layout to make sure everything is accurate  
988 uh, so layout is once we come out of final layout we go to  
989 motion and the two motion, layout animators we'll work with  
990 the motion animators to make changes and then if the  
991 lighting animators come on, the lighting animators will start  
992 having conversations with the sequence layout animators  
993 and start making tweaks and hey can you rotate this model a  
994 little bit, it's kind of a funky angle or this tree is out of frame  
995 and it's casting a shadow in the frame, I want it turned off  
996 you know so they'll, they'll go into the shot and turn that  
997 particular model off so that's like all of the communication  
998 that kind of goes on with the other departments. I interface  
999 with editorial, everybody from editorial all the way down to  
1000 rendering so uh, it's kind of, I'm never board.

1001

1002 Dane: Yeah. You're the big picture guy.

1003

1004 Man: Yes. Um, it's a busy, it's a busy job, we have a huge  
1005 responsibility mainly cause we are initiating most of , we're  
1006 the first I guess shot level production department so, at the  
1007 shot level, so we're, we're pretty much keep creating the  
1008 blueprint for everybody else to follow and we need to make  
1009 sure that's its accurate...

1010

1011 Dane: Right

1012

1013 Man: From the get go and we are flexible in the sense that we  
1014 don't want to hamper of creativity so we are incredibly  
1015 flexible within the realms of layout and CG production  
1016 because we want to stay flexible to make the best possible  
1017 pictures to tell the best possible story so uh, I think that's  
1018 where it can get a little tricky but I think we've done a great  
1019 job at remaining flexible for the point of being able to stay  
1020 creative so...

1021

1022 Dane: It seems like one of the key things that sets this apart from  
1023 traditional animation is this ability, of course you have to go

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Interview 1: Dane Bettis & Layout 2

1024 in knowing something or else you just kind of, but then as  
1025 people collaborate to keep refining without killing yourselves.  
1026 I think that's one of the most fascinating things about it...  
1027

1028 Man: I think that's what keeps, what sets Alpha apart from  
1029 everybody else is just from what I've heard from my friends  
1030 that work in other studios that are either attempting a full CG  
1031 production or have already worked on them is that their  
1032 structure is very rigid and they try to lock down as much as  
1033 they can in the beginning which kind of limits you creatively  
1034 and toward the end of the production, so at any point in  
1035 production we can change and camera and it doesn't,  
1036 depending on the change of the camera now uh, it might  
1037 cause a lot of residual work that has to happen the shots  
1038 might need to be retrofitted but the producer will make the  
1039 call on is that, is that call, is that creative call important to the  
1040 film? Is it gonna add anything to it? Is it gonna detract  
1041 anything to it? It becomes a money issue and does it affect  
1042 the schedule so uh, they make those calls as opposed to  
1043 whether they're gonna let that creative change happen or not  
1044 but I think that's the big power in our pipeline, in our  
1045 workflow is, we're extremely flexible all the way through till  
1046 the end and it's all about, it's all about the story,  
1047 complementing the story with beautiful imagery because just  
1048 you know the story is the underlying foundation. If you do not  
1049 have a compelling story, it doesn't matter how beautiful  
1050 images are and how much you're gonna watch it so it's just  
1051 kind of the nature of the beast so we're always looking at the  
1052 story, changing the story, uh we changed the end of Movie-II  
1053 like right up until the last minute and it was just like well this  
1054 is crazy but it made sense so everybody just kind of buckled  
1055 up and it totally worked you know so uh, and it was the right  
1056 call so it's, our pipeline is very flexible in the sense that we  
1057 can make a change you know, you know so much has  
1058 probably changed from me being in here already....  
1059

1060 Dane: Right  
1061

1062 Man: You know things changing, it just kinda works that way,  
1063 everybody grabs, locks arms and keeps running you know  
1064 so...

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Interview 1: Dane Bettis & Layout 2

1065  
1066 Dane: You mean that the universe is reconfigured while you're  
1067 talking?  
1068  
1069 Man: Oh, yeah.  
1070  
1071 Dane: Wow, uh we're still doing real good here...  
1072  
1073 Man: Okay  
1074  
1075 Dane: [long pause] Uh, we've covered a lot of, just in the  
1076 discussion we've covered a lot of the uh, key things I was  
1077 looking at here. Uh... so really you guys are basically the  
1078 head waters of this whole pipeline and you, you just, this is  
1079 the first truly digital step...  
1080  
1081 Man: Uh, as far as pictures being made, yes. Uh, modeling  
1082 generally starts before sometimes before uh; excuse me, we  
1083 start blocking anything out. They might have modeled a  
1084 couple of pictures, I mean I'm sorry modeled a couple of  
1085 models. The character TDs are definitely the first ones in,  
1086 in the pipeline because they're working on the character rigs  
1087 and working on deformation systems and trying to come up  
1088 with a way uh, to come up with a cost effective character rig  
1089 that can be animated., over course, you know of the whole  
1090 movie so uh...  
1091  
1092 Dane: Right  
1093  
1094 Man: So as far as the movie is concerned uh, we are the first  
1095 group to actually start setting up cameras and sets and uh,  
1096 actually working with shots that are you know cohesive  
1097 enough, and that they work in conjunction with each other to  
1098 start telling a story, the visual development team has been,  
1099 they start really early on and their job is to uh, usually in the  
1100 early, early stages of the project once the script is kind of  
1101 ready and the project's been green lit the art directors and  
1102 the production designer will work with a visual development  
1103 team; it's usually between six to twelve people and the art  
1104 department has come up with uh, visual references either  
1105 digital or traditional like water color, acrylics, or pastels uh,

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Interview 1: Dane Bettis & Layout 2

1106 they'll come up with some kind of look of the film, the visual  
1107 development team's job is to try to duplicate that work with  
1108 our software inside the computer and uh, still make it cost  
1109 effective so an example would be on Movie-VII, I was on the  
1110 visual development team and we, we had a certain look that  
1111 we were achieving that the art department gave us direction  
1112 with and we had some effects developers on board and we  
1113 had some shader develops and some lighting animators, I  
1114 was on layout and when it came down to the wire we, the  
1115 system that we came up with to generate the pictures, the  
1116 solution was so very complicated to use across the course of  
1117 an entire movie, at that time also the story was being  
1118 changed a lot and it wasn't at a point where they felt positive  
1119 enough to green light the entire project so as far as the look  
1120 goes we achieved it but we don't feel, in my opinion, I don't  
1121 think it would have been cost effective to do an entire film  
1122 with it. The, the shader system was a very complicated  
1123 setup...

1124

1125 Dane: Right

1126

1127 Man: It wasn't very intuitive from an artistic side so uh, we kinda  
1128 had to go back to basics a little bit and kind of downplay the  
1129 technicality of how we created these pictures so that's  
1130 another big plus in the pipeline is to uh, you're shooting for a  
1131 specific look to set a specific tone, can our software do it? If  
1132 not, can we develop shaders that can and once we do that,  
1133 is it cost effective to use this technique in production to make  
1134 an entire movie ?

1135

1136 Dane: Right. So you guys had your little mini-pipeline while people  
1137 are hashing out story ?

1138

1139 Man: The story changes all the way through the entire production,  
1140 like they're still rewriting the end of the Movie-III right now  
1141 so....

1142

1143 Dane: Right

1144

1145 Man: And they're making changes in the beginning, changing  
1146 dialogue, they'll re-record Voice-Actor-1 at the last moment

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Interview 1: Dane Bettis & Layout 2

1147 they might have a dialogue change and they'll go find him  
1148 wherever he is in the US or around the world and they'll  
1149 record him more. Nowadays he could be in New York and  
1150 you know we could be in LA and recording uh, over uh, you  
1151 know with the technology that they have so...  
1152  
1153 Dane: Yeah  
1154  
1155 Man: Uh, but that happens all the time that, that there's changes  
1156 made up until the last minute so it's all for the better of the  
1157 story so....  
1158  
1159 Man: Okay. So the key thing is that while people are kind of  
1160 gestating the ideas on paper and the art department says  
1161 OK here's the look and feel we want, it's sort of a little  
1162 vignette you try to set up, cause that's what it sounds like,  
1163 cause I've heard....  
1164  
1165 Man: Basically  
1166  
1167 Man: I heard like somewhere that the thing Delta the little diorama  
1168 that they do a single shot, people think its' gonna be in a film  
1169 and reality is it's just a test.  
1170  
1171 Man: Yeah.  
1172  
1173 Man: Usually they'll pick a key moment in the movie that you know  
1174 for either a lighting mood or that really is descriptive of the  
1175 tone of the film...  
1176  
1177 Man: Right  
1178  
1179 Man: That uh, it's either for dramatic purposes like on Movie-VII  
1180 we picked a really dramatic moment to light uh, and it was  
1181 just uh, it was kind of a pivotal point in the film for, from  
1182 lighting tone, so that's why it was picked as far as it was, it  
1183 had a lot about depth and distance and how detail would be  
1184 handled at that level uh, based off of traditional  
1185 cinematography principals so and uh, how much detail  
1186 versus lack of detail things like that, uh how much you know  
1187 if there a lot of set dressing, is there too much? do we want

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Interview 1: Dane Bettis & Layout 2

1188 this to be sparse, do we want the shape language uh, you  
1189 know do we want to speak for its self? or you know? Like  
1190 intentional decisions like that are made through the visual  
1191 development process. mainly visual development is I want a  
1192 certain look, can I get it and then is that technique cost  
1193 effective to doing an entire movie or if there's hair in a shot  
1194 that needs to be simulated is the visual development method  
1195 to do hair, is that the look and feel we want with the motion  
1196 system that we want?  
1197

1198 Dane: Right  
1199

1200 Man: And can that be easily achieved? You know so if it takes like  
1201 an hour - great, if it takes seven hours then the producer  
1202 make the call like and we need to come up with a more  
1203 simplified method, we can't afford to have every shot be a  
1204 seven hour per frame render  
1205

1206 Dane: Right  
1207

1208 Man: Uh, it's like, things like that that are restrictive from an artistic  
1209 sense but uh, again you have to look at it from the big  
1210 picture like uh, this is a great technique but it takes twenty  
1211 four hours to render, you're, you're gonna render this movie  
1212 in ten years you know....  
1213

1214 Man: Right  
1215

1216 Man: So it's like you have to draw the line somewhere so.  
1217

1218 Dane: So it's like maybe we want to shelve this technique for a few  
1219 years and let mores law catch up do something else creative  
1220 in the meantime.  
1221

1222 Man: Or how can we compromise the look....  
1223

1224 Dane: Right  
1225

1226 Man: Or how can we compromise the technicality without  
1227 compromising the look or is there an alternate technique that



Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1228 we can achieve that looks just as good without uh, ruining  
1229 the picture  
1230  
1231 Dane: Right. Similar aesthetic that is affordable  
1232  
1233 Man: Right. Exactly.  
1234  
1235 Dane: So this uh, this development team is not layout, its someone  
1236 from...  
1237  
1238 Man: Each respective department; so there's a lighter, there's  
1239 usually a modeler, there's usually somebody from layout,  
1240 there's usually somebody from effects so there's almost one  
1241 person from every department and the CG supervisor and  
1242 art directors and the producer kind of all oversee that uh, to  
1243 kind of see which direction it's moving into, is it working and  
1244 that's when everybody gets real excited cause you start  
1245 seeing the first pictures from Movie-VIII were brilliant coming  
1246 out of visual development. It was like everybody couldn't  
1247 wait, it's such a different look from Movie-III that's kind of  
1248 one of the things that I think is powerful about Alpha is uh, if  
1249 you look at Movie-I and Movie-II and then see Movie-VIII,  
1250 three totally different visuals styles...  
1251  
1252 Dane: Right  
1253  
1254 Man: Um, and I think that's the diversity of the medium that we  
1255 really push for is that, yes its CG but you get pulled into the  
1256 story and you don't realize it's CG, just it's a very stylistic  
1257 approach of digital story telling and I think that's kind of,  
1258 that's what's kept me here is that it's, if we used the same  
1259 technique on Movie-I it would you know have, it's gonna be  
1260 just like Movie-I, it's gonna look like Movie-I....  
1261  
1262 Dane: Right  
1263  
1264 Man: You know it could be the same shaders and what not but we,  
1265 with each film we kind of crank the technology up a notch so  
1266 it kind of makes each movie a new challenge so...  
1267

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1268 Dane: diversification of aesthetics is one of the strengths I think it's  
1269 got to be like get everyone charged up to start a project and  
1270 already see here's something is what its gonna look like.  
1271

1272 Man: It's usually the people on the other show that are seeing it  
1273 that can't wait to get on that show so a lot of people on  
1274 Movie-III can't wait to get on Movie-VIII just cause it's that  
1275 kind of frenzied time, time right now where we're starting to  
1276 come out with pictures. We just showed a full sequence on  
1277 Friday, one of the first sequences out of layout that just  
1278 everybody was really excited about just cause, not that it's  
1279 just not Movie-II but it's just like uh, the shape language is  
1280 really interesting, the color palette is beautiful and it's, it's  
1281 more about uh, it's, it really focuses on the story about  
1282 what's going on and like uh, they just, in my opinion this is  
1283 my personal observation is they uh, intentionally want you to  
1284 pay attention, not to distract you with eye candy with  
1285 beautiful, but with beautiful imagery to help you focus on the  
1286 story and be drawn in the visual style of it is very compelling  
1287 to draw you into the story. Um, kind of wow this is really a  
1288 neat world to be pulled into, I wonder like what it would be  
1289 like to live there, you know so it's like really interesting and  
1290 you just kind of find yourself sitting on the edge of your seat  
1291 like you know okay show me another sequence, you know I  
1292 thought we only had one done you know so...  
1293

1294 Dane: Yeah  
1295

1296 Man: But we have like four in production right now so we're  
1297 moving very quickly you know, the pipeline has uh, we had a  
1298 couple of our leads uh, and one in particular Man-1 he was a  
1299 lighting TD in Movie-II spent a lot of time rewriting our  
1300 pipeline and just made it so much more efficient in a sense  
1301 that it allows people to focus more on creativity than the  
1302 technical aspects of what we do....  
1303

1304 Dane: So it automates a lot of the software....  
1305

1306 Man: Um, a lot of the stuff is automated under the hood so one of  
1307 our problems with Movie-II was we used a different look up  
1308 file to generate our layout renders than what the lighting

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1309 animators rendered with so, because the inventory and the  
1310 files at times can be out of sync, layout and motion and  
1311 lighting renders could be different. So if we installed a plant  
1312 into layout we might not necessarily see it in a lighting render  
1313 and one of the breakthroughs that we had with our new  
1314 pipeline is now every department uses the same inventory  
1315 file for rendering so if we install a plant in layout and it  
1316 doesn't show up we know it's not installed properly, we don't  
1317 have to wait all the way down until lighting renders it to find  
1318 out something's wrong...  
1319

1320 Dane: Right  
1321

1322 Man: So we catch it all up front in the immediate launch of the  
1323 sequence so we know if we're not seeing it in our shots we  
1324 definitely know they're not gonna see it and that helps us  
1325 with continuity and efficiency so.  
1326

1327 Dane: Right  
1328

1329 Man: That's just one of the main efficiencies that uh, that were  
1330 kind of implemented in pipeline rewrite  
1331

1332 Dane: Just keep everything universal  
1333

1334 Man: Right  
1335

1336 Dane: Yeah. Um, that's one of the things I've been kind of curious  
1337 about is what is it that like uh, without going into like  
1338 technical details which I'm really not supposed to care  
1339 about...  
1340

1341 Man: Um-hmm  
1342

1343 Dane: Uh, I don't really but, someday I'll be interested in technical  
1344 stuff and not here, you know what I mean?  
1345

1346 Man: Um-hmm  
1347

1348 Dane: But uh, what, what, what are the frustrations that come up "O  
1349 gosh I'm trying to do my work" type stuff and counter-wise

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1350 what are the more clever, you know like we're talking like a  
1351 scale of just kind of describing stuff, not talking about  
1352 anything proprietary  
1353  
1354 Man: I think the biggest thing that's frustrating for me is uh, there's  
1355 enough technical people here at the company that uh, I don't  
1356 think, I feel there's not a problem we can't solve collectively  
1357  
1358 Dane: Right  
1359  
1360 Man: The thing that frustrates me is getting people to play nice in  
1361 the sandbox. It's, and it's so amazing because that's not just  
1362 here, that's at any company you've every worked with. It's  
1363 about communication, it's about relationships, it's about  
1364 developing respect, it's about receiving respect uh, it's about  
1365 having your opinion respected and when it comes down to  
1366 that you know people are in different moods everyday,  
1367 people have things going on inside their lives outside of the  
1368 company and one of things that I really love about this place  
1369 is uh, I learn two or three things everyday that I thought I  
1370 knew and it's not from being conceited it's just I assumed I  
1371 already knew how it worked or how the technique works...  
1372  
1373 Dane: Right  
1374  
1375 Man: But there's such a diversity of talent here that it's really a  
1376 privilege to work with the different levels cause, there's some  
1377 people at the company that have never touched computers  
1378 before that are just, they're the most amazing artist you've  
1379 ever seen that have brilliant sculpture, water color,  
1380 backgrounds, you know beautiful photography and on the  
1381 other hand we have people that have PhD's in  
1382 astrophysics...  
1383  
1384 Dane: Right  
1385  
1386 Man: And there are people like myself that fall somewhere in the  
1387 middle of that spectrum or towards one side and that's kind  
1388 of the thing that you know when I wake up in the morning I  
1389 get to go to work, I don't have to go to work....  
1390

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1391 Dane: Yeah  
1392  
1393 Man: And not a lot of people are gonna say that. So I feel blessed  
1394 in that respect in that fact that everybody here has the same  
1395 goal in mind is to just make the most kick ass pictures that  
1396 we can that are just ground breaking and just amazing. You  
1397 know it amazes me to the level that we critique some of our  
1398 work because some of the stuff people are never gonna see  
1399 and we're just grounding it like the bias on a shadow is not  
1400 perfect but you know we'll just render it two or three times  
1401 until it's right because we know somebody is gonna step  
1402 through a frame for frame on a DVD and try to find you know  
1403 a missing shadow from a frame  
1404  
1405 Dane: Right  
1406  
1407 Man: Or a plant may disappear for one frame so it didn't get  
1408 rendered or you know Character-19's knee might slip  
1409 through her dress through collision detection or something,  
1410 with her knee cap or something  
1411  
1412 Dane: Yeah  
1413  
1414 Man: Um, so I think on that aspect there are a lot of perfectionists  
1415 here and that can make it challenging but getting back to my  
1416 initial comment was that, that issue is not just at this  
1417 company is anywhere that you work, it's like there's enough  
1418 smart people here so I never get intimidated that we can't  
1419 solve a problem it's just uh, in my particular situation  
1420 because I work with multiple departments I need to make  
1421 sure if I have a problem with a sequence that involves every  
1422 department. I need to make sure everybody is having fun  
1423 and that everybody is in on the same boat and nobody is  
1424 throwing sand because as soon as it happens it's chaos....  
1425  
1426 Dane: Right  
1427  
1428 Man: And chaos equals money so uh, that's kind of the most  
1429 frustrating thing with me sometimes is uh, that you get every  
1430 once in a while somebody's having a bad day and they just  
1431 want to throw sand and it makes your job that much harder

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1432 to do. because somebody just doesn't feel like being  
1433 cooperative for a day you know...  
1434  
1435 Dane: Right  
1436  
1437 Man: And it's generally the person you'll never expect...  
1438  
1439 Dane: Right  
1440  
1441 Man: and the next day there fine, you know so...  
1442  
1443 Dane: So the real thing is the human dimension and, cause after all  
1444 we're writing the software  
1445  
1446 Man: Right. And there's, I think you know this is a really bold  
1447 statement; I've said it before I think we have some of the top  
1448 programmers in the country if not the world...  
1449  
1450 Dane: Yeah  
1451  
1452 Man: And I think we have some of the top animators in the country  
1453 if not the world. I have full respect for Delta, our competitors  
1454  
1455 Dane: Right  
1456  
1457 Man: And they're doing their thing, we're doing our thing and for  
1458 them to not be successful would worry me, because then  
1459 that means there's that much more pressure on us to be  
1460 successful...  
1461  
1462 Dane: Yeah  
1463  
1464 Man: So I think in that aspect how a competition is healthy...  
1465  
1466 Dane: Yeah  
1467  
1468 Man: Uh, and I have friends that work over in Delta, you know feel  
1469 in love with Movie-IX, [REDACTED]  
1470 [REDACTED]  
1471  
1472 Dane: Yeah

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1473  
1474 Man: You know impressed with the lighting on that so uh, it  
1475 defiantly kicks it up a notch you know uh, form that aspect  
1476 but it amazes me that people who have been in this industry  
1477 for a really long time and they still want to thrown sand you  
1478 know...

