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The Making of "**The Letter**"  
or  
*Taking Slightly Longer Than I Expected*

by

Richard J. Simms

Submitted in Partial Fulfillment of the  
Requirements for the Degree  
Master of Fine Arts

Master of Fine Arts Program  
College of Imaging Arts and Sciences  
ROCHESTER INSTITUTE OF TECHNOLOGY  
Rochester, New York  
September, 1994

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College of Applied Science and Technology

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Date: September, 1994

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## **ACKNOWLEDGMENTS**

This work is dedicated to those whom, through their encouragement, insight and support, contributed to the production of this film, especially: Mark Rushton, Kathleen Rushton, Timothy Wagner, John Rushton, George Traikovich, Joseph D. Love, Kent Francis, Bill Trainor, Brian Langsbard, Erik Timmerman, Jack Slutzky, Stephen Kurtz, The Simms Family, The Wiebe Family, and my wife, Ellen.

This film was produced using traditional animation techniques and the Amiga 2000 computer. Software used included Deluxe Paint 4, Magic Lantern and Art-Department Professional.

Sound Effects were produced on the Packard Bell PM-75 equipped with CD-ROM and Media-Vision 16-bit sound card. Sound effects were both sampled live and taken from public domain libraries. Principle software for audio mastering was Wave for Windows by Turtle Beach.

Original Score Composed and Produced by Brian Langsbard.

## **INTRODUCTION: In the beginning there was light...**

Even before humans acquired the knowledge to contain light within a bulb, people had been manipulating rays to create paintings with light. One form of light painting called for the placement of a transparent picture in front of a light source and focusing an image on a wall. Before long, this novelty moved from the home parlor to revenue-generating theaters. The next logical step was to combine these projections with mankind's age-old<sup>1</sup> desire to make pictures move. From this, animation was born.

As far back as I can remember, I have longed to be a participant in the world of animation, in particular, character animation. Like most children, I loved watching cartoons on television and in the theater, yet my interest was not confined to merely viewing animated productions. I was fascinated with the actual techniques involved in animation. I could not and still cannot get enough information on the subject. I wanted to know how the characters moved, how they were mated with backgrounds and foregrounds, how effects were created, what made illusions like depth work, and so on. Eventually, I reached a point where I had acquired a great deal of book-knowledge on the subject and it was time for me to actually attempt to animate on my own. That opportunity came when I decided to formally study computer animation at Rochester Institute of Technology.

## **PRE-PRODUCTION: My turn...**

From our first animation assignment at school, I was hooked. I really loved the process, and when I actually saw my creation move, I was virtually speechless. I felt like Dr. Frankenstein, Walt Disney, and God all rolled into one. We did a number of small assignments, but I was bursting at the seams to try more. I wanted to do it all. Yet when I was presented with the opportunity to do a full blown production I began to feel very intimidated and started doubting my abilities. Could I actually convey an idea through a series of pictures; should I use three dimensional computer animation or should I attempt to use traditional methods and draw each frame by hand or some combination of these, could I draw well enough? There was a lot riding on this film: my education, money, lots of time, and validation of my choosing to change my career. These matters and many

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<sup>1</sup>This is evident from cave paintings dating back over 30,000 years.



more began to take their toll on my confidence. When the initial dust settled, reality set in. The only way to answer the questions I was asking myself was to start animating.

Possibly the single most difficult, if not seemingly least productive part of the project, was the first part, the story development. There were a multitude of ideas I wanted to try, experiments I wished to conduct, but I didn't want to make an art film, I was more interested in exploring the narrative using character animation. Therefore, a story-line, something to tie all my ideas together, was necessary. It was suggested that I make a film with a deep meaning, a strong message. I toyed with quite a few ideas, but none of them seemed to gel. I was working too hard to make these thoughts work. After a little soul searching, I realized that I was not ready to make some profound statement. Although I believe everybody has a story within themselves, I did not feel that I had sufficiently mastered the art of storytelling or film-making to adequately convey my message. I simply wanted to make a cartoon, something in the tradition of the Warner Brothers' short subjects. For this, I chose to use a sequence that I began developing a couple of years earlier about a fun-loving dragon performing aerobatics while flying a human passenger around.

The biggest problem with this sequence was that it was just one section and could not really stand on its own; it needed a beginning and an end. The first few ideas that surfaced were very weak and often seemed contrived. Then, with help from my wife, Ellen, a thought arose which I imagined to be universal to almost all recipients of junk mail. The main character would obligate himself to deliver an 'URGENT' letter to his king, but it would turn out that the message was not as important as first expected. The intention was to poke fun at the pretentious importance advertisers use to promote their contests through residential mailings.

With this idea in mind, the principal character, **Arthur Finchway** had a reason to ride the dragon and the story itself had a punch line to end it. The next step was storyboarding the film. A storyboard is a shot by shot, visual plan of the film, resembling a comic strip. It is an indispensable tool with many uses, including allowing the film maker to visualize the entire production and making it easy to add, delete, or reorganize shots. Since storyboards contain so much information, I decided that a written script was not necessary. My plan was to completely work out the action and composition of the shot on the storyboard. But I found that over the course of the production many shots were greatly improved upon from the design on the story panel. Many directors will make very



detailed drawings of the shots but I felt rough sketches would provide all the necessary information. Once the film was completely storyboarded, I timed out the approximate duration of each shot then made a story reel.<sup>2</sup> This revealed that the film could be carried out with little or no speech. At that point an effort was made to replace all speech with pantomime. This would eliminate the need to cast voice actors and read the track.<sup>3</sup>

During the construction of the storyboard, character development became a concern; in particular, the main character **Arthur (Artie)**. Among the questions that had to be answered in order to define Artie's character and justify the story were:

- Why did he feel obligated to deliver the letter personally?  
(What was his motivation)
- Why did he choose to use a dragon rather than a more conventional form of transportation ?
- Was he afraid to use a dragon, if so what made him overcome his fear?

The answers to these and other questions helped me to define Artie's personality. The only other character that required major development was the dragon. Originally designed as a careless, immature, fun-loving character, Professor Jack Slutzky suggested that a crazy, psychotic character might create more of a threat to Artie. This would both strengthen the impact of his decision to fly with the dragon and still validate the dragon's antics.

While working on the storyboard the basic appearance of the characters was planned. For most character animated productions, a model sheet is drawn for each character, so that all animators on a production will draw a given character the same. Considering the fact that I was the only person animating on the film, and I felt I had plenty of practice with the characters while drawing the storyboards, I decided to not concern myself with character model sheets. Rather, I would rely on my knowledge of how I wanted the characters to look and use the storyboards and completed shots as a reference when drawing the characters. For the most part, this method worked well, I didn't get bogged down laboring and over-detailing the characters, and I did not let a sketch on a model sheet potentially

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<sup>2</sup>**Story reel**- a film comprising the still story board panels timed to the planned duration of individual shots. As the production progressed, the still images were first replaced with the pencil tests, then with the completed animation.

<sup>3</sup>**Read the track**- to analyze the vocal recording in order to exactly determine where phonetic sounds occur. This allows the animator to synchronize mouth positions to the recorded voice.

dictate the look of a shot. For example, I did not try to copy the pose of a hand from the model sheet and try to compose the shot around it. As a result, I felt the poses for each shot were fresher. Yet, like any other compromise, there were a few small drawbacks. My main concern was the slight change in appearance of Artie's face from the beginning to the end of the film. On the other hand, I feel that this change was actually for the better and made Artie more appealing.

With each character, their appearance was very important in communicating their personalities. Particularly because of the lack of speech which generally plays a major role in defining characters. My intentions were as follows:



**Arthur Finchway (Artie):** His tall, skinny frame, narrow shoulders, and slightly curved posture were meant to depict him as a character who is unimposing, not exceptionally intelligent, a bit cowardly and somewhat sympathetic. I intended these to contrast his assertive decision of hand delivering the letter.



**Mail Carrier:** His clean official uniform was meant to oppose his tired and lazy demeanor. This was to help explain the misdirected mail.<sup>4</sup>



**Artie's Horse:** An early animation style horse with exaggerated horse features, particularly nose.

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<sup>4</sup>Note: Early in production, Professor Timmerman pointed out that the mail carrier, as he appeared on the storyboard, seemed too alert to have misdelivered the king's mail. As a result, I gave him a more wearied expression.





**Dragon Keeper:** The herder's staff and one-piece garment were meant to make him immediately identifiable as an animal handler of simple means. Yet his squat, round, aging features were meant to give him the appearance of an old "Mr. Know-it-all," similar to Mr. Spacely from the Jetsons.



**Dragon:** The intention was to convey him as a big, bouncy character. While his big cheeks and jowls helped illustrate his aggressive and intimidating side, his tilted snout was designed to caricature his flying speed and forward momentum.



**Rabbit:** A simple, stiff looking character; during the first part of the shot, just his head moved and only in two dimensions. This was to help exaggerate the contrast of him going into the flexible, rubbery take.



**Fisherman:** A fat, dumpy character with a big belly, fat cheeks, and short stubby legs. Pointy bald head helped to make him look a bit simple-minded.



**Bird:** A simple, round, cartoony bird.



**Servant to King:** Rigid, military-like, clean, striking, his pointy beard, mustache, and eyebrows matched the sharp details on his uniform. Inspired by the royal guards at Buckingham Palace.



**The King:** This was probably the most difficult character to design. He had to be very commanding and a bit intimidating in appearance, yet compassionate and with a sense of humor. In fact, I waited until the last possible moment (the day I animated the shot) to design the King.