1479  
1480 Dane: Right

1481  
1482 Man: It's kind of a, it's kind of a personal challenge for me and I  
1483 one of, why I adopted a mantra that I like to, I think some  
1484 people might say I'm the company clown but I play a lot and  
1485 I'll crack jokes in meetings a lot but I like to, I generally do  
1486 that only when I start feeling a little bit of tension in the  
1487 meeting and uh, I work hard, I like my crew to work hard, I  
1488 think everybody works hard but we also like to have fun...

1489  
1490 Dane: Yeah

1491  
1492 Man: I think that's kinda anywhere you want to work you know, if  
1493 you're not having fun then something's wrong and you're not  
1494 enjoying what you're doing uh, so I got very high  
1495 expectations of myself and of the guys that I work with and  
1496 so, and I'm also, which can be detrimental at times, I am  
1497 very protective of layout. If I'm in a meeting and somebody  
1498 starts attacking my group, criticism, you know I'll kind of  
1499 stand up and take a stand and be very protective like mother  
1500 hen you know ...

1501  
1502 Dane: Yeah

1503  
1504 Man: I think a lot, a lot of the leads in the groups are like that you  
1505 know because you want to, we have a rock solid reputation  
1506 in layout and I work hard to make sure we try to keep that,  
1507 so

1508  
1509 Dane: Right

1510  
1511 Man: That's kind of a added challenge but it's fun.

1512

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1513 Dane: Well this is a neat industry it's, it's only just been born you  
1514 know I mean it's like a new Renaissance, if I don't see it as  
1515 a zero sum game if you guys gotta be out there I kinda see it  
1516 as a race. It's not like someone's gonna beat the other guy,  
1517 it's like....  
1518  
1519 Man: Right  
1520  
1521 Dane: If you're all running faster, you're all running faster  
1522  
1523 Man: Right  
1524  
1525 Dane: And I, so, there's a lot of....  
1526  
1527 Man: there's a lot of rumors and crap that goes on that I personally  
1528 don't even consider. It's like you know this whole, every time  
1529 it kills me when we're about to come out with a film, they  
1530 immediately attribute something we're doing to something  
1531 Delta is doing or something that Theta is gonna be doing or  
1532 at square is doing it's like you know whatever, it's press,  
1533 people just want to gossip you know. When the movie  
1534 comes out, you go look at it, you make your own decision,  
1535 you know.  
1536  
1537 Dane: Right  
1538  
1539 Man: And I easily try not to buy into all the politics and the rumors  
1540 and crap, I just, I think it's unhealthy....  
1541  
1542 Dane: Yeah  
1543  
1544 Man: But I mean I think competition in general is good like it said if  
1545 uh, the day Delta stops succeeding I'm gonna worry about  
1546 the CG industry cause then that's gonna be that much  
1547 pressure on Alpha to succeed.  
1548  
1549 Dane: Right  
1550  
1551 Man: That means the entertainment world is not buying computer  
1552 animation for some reason that they're not being entertained  
1553 so....



Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1554  
1555 Dane: Right  
1556  
1557 Man: its going to make it that, more difficult to come up with  
1558 compelling stories and you know these fantasy world and  
1559 you know....  
1560  
1561 Dane: Yeah  
1562  
1563 Man: So I think uh, it's defiantly interesting and my main, I say one  
1564 question here, I'm not sure uh, how does my personal  
1565 mission fit in with the mission of the company?  
1566  
1567 Dane: Yeah  
1568  
1569 Man: I think the biggest thing is I like to have fun and I like to learn  
1570 new things but I think the mission of the company is I'm not  
1571 sure who could really answer this, I guess Executive-1 who  
1572 is the head of the studio uh, or Executive-2, some of the  
1573 higher upper management, I'm not really sure who would  
1574 really answer, that's a good question, is I feel that you have  
1575 medium like computer animation and with that anything that  
1576 your imagination can come up with can be basically done  
1577 and I kind of thought my personal take on Final Fantasy was  
1578 that they were doomed from the minute they started because  
1579 everybody knows what humans look like and yet you have a  
1580 medium to create this whole other world of kind of what's  
1581 going on that nobody can challenge you on...  
1582  
1583 Dane: Right  
1584  
1585 Man: Whereas we created the world of Movie-I [REDACTED]  
1586 [REDACTED] Although there are realistic elements to it, it's  
1587 stylistic because it's a fantasy world...  
1588  
1589 Dane: Right  
1590  
1591 Man: Nobody can tell us if that's right or wrong how we did  
1592 something whereas Final Fantasy and anybody else going  
1593 after photo real, although I applaud their accomplishments  
1594 and what they've done with advancements but personally I

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1595 hope we never try to do anything photo real because of that  
1596 hurtle that you have where the viewers expectations;  
1597 somebody already knows what human skin looks like, they  
1598 know what human motion looks like and immediately if it's  
1599 wrong it pulls them out of the story...  
1600  
1601 Dane: Right  
1602  
1603 Man: When you look at something they see wow, that gesture on  
1604 her face didn't really look real or her skin looks fake, it looks  
1605 CG for a moment. People start noticing that and they forget  
1606 why their watching the story...  
1607  
1608 Dane: Right  
1609  
1610 Man: Whereas if you continue to push in that direction which I  
1611 think what, what Alpha and Sigma is about is creating  
1612 imagery and worlds, fantasy stories that are entertaining and  
1613 compelling by using CG as a medium...  
1614  
1615 Dane: Right  
1616  
1617 Man: So I, I think uh I like that and I think you know Delta is about  
1618 that as well. I don't think they'll ever try to do something  
1619 photo real...  
1620  
1621 Dane: Right  
1622  
1623 Man: Um, and I, you know I think Square kind of crashed and  
1624 bombed, just a lot of the public isn't into Sci-Fi and you know  
1625 most people want to see it for the photo real kind of  
1626 approach...  
1627  
1628 Dane: I've seen a laundry list of things that I thought caused them  
1629 problems, out of nowhere, it's his first time not to make a  
1630 game he's used to having twenty hours to tell you what's  
1631 going on and I don't want to seem rude, it didn't seem  
1632 humble to say well I'm a great game maker so without really  
1633 coming in and learning from filmmakers I'm just gonna up  
1634 and make a film. It sounds like a feature is the pinnacle of all  
1635 this effort where you can, you're working shorts, or you're

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1636 working commercials or you're working whatever and you  
1637 learn things and you learn your way up to, this is just my  
1638 thinking, up to a feature. You wouldn't want to just jump out  
1639 one day and say oh I'm gonna do a feature....  
1640  
1641 Man: Right. I think uh, you hit on the nail on the head. It always  
1642 comes back to the story and you know a video game is  
1643 designed to have multiple levels multiple avenues multiple  
1644 experiences when CG feature is a single experience that  
1645 somebody's taking you from point A to point B to tell you a  
1646 story...  
1647  
1648 Dane: Right  
1649  
1650 Man: I think we're very successful at that, Delta is very successful  
1651 at it you know; I think they got their start doing shorts, by,  
1652 can I tell a story in a short amount of time? That's a huge,  
1653 you know problem to try to solve...  
1654  
1655 Dane: Right  
1656  
1657 Man: Is to have a successful short film and I think they have the  
1658 formula down and then kind of said hey can we, with Movie-  
1659 X, well the public sit down and watch an hour and twenty  
1660 minutes of computer animation, they've proved it right and  
1661 then we kind of challenged, took it up a notch and said can  
1662 an adult sit down and watch a more serious content. [REDACTED]  
1663 [REDACTED]  
1664  
1665 Dane: Yeah  
1666  
1667 Man: Uh, and still be entertained? And then Movie-II was kind of  
1668 hit the gamut for all audiences. You know the little bit of  
1669 humor in there for kids and for adults and what not so....  
1670  
1671 Dane: Yeah  
1672  
1673 Man: Uh, I think one of the problems we had with Movie-VII was  
1674 Movie-VII got too serious too quick. It would start off as  
1675 drama and they weren't sure weather to make it comedy and  
1676 then it kind of got a little sticky and then it got too serious so

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1677 it was just like you know who's gonna go watch a CG  
1678 drama?  
1679  
1680 Dane: Well that is a hard challenge  
1681  
1682 Man: So, it is and I think uh it's, it's all about subject content, about  
1683 the story telling and the CG is just a medium to tell it and....  
1684  
1685 Dane: Right  
1686  
1687 Man: Uh, my case is Price of Egypt which I love visually and just  
1688 incredibly ambitious from a story telling standpoint that such  
1689 a difficult topic; it's religious topic, religious subject matter is  
1690 kind of taboo you know and I think uh, they did a very  
1691 elegant job of telling a story for a tough subject matter....  
1692  
1693 Dane: Right  
1694  
1695 Man: You know and as far as subject matter goes Square had a  
1696 really tough problem because not a lot of the public knew  
1697 about that game and know that it was an extension of a  
1698 video game so...  
1699  
1700 Dane: Right  
1701  
1702 Man: If you weren't into video games or Sci-Fi you kind of like  
1703 were why am I watching this and what's the whole point. I  
1704 mean there was a lot of, there's a lot of lead up history to,  
1705 that you were expected to know from the game that if you  
1706 just, like I did, I'm not thinking I wasn't a gamer, so I went  
1707 just for the accomplishments  
1708  
1709 Dane: Yeah  
1710  
1711 Man: Work on it and if they don't get it cause a lot of the history to  
1712 why you were there what was going on in the story was left  
1713 out so like a prologue kind of...  
1714  
1715 Dane: Right  
1716

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1717 Man: I missed a lot of that about I think uh it all goes back to story  
1718 telling; uh it always goes back to story telling  
1719

1720 Dane: And the trouble is, we don't you know I read one review  
1721 about this we don't know if it's, the story idea was good or  
1722 not he just never effectively told it  
1723

1724 Man: Right  
1725

1726 Dane: That's a sad deal. I, I would look forward to seeing a drama  
1727 in CG, because, I won't say its easier but if you can make  
1728 people laugh but you feel more you know, drama that's a lot  
1729 of work, not to say this wasn't you know tuff stuff. I can just  
1730 imagine a drama would be more so.  
1731

1732 Man: Yeah  
1733

1734 Dane: It looks like we're running within about, we've got about nine  
1735 minutes oh, yeah so I guess at this point I could ask some  
1736 minutia I got left over, but before I get to that, is there  
1737 anything important do you think to have a better  
1738 understanding of this side of it that I have asked that you'd  
1739 want to you know...  
1740

1741 Man: Uh, I think it's, well from what I hear and what I'm reading  
1742 lately most, most companies think this is kind of easy and  
1743 that they can do it themselves. Uh, I think every department  
1744 here is totally involved in the success of what we do uh, from  
1745 recruiting to finding the right people, in essence its about the  
1746 people...  
1747

1748 Dane: Right  
1749

1750 Man: Uh, to finding the talent, to assembling the teams, to finding  
1751 a producer what can work with an art director and an art  
1752 director that can work with a director and CG supervisor that  
1753 can effectively communicate the vision of the director. And  
1754 then finding the right artistic team to carry the vision of the  
1755 story finding the right technical team and uh, kind of like  
1756 match ups and the right pairings to get people to challenge  
1757 each other to our training department that as our software

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1758 evolves and our production pipelines change is to make sure  
1759 everybody's kind of educated as to what our software can do  
1760 and I teach classes and I'm amazed because with each new  
1761 hiring, group of hiring's that we bring in someone always  
1762 does something with our software that I had no idea it could  
1763 do and it's like kind of what rejuvenates the people on the  
1764 floor that have been here for like eight years, you see these  
1765 little whipper snapper come in you know from college and  
1766 they're just amazingly brilliant and they get it and they really  
1767 push our software where we thought wow I didn't know our  
1768 software could do that you know...

1769

1770 Dane: Right

1771

1772 Man: It's kind of, it makes you feel like it's your first day again you  
1773 know so to speak so uh, I'm here for the people that's why I  
1774 came here and I, I'm still here for the people and the work,  
1775 work comes second, I really enjoy the people that work here  
1776 and I think uh, the growing pains have been hard for me  
1777 because Alpha had a really intimate culture and when I  
1778 started here there was seventy people now were on over  
1779 four hundred, um with that, there has to come an  
1780 understanding that this is a business, it always has been a  
1781 business. You know you have to cost effectively create a  
1782 product and market it and still be profitable in order to keep  
1783 moving. Uh, so it kind of baffles me and I'm amazed in it  
1784 just, it works for us here. We have a very successful formula  
1785 from all the way how, how management thinks, how  
1786 management runs, how the productions are assembled, how  
1787 they're put together, the teams, the selection of people, the  
1788 technology decisions that we make uh, kind of all is  
1789 encompassed into this big, you know big ball and uh, I see  
1790 other companies trying it and they approach it purely for the  
1791 business side and not the art and the story telling  
1792 entertainment side just from I want to make money, I want to  
1793 do a CG feature you know...

1794

1795 Dane: Right

1796

1797 Man: [REDACTED]

1798

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1799 [REDACTED]  
1800 [REDACTED]  
1801 [REDACTED]  
1802 Dane: [REDACTED]  
1803 [REDACTED]  
1804 Man: [REDACTED]  
1805 [REDACTED]  
1806 Dane: [REDACTED]  
1807 [REDACTED]  
1808 Man: [REDACTED]  
1809 [REDACTED]  
1810 [REDACTED]  
1811 [REDACTED]  
1812 [REDACTED]  
1813 [REDACTED]  
1814 [REDACTED]  
1815 [REDACTED]  
1816 Dane: [REDACTED]  
1817 [REDACTED]  
1818 Man: [REDACTED]  
1819 [REDACTED]  
1820 [REDACTED]  
1821 [REDACTED]  
1822 [REDACTED]  
1823 Dane: [REDACTED]  
1824 [REDACTED]  
1825 Man: [REDACTED]  
1826 [REDACTED]  
1827 [REDACTED]  
1828 [REDACTED]  
1829 Dane: [REDACTED]  
1830 [REDACTED]  
1831 Man: [REDACTED]  
1832 [REDACTED]  
1833 Dane: [REDACTED]  
1834 [REDACTED]  
1835 [REDACTED]  
1836 Man: [REDACTED]  
1837 [REDACTED]  
1838 Dane: [REDACTED]  
1839 [REDACTED]

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1840 [Redacted]  
1841 [Redacted]  
1842 [Redacted]  
1843 [Redacted]  
1844 [Redacted]  
1845 [Redacted]  
1846 Man: [Redacted]  
1847 [Redacted]  
1848 [Redacted]  
1849 [Redacted]  
1850 Dane: [Redacted]  
1851 [Redacted]  
1852 Man: [Redacted]  
1853 [Redacted]  
1854 [Redacted]  
1855 [Redacted]  
1856 Dane: [Redacted]  
1857 [Redacted]  
1858 Man: [Redacted]  
1859 [Redacted]  
1860 [Redacted]  
1861 [Redacted]  
1862 [Redacted]  
1863 [Redacted]  
1864 [Redacted]  
1865 [Redacted]  
1866 [Redacted]  
1867 [Redacted]  
1868 [Redacted]  
1869 Dane: [Redacted]  
1870 [Redacted]  
1871 Man: [Redacted]  
1872 [Redacted]  
1873 [Redacted]  
1874 [Redacted]  
1875 [Redacted]  
1876 [Redacted]  
1877 [Redacted]  
1878 Dane: [Redacted]  
1879 [Redacted]



Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1880 Man: [REDACTED]  
1881 [REDACTED]  
1882 [REDACTED]  
1883 [REDACTED]  
1884 [REDACTED]  
1885 [REDACTED]  
1886 [REDACTED]  
1887 [REDACTED]  
1888 [REDACTED]  
1889 [REDACTED]  
1890 Dane: [REDACTED]  
1891 [REDACTED]  
1892 Man: [REDACTED]  
1893 [REDACTED]  
1894 [REDACTED]  
1895 [REDACTED]  
1896 [REDACTED]  
1897 [REDACTED]  
1898 [REDACTED]  
1899 [REDACTED]  
1900 [REDACTED]  
1901 Dane: [REDACTED]  
1902 [REDACTED]  
1903 Man: [REDACTED]  
1904 [REDACTED]  
1905 [REDACTED]  
1906 [REDACTED]  
1907 Dane: [REDACTED]  
1908 [REDACTED]  
1909 Man: [REDACTED]  
1910 [REDACTED]  
1911 [REDACTED]  
1912 [REDACTED]  
1913 [REDACTED]  
1914 [REDACTED]  
1915 [REDACTED]  
1916 [REDACTED]  
1917 [REDACTED]  
1918 [REDACTED]  
1919 [REDACTED]  
1920 [REDACTED]

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1921 [Redacted]  
1922 [Redacted]  
1923 [Redacted]  
1924 [Redacted]  
1925 Dane: [Redacted]  
1926 [Redacted]  
1927 Man: [Redacted]  
1928 [Redacted]  
1929 [Redacted]  
1930 Dane: [Redacted]  
1931 [Redacted]  
1932 Man: [Redacted]  
1933 [Redacted]  
1934 [Redacted]  
1935 Dane: [Redacted]  
1936 [Redacted]  
1937 Man: [Redacted]  
1938 [Redacted]  
1939 [Redacted]  
1940 [Redacted]  
1941 [Redacted]  
1942 [Redacted]  
1943 Dane: [Redacted]  
1944 [Redacted]  
1945 [Redacted]  
1946 Man: [Redacted]  
1947 [Redacted]  
1948 Dane: [Redacted]  
1949 [Redacted]  
1950 Man: [Redacted]  
1951 [Redacted]  
1952 Dane: [Redacted]  
1953 [Redacted]  
1954 Man: [Redacted]  
1955 [Redacted]  
1956 Dane: [Redacted]  
1957 [Redacted]  
1958 Man: [Redacted]  
1959 [Redacted]  
1960 [Redacted]  
1961 [Redacted]

Company Alpha – Head of Layout  
Interview 1: Dane Bettis & Layout 2

1962 [REDACTED]  
1963 [REDACTED]  
1964 [REDACTED]  
1965 Dane: [REDACTED]  
1966 [REDACTED]  
1967 Man: [REDACTED]  
1968 [REDACTED]  
1969 Dane: [REDACTED]  
1970 [REDACTED]  
1971 Man: You ready to grab something food...  
1972 [REDACTED]  
1973 Dane: Yeah. I think this sums it all up uh, ... ah!  
1974 [REDACTED]  
1975 Man: a lot to swallow, huh?