### **OBJECTIVE: Time to animate...almost.**

Before the actual production began, there remained several issues that had to be resolved. First, I strongly believed in the theory that the story should be the most important element of a film. A strong story will hold up in the presence of weak animation whereas the strongest animation can not enhance a weak story. But, as stated earlier, my primary objective for this project was to study and determine my capacity for creating character animation. The story and actual film were, in this case, secondary. I did feel the story had to be strong enough to stand on its own and justify the effort that was to be placed on the animation. The result is an unpretentious film with a simple premise and a silly, but hopefully fun, ending. My second priority for this endeavor was the exploration of the practical uses of the desktop computer as a tool in creating cartoon animation. This was to some extent in contrast to the practice of using the computer as the actual medium of film making. Since I was interested in creating a cartoon, I wanted the characters to have a cartoony look and avoid the familiar "high-tech 3-D computer animation" appearance for the characters and the stiff motions that are often characteristic of this approach. From the beginning, I felt that the characters should be animated by hand, in a two-dimensional style.

For the backgrounds, I had hopes of using three-dimensional computer generated models to add depth and heighten the impact of the flying sequence. I investigated the use of scenery generation software, but felt the results were neither realistic nor abstract enough, one or the other would have been acceptable to complement the appearance of this project. I did have another, more unique idea, which I was particularly excited about. It involved the use of real world backgrounds digitized in black and white (gray scale) then colorized on the computer by tinting the image using the paint program's transparency feature, similar to the method used in colorizing old movies. It was my belief that this



process would yield realistic images while tinting would provide a degree of abstraction causing the backgrounds to fit with the cartoon. Since the flying sequence was the most important section of the film, I assembled a team, we armed ourselves with an 8 mm movie camera, 35 mm still camera, and a Hi-8 video camera, then took to the skies. The father of a friend flew us around in his plane for a few hours over mountains, lakes, and valleys in an attempt to mimic the ride Artie would have taken with the dragon. Although some wonderful reference pictures were acquired, this plan did not provide favorable results, due primarily to a malfunction with the movie camera and the color and memory requirements by the computer when employing the tint feature. Had this worked, I expected to construct models of some of the "sets" in the film in order to maintain the realistic style of the backgrounds. At this point, I decided that the 3-D approach was not the right one for this project.

I began to explore the possibilities of flat artwork. After several experiments, including drawing backgrounds on the computer, digitized pastel drawings and acrylic paintings, I obtained very pleasing results with a paintbrush and ink on white bond paper. These drawings were digitized then painted on the computer. This method provided a strong, textured line which was especially ideal for the organic shapes in the backgrounds.



Following the decision of how to create the backgrounds, the next significant consideration was whether to work at school or home. The distinct advantage of working at school was the expected creative energy generated by the presence of others, but by working at home I could depend on the equipment being at my disposal. Working at home was the easy choice (besides, the commute was much smaller). As time went on, I began to feel that working alone started to give me the sensation of creating in a vacuum. I had only Ellen to share ideas with, which was usually helpful, but I remain convinced that a few more individual minds might have helped this project immensely.

The last major consideration before production could begin had to do with the output of the film. Issues included the basic frame rate, 24 frames per second (fps) which is the speed for motion picture film versus 30 fps, the rate for video; the screen resolution; and the number of colors. Since I decided to work at home,



I was forced to work within the constraints of my computer equipment. I used these restrictions to help me resolve most of the aforementioned concerns.

From the start, Professor Timmerman recommended making the screen information compatible with *NTSC* video, which would be a playback speed of 30 frames per second and an interlaced screen format with *overscan*. Through trial and error, I found that my computer would play an animation in real-time with no ill effects, like *tearing*, at a frame rate of 15 frames per second with the colors set to a minimum. Having the frame rate set to 15 (fps) is effectively like having a rate of 30 fps shot on *twos*. This would allow me to record the animation directly onto videotape without the need for any single frame controlling devices.

In the meantime, I learned that most comic books are printed in 32 colors. While the Amiga computer is capable of producing more than 4000 colors (millions with the correct options), too many colors would take too long to *render* thereby inhibiting the computer's ability to replay the animation in real time. With this information, I became convinced that a maximum 32 individual colors per shot would yield quite pleasing results, and, as a bonus, enhance the cartoony look of the film.

### **PRODUCTION: Animation begins...this time for sure.**

With all the big pre-production decisions behind me, it was time to get down to the heart of the project, the animation. I could hardly wait. About a year before I began to formally work on this project, I created "*pencil tests*" for several shots. For these, I drew directly into the computer with the mouse. Although drawing with the mouse was somewhat clumsy, I was sure that I would become accustomed to it while working on a project of this magnitude.

Since I was aware of no apparent advantage with any particular approach, I initially chose to complete the shots in order, beginning with the first. The first shot featured a "worm's eye" view of a wagon focusing on the wheels as they slowly moved into the frame, gradually coming to a stop. I wanted the wheels to have a very solid appearance. What made this especially difficult was my desire to have the wheels move along a curved path while maintaining their perspective. I first attempted to digitize the spoked wheels of a toy truck with a video camera then use the *tracing paper effect* in the animation program to trace the outline of

the wheel, but the digitized image did not provide enough detail to make this method practical. The next approach was to attempt to trace the image of a wheel from the video monitor onto animation vellum. Again, the lack of detail, further diffused by the tracing paper caused this to be an inadequate solution. What finally worked for this shot involved the use of the program's geometric drawing tools to draw, then animate the wheels. I was satisfied with the results and the computer's drawing tools worked well given the solid nature of the cart, but I began to feel that drawing with the mouse would prove to be a disadvantage. Instead, I decided to animate the old fashioned way, with pencil and paper. At first, I was using a video camera and copy stand set up to digitize my drawings, but towards the end of the production, I was able to use a flatbed scanner which greatly reduced the time it took to digitize the drawings while providing a significantly improved image. Over the course of the production, I found that I got very pleasing results when doing the rough animation with a pencil on animation bond paper, then tracing the cleaned-up drawing onto a new sheet of paper with a felt tip pen. When testing the pencil work, I would often digitize the drawings in four shades of gray which provided pencil like images that would run at the correct frame rate. The felt tipped pen produced a controllable line that remained quite fluid. The dark ink on the white bond provided good contrast for the digitizing equipment, although I did expect better results, after regularly observing incidents where easily visible lines were not picked up by the digitizer. These drop outs were not too difficult to fix, particularly when using the scanner, but time consuming nonetheless.

Most of the shots in the film were fairly straightforward, meaning the animated cels were placed over a still background. The digitized outline animation was painted on the computer. I repaired dropouts as they were encountered. These cels were then arranged in their sequence and combined with the background. In many cases, textures were added when painting the background image using some of the program's features such as gradient fills, and the airbrush and blend tools. Care had to be taken to make the backgrounds attractive enough to complement the movement of the animation, yet remain simple enough so as not to overpower the animation and draw the viewer's attention away from it. On more than one occasion, the colors used for the background had to be muted slightly so the animation would stand out.

Completing the work in order, I soon came to a shot where Artie ran into the frame, slowly coming to a stop. I felt that this shot was going to require a



great deal of attention and planning. At that point, I decided to change my approach, rather than complete each shot in order, I would jump around, completing the easier ones first, working toward the very difficult shots. By doing this and inserting the completed shots at their various locations in the story reel, the impact of the reel, as a representation of the film, was quickly heightened. The whole film was suddenly easier to visualize.

Moving on, the next shot posing a significant challenge had Artie running down the road. To sustain the shot, the background had to scroll while the character ran in place. This is called a pan shot. To enhance the illusion of depth, I decided to have the foreground pan as well, creating a multiplane-type effect. The computer program easily accommodated a scrolling background. In order to

have the foreground scroll as well, the foreground elements: trees, bushes, and the like, had to be positioned manually. In other words, once the animated character was placed over the panning background, the foreground elements had to be held as a *brush* and moved incrementally between frames then *stamped* over the existing image to create three levels: background,



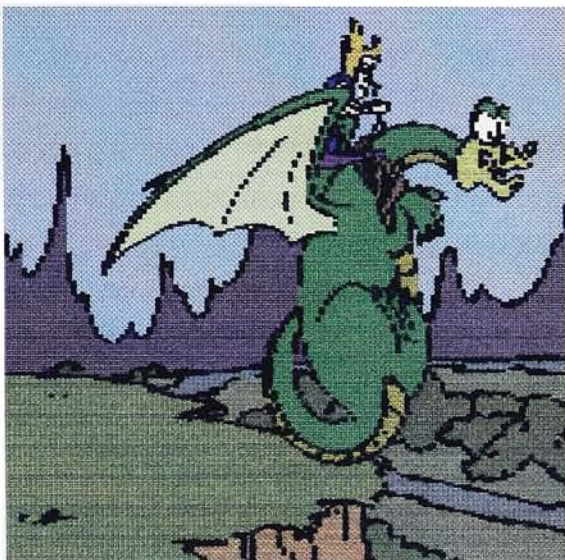
character, foreground. To help distinguish the foreground from the other levels in the frame while working on the shot, I painted the foreground elements all one solid color that I had planned to paint over later. By chance I happened to use purple. When work was nearly complete on this shot, I observed that the single purple color actually enhanced the look of the scene. Purple seemed to evoke a feeling of looking out from the shadows, and the solid color kept from drawing too much attention away from the character.

Normally, pan shots are filmed on *ones* to reduce the effects of strobing, but computer limitations forced me to shoot on twos as well. Even having made this compromise, the computer could not play this shot, and another like it, at the proper speed and a faster machine produced no better results. That meant an alternative for recording the shots had to be investigated. The probable solution seemed to be the school's Optical Disk Recorder (OMDR), the device used by most of the computer animation students, particularly those working with 3-D animation programs. Towards the end of the film though, I came across a



computer program called Magic Lantern that allowed my machine to play these shots from the computer at the proper speed.

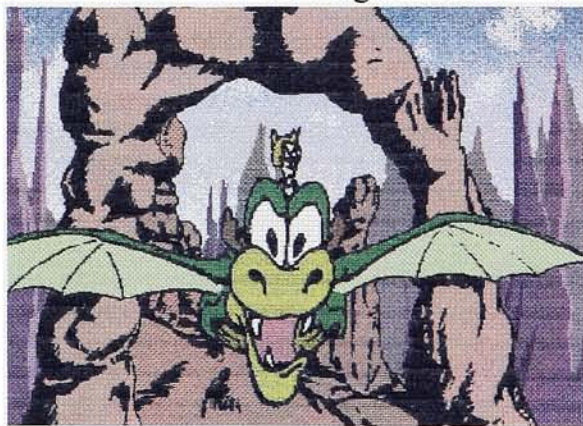
Since I really wanted to make the flying sequence as unique and exciting as I could, I found this section of the film to be especially challenging and rewarding. Here, I tried to come up with creative points of view (camera angles) technically and artistically. This is where the computer really became helpful.



The shot where Artie and the dragon take-off, beginning their flight was similar to the previously mentioned pan shots except there is no moving foreground and the background moves in two directions (horizontally, then vertically). To assist in the illusion that the characters were taking a great leap, I kept the distant background still, relying on the theory that the more distant an object is, the slower it appears to travel with respect to the observer's point of view.

For example, if one is strolling on a moonlit night, the moon will appear to be following the individual, or remaining still with respect to their motion. The illusion was used again when the characters land at the castle in the final scene.

Besides allowing a background to move horizontally (X-axis) and vertically (Y-axis) the animation program will move a background toward and away from the viewer (Z-axis). This is how I was able to create the shot involving the dragon as he slaloms through a collection of rock formations. As the dragon moves into the frame and towards the camera, the middle background moves further into the distance while a distant background remains still. One by one, the individual rock formations, which were held as brushes, were programmed to enter the frame and move into the distance as the dragon swings like a pendulum around them. I experienced





only minor problems while working on this shot but it provided excellent practice for the task two shots away.

The shot opened with Artie and the dragon flying over mountain tops. The dragon then went into a descent, eventually skimming the surface of a lake. In order for me to visualize the design of this shot, I had to draw a profile view of the action illustrating the dragon's flight path. Next, I was able to determine how the camera was to track the dragon and plan the location of the camera in given points in the shot. One of the details that I hoped would improve the composition was the characters' reflection in the water. At first, I expected to simply use an inverted copy of the characters then adjust the colors, but this idea did not work because the reflection had to show more of the dragon's belly than was visible on the animation. Therefore, it was necessary to animate the reflection as well as the main view of the characters.



The next two unconventional shots during the flying sequence were meant to cinematically take the audience along on the ride. The first of these had the camera hurling toward the ground, passing clouds along the way. The other one followed shortly thereafter as Artie panicked upon noticing that the dragon was "playing chicken" with a cliff wall. Both of these were very similar, technically. They started with a

digitized and painted background drawing that was moved along the computer screen's Z-axis (as explained earlier) effectively enlarging the image. Then a foreground element (rock/cloud formations) was added to enhance the depth. Finally, the timing of the animation was adjusted to provide a sense of acceleration. The results were shots that, hopefully, appeared to the audience as they would have to the dragon's passenger.

Most of the shots that remained were either not technically difficult or relied upon the lessons learned from the experimentation with the methods previously described, with two exceptions. A shot at the dragon corral that had Artie, the dragon keeper, and the dragon on the screen together and an earlier shot where Artie discontinued his pursuit of the mail carrier.





While the shot where Artie, the dragon keeper, and the dragon are all appearing together was not altogether difficult from a technical perspective, having the three characters sharing the frame and reacting to one another made it the most difficult shot for me to execute. I found it hard to act out the three character's parts simultaneously. I had to determine which character was

the focus of attention at each point in the shot, then plan his actions, and then plan the reactions of the other two. To simplify matters a bit, I essentially gave Artie one reaction, shaking with fright, and for the most part the other characters acted somewhat independently.

Although I was satisfied with the result, this was an example of how the input of others might have helped add much more life to the shot. Given these concerns, this was one of the last shots to be completed.

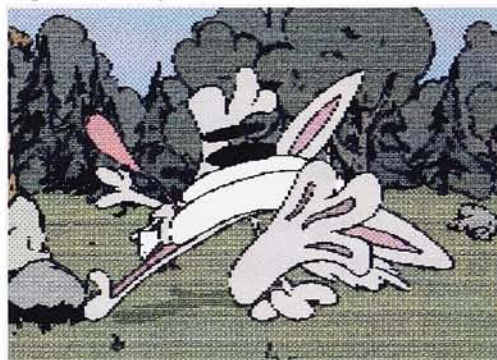
As far as technical difficulty went, the shot where Artie gives up chasing the mail cart was a small project unto itself. To effectively capture the emotion of the character realizing his pursuit was futile, I chose to attempt rotoscoping. This also provided me with the opportunity to explore the incorporation of a traditional animation technique with the computer. Rotoscoping, developed by animation pioneers Max and Dave Fleischer begins with motion from live-action film, usually of a human actor or an animal, which is then traced by hand resulting in an animated movement with a very realistic quality.

The first step, after planning the procedure, was to contract the services of a friend, Mark Rushton, to act out the motions of the character as I filmed him. I chose a location that closely matched the setting in the film; the hills and road were my principal interests. We went out on one of the coldest, most blustery days of winter with a tripod and a Hi-8 camcorder, which we feared would freeze up at any moment. In fact, the battery packs had to be warmed up before they would work. I framed the shot, explained to Mr. Rushton how to run and where to stop. We practiced a few times, warmed our hands, then videotaped several takes. Using the computer animation program, I created about ten seconds of incrementing numbers to run at 30 fps as a makeshift time code generator. Using a *genlock* I made a VHS copy of the live video footage with the pseudo time code



superimposed over the image. The time code, in conjunction with the counter on the VHS deck, gave each of the live action frames a unique identification that helped me identify specific frames as necessary. I selected the best take from the live video, replayed the action frame by frame onto a 13 inch monitor. On top of the monitor, I taped a small animation peg-bar. I draped animation vellum from the peg bar and roughly traced the figure from the still screens, using every other frame (working on twos) of the live action. On a clean sheet of bond for each frame, I sketched the outline of Artie, using the rough drawings on the tracing paper as a guide. I then completed the shot in the normal manner. Many may feel that this method might be like cheating, but the rotoscoping was not a simple process, it still required that the character be drawn and animated. The tracing was essentially only a guide.

When these shots were finished, I added them to the story reel and had almost all the animation complete. After viewing the story reel, Professor Slutzky suggested that I incorporate more extreme exaggeration, make it more cartoony, exploit the medium. That suggestion inspired the shot where the dragon "dive-bombs" a rabbit snacking in a field. This shot was among the most fun to work on. There was a built-in tension in this shot. The rabbit first appeared very stiff, moving in only two directions then, in contrast, went into a wild, rubbery convulsion before being swept off the screen leaving a cloud of smoke. I really enjoyed pushing the limits while animating the rabbit's panic.



The last portion of the production to be completed was the ending scene at the castle; specifically, the guard, the king, the letter and the final shot. Each point was a bit unique and worthy of a brief description.

I had expected the guard to be easy to animate. He was supposed to be a simple, flat, geometric character that was rigid, pivoting only at the waist. When I tried executing this plan I soon discovered that it was not going to be as easy as expected. Since the character's pose was a 3/4 view, his movement, as he bent over, was not parallel to the point of view. Additionally, the guard's head remained vertical with respect to the ground. These points forced me to animate the character in 3-D space, rather than two-dimensionally. I had to concern myself



with perspective and the changing shapes of the guard as he moved. Overall, the animation was easy, but not as easy as I planned.

Aside from designing the king at the last minute, this shot was easy to animate. I succeeded at keeping the motion in two dimensions while maintaining a three dimensional feel to the shot. I did play around and experiment a little with fine detail. For the first three frames that the letter appeared in the king's hand, I drew the picture and text on the letter with great detail, as they would appear if the letter were real. I knew that this was going to be much more detail than was necessary, but it was better than leaving the page blank and it did give me the opportunity to analyze how much detail would come across to the viewer.



All the text in the movie, including the close up still of the letter, was rendered by hand on paper then digitized. No computer typography was used, the only exception being the closing credits, principally because of the distortion that occurred in the interlaced computer screen mode when objects were rotated. Which meant that the text would seem to warp if it was moved along any type of curved path. Although this was only a factor a few times, I opted to hand ink all the text to maintain a consistent look to the work.

The final shot was exciting. Besides being the last shot, I loved drawing the contorted look on Artie's face, his deadpan reaction to the letter. Yet, when the shot was complete, it still called for something more. I kept considering the common "fade to black," but I decided early on to keep post production to an absolute minimum and avoid any effects that could not be accomplished by hand or with the computer. The answer came easily when I thought back to the comedy films of the silent era that often made use of the "iris out" effect. Not only was this easy to accomplish on the computer but it would perfectly complement Artie's, Joseph "Buster" Keaton inspired, deadpan expression.



Wow, the animation was done! Or was it? Again a story reel was assembled, but this time all the shots were complete. I then presented this rough cut to my thesis committee. Naturally, there were comments and suggestions,

most of which concerned editing. There were also points directed toward the actual animation, which were the ones I feared the most. I viewed any rework on the animation as a step backward. I would have to redo something I thought was complete, thus preventing me from moving ahead. Fortunately, most of the criticisms were easily remedied, for example, Prof. Timmerman suggested that a stream of vapor would pass Artie after the dragon exhaled the mouthful of cloud he collected while flying. Another comment pointed out how unnatural the *jaggies* looked on the sides of the castle as the dragon flew around it at the end of the film. I did give this comment much consideration and came to the conclusion that since it was not my plan to disguise the fact that I was using a computer, I would leave this shot as it was.