**APPENDIX D**

**ALPHA STUDIO ANIMATION TRANSCRIPT**

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1 Dane: [REDACTED]  
2 [REDACTED]  
3 [REDACTED]  
4 Man: [REDACTED]  
5 [REDACTED]  
6 Dane: So I guess the, you know icebreaker is how did you come to  
7 be an animator at Alpha?  
8 [REDACTED]  
9 Man: Uh, well you want to do any other introduction like name or  
10 spelling or location or job or any of that stuff? How do you  
11 feel about that, all of that, jot that down?  
12 [REDACTED]  
13 Dane: Yeah. That and I have to [make confidential] anonymize  
14 everything you say so.  
15 [REDACTED]  
16 Man: So what would you like to know then?  
17 [REDACTED]  
18 Dane: Well uh, kind of how you got here and then most of the  
19 interview will be focusing on what, how animation works in  
20 the pipeline  
21 [REDACTED]  
22 Man: so are you interested in education, getting here or  
23 professional?  
24 [REDACTED]  
25 Dane: Uh, professional  
26 [REDACTED]  
27 Man: Uh, well once I graduated from animation school I uh, I uh, I  
28 got a job as a traditional animator at a place, a studio that  
29 had both traditional and computer animation in the same  
30 house . you all right?  
31 [REDACTED]  
32 Dane: yeah, yeah. I've got a pen here, I just realized. Keep talking,  
33 sorry. [I was looking for a pen at this point and said  
34 something to that effect]  
35 [REDACTED]  
36 Man: no, no, no and as a matter of fact they didn't have a lot of  
37 work for the traditional animators....  
38 [REDACTED]  
39 Dane: Uh-huh  
40 [REDACTED]

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

41 Man: So we were sort of sitting around and uh, I was very  
42 interested in this computer stuff was the reason I actually  
43 took this job and uh, and I befriended one of the 3D  
44 animators the computer animators and he sorta took me  
45 under his wing and showed me all how the 3D stuff worked  
46 and taught me how to program, and back in those days in  
47 1985, you still had to know how to program so uh, he taught  
48 me all that stuff and I started making images, you know, on  
49 early, early computers and was just hooked on it so I sorta  
50 gave up traditional animation right away, jumped over to the  
51 computer, both feet, and then I sort of you know worked my  
52 way up [from there] started off as an assistant animator for a,  
53 I spent a year sorta helping senior animators and I got a job  
54 as an associate and then the guy I was working with, I  
55 moved to Europe for a couple years to animate the animator  
56 I was working with left and sort of left me in charge you know  
57 so sort of a trial by fire and uh it was great. I worked, I spent  
58 this one year of working harder than I've ever worked. I  
59 think I did fourteen commercial productions in one year and  
60 uh, it was hard I was single though and I learned so much  
61 about everything, I had to do every component. I had to  
62 design, model, animate, light, and deliver; so I learned the  
63 whole pipeline of CG production and had to do this over and  
64 over on all these productions....

65

66 Dane: Yeah

67

68 Man: communicating with clients , and doing reviews and  
69 everything, but that was a good foundation and then I uh, I  
70 uh got a job as an art director in Paris for a year so I directed  
71 other animators and helped design things and then uh, I'd  
72 always wanted to work at Alpha – oops, at this studio.

73

74 Dane: Oh, no, you don't have to, I was going to say at some point,  
75 you don't have to worry about name dropping, ether, as well  
76 I'm going to code this stuff – you don't have to go out of your  
77 way, just relax.

78

79 Man: so I came here in 1988 as an animator and then uh, I guess  
80 I, I guess I just survived through the years. I rose up to take  
81 on more responsibility I became a senior animator within a

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

82 year of being here and then within, in 1990 uh I, I had sorta  
83 dabbled doing some character animation here uh, the  
84 owners of the company at the time Executive-3 and  
85 Executive-4 they heard our pleas about really wanting to  
86 focus on character animation it was this new thing, that  
87 hadn't really,  
88  
89 Dane: Yeah  
90  
91 Man: that hadn't really been done very extensively and so uh,  
92 Man-2 and I really pointed out that if we want to stay up, stay  
93 ahead in this market we really have to focus some resources  
94 on figuring out technically and creatively what it was all  
95 about. So we got the budget to make a small film *Hello?*  
96 *hello, Yes. Oh hello, can I call you right back? Okay. Uh,*  
97 *okay, okay, Bye.* I'm sorry. Uh, so yeah we started the  
98 character animation group in 1990 and that was sorta the  
99 turning point in my career as far as animation, at that point I,  
100 I gave up all the technical the TD side of my responsibilities  
101 which I had been doing a lot of TD and really focused on  
102 animating and all the issues involved in learning how to  
103 animate, learning the technical issue, how do you make  
104 characters expressive, how you make them act, how you  
105 make, empathetic characters and what not and uh, so then  
106 we got this small group of very talented animators, it turns  
107 out, and worked together for five years doing commercial  
108 productions and uh, uh we did a lot of very high profile stuff  
109 at the time and uh, developed a lot of software and  
110 technique and technology for, this process and pipeline and  
111 uh, **in 1995** I went to work at Delta to work on Movie-X. So I  
112 worked up there for two years and started doing pre-  
113 production on Movie-XI. And then I got a very good offer to  
114 come back to Sigma to finish off what I had started with  
115 Man-2 when, when uh, when Alpha merged, when Sigma  
116 bought Alpha and uh, they wanted to do a feature film which  
117 is what we had put that group together for so came back  
118 and, and uh, and they asked, invited me to come back and  
119 sort of head up this department and take it into the world of  
120 you know, doing feature films and then we grew the  
121 department and it is now 40 some people. You know now

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

122 we got two or three features under our belt and uh, hopefully  
123 we're you know we're gonna keep making movies so....  
124  
125 Dane: Yeah  
126  
127 Man: Was that kinda what you wanted?  
128  
129 Dane: Yeah. Yeah.  
130  
131 Man: Ok  
132  
133 Dane: Uh, yesterday I had spoken with layout and uh, there you  
134 know some interesting stuff about how their connected in  
135 through the process and what I'm interested is could you  
136 start how an element, and it sounds like the element you  
137 would get is in terms of shots, how they come to you uh,  
138 what animation or you and animation do with it and then  
139 where it goes. What all is involved with that?  
140  
141 Man: Layout, We have uh, so the basic building blocks are, of a  
142 film are for us are a sequence...  
143  
144 Dane: Uh-huh  
145  
146 Man: Which is uh, basically you can think of it as a location at a  
147 certain time. Uh, and I a sequences is a collection of the  
148 maybe 20 and 80 shots between one and four minutes long.  
149 So we get a sequence and we have a sequence which is  
150 made up all of these individual shots; that comes from layout  
151 as you pointed out, and what layout does is they take the  
152 story ideas and turn it into the first three dimensional  
153 cinematography, so they layout the cameras, they place the  
154 characters in the scene I'm sure you had this all explained to  
155 you but, so we get that where each shot has the basic  
156 composition already figured out...  
157  
158 Dane: Yeah  
159  
160 Man: Character placement but no acting on the characters at all  
161 we get you know, what we call road kill characters basically  
162 characters, just yeah, not even posed – just positioned,



Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

163 layout has their own set of characters that they pose for their  
164 own purposes but we basically uh, turn those off and start  
165 literally from uh, crucifix poses  
166  
167 Dane: would that be the high quality type models? cause layout  
168 talked about they had their own quickie version  
169  
170 Man: Right. So we, yeah we get the full character rigs in our shots  
171 and uh, so its nice because a lot of the cinematography like  
172 the film making, the editing, the camera placement, the  
173 depth of the scene and everything; that's all been thought of  
174 by the head of layout and uh, so we're really focusing on the  
175 performance of the characters, in this group, which is great.  
176 It highly specializes our task which, means we can do that  
177 much better so we basically take a whole sequence, break it  
178 up into small contiguous chunks which uh, for us just means  
179 that we look at places where we can uh, uh, break between  
180 shots without those two shots having to know anything about  
181 each other...  
182  
183 Dane: Um-huh  
184  
185 Man: So in other words if you cut away the ocean and then you  
186 cut back to a character that's a good time to give that  
187 breaking point to two different animators, cause they don't  
188 need to -  
189  
190 Dane: sync up  
191  
192 Man: Yeah. If you have a shot of a character turning around and  
193 you cut on that action then those two animators have to be  
194 highly synchronized to get everything about that action to  
195 feel continuous across the cut, so we try to avoid those kind  
196 of what you call hook up, you try to avoid those kind of hook  
197 ups, we try to find these natural breaking points. Uh, do you  
198 want more of this?  
199  
200 Dane: Oh, yeah  
201

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

202 Man: So, so once we break it into chucks we have a team of  
203 animators that assigned to each sequence, so we'll say take,  
204 you know this sequence, team eight...  
205  
206 Dane: Right  
207  
208 Man: and there will be a directing animator and 6 animators and  
209 then a supervising animator, over the whole, so I oversee  
210 maybe 5 or 6 teams  
211  
212 Dane: right  
213  
214 Man: and then so we take those chunks of shots and basically  
215 there's a few criteria that we, that we use to determine which  
216 animator will get which chunks....  
217  
218 Dane: Right  
219  
220 Man: And based on the animators experience, their technical  
221 abilities, their acting abilities with the characters, even which  
222 characters, which characters they seem to feel more natural  
223 with...  
224  
225 Dane: Right  
226  
227 Man: You know some people have trouble doing female  
228 characters and some people have trouble doing physical  
229 comedy and some people, of course some people are really  
230 strong you know with female characters, some people are  
231 strong with physical. So we can basically assign those  
232 chunks to the animators and we try to balance out the  
233 workloads so everybody gets about the same amount of time  
234  
235 Dane: Right  
236  
237 Man: We go and take eight weeks per sequence on average so  
238 we give the animators maybe eight shots and we say go  
239 away for 8 weeks and get those eight shots finished  
240

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

241 Dane: And the continuity of style of how different, how the same  
242 character acts over sequences is that just emerges from  
243 dallies? everyone seeing each others work?  
244

245 Man: Yeah. The dallies and the directing animator. there's a  
246 directing animator who oversees each team and that  
247 directing animator part of their responsibility is to insure  
248 consistency across all animators including the other teams,  
249 the directing animators look at everything  
250

251 Dane: So they look at each others teams all the time?  
252

253 Man: Yeah. We're all looking at everything  
254

255 Dane: Right. And do they uh the directing animator, is there  
256 anything at what level do the animation position become  
257 managerial as opposed to animating, or does it stay a little  
258 bit of animating no matter how high up the ladder you go?  
259

260 Man: Well yeah you're, the directing animators animate almost a  
261 full quota and supervising animators are certainly doing  
262 shots all the time so uh, you know maybe what you're getting  
263 at is as you go higher you have more responsibilities that  
264 aren't animation so uh, part of my responsibility it preparing a  
265 sequence to come into this department so I work with the  
266 other departments to anticipate issues uh, to look at the  
267 sequence before it goes into layout even to talk about you  
268 know how we might want to lay things up so it makes  
269 animation easier later on to avoid problems where we can,  
270 speak with the effects department for example talk about  
271 how, how they're planning on doing something so we can,  
272 we just wanna to minimize any, any uh eleventh hour you  
273 know emergencies , like you're in production and trying to  
274 get something finished, you can't have some issue come up  
275 for the first time at that point.  
276

277 Dane: So no surprises if you can help it  
278

279 Man: You try not to. you'll get em no matter what you do but...  
280  
281

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

282 Dane: Right. Um, I was kind of something interesting came up  
283 yesterday finding out that editorial got to say everyone could  
284 talk to him about that they got to say under the director this  
285 shot is however many frames long, layout got to say under  
286 the director and I suppose the people's input, the camera  
287 ought to be here and they're the only ones with [the power to  
288 move the camera] uh, what does animation have uh, just  
289 under the powers that be, what do they have authority over?  
290 I mean obviously the characters.  
291

292 Man: Well I mean the characters is the main...  
293

294 Dane: Okay  
295

296 Man: main thing so as far as the structure of the film goes uh,  
297 there's not that much that we really have power to change,  
298 other than what comes from the performances...  
299

300 Dane: Right  
301

302 Man: So we put up a compelling performance of characters and  
303 we've got this moment and we feel like we need more time to  
304 communicate that idea well, well uh, well we'll sorta say boy  
305 you know I'd like to stay on that a bit longer, you know bring  
306 that up to the directors....  
307

308 Dane: Right  
309

310 Man: you know maybe these two parts in this line are too, too  
311 crowded that you know now that we're animating we feel like  
312 it's not enough time to either to laugh in there, to get any  
313 action that you really want [or possibly reaction – from the  
314 audience] animation that you really want, cover the  
315 distances, that sorta thing  
316

317 Dane: Yeah. And so the upstream I'm kind of thinking where you  
318 talk about pipeline water flow, it's got an awkward metaphor  
319 kinda upstream layout is handing locations, and cameras  
320 and shots and sequences uh, they inherit that [characters]  
321 from modeling and then also uh, a character set up, right so  
322 you come in with everything in place. Is that an accurate?

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

323  
324 Man: Yeah. That's very accurate. good and uh, you know the  
325 character TDs, character set up, they're basically uh, you  
326 know they're basically setting up our tool kit for animating the  
327 characters they basically are the one's who are building this  
328 awesome tool kit that allow us to go move these characters  
329  
330 Dane: Right  
331  
332 Man: Um, so you know if you wanted to, you know water, water  
333 going through a pipe is one analogy but it doesn't really, it  
334 really doesn't put its finger like it doesn't sorta make clear  
335 maybe what uh, how the different departments contribute,  
336 it's almost like, it's almost more like a car assembly line but  
337 that doesn't even get it it's like if you imagine uh, I don't  
338 know, I'm just thinking, you know those little uh, restaurants  
339 where the sushi boats kinda go, kinda comes floating by  
340  
341 Dane: Yeah  
342  
343 Man: Well if you imagine that you have a team of artists sitting  
344 along that little sushi boat counter  
345  
346 Dane: Yeah  
347  
348 Man: And on the sushi boat was a painting  
349  
350 Dane: Right  
351  
352 Man: It starts off as just a blank canvas and it goes to the first  
353 department and their job is to apply a foundation coat on that  
354 canvas of gesso  
355  
356 Dane: Uh-huh  
357  
358 Man: And then it goes along to the next department who might  
359 rough in the shapes on the, on the uh canvas and that might  
360 go along to the next department who might add another  
361 layer of you know of uh, maybe they start painting in the  
362 forms and then another department you know, you see what  
363 I'm saying? sorta building this thing up but each department

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

364 is reliant on the department that's come before. so for us I  
365 sort of think of the, the animation and the lighting uh, uh, we  
366 have this little pallet of tools and if you think of it like a paint  
367 palette that the character TDs are kinda building our paint  
368 pallet and with the stuff we have to work with when it gets to  
369 be our turn. They're building this, this rig for these  
370 characters that allow us to do things or not do things and  
371 there's a lot of times where the directors will sorta, yeah I  
372 want it to bend over backwards when it touches, you know,  
373 touch his heel with his nose or something and you go well  
374 you know I don't have that color on my pallet you know.  
375  
376 Dane: Right  
377  
378 Man: You know I cant' mix it and I'll see if I can do some other  
379 thing but if you want that I'm gonna have walk over to the  
380 closet and its going to cost you extra, I'm gonna have to get  
381 up from my seat and go get something new and then come  
382 back and it's gonna disrupt the whole thing.  
383  
384 Dane: Um-hmm. You have to go back to character setup and see if  
385 they  
386  
387 Man: Yeah. Exactly.  
388  
389 Dane: can solve it  
390  
391 Man: So what you want to do is you want to anticipate that before  
392 production. You want to get it, all the tools that you think, if  
393 you think of it in terms of colors- I think mix and match these  
394 colors you get almost anything that I want and I got this little  
395 set of brushes and I've got this set of tools and I've got a rag  
396 and I've got some you know I got all the things that I think I  
397 should need to do....  
398  
399 Dane: Right  
400  
401 Man: To do my part  
402

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

403 Dane: So you basically, the characters setup needs to come in able  
404 to do a bunch of stuff that it may not end up doing but he  
405 needs to be a fully functioning being...  
406  
407 Man: Right  
408  
409 Dane: Or basically functional enough to act  
410  
411 Man: Right. And the added, the added twist to this is we don't  
412 really know what this painting is going to be before it gets to  
413 us...  
414  
415 Dane: Right  
416  
417 Man: You know. They might tell, you know we don't really know  
418 what if you imagine a feature film you know an hour and  
419 something worth the time documenting every movement that  
420 a character would have to do in this film before hand is  
421 impossible, you kinda have to guess, you're kinda have to  
422 say well this is the range that we think we're gonna be  
423 operating in so this is, we're gonna try to set up a character  
424 that can go, move through this reasonable operating range...  
425  
426 Dane: Right  
427  
428 Man: And what you get in that case it's like a car you say okay is  
429 this car being designed to race around an oval track? or is it  
430 being signed to race up a mountain over rocks? and you  
431 build it, you build it differently depending on what the  
432 function was  
433  
434 Dane: Yeah  
435  
436 Man: so we try to anticipate what these guys are going to do and  
437 build our rigs accordingly.  
438  
439 Dane: There's a lot to discussion on character set up during  
440  
441 Man: Yeah  
442  
443 Dane: the story boarding days

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

444  
445 Man: Yeah. We've during pre-production we try to look at the  
446 storyboards that are competed and see kinda what they're  
447 thinking of and how physical they're imagining these  
448 characters being and, then we look at the artwork you know  
449 that comes from the art department and that's not  
450 necessarily representative of the film...  
451  
452 Dane: Right  
453  
454 Man: Usually when they are designing characters they're not  
455 necessarily thinking about how they're gonna be used in the  
456 film, they're thinking about what this, how this character can  
457 be expressive....  
458  
459 Dane: Yeah  
460  
461 Man: so we'll get lots of these poses and things and from the  
462 character designer that, you know like wow are we ever  
463 actually going to do that in a film?  
464  
465 Dane: Yeah  
466  
467 Man: Some of them you have to, you have to say well that's a  
468 defining pose for that character, we have to be able to hit  
469 that...  
470  
471 Dane: Right  
472  
473 Man: And then there's other things; like that pose or maybe, this  
474 thing maybe go well that's just not gonna happen [showing  
475 me a animal in a spread eagle sort of awkward pose]  
476  
477 Dane: that's just personality  
478  
479 Man: Yeah. That's having a silly moment drawing a character  
480 that's not really end up in the film  
481  
482 Dane: yeah. He won't do it, but its what kind of guy is he  
483



Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

484 Man: Yeah. And we can get something pretty close to that, that  
485 gets across the same feeling but...  
486

487 Dane: Right. So uh, I guess uh, one of the other things is, we may  
488 have already covered this uh, what are, what are the key  
489 frustrations? The things that uh, and you can be as specific  
490 or general as you feel like, feel like you know that kinda just  
491 grrr?  
492

493 Man: doing animation?  
494

495 Dane: Yeah. The animation or things where the system gets your  
496 animation stuff  
497

498 Man: Very, very easy. For me this is my biggest, my biggest uh,  
499 mission here is to continually push for closing the gap  
500 between what an animator looks at...  
501

502 Dane: Uh-huh  
503

504 Man: While they're working and what ends up on the screen. right  
505 now there's a huge gap between those two things. If you  
506 look at, you know this is what I'm looking at on the screen  
507 [there is a screen in his office and he is showing me what a  
508 shot looks like for the animator – un-textured, unlit,  
509 segmented and non-deforming – it looks very much not like  
510 the filmed character (or sets) will look]  
511