### **EDITING: Making a movie that has already been made.**

Computers tend to generate more intense colors than an NTSC signal can accommodate. Because of this, I adjusted my palettes by reducing the color brightness and saturation in an attempt to match the acceptable signal dynamics. For all the rough cuts, the image quality was pleasing, but as I set up to edit, video analysis equipment revealed imperfections in the signal. Therefore, some of the signal levels were adjusted to compensate for this. After the editing was complete, I observed that the signal adjustments actually reduced the quality of the image. This was not terribly distracting when played through a video projector, but on decent quality monitor, the picture seemed washed out. I was very unhappy with the results and was encouraged to re-edit the piece. I did not look forward to the task but knew that I would not be completely satisfied until the film was just right; in addition there were editing adjustments I would have the opportunity to make. Re-editing was a good idea. I was pleased with the reworked version.

## **MUSIC**

To complement the medieval setting of the film, I planned on using music with a Renaissance feel. I envisioned something with a light, minstrel quality. I asked Mark Rushton if he would consider attempting the music for the film. He was very interested, if not excited by the prospect. For a couple of months, he worked out melodies and rhythms on the guitar and electronic keyboard, with me



assisting whenever possible. Neither of us were very familiar with the music of that period, which magnified our difficulty. We had some melodic ideas, but to establish a foundation on which to build the music, Mr. Rushton worked out a rough rhythm track. I felt the rough track was a good sketch of the musical flavor I was seeking. I then mated this recording to the visual for presentation to my committee. Although my committee members did not meet with me together as I presented the film with the rough score, unanimously, they were displeased with the music. While I never intended for the example to be the final version of the soundtrack, their comments caused me to abandon this pursuit. Instead, I contacted a graduate of the Eastman School of Music, Brian Langsbard, to compose the film's score. Mr. Langsbard provided me with an arrangement that incorporated elements of Renaissance music then moved towards a fully orchestrated film score for the highlight of the picture, returning to a relaxed feel for the ending.

This version, unfortunately, did not play well to audiences. My committee indicated that the beginning made the film seem flat. They also strongly suggested that I add sound effects.

Going back to the composer, I asked him to rewrite the beginning of the score. He agreed that it was somewhat lacking, citing the compromises he had to make to accommodate my requests for a light minstrel feel to the piece. Instead, he suggested that I allow him to fully orchestrate the score.

He returned a composition that was so full and rich that several people believed that it might eliminate the need for sound effects. Professor Timmerman disagreed. While stating that the music was significantly improved, he insisted that the movie cried out for sound effects.

## **SOUND EFFECTS**

I was originally displeased with the idea of having to do sound effects. I had planned on the film not requiring any audio other than the musical score and upon presenting the film with the music to my committee, I believed the production was complete. Unfortunately, they did not. Having never even considered audio effects let alone attempted them, I had no idea where to begin.

Things did seem to fall into place rather well though. At home, I was able to use an IBM compatible machine with a CD-ROM drive and a 16-bit sound card to create the effects track.



The first step in creating the effects track was to make a cue sheet and indicate the location of each effect. For this, I printed a copy of my storyboard, placing about eight panels on each page and leaving plenty of room to note the cue points.

Next, I listed all of the effect points on the cue sheet as indicated from a time code dub of the film. Armed with this information, I auditioned about 2,000 sound effects located on two CD-ROMs. I found nearly all the effects I might need, but each had to be customized to fit the film. For example, footsteps had to be synchronized with the film, stereo effects were added to some sounds, and others had to be modified so extensively that they barely resembled their original sound.

The effects not found on the CDs had to be sampled live. This required the use of a microphone, the computer sound card and sampling software. The principal software used for sampling, customizing and mixing was Wave for Windows by Turtle Beach.

Once all of the effects were customized, they were mixed together into a single file. This file was then mixed with the score which was recorded onto the computer from digital audio tape; resulting in a final stereo audio track. The final audio was recorded from the computer simultaneously with the master video from Super VHS onto a Hi-8 video tape, creating a master copy of the finished film.

### **CONCLUSION: The end after "The End"**

There were some extremely tense moments, trying to get drawings and movements worked out, solving computer problems, and all sorts of other technical and creative problems. There were also times when I had to force myself to do my work; it was not all fun and games. But by far, the most stressing times were those occasions when I felt as if I was never going to finish; I would forever be pigeonholed as a failure. Maybe this was a defense mechanism of my conscience; a device to keep me motivated when I was tempted to relax. In fact, the sheer amount of time it took to complete this project was often enough to cause me to rethink my decision to become an animator.

All of these anxieties were quickly laid to rest the first time I had an audience watch my film. It was shown without any soundtrack whatsoever which increased my apprehension, but before long, people were laughing, and their laughter was honest. The audience was reacting to pictures I had drawn on paper.

It was remarkable. I did not know what to think. While the film may not be outstanding enough to win awards, the fact that I was able to entertain an audience was the best reward I could have received for all my work.

Even after the positive audience reaction, I continued to feel embarrassed about the project taking two years to complete. Then my wife, Ellen, helped me to realize the amount of learning I had done and the fact that I taught myself character animation well enough for an audience to appreciate my work. She also pointed out that almost all of the animation on this project was completed over the last year and despite my book knowledge, animation has a steep learning curve. In short she said that this was a successful effort of which I should be proud. I am, and I thank her.

*The End*

## Glossary of Terms

***Brush:*** the image used to draw on the computer. Brushes can be anything from a single dot (pixel) to a full color drawing.

***Genlock:*** a computer hardware device that synchronizes the computer's video signal with external video sources.

***Jaggies:*** the 'staircasing' effect seen on the edges of computer drawn lines which are neither completely vertical nor horizontal.

***NTSC:*** abbreviation for National Television Standards Committee, the organization responsible for establishing the video and broadcast standards used in North America and Japan.

***Ones:*** the act of drawing every single frame of an animated sequence. (see also 'twos')

***Overscan:*** a computer screen mode which allows the picture to occupy the entire monitor display resulting in a borderless image.

***Pencil tests:*** a film test of rough, pencil drawings for the purpose of examining the animation.

***Render:*** the computer process of generating a screen image based on digital data and computations.

***Stamped:*** the act of placing an image, in the form of a brush, within the picture.

***Tearing:*** a visual observance of the screen image separating horizontally caused by a computer's inability to render successive animation frames at the proper speed.

***Tracing paper effect:*** a feature of some computer animation programs allowing the current frame and several frames before and/or after to be visible on the display simultaneously.

***Twos:*** the act of animating every other frame of a motion thereby reducing the number of drawings required. Early in the history of studio animation, several animators observed that this method, though economical, still produced acceptable results.



## Reference List

### **Written Publications**

- Adamson, Joe. Tex Avery: King of Cartoons. New York: Da Capo Press, 1985.
- Blair, Preston. Animation: Learn How to Draw Animated Cartoons. Tustin, California: Walter Foster Art Books, 1949.
- Blair, Preston. How to Animate Film Cartoons. Tustin, California: Walter Foster Art Books, 1980.
- Cabarga, Leslie. The Fleischer Story. New York: Da Capo Press, 1988.
- Culhane, John. Disney's Aladdin: The Making of an Animated Film. New York: Hyperion, 1992.
- Culhane, Shamus. Animation: From Script to Screen. New York: St. Martin's Press, 1988.
- Foster, Walter. Animated Cartoons for the Beginner. Tustin: California, Walter Foster Art Books.
- Foster, Walter. How to Draw With Pastels. Tustin, California: Walter Foster Art Books.
- Garner, Frederick. How to Draw Trees. Tustin, California: Foster Art Service, Inc.
- Gnagy, Jon. Learn to Draw Landscapes. Brooklyn, New York: Visual Art Industries, Inc., 1962.
- Halas, John. Masters of Animation. Topsfield, Massachusetts: Salem House Publishers, 1987.
- Jones, Chuck. Chuck Amuck: The Life and Times of an Animated Cartoonist. New York: Farrer Straus Giroux, 1989.
- Laybourne, Kit. The Animation Book. New York: Crown, 1979.

- Muybridge, Eadweard. The Human Figure in Motion. New York: Dover Publications, 1955.
- Naoke, Roger. Animation Techniques. Secaucus, New Jersey: Chartwell Books, Inc., 1988.
- Schneider, Steve. That's all Folks: The Art of Warner Bros. Animation. New York: Henry Holt and Company, 1988.
- Soloman, Charles and Stark, Ron. The Complete Kodak Animation Book. Rochester, New York: Eastman Kodak, 1983.
- Soloman, Charles. The History of Animation: Enchanted Drawings. New York: Alfred A. Knopf, 1989.
- Thomas, Frank and Johnston, Ollie. Disney Animation: the Illusion of Life. New York: Abbeville Press, 1981.
- Thomas, Frank and Johnston, Ollie. Too Funny for Words: Disney's Greatest Sight Gags. New York: Abbeville Press, 1987.
- Whitaker, Harold and Halas, John. Timing for Animation. Boston: Focal Press, 1990.
- White, Tony. The Animators Workbook. New York: Watson-Guption Publications, 1988.

## **Films**

The Following films were used as reference, as well as many short subjects from the Warner Brothers, Walt Disney, and Fleischer Studios.

Aladdin. Walt Disney Productions: Walt Disney Home Video, 1992.

Cartoons for Big Kids. Warner Brothers Studio: Turner Home Video, 1989.

The Little Mermaid. Walt Disney Productions: Walt Disney Home Video, 1989.

Peter and the Wolf. Walt Disney Productions: Walt Disney Home Video, 1946.