512 Dane: Yeah  
513

514 Man: And this looks nothing like what this is gonna look at the end  
515

516 Dane: Really  
517

518 Man: You know the basic shapes are there, obviously the  
519 character shape is there but none of the other visual cues for  
520 example this character we have certain markings  
521

522 Dane: Right, black and white [like having color] or something  
523

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Interview 2: Dane Bettis & Animator 5

524 Man: Yeah. There would be, there would be all kinds of just, you  
525 can put this in your head , obviously I can't give you any  
526 visual reference, but um...  
527  
528 Dane: Just as well  
529  
530 Man: so this is, just for... you know, posterity, this is a picture from  
531 Movie-II  
532  
533 Dane: Uh-huh  
534  
535 Man: that's where this is going to end up and this is what I'm  
536 looking at right now [he shows me the PC comparing the  
537 rendered image with the working interface for that shot –  
538 quite different]  
539  
540 Dane: and this is a very remarkable differences  
541  
542 Man: Yeah. You'll see here that Character-4 is uh, he looks a  
543 certain way you know his greenness [appearance,  
544 coloration] very clear you can see the lighting and the  
545 contrast and the  
546  
547 Dane: and its lacking here [pointing at interface]  
548  
549 Man: With, with the animator, what we look at is this other version  
550 that hugely removed from that  
551  
552 Dane: Yeah. Chopped up in pieces along the joints, all sorts of  
553 stuff  
554  
555 Man: Yeah. it's like you're trying to separate an actor from the  
556 environment that they're in....  
557  
558 Dane: Right  
559  
560 Man: In more than just you know like blue screen, you know about  
561 blue screen  
562  
563 Dane: Right  
564

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

565 Man: And actors find that really frustrating cause they're not in the  
566 space. And a cinematographer would find that very difficult  
567

568 Dane: Right. Worse here he's lost his costume and his makeup  
569

570 Man: exactly, it just yeah down to nothing, so for me that's the  
571 biggest thing , I want to be animating that [by that he is  
572 referring to the textured, rendered, lit, shot – he wants to  
573 work in something that looks like the final output]  
574

575 Dane: Yeah  
576

577 Man: I want to touch on his neck and move that, when I move his  
578 eyes I want to see that move in that space....  
579

580 Dane: how the light catches it and everything  
581

582 Man: As powerful as our computers are we're years away from  
583 that , even a close approximation, we're years away  
584

585 Dane: Yeah. But, and that would be just great. That would be like  
586 claymation again whenever you just, except without the  
587 irreversibility of claymation  
588

589 Man: Right. And that's the uh, it's funny cause I always , we have  
590 some stop motion animators here and it's something that just  
591 endlessly fascinating to me is that with stop motion when an  
592 animator takes their hand off the puppet and backs away  
593 that's the frame that's on the screen...  
594

595 Dane: Yeah  
596

597 Man: That is what the audience will see and there's nothing  
598 different. You know they may do a little enhancement here  
599 and there but that is, there's no, there's nothings gonna  
600 change  
601

602 Dane: No escape from it  
603

604 Man: No escape from it and that, I would love that, I would love  
605 that. So we approve things at this level and then they go

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Interview 2: Dane Bettis & Animator 5

606 onto the next phase; you know, the lighting department  
607 where they're gonna add a whole other level of uh, all this  
608 beautiful stuff that they had but its after us so we never get  
609 to see that while we're working on our part.  
610  
611 Dane: So then its not likely that when you see something like now  
612 wait a minute, either lighting changes or the performance  
613 changes, does that happen?  
614  
615 Man: Uh well, and that's, your actually putting your finger on  
616 something that's, that is, is the sushi boat idea...  
617  
618 Dane: Uh-huh  
619  
620 Man: You know the painting, there is no such thing as that boat  
621 just going back the other way for a second and then come  
622 back and going there's none of this, right [ a little circular  
623 motion with his hand]. Everything is always flowing....  
624  
625 Dane: Right  
626  
627 Man: In one direction and it would be really great uh, and it's  
628 something again that I'm pushing for here a lot is uh, for us  
629 to see you know say what's lighting on, what lighting is  
630 working on while we're animating....  
631  
632 Dane: Right  
633  
634 Man: So I want to actually take that department, and put it in front  
635 of us  
636  
637 Dane: So that at the same time that they're, while they're refining  
638 lighting you're refining performance...  
639  
640 Man: Right  
641  
642 Dane: So that you actually get to have feedback  
643  
644 Man: As a matter of fact it's even more complicated than that. I  
645 would want to put them across from us, so that we're  
646 working on canvas at the same time

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Interview 2: Dane Bettis & Animator 5

647  
648 Dane: Right  
649  
650 Man: Stick with that analogy [laughing]  
651  
652 Dane: Or, or we don't have to stick with any analogy, it's a its own  
653 animal, but they need to be next door  
654  
655 Man: Being forced to have these things following serially, one after  
656 the other um, it makes it, I think a less, I think a lesser  
657 integrated end result cause they get to lighting and uh, you  
658 know it would really make this character's face uh, you know  
659 the eyes glow; if you could just tilt the head up a little bit,  
660 they have to go through a whole bunch of tricks to make that  
661 appear in lighting and they do it...  
662  
663 Dane: Right  
664  
665 Man: But, it would be so great if that was a more integrated uh...  
666  
667 Dane: So it's sort of a hard stop where it gets baked and can't  
668 come back to animation once lighting occurs  
669  
670 Man: Yah, It's actually, it's actually a pretty hard and fast rule that  
671 we have here, the shots don't come back from lighting based  
672 purely on ascetic issues like that they really only come back  
673 from lighting based on technical issues.  
674  
675 Dane: Like someone's suddenly out of frame or...  
676  
677 Man: Or his hand goes right through his face or....  
678  
679 Dane: Right  
680  
681 Man: He's supposed to be grabbing something and his hand goes  
682 right through it...  
683  
684 Dane: Once again, a lot more detail you didn't see when you were  
685 animating  
686  
687 Man: intersections and things

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Interview 2: Dane Bettis & Animator 5

688  
689 Dane: Okay... Yeah. And uh, not to put you on the spot, but I've  
690 been focusing a lot on layout yesterday and I think we  
691 focused a good bit on animation just now, and we'll probably  
692 keep talking about that but uh, there are a couple of other  
693 things mentioned; set up, effects, lighting uh, are we missing  
694 any other departments that are really I mean I'm not talking  
695 about food service or HR, but like who are content creating  
696 that we haven't talked about so far?  
697

698 Man: Uh, well the one that you haven't mentioned yet is what we  
699 call finaling uh, which is, it's a new department around here  
700 but it's a department that I think makes a very big difference  
701 in the nuance of our animation and again uh, you look at a  
702 film like Movie-II and see how incredible deformations of  
703 these very solid looking characters and this beautiful  
704 anatomy and muscle system and everything there's an  
705 Achilles' heal that our system, and a major Achilles' heal that  
706 our system has that finaling tries to address which is to say  
707 that and it's very common in the computer industry right now.  
708

709 Dane: Yeah  
710

711 Man: Uh, we have, the computer doesn't do soft tissue against  
712 soft tissue very well or soft tissue against hard tissue very  
713 well.  
714

715 Dane: way to compute-intensive  
716

717 Man: Yeah. So we now have this finaling department that will take  
718 pretty much every shot that we, that we work on, to me this  
719 is a really great thing but it's a really brute-force way to do  
720 this they basically take any opportunity where, where like my  
721 shirt would react from my finger touching it, we have no way  
722 of doing that now  
723

724 Dane: Right  
725

726 Man: So finaling will take my fingertips and track each one of  
727 those, push around the fabric of the shirt and create wrinkles  
728 and create this soft tissue soft material contact and, you

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Interview 2: Dane Bettis & Animator 5

729 know, that's what I say, [in response to my cringing facial  
730 reaction] but it looks fantastic. It just like elevates things to  
731 this level like you wouldn't believe of subtlety, it's not like  
732 you're gonna look at this shot and go wow the finaling is  
733 beautiful on that shot but you're gonna feel like when  
734 Character-4 you know smacks the horse on his rear end to  
735 get em going you can feel that tissue move as opposed to  
736 these two sort of plastically kind of solid computer things you  
737 know interacting...

738

739 Dane: billiards

740

741 Man: Yeah. Yeah. You know sort of that feel and uh it's  
742 something that's very difficult to do and, and uh, so we have  
743 this department that really ads that really nicely. When your  
744 characters rubbing their face or something you can push that  
745 cheek up and get the fingers pressing in on the skin a little  
746 bit you can drag the nose down a little bit

747

748 Dane: Now that's happening after animation is there, they kinda  
749 have to go stop-motion each frame still frame again? That is  
750 brute force [I meant frame-by-frame, I think]

751

752 Man: they've got some cool tricks for making that a little easier  
753 than just every frame, cool tools for tracking

754

755 Dane: right

756

757 Man: But still, it's not part of the animation process

758

759 Dane: Yeah. So looking at then we ...

760

761 Man: Smaller department then lighting or animation are the two  
762 big departments

763

764 Dane: Right. Yeah. Well the thing that uh, another thing that  
765 occurs to me, see where effects fits in, cloth or clothing, they  
766 go under effects?

767

768 Man: Yeah. Yeah. Some of the, some of the hair and fur uh,  
769 Movie-VIII is a very furry film with a lot of animals...

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Interview 2: Dane Bettis & Animator 5

770  
771 Dane: Yeah  
772  
773 Man: a lot of that falls into our finaling department like our lead  
774 character has this big mane and a lot of the effects there fall  
775 to the finaling department to you know if he's running his  
776 hand through his mane  
777  
778 Dane: Yeah  
779  
780 Man: they figure out how to make that work, if its too complex for  
781 them then it will go to effects for a full-on effect.  
782  
783 Dane: Right. Some sort of complex solution  
784  
785 Man: Yeah  
786  
787 Dane: Yeah. And uh, I guess this is fine maybe I'll go into more  
788 detail later, shading and surfacing. does that fall into lighting,  
789 is it its own thing? When's that happen?  
790  
791 Man: Well it falls under lighting loosely, uh but it happens much  
792 earlier, it happens even before the character set up. Like we  
793 see a fully lit and rendered version of the character of the  
794 default model before it's set out. so in a funny way there's  
795 this one part of lighting that happens really really early.  
796 There's modeling and then surfacing right away so we can  
797 sorta see if that's the right character when we set em up we  
798 do the deformations on the character and then you can see  
799 them lit again once they've done the deformations, they take  
800 all that surfacing information and we can now see it moving  
801 around so that when we test our character, we're testing  
802 around, we're testing a character that's fully surfaced so we  
803 can see how these surfaces work which is fantastic...  
804  
805 Dane: So on the bright side even if your saying the console , you  
806 see this model, when he comes back for dailies he'll look  
807 better than he uh, I mean, he'll look like he ought to?  
808  
809 Man: Yeah. Well for animation dailies we don't render all that  
810 detail



Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

811  
812 Dane: Oh, okay  
813  
814 Man: But we have the ability at that stage to uh, through uh,  
815 what's the word I'm looking for?  
816  
817 Dane: Like render key frames to see ...  
818  
819 Man: Yeah. Yeah. We can uh, selectively render these  
820 characters or shots, test shots to see how they'll look you  
821 know what I mean? so we don't do it just you know as a  
822 standard practice for every shot but we can do it at that  
823 stage  
824  
825 Dane: Yeah. Okay. So I need to check the time we got, make sure  
826 I don't go over, Okay. We're still have just over 30  
827  
828 Man: And if you don't mind, how are we doing for your questions.  
829  
830 Dane: Well I think we're doing alright. The way this works is uh, I  
831 basically got the questions in my head, also the yellow paper  
832 and when we run through well, the actual process I will do  
833 kind of a clean up and see if there are any odd questions  
834 then go through the normal stream of consciousness.  
835  
836 Man: Okay  
837  
838 Dane: We're kind of getting there and so if you can give just a half  
839 second...  
840  
841 Man: Can I make a quick phone call?  
842  
843 Dane: Oh, yeah sure. Uh, I'll just pop this on pause...[paused for  
844 call]... there we go. Uh, a couple of key questions, I got a  
845 couple of little minutia things and then we're pretty much  
846 wrapped up, is there a particular project that stands out as  
847 something you really enjoyed working on like either process-  
848 wise or product-wise and like why?  
849  
850 Man: Uh, well yeah there are two I would, would have to say:  
851 Movie-VIII is one; it's just fantastic um, I think the whole

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

852 package of the film looks beautiful, the designs are beautiful,  
853 its being carried right through all the art direction, the  
854 production design  
855  
856 Dane: Yeah  
857  
858 Man: the voices are right up my alley and the story is, its  
859 everything, you know, that I enjoy. And the directors and I  
860 are very much on the same page about the style of the film  
861 and it's uh, what's really been enjoyable, scary at times, is  
862 that they want something that we have never done before.  
863 Which is, tendency - which, but that's what's great about it,  
864 and I want that too. You know we both sort of want the  
865 same thing. We're not exactly sure what it is and exactly  
866 sure what characterizes it but we can look at a lot of other  
867 films and say its not that, and its not that, and its not that,  
868 and its not that and a little flavor of that and a little flavor of  
869 that but, but it's really exciting to be on something that you  
870 feel is very unique in some regard and, and people that  
871 show this film, the parts of this film that we've done already  
872 to, they're like wow I've never seen anything like that before  
873 and we just , its great, I think that's always a good thing  
874  
875 Dane: Yeah  
876  
877 Man: And the other one that I felt that with, was Movie-X which  
878 was the same thing is that you know we were doing stuff that  
879 nobody had ever seen....  
880  
881 Dane: Right  
882  
883 Man: we looked at those images and wow I've never seen  
884 anything like that. Of course in hindsight its a different thing  
885 but at the time, it was very very exciting I think it actually  
886 holds up very well in hindsight but, but you know there's now  
887 films that are now more technically sophisticated and visually  
888 rich and...  
889  
890 Dane: Yeah. Yeah.  
891

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

892 Man: better animation, But that's the process of both of these  
893 films. It's very similar in that way that you felt like it's a really  
894 big collaborative effort that everybody was trying to do this  
895 thing that nobody quite knew how it was gonna look in the  
896 end but it was very exciting and that every shot was a new  
897 kind of challenge.  
898

899 Dane: So everyone pushes to the undiscovered country  
900

901 Man: a little bit, yeah  
902

903 Dane: Yeah.  
904

905 Man: Yeah, that's kind of exciting and, and you'll see things and  
906 someone from another department will come over and go  
907 wow that animation looks great and then you'll see  
908 something that comes out of lighting and you'll go over to  
909 them and you'll go over to them and you go wow that  
910 lightning looks awesome and you'll see some effect and go  
911 wow that was and everybody very supportive and everybody  
912 feels very excited.  
913

914 Dane: So then uh, what would be the opposite of that? And it  
915 doesn't have to be specific but it does get, you know,  
916 cleaned out afterwards anyway so you whatever you want to  
917 say on that  
918

919 Man: Well uh, you know I have worked on uh, other productions  
920 where uh, where you don't feel that same level of  
921 collaboration. You feel its very easy for this to feel like a  
922 pipeline, and a production line in the factory uh, where you  
923 don't feel like you have creative input and you don't really  
924 feel like you have creative ownership of things, and you're  
925 feel like just sort of you know banging in nails where  
926 someone tells you to bang in nails, and it becomes less, less  
927 interesting and with all the work that you have to do - every  
928 department not just animation, it really, when you're working  
929 long hours you need to have that, those little jolts of  
930 excitement to go oh how I remember why I'm doing this  
931

932 Dane: Right

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Interview 2: Dane Bettis & Animator 5

933  
934 Man: When you see the shot lit on the big screen you go wow  
935 that's what , I got to remember that, that's what this is gonna  
936 look like when we are all finished. so, so this little bit of work  
937 that I'm doing now is gonna pay off...  
938  
939 Dane: Right  
940  
941 Man: And you, you don't want to get to a point where you go uh,  
942 this little detail, nobody's ever gonna notice it, nobody's  
943 gonna appreciate it so I'm just not gonna do it.  
944  
945 Dane: [its like saying] what would the difference be ?  
946  
947 Man: Its just me staying an extra hour to do this little thing....  
948  
949 Dane: Right  
950  
951 Man: You know it's, you know nobody else seems to be doing that  
952 you know you get into that kind of rut where, where people  
953 start kinda giving up on, on their part of the show a little bit,  
954 resigning themselves to the  
955  
956 Dane: so its entirely the difference between having the people like  
957 collaborating with each other, loving this thing and having I  
958 suppose the folks in charge of - I mean not in charge of  
959 corporate culture but I kind of see it as coming from the top  
960 down, that if the people at the top have bad attitudes about  
961 it, or think it's a machine that is , its going to be just a  
962 machine.  
963  
964 Man: And that's exactly, exactly where uh, at its base level you  
965 can compare what we do to an automobile assembly line  
966  
967 Dane: Uh-huh  
968  
969 Man: But if you do that and you do it more than as a casual  
970 analogy....  
971  
972 Dane: Right  
973

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Interview 2: Dane Bettis & Animator 5

974 Man: You're making a fatal mistake because the factory uh,  
975 production line does not count on the men and woman along  
976 the line adding to that car. They just want, the need is that  
977 that person puts this screw in this place as efficiently as  
978 possible and it gets done, I don't want you think about which  
979 color is screw I don't want you to think about where it  
980 should go I don't want to have to tell you where you should  
981 go. It's all about efficiency and that's a part of our pipeline to  
982 be sure is that efficiency, but it is a bunch of artists which is  
983 why I, I use the sushi boat with the painting, it's, every time it  
984 comes by you might have a different idea that, the color of  
985 the light outside might give you a different idea about what  
986 you're, what you're contribution might be.  
987

988 Dane: and [it goes to where] everyone sees its essential that  
989 everyone be creating instead of simply plugging their cog in.  
990

991 Man: Exactly.  
992

993 Dane: Okay  
994

995 Man: Yeah, If you, if you take it down to okay Dane, you apply  
996 green in this area and don't go outside the borders then  
997 that's taking this creative process and turning it into a  
998 production, a factory process and that's where I think uh,  
999 that you pointed out some of the higher ups, the people who  
1000 are basically running this whole production from above make  
1001 mistakes because you have to allow that uh that creativity  
1002 and that little bit of ownership and you have to, you have to  
1003 sometimes say, you know it doesn't matter to me whatever  
1004 he walks with his left foot or right foot first, I want you to do  
1005 what you think is best. Do what's best for the performance,  
1006 all of the sudden an animator kinda goes wow the director  
1007 wants me to put some of me in this shot, they don't just want  
1008 me to go execute their vision ....  
1009

1010 Dane: Right  
1011

1012 Man: now it's not just put the left foot down and have em take  
1013 three steps and have him sit down; we try not, like the good  
1014 films don't do that...

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1015  
1016 Dane: Right. Its like they respect my talent and let me tell the story  
1017 the way....  
1018  
1019 Man: Right. And uh, and for a production to be in my mind  
1020 successful that way and not just be a drag, everybody has to  
1021 understand what they're doing.  
1022  
1023 Dane: Right  
1024  
1025 Man: there is no shot that stands alone this isn't about Joe  
1026 Animator go the most beautiful animation Joe Animator can  
1027 do this is about Joe Animator animating that shot in support  
1028 of the sequence first and the sequence is in support of  
1029 the whole film so if the need for this shot is to communicate an  
1030 idea that every shot in the film for a reason, there is a story  
1031 point that needs to be communicated, first and foremost if  
1032 the director makes that clear, this shot is in the film to  
1033 communicate this characters feeling about this situation  
1034 here's what I want him to feel and that's important the  
1035 animator has to understand that but then within that if you  
1036 told an actor to do that they could act it out fifty five different  
1037 ways and it would still satisfy that goal, right, so a good  
1038 director will sort of let the actors act and we don't get the  
1039 luxury of animating something 55 different ways but an  
1040 animator can bring something unexpected if you let them,  
1041 and most do. Cause everybody has their own life  
1042 experiences. There are all different ways of interpreting that  
1043 situation...  
1044  
1045 Dane: So that, I heard of right before the there a lot of different  
1046 people think of animators primarily as actors?  
1047  
1048 Man: the good ones do...  
1049  
1050 Dane: Yeah  
1051  
1052 Man: You know the bad ones think of animators as computer  
1053 operators and you know their defiantly seeing that happen  
1054 you know we're just a step above that where uh, you know  
1055 where it's go do this and here's your list of notes for today

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Interview 2: Dane Bettis & Animator 5

1056 and go do these things and the shot will get finished and  
1057 what we try to do uh, is to talk to the animators and have  
1058 them buy into what's going on and try to appeal to them at  
1059 the emotional level of this shot rather than to say his  
1060 eyebrow needs to be higher, his lip needs to be more tense,  
1061 his head needs to be down, we can do that but what you  
1062 want is you want to say do you think he really looks  
1063 anguished there? Think about a time in your life when you  
1064 have that something, someone told you something like  
1065 that...

1066

1067 Dane: Right

1068

1069 Man: You thought your best friend or your brother or Aunt or  
1070 someone was dead or you know you thought for a moment  
1071 that they were dead or what does that feel like in your body,  
1072 what grips you and you want the animator, I mean its, its  
1073 nothing new in the acting world, that's method acting. Which  
1074 is to the old cliché of what's my motivation.....

1075

1076 Dane: You have to put yourself in that what if I was Character-4  
1077 and...

1078

1079 Man: Yeah. Exactly. Think of you just walked all night and you're  
1080 wet and you're now just sitting down by a fire, what would  
1081 that feel like, you know? What you feel like, Ah, you'd be  
1082 talking to your friends, you'd be – ah that fire is this glorious  
1083 thing, and that gives you, that really puts you in a moment  
1084 you can go yeah, yeah I'm coming but you know you maybe  
1085 that informs the shot a little,

1086

1087 Dane: right and you look up say ok you're right the shoulders need  
1088 to draw up cold...

1089

1090 Man: Or they need to tense up or you know uh....

1091

1092 Dane: Yeah

1093

1094 Man: That's the kind of thing where if you give the animators that  
1095 uh, latitude to put themselves in the shot you'll often get  
1096 back some really surprising and real cool...

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1097  
1098 Dane: right  
1099  
1100 Man: Results. And uh, it takes, I think it takes a little, it defiantly  
1101 takes a lot of trust to do that and for my part, the thing that I  
1102 promise to the directors is to say that uh, we'll think about  
1103 those things. You know I'll sit down and talk with the  
1104 animator and we'll bring something to every shot that we  
1105 animate. We'll at least think about that situation if it's not  
1106 exactly the way the director thinks about the situation, that's  
1107 fine it's all about getting that communication very clear uh,  
1108 what's needed on screen....  
1109  
1110 Dane: Yeah  
1111  
1112 Man: And then we try to give that. Its very exciting in that way ....  
1113  
1114 Dane: Yeah  
1115  
1116 Man: Even though it's was a very tedious job of animating there's,  
1117 there's a brief period of animating, takes about a week to do  
1118 a shot, you know?  
1119  
1120 Dane: Uh-huh  
1121  
1122 Man: And I always tell the animators that most of that week is  
1123 spent implementing the idea that you have in the first hour or  
1124 two that you're working on a shot so take that hour or two  
1125 and allow yourself to really think about the situation, to think  
1126 about that because as you're going and animating curves  
1127 and dealing with all the technical mumbo jumbo of animating  
1128 the shot, you're not really being creative in that same way.  
1129 It's that first moment where, where the director hands you  
1130 that brief about the shot, here's why the shot is in the film  
1131 that you can be creative so recognize that, on that morning  
1132 you get the shot, take an hour or two, go for a walk, sit  
1133 down, put your headphones on, think about that situation  
1134 and that's your chance to be creative and once you're really  
1135 clear on what you want then you spend the rest of the week  
1136 animating it and bringing it to life the way you imagined it. A  
1137 lot of animators make the mistake of sitting down first thing



Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1138 and start posing their characters without thinking about it,  
1139 they listen to the dialogue, they break it down, and they start  
1140 animating to the dialogue.  
1141  
1142 Dane: And you start getting lost in the action of doing it  
1143  
1144 Man: Yeah. You, you get all tied up in the movement of the  
1145 character rather than the moment of the character.  
1146  
1147 Dane: Yeah. That's a lot of really good information, I like that.  
1148  
1149 Man: Cool.  
1150  
1151 Dane: uh, We're looking at up there and over here make sure we're  
1152 not, 11:30, we've got about 12 minutes so I guess it's time  
1153 for the, I've got a couple of tiny things that I can ask  
1154 afterwards, but its more important at point that these  
1155 questions could fall at the wayside so first I'll ask the more  
1156 important question of - we've discussed a lot here in, you  
1157 know what' the thing that you think needs to be said that we  
1158 haven't, you know, you know we haven't brought up yet, you  
1159 know what's something key to you ?  
1160  
1161 Man: well I guess I'd say, I guess I'd ask you what, like what are  
1162 you trying to there's a million things  
1163  
1164 Dane: Yeah  
1165  
1166 Man: So , if you want to talk about technical issues, there's a  
1167 million technical issues that we haven't talked about. If you  
1168 want to talk about performance, if you want to talk about  
1169 process, if you want to talk about, you know, technology, you  
1170 know there's a lot of different things so what is the area that  
1171 you're most interested in scratching away at?  
1172  
1173 Dane: Well let me put it this way uh, I can't get too interested in  
1174 software or anything in particular besides people write  
1175 software but if there is an issue about how you interface with  
1176 it yeah, but I guess more to the point is, I'm looking at the  
1177 pipeline as a an arrangement of technology made by people  
1178 to help people collaborate; it's just interface. How do we do

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Interview 2: Dane Bettis & Animator 5

1179 this on time, how do we collaborate and do this the way we  
1180 all want to do this and not pull our hair out so I guess that's  
1181 what I'm looking at might be the human aspect of pipeline so  
1182 [or if you just see something that is] ultra salient  
1183  
1184 **Man:** The one thing I will say about software without going into a  
1185 lot of software stuff is um, some people, some you know  
1186 programmers, some companies, um will, will invest in  
1187 software that has a lot of bells and whistles but to me  
1188 software is only really good if it can keep an animator  
1189 hooked on you know that feeling we were just talking about  
1190 like being in moment with the character and every time a  
1191 piece of software forces you to okay well I got you know it'll  
1192 take two minutes to go play blast that thing or to go shoot  
1193 that out or to re-draw the face or, or it takes me time, like  
1194 once I have an idea, if I have to do ten steps to get to the  
1195 thing in my system that I need to get to um, it's separating  
1196 that.  
1197  
1198 **Dane:** Right. Or where is that control?  
1199  
1200 **Man:** Yeah. It's making that paint brush longer and longer each  
1201 time it happens and so this is one of the main things is that  
1202 uh, that people evaluate software, I think on, on a lot of the  
1203 wrong criteria sometimes, you know, and for me animation  
1204 should be about that cycle of having an idea and trying it out  
1205 and accepting or rejecting it, having an idea, trying it out,  
1206 accepting or rejecting it, being able to adjust timing, being  
1207 able to adjust position there's these things we do over, over,  
1208 over, over, over, over, over, over, over, over, and those things  
1209 need to be you know, as efficient as possible and the big  
1210 thing that we always work on with our software and we're  
1211 not there yet, but you know it's a little, little glitches where I  
1212 have to take my hand off the mouse to go do that thing or I  
1213 have to look down at the keyboard, you're taking uh, the  
1214 animator out of  
1215  
1216 **Dane:** Or if you have to think about something  
1217  
1218 **Man:** Yeah. How do I, how would I go do that with the hand? you  
1219 know it's very easy to say this, it's very difficult to create

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1220 these rich characters, that don't have some of that. Ok I  
1221 won't go into software more than that.  
1222  
1223 Dane: Well no that's Ok, I guess the main thing that concerns the  
1224 companies is that some great new algorithm be divulged to  
1225 me, because then it sounds like corporate piracy, so that's  
1226 where I don't mind people saying you know out at Gamma  
1227 they do this and it takes them longer to render but on the  
1228 other hand they more of this one. you know how people  
1229 react to software, so that was perfectly in bounds, I think.  
1230  
1231 Man: Well and, you know I always joke around there is nothing  
1232 magic about our software at all...  
1233  
1234 Dane: Right  
1235  
1236 Man: And as a matter of fact if you sat down and did an expose of  
1237 our software I think the rest of animation world would kinda  
1238 go you made Movie-II with that? How the hell did you make  
1239 Movie-II with that?  
1240  
1241 Dane: Right  
1242  
1243 Man: You know that's incredible, that's a testament to your  
1244 animators...  
1245  
1246 Dane: Yeah  
1247  
1248 Man: That they were able to get that out of that software as  
1249 opposed to like oh, yeah well the software made that  
1250  
1251 Dane: Yeah. Its funny cause I heard ether some say Movie-II or  
1252 Movie-X, Movie-XI or something, was made with these O2s  
1253 that were kind of similar to ones in our lab, and I was like, it  
1254 sort of froze me in my tracks, how did people survive?  
1255  
1256 Man: Yeah. Well, but it's different you can't measure an O2 now  
1257 against an O2 in 1995  
1258  
1259 Dane: Oh yeah  
1260

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1261 Man: You know they're very different. And O2 then was the state  
1262 of the art and everything was written around the start of the  
1263 art and now everything around it would just swamp an O2  
1264  
1265 Dane: Right  
1266  
1267 Man: So you can't compare what an O2 would be like on your  
1268 desk now, the fact is it's about the same speed at the time,  
1269 an O2 was about the same speed with my shot had the time  
1270 as these ones are with my shots now  
1271  
1272 Dane: Yeah  
1273  
1274 Man: the complexity has gone up.  
1275  
1276 Dane: Yeah. Moore's law is canceled out by the software writers  
1277  
1278 Man: Exactly. And so in 5 years we'll look back and we'll say –  
1279 whatever the hell these machines are, I stopped keeping  
1280 track of what they are, we'll look back and go oh my god we  
1281 only had a 2.5 GHz processor with 2 gigs of ram, I can't  
1282 believe, how could we work? But today that's, that's [state of  
1283 the art] Ok so we're not talking about software.  
1284  
1285 Dane: Well yeah no more than we just did, I think that's fine, uh I  
1286 guess the last thing is the minutia of a...  
1287  
1288 Man: well you were talking about, you know, personal like...  
1289  
1290 Dane: Oh yeah  
1291  
1292 Man: Like the human component of the pipeline  
1293  
1294 Dane: Yeah  
1295  
1296 Man: Is that something your interested in?  
1297  
1298 Dane: Yeah. Yeah. I'm saying the last thing wasn't out of bounds  
1299 since you weren't talking out uh here's how to implement  
1300 something or we did particular  
1301

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1302 Man: Do you want to talk about like the human component?  
1303  
1304 Dane: Oh yeah  
1305  
1306 Man: I think that's something that we do very well actually, some  
1307 thing that we've always done well we may not do everything  
1308 very well, that's something that's pretty good is  
1309 communication between the departments typically is very  
1310 strong if you, if you, setup channels that uh, allow artists to  
1311 communicate with one another, and, and all that takes an  
1312 animator knowing who's lighting their shots and a lighter  
1313 knowing who's animating their shots and basically saying  
1314 you guys need to talk about this shot, you're both doing it.  
1315 At the end of the day this is gonna be your two peoples shot,  
1316 the lighter and the animator, don't be afraid to talk...  
1317  
1318 Dane: Yeah.  
1319  
1320 Man: We're not gonna, we're not gonna like take that, that canvas  
1321 out of the pipeline and do this all day [hold it or talk about it]  
1322 but you guys get talking and you kind of go you know I'm  
1323 gonna work on this area, do you think it would be hard to tilt  
1324 the head a little bit because then that would give me this  
1325 opportunity to do this other thing, and I love it when that  
1326 happens its sort of this you know undercurrent of  
1327 communication that you either facilitate or you forbid and  
1328 there's been times in the past when we just sort of forbidden  
1329 that sort of stuff sorta said lighters aren't allowed to really  
1330 talk to  
1331  
1332 Dane: Is there a benefit to that? cause we just saw the benefit to  
1333 getting to talk  
1334  
1335 Man: Again if you go back to the automobile production line, if you,  
1336 if you look at it like that and you say well the person putting a  
1337 screw in the door, I don't want them talking with the guy  
1338 who's putting the glass in the door. There's nothing they  
1339 need to talk about.  
1340  
1341 Dane: they might say something I didn't want  
1342

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1343 Man: I don't want, I don't want this person getting some idea about  
1344 there's a different way to put the screw in. I don't want the  
1345 person with the glass thinking that maybe that their job is  
1346 harder than some. Whatever it is, whatever it is there's no  
1347 need for those people, all its going to do is get in the way of  
1348 the process.  
1349

1350 Dane: Right  
1351

1352 Man: Right, and, and you say that for an automobile production  
1353 line that probably makes sense...  
1354

1355 Dane: Yeah  
1356

1357 Man: you know if if Nancy and Joe just start talking and open up  
1358 this dialogue about what they're doing it's like it can just  
1359 open it can lead to bad things in terms of a production line,  
1360 like in automobile production but when you have artists  
1361 trying to create an image, two separate artists trying to  
1362 create an image together I think you need to have that  
1363 communication and you need to at the very least uh not  
1364 forbid it and at the most encourage it, you know...  
1365

1366 Dane: Right, So a meeting of the minds on these things  
1367

1368 Man: I think we don't do as well as we would like. I would like for  
1369 them to actually meet and I would like for them to look at the  
1370 shot together and we don't do that. We keep them, you  
1371 know who they are and they can communicate on the phone  
1372 or computer. Some of them choose to look at the shot  
1373 together but overall that's not part of the process.  
1374

1375 Dane: Right. That's one of the things on Lord of the Rings got me  
1376 was that their computer effects people were literally next  
1377 door to folks building the armor and miniatures and stuff, ...  
1378 wow, what must that be like to just walk over and get, and  
1379 even if your not communicating, to be inspired by what the  
1380 other guys are doing  
1381

1382 Man: right, right.  
1383

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1384 Dane: Yeah  
1385  
1386 Man: Yeah. And then the higher level of, the production  
1387 management level communication I think is also very  
1388 important where an animator knows, where he or she stands  
1389 all the time, you know how much time you have left, you  
1390 know what the expectations are of you, you know um, you  
1391 know that you've got someone watching out for you,  
1392 someone who's there to uh, support you. Not everybody  
1393 just, you know, giving you notes and coming down on you  
1394 that you actually have a support system to back you up and I  
1395 think those things are all very important. it can be very  
1396 intimidating for an animator to show their shot to a room of  
1397 fifty people and directors and producers and uh, to sort of  
1398 exposing a part of yourself when you do that, certainly you're  
1399 exposing your ego...  
1400  
1401 Dane: Right  
1402  
1403 Man: You know in a big way because you open this up and say  
1404 well what do you think and you know cause you could just be  
1405 wow that's not good, that's not terrible, you're missing the  
1406 point and there's always this big risk....  
1407  
1408 Dane: Right  
1409  
1410 Man: Personal sorta ego risk every time you show your shot  
1411  
1412 Dane: I think we're running out and I don't want to eat your day....  
1413  
1414 Man: No, that's fine. But the last, the last little component of that  
1415 is very important in that if producers and directors and  
1416 production management understand that then that doesn't  
1417 need to be as scary or painful process. If you know that  
1418 you're always gonna get constructive feedback, you know  
1419 that everybody's trying to work towards the same thing, then  
1420 there's very little ego risk....  
1421  
1422 Dane: Right  
1423

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1424 Man: You're not gonna leave a meeting with egg on your face,  
1425 you're not gonna be uh, you'd never get humiliated at this  
1426 company but uh, uh but you're always gonna leave feeling  
1427 like you're being pulled in a good direction. Not like you're  
1428 being, you know, oppressed...  
1429

1430 Dane: Right  
1431

1432 Man: And that, those are again a successful pipelines of  
1433 processes are the one's where people aren't afraid to show  
1434 their work....  
1435

1436 Dane: Right  
1437

1438 Man: they know that they're contributing, that they're gonna get  
1439 constructive feedback by in large. If everybody does their  
1440 little part of this and stuff....  
1441

1442 Dane: Right. So you talked a moment ago about someone  
1443 supporting them, does that mean that after the whole  
1444 brainstorm and the dallies happens there's one person over  
1445 them that distills that information and gives specific advice?  
1446

1447 Man: Yes. We have directing animators that do that. But also we  
1448 have uh, uh we also have directing animators at the  
1449 supervising animators who work with people during, between  
1450 their review sessions and then when they go to show that  
1451 shot the directing animator can sort of stand behind that  
1452 person and say we would like to show this shot, so it's kind  
1453 of the like the person has a, you know, a big brother or a big  
1454 sister standing there with them giving them a little bit of  
1455 confidence, who can take a little bit of the heat if anything  
1456 was a miscalculation...  
1457

1458 Dane: Right  
1459

1460 Man: You know so, so we try to give the animators that little bit of  
1461 support so it's not one person against this whole panel of, of  
1462 you know critical eyes...  
1463



Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1464 Dane: Right. I don't know, I guess the other thing is when you get  
1465 good criticism instead of its like "aw you can't animate" it  
1466 gives, no matter how unspecific it may be at the time it gives  
1467 something that you can act on. "okay, he [the character's  
1468 acting] needs to change"  
1469

1470 Man: Right and yeah that's all, that's all nuance in the way  
1471 directors communicate but the director needs to make clear  
1472 what they do want; they need to make clear what they don't  
1473 really care about...  
1474

1475 Dane: Right  
1476

1477 Man: And so our directors are fantastic this way and that, oh  
1478 that's an animators choice, do what you want there, you  
1479 know as long as it fits with the spirit of the moment of the  
1480 shot its up to you what you want to do, and an animator  
1481 loves that and it's oh cool I can you know I can I have to  
1482 please myself on this thing and that's great when you can,  
1483 you know but it doesn't always happen you get some  
1484 dictatorial directors from time to time  
1485

1486 Dane: Yeah.  
1487

1488 Man: Or worse indecisive directors that's the worst thing directors  
1489 who can't make ...  
1490

1491 Dane: so indecisive is terrible and the second worst thing is like  
1492 "Yoda's got to fight with a light saber... now wait a minute"  
1493

1494 Man: Well yeah, but there's a higher level that, and its something  
1495 that we talk about all the time is that you have to remember  
1496 the animator is, is has a very, very, very narrow field of  
1497 view....  
1498

1499 Dane: Right  
1500

1501 Man: You typically look at one shot at a time. The director is trying  
1502 to put together this whole film...  
1503