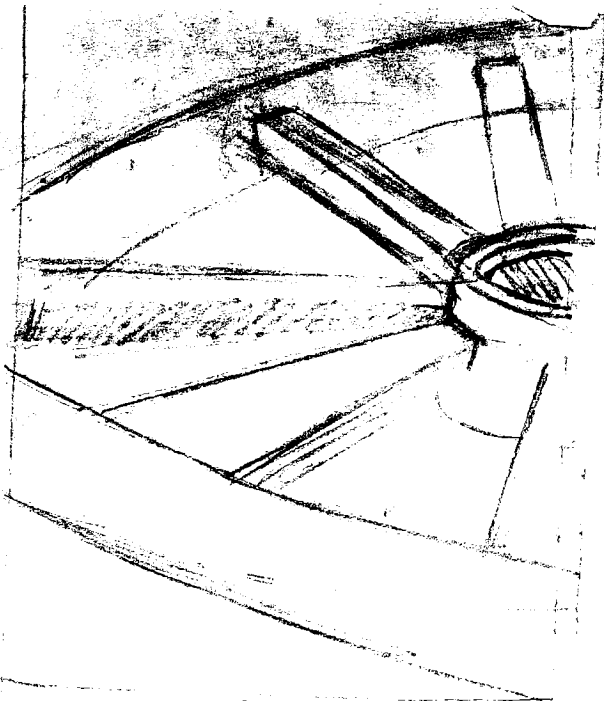


The Rescuers Down Under. Walt Disney Productions: Walt Disney Home Video, 1990.

Who Framed Roger Rabbit. Spielberg, Steven and Zemeckis, Robert.  
Touchstone Home Video, 1988.

# Storyboard

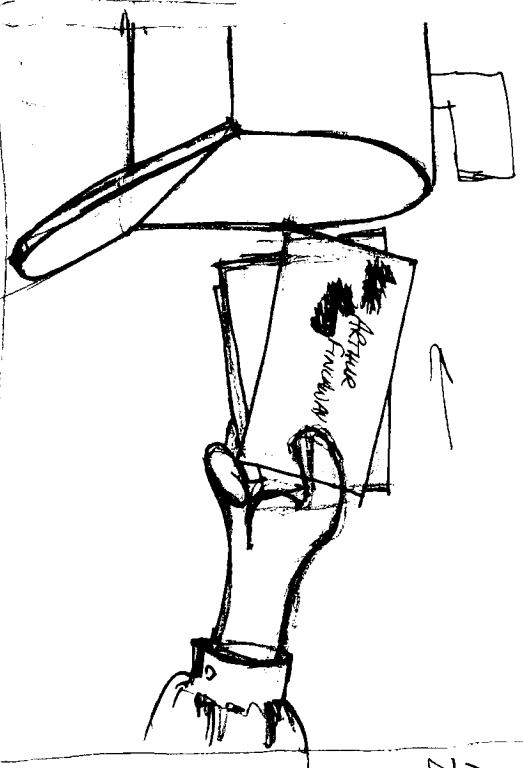




WHEN WHEEL  
ROLLS INTO  
THE FRAME  
POSSIBLY  
CRASHING SOME  
MUD.

~ 2 1/2"

x 1



MAIL BEING  
DELIVERED

2

30.0 15.0



MAIL (HARRIER  
INHALES...

(HE LOOKS TOO ALREADY)  
— 57

1-1 1/2"

113

3



...AND BLOWS  
WHISTLE.

1 1/2"

134

4

{WHISTLE}

ARTE, HEINRICH  
THE GARDEN  
HEARS THAT  
THE MAN  
HAS ARRIVED

2 1/2 - 3"

158

5

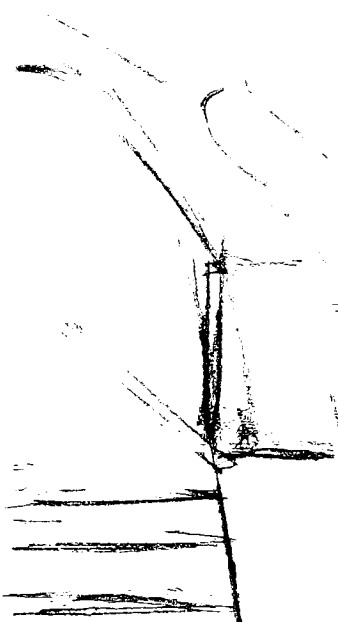


ARTE IS  
SURPRISED  
HE HAS  
RECEIVED  
AN  
URGENT  
LETTER  
MEANT FOR  
THE KING  
[HAVE HIM  
START TO  
RUN AFTER  
POSH  
CARRIERS]

3 1/2 - 4"

204

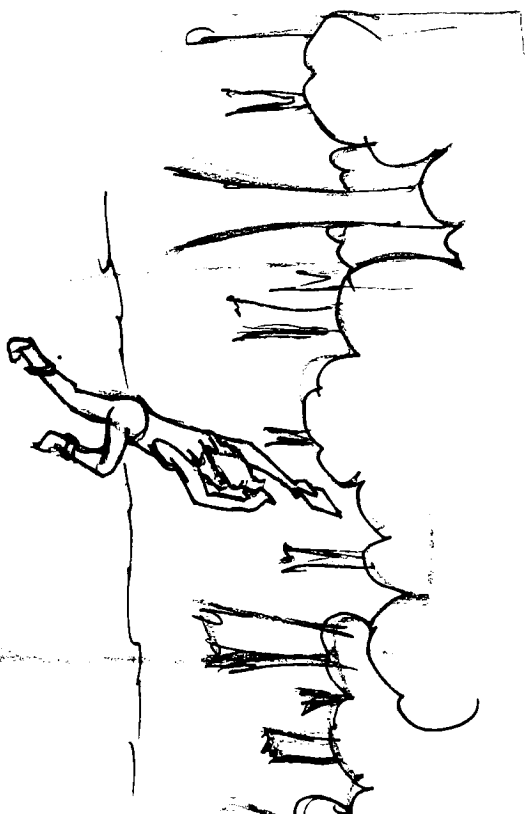
7



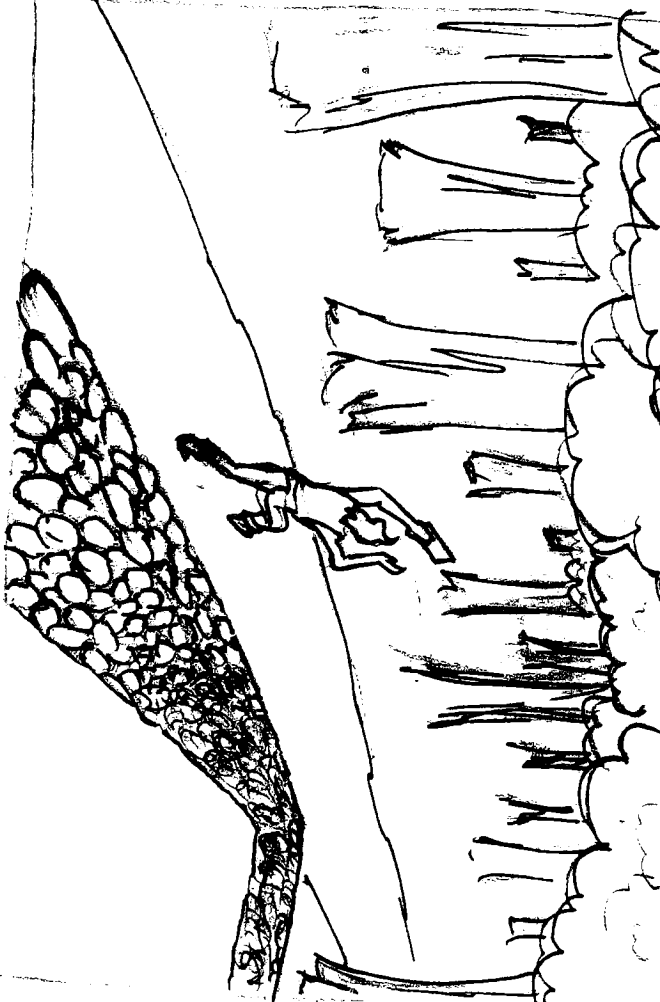
URGENT  
The King  
IMMEDIATE REPLY REQUIRED