1504 Dane: Right

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1505  
1506 Man: And um, you know an animator looking at their shot goes  
1507 you know I don't think Yoda should fight with a light saber  
1508 and the director's looking at this whole film and taking into  
1509 account a lot - a thousand more things than an animator is  
1510 taking into account with that that one shot even more the  
1511 director in that example is looking at six films...  
1512  
1513 Dane: Yeah  
1514  
1515 Man: And saying well this is a necessarily progression that this  
1516 character has to go thorough...  
1517  
1518 Dane: Right  
1519  
1520 Man: So I really have no choice...  
1521  
1522 Dane: Yeah  
1523  
1524 Man: But to have this guy fight with a light saber so as much as  
1525 you feel like that's not the right thing for your shot but for this  
1526 whole context it is the right thing  
1527  
1528 Dane: Yeah  
1529  
1530 Man: You know so and that's the thing the animator needs to  
1531 understand is that yeah, I'm not looking at the whole film...  
1532  
1533 Dane: Right  
1534  
1535 Man: And the director is looking at the whole film  
1536  
1537 Dane: so then he understands, why, his vision and then he  
1538  
1539 Man: Right. You know and what you want is you want people to  
1540 have faith when a director says something like that. and you  
1541 go, got it I totally, I hear, I don't quite understand but I totally  
1542 trust that you're, you're steering me the right way, there's got  
1543 to be that mutual trust  
1544

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1545 Dane: then he's starts to implement whatever that thing was that he  
1546 doesn't understand.  
1547

1548 Man: And I love analogies , take a look at this [shows me panels  
1549 of a drawing, also of a finished drawing in the animation  
1550 dept.] take a piece of art and then divided it out into grids  
1551 and then each animator will get a grid with just like two lines  
1552 on it.  
1553

1554 Dane: Uh-huh  
1555

1556 Man: And you know, you know, these are abstract shapes, and  
1557 you're like I have no idea what that is and you're given a  
1558 color scheme that goes with those lines so you'll get an 8x  
1559 10 canvas with two lines across it and it's says yellow,  
1560 orange, yellow and that's it or you'll get something that says  
1561 blue, black, you don't really know what it is.....  
1562

1563 Dane: Yeah  
1564

1565 Man: But you have to take, you have to trust in the fact that the  
1566 person giving you this thing can see this whole big picture.  
1567 and this wasn't a big teaching moment it was kind of a fun,  
1568 the whole department but it turns out that its very analogous  
1569 to making the film that you've got this canvas and you're  
1570 going to make it look beautiful you're gonna try to make it  
1571 look beautiful but it stands out too much as being too  
1572 individual then the whole thing isn't gonna work as a unit  
1573

1574 Dane: Right  
1575

1576 Man: And so really you want this person to talk to the people  
1577 around him and kinda go I'm using this color of yellow, and  
1578 I'm gonna do that this needs to seem like you and I need to  
1579 this hook up and da, da, da, da, da and you end up with this  
1580 thing that when you do it right it all works together  
1581

1582 Dane: Yeah  
1583

Company Alpha – Head of Animation  
Interview 2: Dane Bettis & Animator 5

1584 Man: Pull back and you say well 30 animators contributed one  
1585 little piece each to make this bigger thing it was we didn't  
1586 actually think of it that way we just thought it was fun....  
1587  
1588 Dane: Yeah  
1589  
1590 Man: Project to do with the whole department that everybody can  
1591 contribute to something that would be kinda permanent  
1592  
1593 Dane: Yeah  
1594  
1595 Man: But again it's very analogous to the process of trusting in the  
1596 bigger picture, someone seeing the bigger picture  
1597  
1598 Dane: Yeah. Cool.  
1599  
1600 Man: too much talking I'm sure..  
1601  
1602 Dane: No. No. I have lots of [this was Inaudible, but what I said at  
1603 this point is unimportant, something to the effect of what I  
1604 was going to do with all this data] if you think about it, yeah  
1605  
1606 Man: Yeah. Oh god. ... make any sense of it?  
1607  
1608 Dane: I choose this punishment on myself.  
1609  
1610 Man: that's fantastic. when are you hoping to get this all together?

**APPENDIX E**

**ALPHA STUDIO LIGHTING TRANSCRIPT**

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1 Dane: [REDACTED] Lighting. Hold on, there we go. Basically  
2 we're looking at this is a, you know this isn't like a survey  
3 where we have to get every point  
4  
5 Woman: Good. Good.  
6  
7 Dane: hold forth, you know. so uh, normally I guess where I'd start  
8 is, what brought you to be a lighter here at Alpha?  
9  
10 Woman: Oh, okay. Convoluted, I've studied fine art for a long time, a  
11 long time and I was like a senior and I decided I didn't know  
12 what to do with a fine art degree so I switched my major to  
13 computer information systems and wrapped that up really  
14 quickly and worked as a Cobalt programmer and then I  
15 moved to Southern California and couldn't find a Cobalt  
16 position because they were all like defense contractors and I  
17 saw an ad for computer animation and I thought oh I can, I  
18 can do that, sure I can do that and so I went in and I took, I,  
19 I, well no I had to go in like the backdoor. I had to work  
20 coloring black and white movies in the middle of the night for  
21 Executive-6. [laughter] You'd sit there frame after frame in a  
22 computer coloring frame after frame of a movie and just  
23 having a great time with people on the graveyard shift and  
24 uh, but I knew I could get into the animation department so I  
25 took their pencil test and I got into that and that was doing  
26 some pretty basic uh, you know kinda cell animation but all  
27 done on computers and they had written some pretty nice  
28 ink and paint software in the process. Did a season of  
29 Saturday morning Cartoon-series-1 and it was a lot of fun  
30 and uh, and I animated and I, I liked animation except I  
31 hated to see what happened to it when it went through ink  
32 and paint especially on a cheap, a really cheap budget.  
33  
34 Dane: Oh yeah  
35  
36 Woman: Because you put all this great stuff in there and it would  
37 come back and it would just be you know they'd hold frame  
38 of eight frames, it would be gone and it was just too tedious  
39 for that and uh, so we all got laid off. Uh, in the meantime  
40 the ink and paint package actually went to uh, Small-Studio-  
41 3 and a bunch of people went with it to work in City-1 uh,

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

42 which is you know that wasn't, I wasn't one of them. I went  
43 and worked in uh, uh educational packages, CD-Rom stuff  
44 doing a little animation and stuff, you know and what not and  
45 then from that because they finished their project, laid  
46 everybody off, went to uh, video games and that was, that  
47 was kind of a trip, working with a pallet of 16 colors and little  
48 tiny tiles and you know you can repeat the same tiles as  
49 many times as you want but you only get a hundred of them.  
50 So that was a challenge, that was kind of fun. Then they  
51 decided not to do that anymore and laid us all off no, oh no,  
52 first we did a big, a really nice uh, game called CD-Game-1  
53 and it was a, it was a 3D it was, it was great fun they  
54 brought, and this directly relates to how I got here. They  
55 brought in four SGI machines and with alias power animator  
56 on them and I went into the room and sat down and I just  
57 started playing with it and I thought hmm, this is what I'm  
58 gonna do, I'm do this now, this looks like fun and after a  
59 couple weeks my boss came in and said what are you  
60 doing? And I said this is what I'm gonna do now, this looks  
61 like of a lot of fun and so we came up with a, a, with a game  
62 called CD-Game-1 which ended up being just beautiful and  
63 no marketing at all, no marketing, it's just kind of buried out  
64 there.  
65  
66 Dane: That, that, is that the one where you're like an astronaut  
67 traveling through time, you kind of got a suit on or  
68 something?  
69  
70 Woman: No.  
71  
72 Dane: Oh sorry  
73  
74 Woman: No. Uh, but it, it was, it was kinda it came out after Myst so it  
75 was very much, this going through environments and turning  
76 over every rock and looking for clues and that kind of thing  
77 and I did two of the worlds in there and I did the modeling  
78 and, and surfacing and lighting and I didn't do any of the  
79 animation for that. Uh, got done with that, they decided they  
80 didn't want to do games anymore, they didn't really market it  
81 but it was really, really pretty and I was very proud of it.  
82 Threw it all of my reel and send it up here. Uh, the lighting

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

83 department here got it right after somebody had brought in  
84 the game and said this is what we want for Movie-I, we want  
85 people who can do this. so it was perfect timing. It was  
86 definitely the right place at the right time; that's how I got  
87 here and in the meantime of course I met all those people  
88 who went to Small-Studio-3 to do ink and paint and now  
89 work down at Sigma you know which is, was kinda fun, big  
90 circle.

91

92 Dane: Well I like that I don't know how to describe it on Movie-I, the  
93 way the light played on the surfaces, I liked that, so you  
94 know not to drop in to fan boy mode, which probably  
95 wouldn't help the interview in the long run.

96

97 Woman: I loved Movie-I, I though it was great, it was a fun movie.

98

99 Dane: So something interesting I just noticed just in what we've  
100 already been saying is uh, you've had a real generalist  
101 background. you did animation, programming, fine art uh,  
102 then modeling, lighting, and shading and uh, I've also  
103 noticed that the other two people interviewed uh, animation  
104 to the least degree but also layout uh, had wider  
105 generalization before now, maybe this is a question that  
106 needs to be asked later in the thing, but it's interesting you're  
107 now in a more specialized thing, but I'm sure that generalism  
108 has given you some strengths that still are useful here, in  
109 here

110

111 Woman: absolutely. Uh, and it mainly has to do with problem solving  
112 uh, which is always my, my strength and, and my love when  
113 I was Cobalt programmer I was a troubleshooter. I  
114 somehow missed that bullet of having to do code  
115 maintenance...

116

117 Dane: Um-hmm

118

119 Woman: Which is just dreadful and I could get in and solve problems  
120 and here being able to tear apart a script or be able to go  
121 back and look at models and all of that stuff just really helps  
122 you focus and, and since I'm supervising lighters now,  
123 sometimes it just, you know I can get in, they have a



Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

124 problem, they're spinning their wheels and I can help break it  
125 down and say okay let's look at the parts, let's focus, let's  
126 find where the problem is and we can do that pretty quickly.  
127 I don't think I could do that if I, if I came from a strictly  
128 lighting, painting, color background; I think it would be  
129 harder.  
130  
131 Dane: Right. Yeah. I guess that might have been a late interview  
132 question but that was all that comes to mind  
133  
134 Woman: Yeah  
135  
136 Dane: Uh, something I would be interested in at this point is it  
137 sounds like we've got lighting and shading are all under  
138 lighting...  
139  
140 Woman: Yes  
141  
142 Dane: And so this is gonna be more complex a question to answer  
143 than most of the other guys. The question is about the  
144 same, which is: an element comes through the pipeline, it  
145 comes to you uh, how is it, what comes to you? What do  
146 you guys do? And then where does it go from there. Sort of  
147 like saying what's the pipeline focusing on the spot where  
148 uh, you have the expertise in lighting?  
149  
150 Woman: What we get is uh, a sequence that's been set dressed all  
151 laid out, the characters are in there, there may or not be  
152 blocked motion...  
153  
154 Dane: Right  
155  
156 Woman: Um, but we know what it looks like and the environments are  
157 all there, they've been built. Uh, there are two things that  
158 happen; there's a kickoff for the surfacing department...  
159  
160 Dane: Uh-huh  
161  
162 Woman: And they get all the, all the prop artwork, the environment  
163 artwork, everything that, this is what this environment is  
164 made up of...

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

165  
166 Dane: from art  
167  
168 Woman: From art, yeah and if there's any new characters, these are  
169 the characters that are in there. If there's new characters  
170 hopefully, we got them a lot sooner...  
171  
172 Dane: Uh-huh  
173  
174 Woman: Um, so they have their own supervision and their own  
175 structure but they're defiantly underneath our sequence  
176 supervisor umbrella, so myself, I have 'x' number of  
177 sequences that are mine then, and I just have to make sure  
178 that these things are all happening at the same time. So  
179 they get to work on that and then we have a lighting kickoff  
180 where the lighters, key lighters are given, here are two  
181 paintings of what this sequence looks like, this is you know  
182 time of day, the light and color, temperature, mood, where  
183 we want to look at all that stuff. When they get in there and  
184 start working on those key shots they're also working, they're  
185 pulling in all the stuff that's surfacing is generating. There's  
186 a lot of back and forth at that point between those two  
187 people. Uh, there is generally two and it can be more, two  
188 lighters and one surfacer and they'll look at different things  
189 and say you know that's not fitting in at all with the rest of  
190 this environment, it's too dark bring it up in value or that's  
191 what an attribute that I can fix in lighting, let me do it here it'll  
192 be easier so we use their expertise and their kind of decision  
193 making uh, at that point and let them put stuff where it  
194 makes more sense.  
195  
196 Dane: Right  
197  
198 Woman: Uh, so that's very much back and forth at the early stages  
199  
200 Dane: Yeah. So are the shaders dedicated shaders all the time uh,  
201 or do they switch to lighting? Is it a back and forth sort of  
202 thing inside the department or ?  
203  
204 Woman: Uh, uh our shaders, we have it, the way it's set up we have,  
205 we're shaders, kind of a generic set of shaders uh, it's not

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Interview 1: Dane Bettis & Lighting 13

206 like in Maya or Power Animator, I'll go back to that cause I'm  
207 not a Maya user where you create a shader per object. We  
208 have these, we the this basic shader and we have a fir  
209 shader and we have all these different kind of generic, not  
210 generic, they're pretty specific, uh...  
211  
212 Dane: templates  
213  
214 Woman: yeah shader groups and, and they have just a ton of  
215 attributes. Now these will be turned into what we call  
216 materials for the different <unintelligible>. Uh, you know  
217 Character-4 had his set of materials and the environment will  
218 have its set of materials and that stuff all gets stored in a  
219 library. At that point uh, there's two ways you can, you can  
220 deal with that stuff. You, it it's, if it's a main character it gets  
221 locked in the library that's it....  
222  
223 Dane: Uh-huh  
224  
225 Woman: If you need to make a change to it, let's say a sequence is  
226 so dark or so rainy or so sunny that all the current attributes  
227 don't quite work...  
228  
229 Dane: Right  
230  
231 Woman: You can override it for that sequence. You don't touch what's  
232 in the library but you can override it for all the shots that fall  
233 underneath that....  
234  
235 Dane: Right. You'd plug something into that....  
236  
237 Woman: Um-hmm  
238  
239 Dane: Yeah  
240  
241 Woman: And so we can keep it pretty separate and clean so that  
242 other people can, some people working on Character-4 but  
243 we can be doing something very different to him in a pretty  
244 convenient way. Uh, some things, props and what not,  
245 they're only used in let's say my particular sequence they,  
246 they come out of surfacing, they look great, they got

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

247 approved, surfacers are all really busy and we decide you  
248 know it just, it's a isn't working, it's too shiny, it's too dark  
249 whatever, the lighter will go in and make these changes to  
250 the library so now anybody else who ever picks that up will  
251 get those changes but that's probably a good thing so that  
252 there's always that kind of decision tree, right there  
253  
254 Dane: Yeah  
255  
256 Woman: Am I going to make a change that's global, am I gonna make  
257 one that's local? Am I gonna make it local to a sequence or  
258 am I gonna make it specific to the shot. Uh....  
259  
260 Dane: Right. And so the material attributes and the lighting are  
261 always under just your jurisdiction under the director. Yeah.  
262 So I guess the other question that was kind of in that first  
263 one was, the material artists since they have a lot of back  
264 and forth with the lighters, are they always working as  
265 material artists or given uh, you know needs, do material  
266 artists become lighting artists or vise versa during a show?  
267  
268 Woman: Uh, they can I mean we've, we've took somebody out of  
269 surfacing recently and made him a lighter....  
270  
271 Dane: Yeah  
272  
273 Woman: But like permanent move  
274  
275 Dane: Oh, I see....  
276  
277 Woman: In surfacing they tend with, we tried to set it up for their own  
278 convenience for time savings to have a certain number of  
279 lighting set ups that are available to them so that when they  
280 surface something they put their materials, they put their  
281 specular, whatever they do to this, this object they can  
282 render it out and spin tests under all these different lighting  
283 scenarios and say well this is gonna be in the dark, well let's  
284 render it in a neutral but let's also render it in dark and see  
285 what it looks like. So they don't have to go in and set these  
286 lights up....  
287

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

288 Dane: Right. So you've got the real life sort of this is an neutral  
289 light then here are the possible lights in our movie, sort of  
290 generic possibilities  
291

292 Woman: very generic. It also helps to keep uh, some kind of uh,  
293 continuity across surfacing that when their surfacing  
294 something for a dark room they're all using the same, the  
295 same uh, standard  
296

297 Dane: Right... So lets say, what are the uh, what are some of the  
298 key uh, aesthetic considerations? I mean some of them are  
299 obvious to me but I'm sure there's a lot I'm missing, but the  
300 technical and aesthetic uh, driving forces as being a lighter,  
301 cause for animation its to be the actor for the character at  
302 that point, see what I mean?  
303

304 Woman: Uh, okay. If I was talking to the lighters this is probably how  
305 I'd say it. The first thing you want to do is, are you- if you're a  
306 key lighter you want to know what time of day it is and the  
307 color, the temperature of the light and that kind of thing, you  
308 want to make sure that it fits with the story and where you  
309 are....  
310

311 Dane: Yeah  
312

313 Woman: fits the space and place, uh you want to know, you want to  
314 help identify where the action is. Uh, you want to direct the  
315 eye where to look uh, more than once over the course of  
316 Movie-II we'd get so you know tied up in the detail and then  
317 Executive-5 would come up and he would look at the screen  
318 and say, why am I looking over there? I should be looking  
319 here and we'd all go, why didn't we see that? You know and  
320 it's just, we can drive that too, we can do that, we can help  
321 point to the action or the mood or whatever. Uh, then it's  
322 from my perspective, getting, where are people going to be  
323 looking. If a character is talking they're gonna be looking at  
324 their face, they're gonna be reading their lips, they're gonna  
325 be watching their eyes and it's like really getting, helping  
326 them clean that whole area up. Uh, you know . . . was it...  
327 Final Fantasy they still had problems, as much as you know,  
328 they had some really gorgeous stuff in there. Uh, and that's

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Interview 1: Dane Bettis & Lighting 13

329 its really gorgeous stuff in there, but it was still that black line  
330 under the lips, you know, trying to get enough light in the  
331 mouth without making it glowy or fake and so we spent a lot  
332 of time with that because that was gonna sell this character  
333 talking to you as being real. If you can just have that and it's  
334 not, it's not making them look human, it's making them look  
335 lit by a real light source....  
336  
337 Dane: Yeah. Visually plausible  
338  
339 Woman: Yeah. Yeah. It's taking away any of the CG que's any of the  
340 stuff that says yeah, this is fake  
341  
342 Dane: Yeah  
343  
344 Woman: And then kind of working yourself, working your way out the  
345 screen and getting rid of uh, it's like painting very much at  
346 this point...  
347  
348 Dane: Uh-huh  
349  
350 Woman: You know how you put your higher-contrast stuff in the front  
351 you, things fade out as they go back into the distance you  
352 don't have a lot contrast back there. Uh, you know you get  
353 nice compositions of light. It's very much like a painting.  
354  
355 Dane: So, now my experience has been just from Maya and also  
356 just from open knowledge that there are kind of two  
357 approaches emerging there is the one that's been living  
358 longer and there's the kind of global illumination which has  
359 just now become computationally feasible or faking it which  
360 has seemed to become suddenly very popular, I can see  
361 why...  
362  
363 Woman: Yeah. Yeah.  
364  
365 Dane: But, I mean, what's your sense? You've talked about  
366 painting light, is it worth the drawbacks of having to put  
367 everything in to be able to put everything in?  
368

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

369 Woman: Uh, this is where; where we're at right now and it's kind of  
370 fun because we're really at an interesting spot where we put  
371 every blasted light in. We have lights inside mouths, you  
372 have lights attached to eyeballs everything, trying to get that  
373 look and now we have a shot where the artist, the lighter  
374 went in and put in house lighting with one key light and that  
375 shot is lit so beautifully. Now everything was in place for  
376 that; all the, all the planets aligned and everything worked.  
377 In another shot with the character is standing in the same  
378 place, you do the same thing and it doesn't work because  
379 you, you just, things have to be right and we're getting a feel  
380 for what that is....