Arthur  
Kingway

← PAN B/6 →







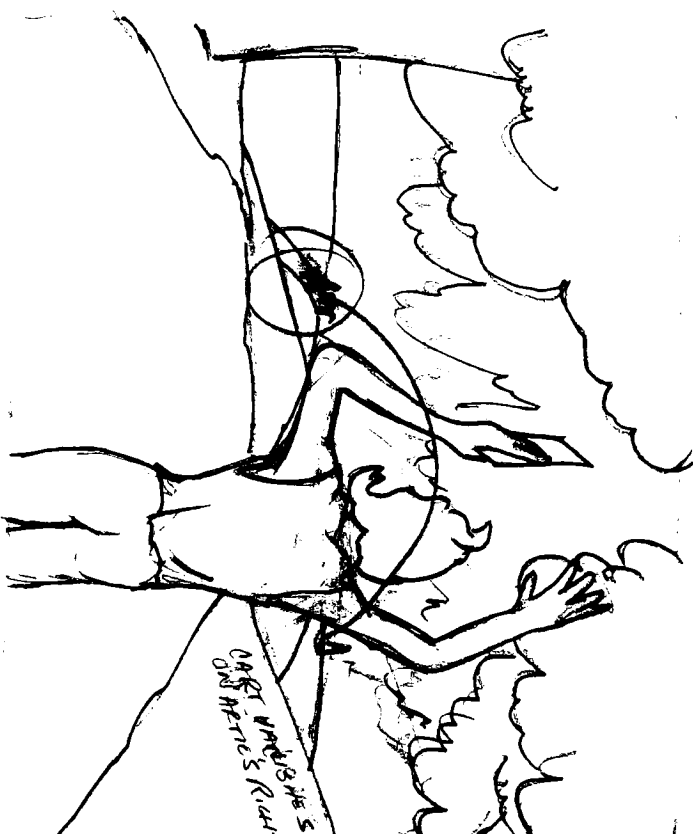
HE RALES  
OFF  
HIS  
WIFE

2/22

364

9

1



ONCE UPON A TIME  
ON THE RAIL  
ON THE RAIL

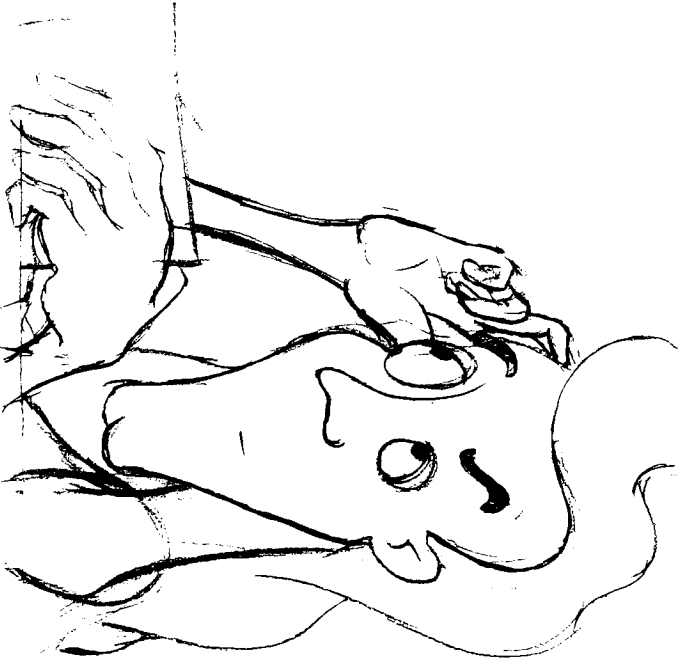


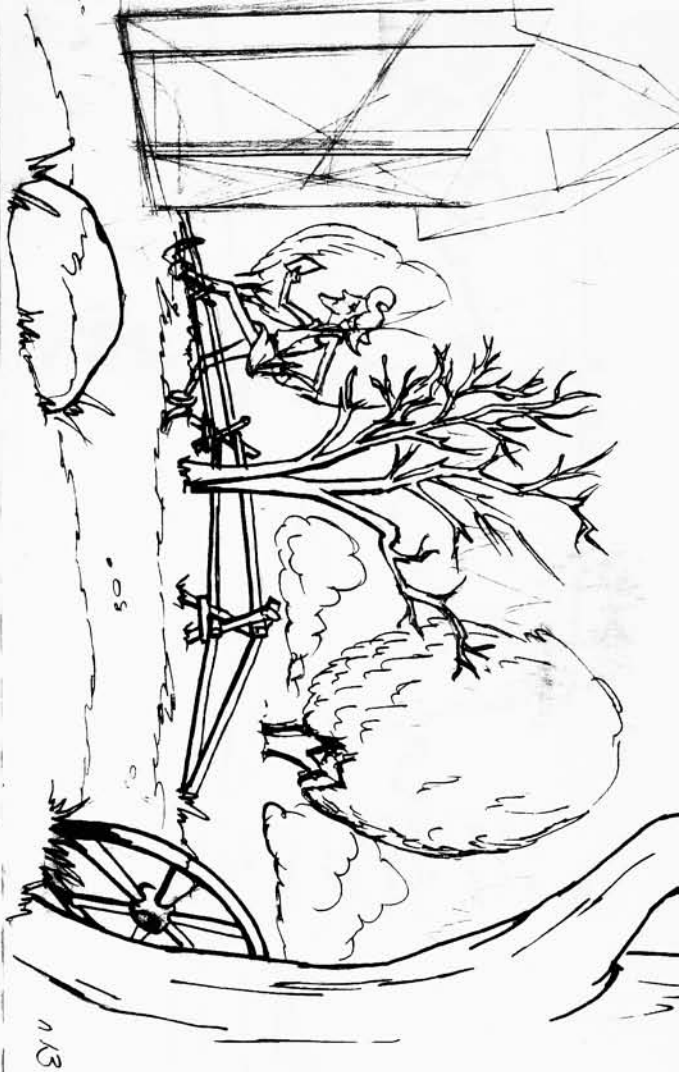
ARTIE, II  
A LOYAL  
SUBJECT  
OF THE  
CROWN, IS  
FACED  
WITH THE  
DECISION  
OF WHAT  
TO DO  
WITH AN  
URGENT  
LETTER  
MEANT  
FOR HIS  
KING.

3-4

467

11





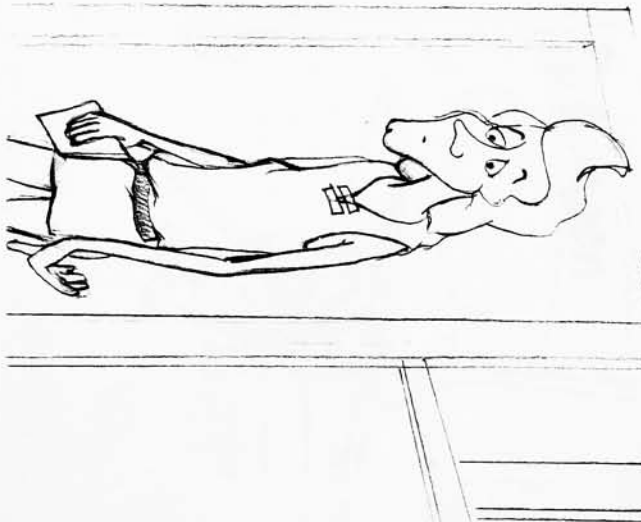
1/13

IT'S NOT  
QUITE UP TO  
A TRIP.



3-3 1/2

1/15  
1/16



C





22 - PAN 216



...HE SETS  
OUT TO  
DELIVER  
THE  
IMMEDIATE  
MESSAGE  
HANGERS  
FABRIC  
MAY BE HE  
ENCOUNTERS  
SOME TROUBLE  
TRIVIAL OR  
HE SEES ANOTHER  
[DRAGON FLYING  
A RIDE]

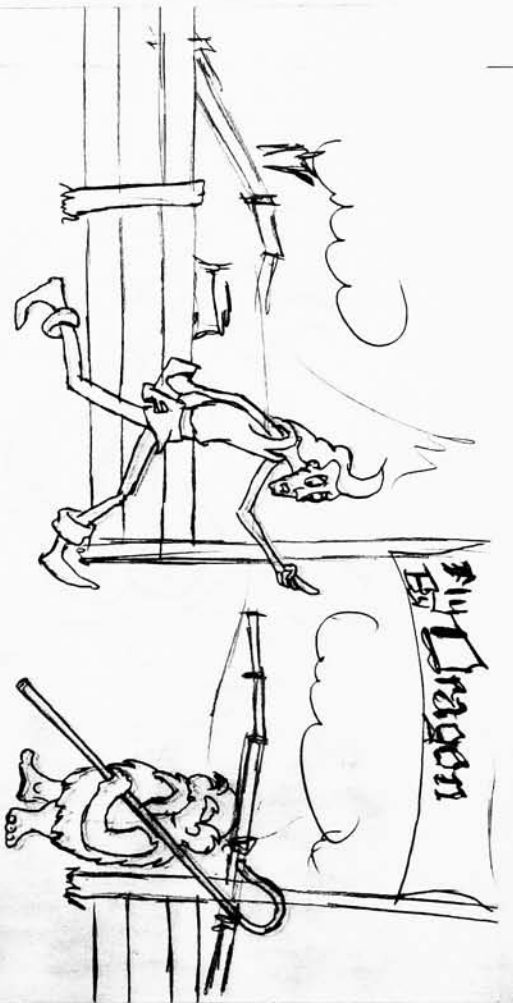
~ 4" ±

587 13

\* MAY BE HIGHER DOI. (SOMEONE FROM AERIAL)



11:50 PM  
1000



218



"No, I only  
have 1 and  
you don't  
want him...  
He's Crazy!"

220 PM  
1000

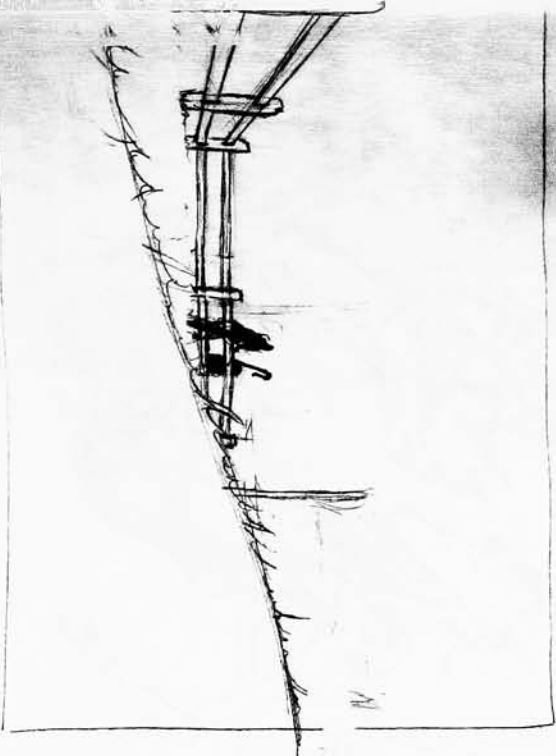
TURNS HEAD FROM KEEPER TO HORSE



AKYE  
FINDERS,  
"I NEED HIM"  
IT'S IMPERIAL!"

2"

R21  
add  
49



R23  
add  
49



R22  
add  
49



2-2-1968

R24  
add  
49



R25  
1/2



DRAKON SURROGS  
AKTIE. THE KETTER  
SHOPS HIS HEAD  
("OH NO!!") AT  
THE DRAKON'S  
SUDDEN AND  
RUDE APPEARANCE

NOTE: DRAKON'S  
HEAD SHOULD BE  
BIGGER!

reverse X

R27  
1/2



R26  
1/2



AKTIE RECOMMENDS  
DRAKON TAPS  
AKTIE (S711)  
SMILE IN (6) ON THE  
SHOULDER.

NOTE:  
If dragon keeper points  
to finger (see sketch) and  
AKTIE will call the rubber head  
dragon.

If AKTIE points, dragon keeper  
will be nodding his head  
(Yes, he's the one.)

NOTE:  
DRAKON'S HEAD  
SHOULD REMAIN  
BE BIGGER!

AND CHECKED ON  
AKTIE MORE OF AN  
AKTIE

reverse X

1/2 30 =

R28-236





ARTIE IS STILL  
SHAKING!

POOR  
POOR  
POOR

3



DRAGON  
TAKES OFF  
UP RIDER  
STRAPPED IN

11/58  
24



ARTIE, STILL  
SHAKING UP  
CONTEMPORARY  
CHARACTER!  
Note: his action is  
very important to his  
character!

POOR  
POOR  
POOR

330

4



2 1/2 - 3"

12/8  
238  
25

3



DRAGON APPROACHES  
CAMP PA  
ATTACKING  
CAMPING  
BACK SCOTCH



DRAGON MOUNTAIN BRIDGE, I WILL HAVE  
TO BE RE-SIZED (SHUTTER)

GREEN PEAR CAN BE STILL HORN AS BROWN  
THAT MOVES ON DIFFERENT PLANE.  
5 26

THE DRAGON  
TAKES HIS ASIDE  
OVER THE LAKE...

DESCEND FROM  
HIGHER ALTITUDE TO  
JUST ABOVE WATERS  
[surface]



1504

11/3  
30



SEE DRAGONARY  
CUT BACK  
TO THE  
BOTT.

~3-

1572

42  
45  
32

AND SKIMS THE  
SURFACE.

2 1/2"

1534

144  
34



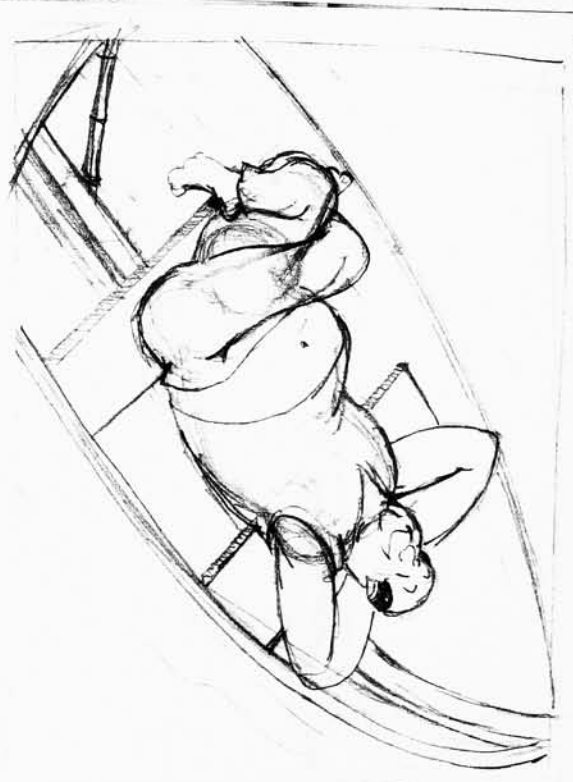


~~REVERSE~~

4/5 of dragon  
skinned from  
the left's  
surface.  
[NORTH R/L: ]  
[and R/L slower than  
dragon flies]

~ 1/2" ?

NO 5.45 46  
1017 246 33 8



4/11 of  
BROT AND  
LAZY OCCUPANT  
[NAN HE SMACKS  
HIS JOESUS (ie.  
like chewing  
a cud.)]

4 1/2"

1010 247 34



... DRAGON  
ENTERS  
SCENE ...

(It takes Dragon  
about 1/2 sec. to  
cross frame.)

48 1738 36



... TO PILING THE  
BOAT IN HIS  
WAKE.

~ 1/2"

1746 250 37





~5"

1254  
~51  
38

114

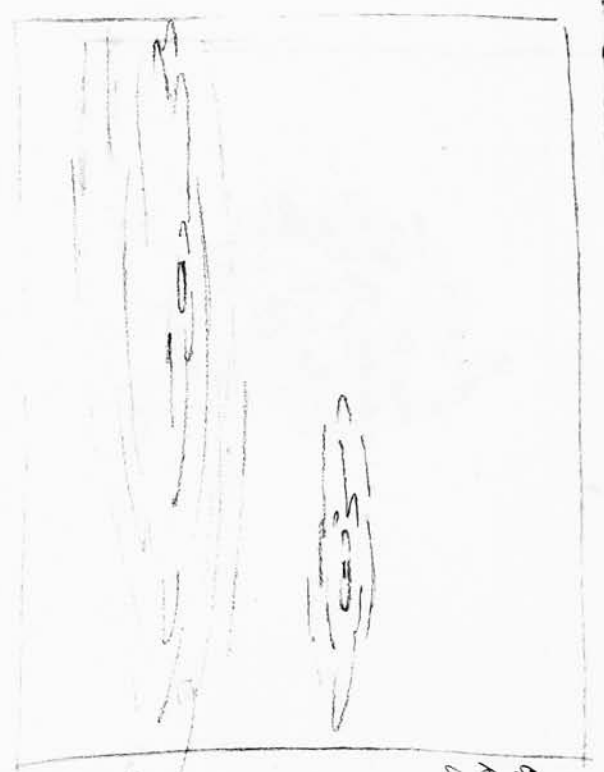
BOATER POPS  
OUT OF THE  
WATER. FOLLOWED  
BY BOAT'S HULL.  
BOATER SPITS  
OUT WATER



~2 1/2"

1867

~53  
40



~2 1/2"

1825

~52  
39

44 OF  
APPROX  
WATER.



~3'

1905

~54  
41

BOATER IS  
STUNNED.



DRAGON'S  
FLIGHT  
PATTERN

FLY INTO  
CAMERA,  
LEADING TO  
SHOT 43

~2 1/2 - 3"

155  
1350 43

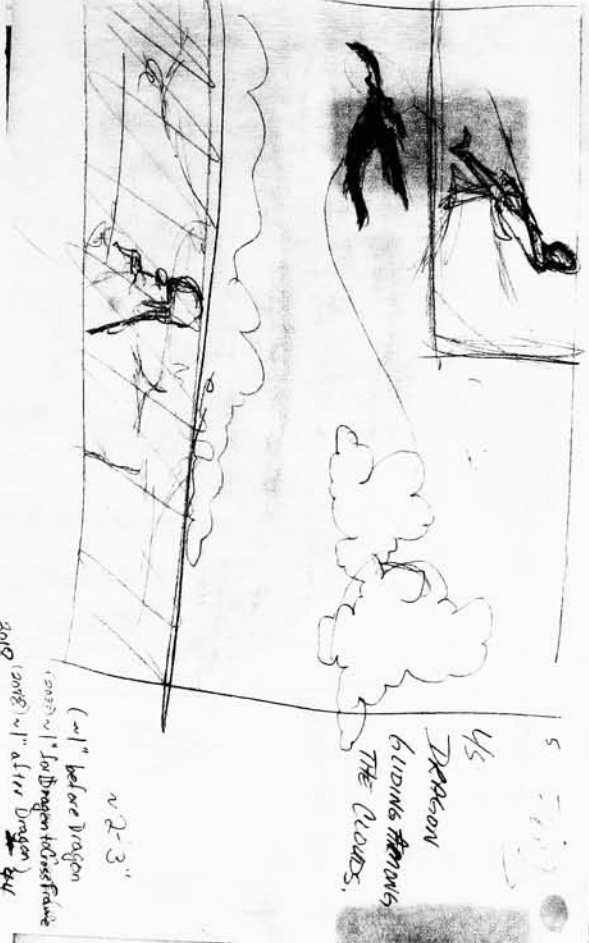


q14  
VERY  
NERVOUS  
RIDER

MANOE  
HE SPINS

~1-1 1/2"

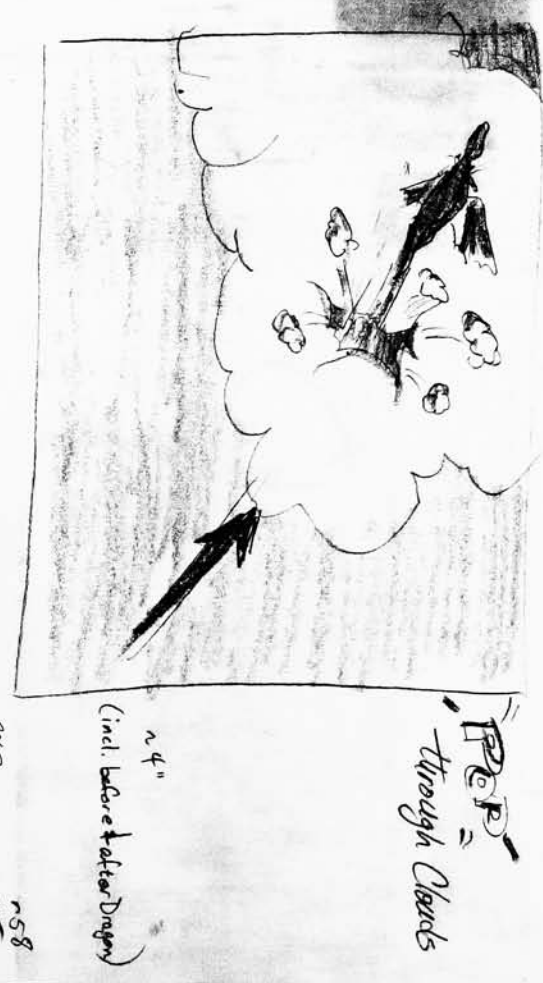
156  
1995 43



45  
DRAGON  
HIDING THEM IN  
THE CLOUDS.

~2-3"