381

382 Dane: Right

383

384 Woman: But uh, and again this is, this is kind of a, kind of a fake,  
385 global illumination...

386

387 Dane: Right

388

389 Woman: Solution so you can get the renders back in this lifetime

390

391 Dane: Yeah

392

393 Woman: Uh, but then what happens is and I think this is might be  
394 where you were going, you set that up and then the art  
395 directors goes oh, I think we should get a little bit more blue  
396 in the shadows and try to get a little bit more light coming up  
397 here this way to separate him off of this background and this  
398 kind of thing, and then you go oh crap there's only one light  
399 in there, well then you start adding lights, well then we start  
400 complicating your global illumination then you start throwing  
401 in more numbers into the computation and pretty soon  
402 you've got things glowing where they shouldn't glow and,  
403 and then you have to have dials to turn things down and so it  
404 gets really complex really fast

405

406 Dane: Right. It's, it's like a physics stimulation with like the  
407 bouncing ball, you don't have to worry about all this  
408 sophisticated things happening and then you can't target  
409 changes because unpredictable stuff did happen

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

410  
411 Dane: Right  
412  
413 Woman: Yeah. I think we, if we were, if we were lighting for physical  
414 reality that might be okay and you'd say look great it's done  
415 but because we're lighting in a really stylistic manner uh in it  
416 can complicate things...  
417  
418 Dane: Right  
419  
420 Woman: Uh, again we're just, we're just really getting our, our head  
421 around this and I think some of the lighters are really making  
422 great leaps with it and others are just burying themselves in  
423 holes of, of well I turned down the contribution on the table  
424 but then I had to add another light and then I, of course that  
425 didn't fit and then its just spaghetti  
426  
427 Dane: Oh, I guess renaissance is always chaos  
428  
429 Woman: Yeah.  
430  
431 Dane: Well so uh, we discussed how we come in, how it comes  
432 through uh ... .. I'm sorry, I apologize the pause is bad for  
433 the pause is bad  
434  
435 Woman: No. they're not bad  
436  
437 Dane: ... and lets see... well, one of the things we can look at is uh,  
438 in a more global sense, outside of lighting what do you  
439 consider to be?, or actually this is even faster first and then  
440 I'll ask the other one, it's a good question, what are the  
441 things in lighting right now that uh, are pull your hair out sort  
442 of in frustrations and counter-wise, what are the things that  
443 just kind of joys and you know you can be as specific or  
444 general as you want about it, you know.  
445  
446 Woman: Um, ... Too many cooks, too many chiefs in the kitchen, too  
447 many people who can say make it darker, make it lighter.  
448 Uh, that's probably my, really my chief frustration.  
449 Technically, uh I don't yea we're getting pretty good at  
450 fooling them, I think we've gone through a period of adding



Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

451 so much uh, technical enhancement that now I feel like it's  
452 time to integrate that and make it easier before adding  
453 more...  
454  
455 Dane: Right  
456  
457 Woman: because we complicated things a lot and where I used to be  
458 able to get into a lighter's shot to debug something and be in  
459 there really quick and find out what they're doing, now I find  
460 that I have to do a lot of things in a very particular order in  
461 order to get to that decision point. That can take 2 hours...  
462  
463 Dane: Yeah  
464  
465 Woman: And something I used to be able to do in 15 minutes, now it  
466 takes me a lot longer, that's frustrating. Uh, I think well, we  
467 will, we'll start to get that time down again as we start to  
468 integrate this stuff they make it, make it fit better....  
469  
470 Dane: Yeah  
471  
472 Woman: more user friendly really  
473  
474 Dane: Alright. Minimize the UI, clean it up so everything's...  
475  
476 Woman: Yeah. Things happen just a little bit more uh, either  
477 automatically or you can, something that you can set up and  
478 say always do this you know or, or never do this, whatever.  
479  
480 Dane: Right  
481  
482 Woman: Just some more, more user input ...  
483  
484 Dane: Right  
485  
486 Woman: that helps things go a little bit quicker. Or make the software  
487 a little bit smarter, cause I think we do that, we hang things  
488 on for a while and see how they work and to get the bugs out  
489 and to really think about it uh, which I think is to our  
490 advantage in the long run. We don't just throw stuff in and  
491 patch and have it break, but right now we have a lot of stuff

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

492 just kind of hanging on the outside that we need to make  
493 integrate better.  
494  
495 Dane: Uh, and, are there any, so counter-wise are there things that  
496 either technically or non-technically like human-wise that  
497 really accelerate or have bettered the lighting process.  
498  
499 Woman: [very long pause]..... an awful lot of things have  
500 conspired to make it harder uh, shorter schedule you know  
501 all that stuff, not starting, we're starting lighting on a  
502 sequence right now that motion hasn't started yet...  
503  
504 Dane: Yeah  
505  
506 Woman: That's really hard. That's really hard to fix it  
507  
508 Dane: Okay. Why would you do that?  
509  
510 Woman: Because they want the movie out by a certain day.  
511  
512 Dane: Okay  
513  
514 Woman: Yeah. Yeah.  
515  
516 Dane: The only other thought that would occur on way they do that  
517 is if there were going to be any interaction between lighting  
518 and animation to better you know let the animation better  
519 play to the lighting or vise versa?  
520  
521 Woman: No. Actually that when you mentioned that, that would be  
522 something that we've asked for and animation has asked for  
523 it, lighting's asked for it, I think it would make our life better.  
524 Again, it would complicate things at first to get some lighting  
525 in for the actors to use, so they know where the blasted  
526 lights are. How can they, you know, we had this on Movie-II  
527 all the time, where Character-19 would be looking down and  
528 there's a thing of hair here and we'd light it, and she'd be  
529 completely in shadow, well that's not what we want. So if  
530 you put the sun down here and it would be nice, I think it  
531 would make sense if the actors knew where the lights were.  
532 but uh, yeah, right now just it, you know schedule crunch

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

533 and, and we'll work through it but it's gonna make it awkward  
534 and frustrating and it's not gonna go really smoothly....  
535  
536 Dane: Yeah  
537  
538 Woman: Uh, on the other had you know we've got faster machines,  
539 they're working on a faster compiled version uh, they're uh,  
540 the global illumination stuff when it works on one pass like  
541 that its wonderful so I think there, there are some really big  
542 steps that we've made uh, and then we've added a lot of  
543 complications.  
544  
545 Dane: Yeah. Uh, about to ask that good question again, just so  
546 like the weather at the end of the news we'll tell you uh, is  
547 compositing in editorial or is that in your domain?  
548  
549 Woman: That's in ours  
550  
551 Dane: Okay  
552  
553 Woman: Yeah. Uh, we don't rely heavily on compositing here.  
554  
555 Dane: Right  
556  
557 Woman: It's, it's pretty much uh, a matter of you break up your layers  
558 and uh, you're renders into layers that to make sense for you  
559 to get the shot done sufficiently and then its just a series of  
560 overs, You know kind of piling up on top of each other. Um,  
561 occasionally we might you know loop some stuff in front of a  
562 bright light or we might add you know a color shift, we might  
563 do little things like that but compositing is not one of our big  
564 uh when I went down to Sigma to work on Movie-XII, they  
565 were just kind of whoa, what do you mean you do all that in  
566 the renderer? well of course we do it in the render because  
567 our lighting tool, lets see everything we're doing why  
568 wouldn't we do it in the render? Where as people coming  
569 from a 2-D or, or, or visual FX background tend to break  
570 things up render their, render a specular layer, render this  
571 layer, render that light, render this and then in the composite  
572 they're tweaking a lot of numbers.  
573

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

574 Dane: Right  
575  
576 Woman: We just don't do that  
577  
578 Dane: photographic trickery where as all you're doing is breaking  
579 up so that if Character-4 has an intersection you don't lose  
580 all the time you spent rendering trees too ...  
581  
582 Woman: Yeah....  
583  
584 Dane: Ok...uh  
585  
586 Woman: now its time for the good question  
587  
588 Dane: its now time for the good question which is embarrassing  
589 because it came to me and it went again and its about to  
590 come back I promise  
591  
592 Woman: Write it down  
593  
594 Dane: I am gonna write it down...pen  
595  
596 Woman: here's a pen  
597  
598 Dane: Thank you very much. Must have put my pen over on the  
599 brief case... ... Ok, Uh, you're gotta get a stick here and beat  
600 me in a second, One thing we can look at is uh, overall  
601 looking at the pipeline overall because what we've got in the  
602 past few interviews I've seen glimpses of all the different  
603 parts of the pipeline, but mostly and this is right, what, I get  
604 80 percent contribution from whatever the field of expertise  
605 is which is good because you kinda want that depth, so I'm  
606 gonna ask a couple of more general questions of you if that's  
607 alright. In particular like what's the, what a really good  
608 project you feel overall that you worked on here or anywhere  
609 and what made it a good project?  
610  
611 Woman: Um, well movies are so big that I almost have to break it  
612 down into subsets cause; uh they just go on for ever. Movie-  
613 II, you know we were supposed to be done in October then  
614 they added another 6 months to it. The last six months of

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

615 Movie-II were really hard, really high pressure, stressful,  
616 incredible demands and probably the most fun I've ever had  
617 and I, and I tried to figure out what that is about it and I think  
618 what happened for the last six months of Movie-II is that the Art  
619 Directors, the Effects supervisors, myself, other supervisors  
620 like me were really in sync. We knew we were all making  
621 the same movie and so when decisions came down we all  
622 knew where to go uh, when, questions came up, we all knew  
623 where to go with stuff which is we were all making the same  
624 film...

625

626 Dane: Right

627

628 Woman: Uh, there would be a lot of trust across those boundaries  
629 that you knew that the Art Director wasn't gonna ask you to  
630 something out of, out of left field. You knew that the effects  
631 supervisor is going to be looking for a certain level of quality  
632 and precision and all of that stuff so we, we were just  
633 humming through the rest of that, rest of that movie. We got  
634 to the very end and there were two supervisors left. Two of  
635 em had, one had gone on maternity leave, the other had  
636 gone onto another project and so, and it was so much left to  
637 do and we were just juggling plates all over the place. And it  
638 was just things literally humming you could hear it, you were  
639 here long hours and it was just, it had become your life.

640

641 Dane: Yeah

642

643 Woman: And they added a sequence [said with disbelief] and, and I  
644 just kinda set there stunned and they said we're gonna add  
645 this sequence at the end of the movie where there is kinda  
646 like this video and it was like the reception, when, after, they  
647 had when they got married...

648

649 Dane: Yeah

650

651 Woman: The video the, the dancing....

652

653 Dane: the not the karaoke, but the 'I saw her face'

654

655 Woman: Yeah

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

656  
657 Dane: Okay  
658  
659 Woman: With everybody dancing and all this stuff and it's like oh my  
660 god and they said you've got like three weeks to do it and we  
661 sat down and said okay we can do this but here are the rules  
662 and we went through everything and said okay no beards on  
663 the elves[dwarves], no blah blah blah, and just every,  
664 everything we could think of just how do we get this done in  
665 three weeks and we did it and it was just like see we can do  
666 this, if you just give us some control, we can do this. It was  
667 just wild, it was just so much fun came through six months  
668 everyday was " I'll never do this again! As long as I live! I  
669 never want to work for Executive-7 again, but if he asks me  
670 I'd say yes tomorrow"; it was awful so....  
671  
672 Dane: Sounds like, sounds like a mother's reaction to having kids  
673  
674 Woman: Um-hmm. Yeah. Except mine are grown so I suppose it  
675 was natural. It was uh, it was wild uh, but I think that what,  
676 when I think about it what really made it work was that there  
677 was no, there's no question we were all making the same  
678 movie and we had a lot of faith in each other to make all of,  
679 all of the decisions that would get us there in the end.  
680  
681 Dane: So kind of continuity of vision, trust and uh....  
682  
683 Woman: And a certain amount of control, you know let me; let me  
684 make decisions in my area...  
685  
686 Dane: Right  
687  
688 Woman: And, and trust  
689  
690 Dane: Being uh, being of a mind... yeah... the good question will  
691 come up and I'll e-mail it to you just for your entertainment,  
692 the downside of being me, its gonna drive me insane.  
693  
694 Woman: Yeah  
695

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

696 Dane: Uh, let's see uh I hate to interrupt the flow but I have to make  
697 certain of something here, normally [not important to get  
698 word for word... I just dug my pocket PC out of the brief case  
699 in order to see the alarm for when the interview should end]  
700  
701 Woman: Okay. Hey I have kids, I don't mind interruptions  
702  
703 Dane: I will grab the pen, which was... so there we are ...  
704 everything is still running good so in spite of a couple of  
705 brain freezes, I think we're doing okay. We've looked at the  
706 challenges, we've looked at the [long pause]... I guess going  
707 back to the global sense of the pipeline, I've looked and just  
708 for my own edification [I show my diagram of the  
709 departments at Alpha to her] was looking at how, its kind of a  
710 mess interpreted in two dimensions,  
711  
712 Woman: Yeah  
713  
714 Dane: But I've got like I know there's story development and then  
715 you go, storyboard, art, layout, animation, lighting, effects,  
716 finaling, editorial and then you've got like your second layout  
717 or final layout, which I've heard kinda shepherds over to  
718 make sure layout is safe, layout and continuity are safe  
719 during animation and lighting and of course effects,  
720 modeling, setup and the dev team, and finaling. I'm  
721 wondering uh, are there departments production related, not  
722 like food that I'm missing here or am I misunderstanding how  
723 they're related I mean not worrying about this graph but I  
724 guess sort of a, just follow the pipeline, here's what we are  
725 here's some of the others....  
726  
727 Woman: Um, I'm not sure exactly what you're asking.  
728  
729 Dane: Okay. I'll rephrase the question a tad ....  
730  
731 Woman: Yeah.  
732  
733 Dane: Uh, I'm worried that in the long run while it's been good that  
734 I've gotten a very keen understanding of layout, animation  
735 and I'm developing one of lighting in this interview. I heard  
736 some of these peripheral, or not peripheral, but some of

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

737 these things that live on the side of this main track and I'm  
738 worried that I may be missing some of them and in the end I  
739 won't understand because it's like "well gosh I missed  
740 finaling I," you know.....  
741  
742 Woman: Yeah  
743  
744 Dane: Or "I missed effects and my brain's empty now."  
745  
746 Woman: Yeah. Well it wouldn't surprise me because it took me quite,  
747 I went down to Sigma for a couple of years and worked on  
748 Movie-XII and came up for this and it was like what's finaling,  
749 what's finaling again? where do they fit in, who are they?  
750 And why would I get a hold of them and when?  
751  
752 Dane: Yeah  
753  
754 Woman: Yeah. And I, would get finaling and get completion mixed up  
755 all the time, so you know....  
756  
757 Dane: I've never of them before so....  
758  
759 Woman: Yeah. completion is after, completion is paint fix, so after it  
760 goes through lighting we've rendered everything, it looks  
761 beautiful, a lighter, but you've got maybe one little thing in  
762 the background....  
763  
764 Dane: Um-hmm  
765  
766 Woman: It's a pain in the neck to fix. We can render it, it's gonna take  
767 ten hours to render uh, per frame, it's a pain in the neck, we  
768 can get somebody and paint that out in 15 minutes...  
769  
770 Dane: Right  
771  
772 Woman: That's completion or they'll go in and if there's just you know  
773 some, some buzzing that we can't quite fix so right after  
774 lighting you have completion.  
775  
776 Dane: and the buzzing is? Flickering?  
777



Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

778 Woman: Yeah. Its just some aliasing going on, that's you know again  
779 it's gonna take you forever to get it out and we can paint fix  
780 it, we, you know this place has developed a certain amount  
781 of tools and wire removal and everything...  
782

783 Dane: Right  
784

785 Woman: We have access to tools to do some of this stuff  
786

787 Dane: Oh yeah  
788

789 Woman: So it's like let them, let them deal with it and we'll stay on  
790 track with our uh....  
791

792 Dane: Yeah. And so I, I'm not trying to get over specific on that uh,  
793 and like I said this like the conversation goes to the men  
794 upstairs once I've organized it, and they say if where or not  
795 they want anyone to ever hear about it...  
796

797 Woman: Right  
798

799 Dane: And then, then what's left I make my grand thesis out of, but  
800 so far everything sounds like it's going real well on that but  
801 uh, so we've got completion, finaling which I understand is to  
802 be clean up of doing these little fine grain things and fixing  
803 little....  
804

805 Woman: Exactly. So that has to happen before lighting finishes. It  
806 typically happens when we're in lighting cause that's when  
807 we see a lot of this stuff.....  
808

809 Dane: Uh-huh  
810

811 Woman: We have a shot of like the king where uh, he you know it in  
812 it, in motion it looks like he just brings his arm up and when  
813 we get him in lighting and we get this fabric on him we can  
814 see that his arm is doing this kind of nasty twist thing when it  
815 comes up that you don't see when you're you know just  
816 looking at it finaling will get at that rotation.  
817

818 Dane: Oh, so even something that major, finaling

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

819  
820 Woman: Yeah  
821  
822 Dane: will catch, cause that sounds like some thing you'd almost  
823 have to jump back to animation for  
824  
825 Woman: Uh, but finaling will do it  
826  
827 Dane: Wow  
828  
829 Woman: Yeah... You know, yeah they'll pick up stiff. Clothing is in  
830 there, we have a clothing ...  
831  
832 Dane: Under effects  
833  
834 Woman: Yeah. Yeah.  
835  
836 Dane: They're all; they're worried about cloth and anything that  
837 does that sort of cloth like follow through...  
838  
839 Woman: Yeah. Yeah.  
840  
841 Dane: Yeah. I talked to Man-4 back when we were in the summer  
842 class and he talked about how chains could be thought of in  
843 a way as being sort of clothly and I was like oh I never  
844 thought.  
845  
846 Woman: Yeah. Yeah.  
847  
848 Dane: chains being a cloth, well okay  
849  
850 Woman: Yeah. Certain kinds of dynamic stuff that, that depends on  
851 what characters are doing, yeah.  
852  
853 Dane: Probably makes since with effects because that would be  
854 really heavy on physical simulation and dynamics and then  
855 I've heard about the dev-teams which are like, your, your  
856 micro – could you describe that because I've had some  
857 understanding?  
858

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

859 Woman: Uh, well I'm not real sure. What, what do you understand  
860 because I'm not sure if you're talking about like the pods  
861 people or you know....  
862

863 Dane: Ok so there's two  
864

865 Woman: Or are you talking about, are you talking about effects  
866 developers?  
867

868 Dane: Actually, that's, those are good questions both of them. So  
869 on the one hand I do want to know what pod people are ...  
870

871 Woman: yeah we all would.  
872

873 Dane: I had beforehand this idea from talking in, animation, layout  
874 before, like say we're working on whatever three films here  
875 and something comes down out of from story development  
876 from LA, wherever, and you go okay we're gonna try out  
877 some of these things to get the look and feel and you grab  
878 one lighter, one animator, one of each person and they do  
879 this one pivotal shot and just kinda say OK, its going to look  
880 like everybody's made of velvet...  
881

882 Woman: Yeah  
883

884 Dane: That it's gonna be a comedy or something.  
885

886 Woman: That would be pretty basic pre-production development.  
887 Yeah. Uh, so I did just a little bit of that just for a few weeks  
888 on Movie-VIII just while they waited for my sequence to start  
889 on Movie-II and yeah you just all kind of work together, you  
890 throw stuff into a shot, it gives people an opportunity to make  
891 sure your character rigs are working and, and gives us a  
892 chance to try out some you know different surfacing stuff that  
893 they're expecting for the film and gives us a head start on  
894 some of that.  
895

896 Dane: And so experimenting. Okay well then I guess the other two  
897 questions that are, is there a R&D for every department like  
898 are there programmers who are always thinking okay how  
899 can I make the animation better, how can I, what other tools

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

900 can we make for lighting and rigging or is their just one  
901 R&D? And the second question is who are the pod people,  
902 should I be afraid of them?  
903  
904 Woman: Pod people, no the pod, you know the pods we have this  
905 development thing going down on down at Sigma which  
906 would feed, which feeds up the movies and so they're  
907 developing on you know any number of ideas uh, as far as  
908 are we gonna go any farther and make a move out of this...  
909  
910 Dane: Okay  
911  
912 Woman: And then they spit it out and then it goes through this whole  
913 process.  
914  
915 Dane: So that's like story pre-brainstorming? They come up with a  
916 good story...  
917  
918 Woman: Yeah. Yeah.  
919  
920 Dane: So they're the pod people...  
921  
922 Woman: Yeah.  
923  
924 Dane: Okay. Well I'm relieved, because I'm safer now.  
925  
926 Woman: Yes, we all are. Uh, and then as far as the R&D question  
927 you know and I'm not sure a hundred, I can answer that  
928 absolutely, we have our R&D department had grown so big  
929 uh, a lot having to do with our, our relationship with Sigma  
930 and having to support so many more people at so many, so  
931 much more stuff.  
932  
933 Dane: Right  
934  
935 Woman: So I'm sure that they've become more uh, specialized and  
936 organized in that way but in the past it was always I think  
937 driven on, on the need of the production, when it was, when  
938 it was you know just Movie-I going forward then you know  
939 R&D is I'm sure thinking we can do this better but they're  
940 also addressing the needs of the production. On Movie-II,

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

941 you know pretty much the same thing. Now we're in a  
942 situation where we've got Movie-III but we've got Movie-VIII,  
943 we've got Movie-VI, we have all these other things  
944 happening out there and so there's kind of a global group  
945 that gets together, across all these productions and says this  
946 is what I think we should be working on and they kind of  
947 battle it out and then R&D takes that list and works on stuff  
948 from there  
949  
950 Dane: creates tools and then, is R&D, they're not the same people  
951 that fix bugs in the code? I mean I'm not trying to ....  
952  
953 Woman: Yeah  
954  
955 Dane: ask details on that  
956  
957 Woman: Yeah, I think, no I think they are, you know cause you have  
958 your specialists, you have people who know all about  
959 shadows and so if there's a bug with the shadows they're  
960 gonna, they're gonna get that. Now they may be able to uh,  
961 uh delegate that off and work other people through it. It's  
962 kind of a, it's a management thing...  
963  
964 Dane: Yeah. That's really the angle the question I was come at,  
965 cause I think what you know I'm not wanting to go into  
966 technical details or any thing like that...  
967  
968 Woman: Yeah. Well I couldn't tell you if you asked...  
969  
970 Dane: Yeah. Well I think one of the concerns is that I walk out of  
971 here with some secret algorithm,  
972  
973 Woman: yeah, you're gonna walk out of here with the Alpha pipeline  
974  
975 Dane: there's a difference between being able to properly describe  
976 the British government and being able to run it. and all, at  
977 this point we could only hope to describe Alpha...not "hey  
978 guys [lets be them]"... no  
979  
980 Woman: Yeah  
981

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

982 Dane: uh, something else, so uh, not to talk too much about that,  
983 it's just you know all that while I'm here. Uh let me verify  
984 we're doing okay, we're doing okay on time, this is great.  
985 Uh, I guess you could describe I don't know if ideal, ideal  
986 may be a silly thing to say, an excellent, a good, what would  
987 be a good kind of movie to make or a good kind of process,  
988 either way you want to tackle that question.  
989

990 Woman: Um, I can tell you what I, what I, a big change I'd like to see  
991 happen. Uh, and, and that's ...[long pause]... let me see,  
992 we struggle a lot right now in being reactive to story changes  
993 uh, I, I'd love to see the time come where that is a lot more  
994 stable going in, the whole story thing and so animators can  
995 get in there and act....  
996

997 Dane: Um-hmm  
998

999 Woman: And then lighters can get in there and light and not have the  
1000 disruption of story changes or schedule disruptions uh, or  
1001 marketing going um, "oh but we want, but we want to use  
1002 that in trailer, you know that fact that you aren't gonna  
1003 animate for six months, well do it now." you know being kind  
1004 of driven by the stuff that pays our bills, the stuff that writes  
1005 out our paycheck so, you know it's, it's kind of, it's a bit of a  
1006 dream but it would be a much more ideal situation if you  
1007 could just if things can be more stable and go through the  
1008 pipeline without so many bumps...  
1009

1010 Dane: At what scale are we're talking about you mean like, say  
1011 we're making up a story that a new sidekick doesn't get  
1012 invented or a new plot twist doesn't occur midway through,  
1013 cause I kinda see the strength and danger of this new  
1014 pipeline, not Alpha's but digital in general is that you animate  
1015 mickey mouse, you paint him, you save the film, and if they  
1016 say you know we want him doing something different in that  
1017 shot, well if the camera is somewhere else it's over...  
1018

1019 Woman: Yeah  
1020

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1021 Dane: But here if the camera needed to shift it's okay but I  
1022 understand that if you need the story to shift then you're  
1023 back to the mickey mouse stage.  
1024

1025 Woman: Yeah  
1026

1027 Dane: So I mean what scale is satisfactory for flexibility?  
1028

1029 Woman: I don't know, I think I, uh I guess it depends on how much  
1030 you're willing to spend and how long you want your process  
1031 to take and how many people you want to kill in the process.  
1032 Uh, you know on a live action film, I'm guessing I mean they  
1033 have short schedules. They pretty much go in there, they've  
1034 got the script and unless things really go to hell you know  
1035 and you're in a desert and start to have monsoon weather  
1036 for six months uh, you kind of stick with that and go through  
1037 it and a lot of stuff goes into those films that if you went  
1038 through it with a fine tooth comb you, you'd just laugh you  
1039 know, oh look at there's the shadow of a mic back there on  
1040 that you know....  
1041

1042 Dane: Right  
1043

1044 Woman: Whereas because we make every blasted pixel from scratch  
1045 and we look at every one of them we kill ourselves over  
1046 details that ninety percent of the viewing public will never  
1047 see and we think we can change every thing because it's  
1048 CG because the computers gonna do it, you know the quote  
1049 computer. Uh, all you have to do is re-render no actually we  
1050 have to relight. Uh, you know because we can we do...  
1051

1052 Dane: Yeah  
1053

1054 Woman: And , and sometimes I, I think we should just stop and say  
1055 you know yeah we can do that but no, I don't think we should  
1056 and that's a production call that's a money call....  
1057

1058 Dane: Right. It's kind of like Jurassic Park, I don't mean the movie,  
1059 I mean the concept like we can clone dinosaurs, and then  
1060 you don't stop and say how many should we make....  
1061

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1062 Woman: Um-hmm  
1063  
1064 Dane: And then you know ...  
1065  
1066 Woman: Yeah. If there's a lot of times when I just feel like because  
1067 we can we do and also because we can fix every little thing  
1068 that shows up we knock ourselves out trying to fix it and I  
1069 have this, this other standard that is you know will my mom  
1070 notice? Nope. Nope. She'll never see it.  
1071  
1072 Dane: its like, yeah you got, I guess two questions with the  
1073 uninitiated- one is will they notice, probably not. then if they  
1074 won't be subconsciously bothered by the mistake – then  
1075 heck....  
1076  
1077 Woman: you're not gonna be pulled out of the movie  
1078  
1079 Dane: Right  
1080  
1081 Woman: the stuff that pulls you out of the movie, is the stuff we  
1082 should be worrying about...  
1083  
1084 Dane: Right  
1085  
1086 Woman: And uh, sometimes I think we can miss that for the details...  
1087  
1088 Dane: Yeah. I see that as kind of a universal thing right now is that  
1089 since its new and you're like wow everything is possible...  
1090  
1091 Woman: Yeah. So let's make every shot a different camera angle oh  
1092 guah...  
1093  
1094 Dane: Yeah  
1095  
1096 Woman: You would never do that. You wouldn't be able to afford to  
1097 do that and, and I think when they start equating a, that  
1098 moving a camera and then moving all the lights really does  
1099 cost money, it's real money, it's just like moving a real  
1100 camera and real lights. You know then they could start  
1101 seeing that oh, maybe we should have a lot more lets just  
1102 lock it down for a while, you know we can have the action



Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1103 take place in here and let's think about resetting up all this  
1104 stuff.  
1105  
1106 Dane: we've added new laws of physics but we haven't gotten rid of  
1107 economics...  
1108  
1109 Woman: Yeah. Yeah.  
1110  
1111 Dane: Well we've covered some stuff uh...[long pause] ... this may  
1112 be out of line, if it is you don't have to answer it, how many  
1113 people more or less are lighters?  
1114  
1115 Woman: There's what 30? Uh, let me do that math. There's five  
1116 teams on Movie-III, with two leads and four lighters on each  
1117 team, yeah 30.  
1118  
1119 Dane: Okay  
1120  
1121 Woman: And there were about that on Movie-II, we started out fewer  
1122 and toward the end if you could breathe you could light  
1123 really, if you knew anything about the software at all. Uh, we  
1124 had you in there working, we had so much we had to crank  
1125 through.  
1126  
1127 Dane: That must have been a lot of oversight then taking people  
1128 who were new to lighting and always watching to make sure  
1129 they came out right and I've heard of that stuff, I mean not,  
1130 just my friends going off to become lighters. They love it. Of  
1131 course, its a pay check, I'll love when the cash flow reverses  
1132  
1133 Woman: Yeah  
1134  
1135 Dane: I expect to work my whole life and I love working but college  
1136 wants me to pay for work and I'd just rather it go backwards  
1137  
1138 Woman: Yeah  
1139  
1140 Dane: Let's see uh, ... I guess at this point what we're really  
1141 looking at is uh, is something are there some things that you  
1142 thought should be covered in this interview? Or something

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1143 salient, something, you know, that I just missed, walked  
1144 around like that good question that died?  
1145  
1146 Woman: The good question that died, what were we talking about?  
1147 Wow, I want to know what the Good Question was. Uh, I  
1148 don't know.... Uh, you know looking at the questions you've  
1149 asked all the ones I care to answer uh, yeah except for  
1150 maybe nine.  
1151  
1152 Dane: Oh yeah uh....  
1153  
1154 Woman: How's a feature animated film different from working in other  
1155 medias ? Time  
1156  
1157 Dane: it almost seemed too obvious,  
1158  
1159 Woman: Time  
1160  
1161 Dane: but it was a good thing to ask  
1162  
1163 Woman: It's time, scale, you know you're on a project for a long time.  
1164  
1165 Dane: Yeah. I couldn't remember if that got in the official list, and I  
1166 realized it was the kind of question I could answer about  
1167 reading all the other answers....  
1168  
1169 Woman: Yeah. Right.  
1170  
1171 Woman: Um-hmm  
1172  
1173 Dane: Uh, well if we're....  
1174  
1175 Woman: No. What else do you want to know?  
1176  
1177 Dane: Oh now we're, now we're to this part this is cool  
1178  
1179 Woman: Yeah. Yeah.  
1180  
1181 Dane: Uh, if you don't mind then, okay well then we'll run up til then  
1182 uh this may be just minutia but what would be like you're

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1183 favorite, what's your favorite thing to do in lighting? I mean if  
1184 there are aspects to it uh, probably a silly question...  
1185  
1186 Woman: Well I don't know. Lets see when I was lighting I guess I,  
1187 challenging key shots uh, you know we had one in Movie-I  
1188 where uh, the we had this translucent light on the leaves  
1189 and, and Character-8 is walking behind it, you know these  
1190 blades of grass and at the time our materials and shaders  
1191 really didn't quite get us what we needed so it's finding, you  
1192 know finding creative solutions to solve problems like that....  
1193  
1194 Dane: Yeah  
1195  
1196 Woman: Um, now that I'm supervising it's continuity it's, it's getting in  
1197 there and getting the team to uh, do all the broad brush  
1198 strokes right away that, that tell everybody on the production  
1199 that this sequence is fine, we know where we're going with it.  
1200 We've got it, it looks good across the board, there's a lot of  
1201 problems but it, it works...  
1202  
1203 Dane: Right  
1204  
1205 Woman: And now just leave us alone and let us finish it up. Uh it's,  
1206 it's nice to get that kind of foundation out of the way right  
1207 away in front of people and, and you just know that your  
1208 heading in the right direction.  
1209  
1210 Dane: Well that reminds me of something I should have asked you  
1211 a lot earlier, that as supervisor do you get to have your hand  
1212 in lighting much or has it become entirely help supervising?  
1213  
1214 Woman: It's almost all supervising. Um, occasionally I'll get into a  
1215 shot to see what's going on uh, occasionally I'll you know  
1216 pick up the phone, lets solve it because that's really what I  
1217 love to do and that would be my ideal job. I should be TD  
1218 here, not a supervisor, uh, and occasionally like we, we,  
1219 we're just wrapping up the sequence and they added a  
1220 brand new shot, just added it completely out of the blue, like  
1221 fine we're not gonna touch it until it's done in animation, until  
1222 it's completely finished; we're not gonna go in, when we do  
1223 go in we're gonna go in fast and get it over with and uh, I got

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1224 a Saturday I need to make up and I told them, I said you  
1225 know what I think I'll do that shot. I think I'll just come in and  
1226 work on it cause as a supervisor, how do I make up a  
1227 Saturday? I come in and sit here so I thought  
1228

1229 Dane: so you call up a bunch of people, hey what are you doing  
1230 Saturday?  
1231

1232 Woman: yes I called them up at home, how's that project coming?  
1233 Uh, so you know yeah I'll do a shot it'll be kinda fun, it'll be, I  
1234 think we need to, I think we need to get in just to, just to  
1235 understand what, where the tools are going and where the  
1236 process is going.  
1237

1238 Dane: So you would like to be able to keep something like maybe a  
1239 half quota of what a normal lighter has to do?  
1240

1241 Woman: Oh, I wouldn't want that much. we couldn't handle, we  
1242 wouldn't have the bandwidth for that, but uh, you know to be  
1243 able to pick something up in kind of an emergency situation  
1244 and, and run with it yeah, ... yeah, I wouldn't want to have a  
1245 shot load, no not on a regular basis it's just too crazy  
1246 especially toward the end we get, the sequences start piling  
1247 up as much as much as we don't want them to uh, at the end  
1248 we had I think every sequence, at the end of Movie-II, we  
1249 had just about every sequence in production at some stage.  
1250 A few shots, maybe a whole section that needs to be  
1251 reworked, whatever and because the other supervisors had  
1252 moved on the two of us have the whole movie on our plate  
1253 so there is no way we could do anything but just wrangle  
1254

1255 Dane: That's kind of where bottle-necks come in is if too many,  
1256 elements come to one stage in the pipeline at the same time.  
1257 right?  
1258

1259 Woman: Um, no, well yeah except we're at the end of the pipeline so  
1260 it, you know it's not, it's not so much a bottle neck as it's just  
1261 a pile up, you know, a sixty car crash.  
1262

1263 Dane: Right  
1264

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1265 Woman: Uh...  
1266  
1267 Dane: So I mean how do you avoid, how do you avoid that, do we  
1268 put, does lighting uh, keep working earlier and earlier or  
1269 something?  
1270  
1271 Woman: Uh, how do you avoid that? ...[long pause]... it's got to be  
1272 kinda schedule driven because there's a limit....  
1273  
1274 Dane: Right  
1275  
1276 Woman: To what you can change and I think that's really a producer's  
1277 job to look at that and say okay we're, we're letting stuff pile  
1278 up way too much here because we won't commit and that's  
1279 generally what it is. We haven't committed to the lighting,  
1280 we haven't committed to the motion we haven't committed to  
1281 the story, one of those things we're changing for some  
1282 reason. And if you keep doing that then stuff keeps piling up  
1283 because the other sequences, we're not backing off we  
1284 haven't changed our end date...  
1285  
1286 Dane: Right  
1287  
1288 Woman: The end date stays the same so at some point you say okay  
1289 you know we have to back off of these changes and that's  
1290 where CBBs come in which  
1291  
1292 man: CBBs?  
1293  
1294 Woman: CBB which is supposed to could be better....  
1295  
1296 Dane: Oh yeah, now I know the term...  
1297  
1298 Woman: Yeah. Or can't be bothered...  
1299  
1300 Dane: Right  
1301  
1302 Woman: This is what we call em  
1303  
1304 Dane: The producer says OK this has reached a threshold, this will  
1305 make a good

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1306  
1307 Woman: Yes. this can go into the movie but this is what I'd really love  
1308 for you to do if you can  
1309  
1310 Dane: I, I wish I could keep, tweaking my vision but this is good  
1311 stuff...  
1312  
1313 Woman: Yeah  
1314  
1315 Dane: Okay. So that's really not a problem with the pipeline per  
1316 say, it's a problem with human nature...  
1317  
1318 Woman: Yeah. Yeah.  
1319  
1320 Dane: Okay.  
1321  
1322 Woman: No, I don't think pipeline wise you can change that  
1323  
1324 Dane: Right  
1325  
1326 Woman: Unless it was just longer, unless you never had to put on a  
1327 movie and...  
1328  
1329 Dane: but then we'd never put out a movie. Cause I know artists, if  
1330 they don't have to tell themselves to stop painting a painting  
1331 they'll keep going till its dead.  
1332  
1333 Woman: Yeah, exactly. Exactly. So it, and I think you, you know it's  
1334 you just let it go you put it out there sometimes, you just let it  
1335 go ... and it works.  
1336  
1337 Dane: Well I can't  
1338  
1339 Woman: you didn't ask the good question. Darn! you're gonna have to  
1340 call me. When you think of the good question, call me.  
1341  
1342 Dane: I know it'll happen, after I review this and we go back in the  
1343 room and talk about it.  
1344  
1345 Woman: Yeah. Yeah. What were we talking about?  
1346

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1347 Woman: Can't remember. You'll think of it. call me, now on I'm going  
1348 to lose sleep over it. – "what was the good question?"  
1349  
1350 Dane: then you won't be obligated to answer you'll just have the joy  
1351 of knowing what the question was  
1352  
1353 Woman: I'll laugh, I'll laugh hysterically into the phone...  
1354  
1355 Dane: Yeah. But yeah, I think at this point uh, even though uh, you  
1356 know I am curious about so many things it's like my brain  
1357 is....  
1358  
1359 Woman: Um-hmm  
1360  
1361 Dane: I'm starting to seize up and I can't think of what next to ask  
1362 you...  
1363  
1364 Woman: Yeah. That's fine.  
1365  
1366 Dane: So, uh...  
1367  
1368 Woman: please, have lunch  
1369  
1370 Dane: Yes- Thank you.  
1371  
1372 Woman: Oh, well thank you. This was fun. I thought you'd ask me  
1373 number three and then I'd have to cry and ...  
1374  
1375 Dane: describe your company?...what happens in each section?  
1376  
1377 Woman: We have a different one. How does your personal mission fit  
1378 in with the mission of the company?  
1379  
1380 Dane: I thought that was another one that uh, you know I realized  
1381 that with an hour and half it was essential to ask the  
1382 questions I needed answered most instead of...  
1383  
1384 Woman: Yeah. Yeah.  
1385  
1386 Dane: That occurred to me  
1387

Company Alpha – Head of Lighting  
Interview 1: Dane Bettis & Lighting 13

1388 Woman: you know if he asks me that I'm just gonna set there, dumb,  
1389 absolutely dumb



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