(~1" before Dragon  
(~2-3" ~1" for Dragon to reframe  
2018 12018 ~1" after Dragon)  
~57



POP  
through Clouds

~4"

(incl. before & after Dragon)

2063

158  
46  
25

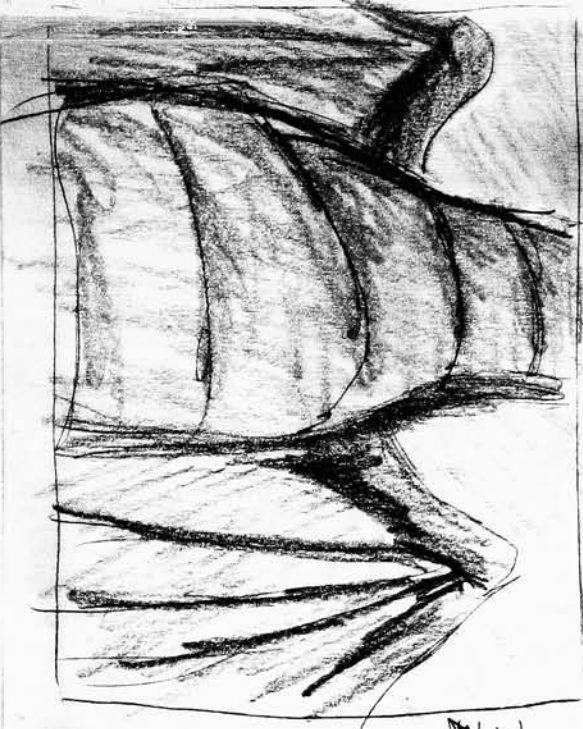


May Exhale  
Sweat Cloud 58  
from 5x

REV X  
96  
VER  
HARTY PRAISON

~2 1/2"

23516  
~62  
49  
12



DRAGON SWEETS  
UP THE SCREEN!



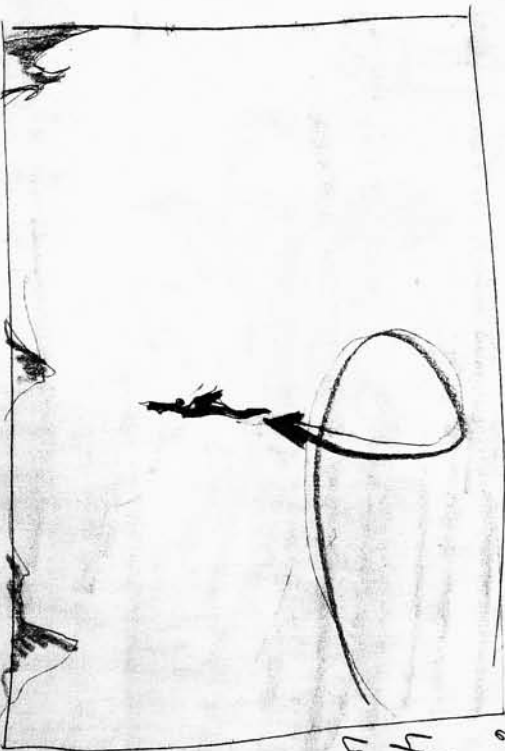
~3"  
2432  
~64  
51  
14



RIDER ON  
THE LEGGE  
OF HIS SLICKNESS.

~2 1/2"

2394  
~63  
52

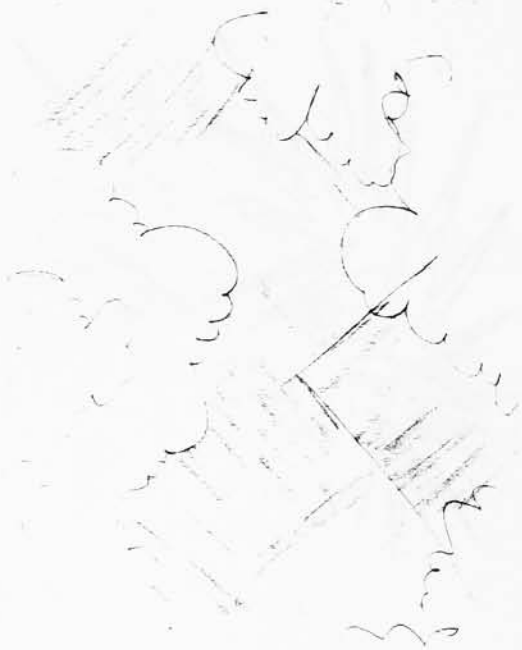


45  
LOOF-MEN  
NISE DIVE

~4 1/2"

~65  
2477 15 52





Red-tailed  
Hawk  
in flight  
nearby

10/1/67

2515 #53



Monarch  
Bird  
Sleeping  
in eggs

5/1/67

2613

#55



1/6  
Dragon Alarms  
on script  
change of  
direction and  
flapping the  
tree tops.

2/1/67

2583

#54



Bird gets  
blown out of  
nest,  
catches egg

3/1/67

2616

#56

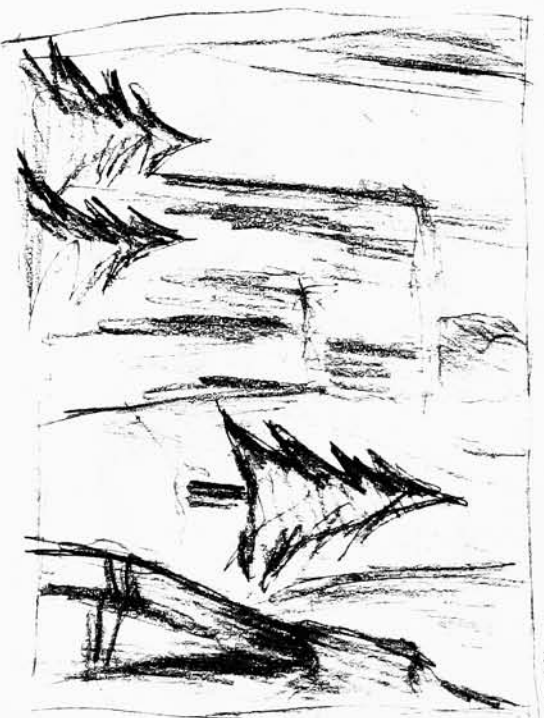


of  
TERRIBLE  
THREE STARS  
A 3rd Star is not  
P. 1st Star is the  
width of the tree trunk  
just below the set

2 1/2 - 3"

2749

170  
257



TRAIL IN

~~DEAD~~ MOUNTAIN SIDE  
DEAD, SHED  
(AND GETTING  
LARGER)

1 1/2" ±

2794

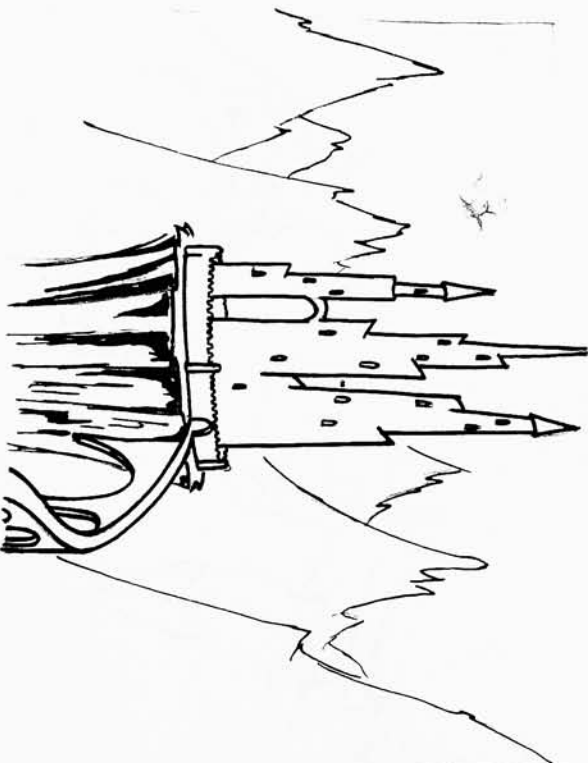
171  
58  
25



4.  
PIONEER  
ACREAGE  
HOUSE OF  
PIONEER  
AND DEPENDENT  
PIONEER  
HOUSE  
MOUNTAIN VIEW

2817

172  
54  
25



4.

RIVER'S POOL  
AS THE  
CASTLE NEARS.

(FADE IN)

[maybe tell frame  
as if figure is  
banking for a turn]

6" ± (1 1/2 8")

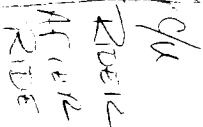
2817

173  
60



Depression  
LAD's  
THEN 6 yrs  
AHEAD

26



2065

53.



f + 12 =  
 12 + 12 =  
 24  
 24 + 12 =  
 36  
 36 + 12 =  
 48  
 48 + 12 =  
 60  
 60 + 12 =  
 72  
 72 + 12 =  
 84  
 84 + 12 =  
 96  
 96 + 12 =  
 108  
 108 + 12 =  
 120  
 120 + 12 =  
 132  
 132 + 12 =  
 144  
 144 + 12 =  
 156  
 156 + 12 =  
 168  
 168 + 12 =  
 180  
 180 + 12 =  
 192  
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 204  
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 336  
 336 + 12 =  
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 348 + 12 =  
 360  
 360 + 12 =  
 372  
 372 + 12 =  
 384  
 384 + 12 =  
 396  
 396 + 12 =  
 408  
 408 + 12 =  
 420  
 420 + 12 =  
 432  
 432 + 12 =  
 444  
 444 + 12 =  
 456  
 456 + 12 =  
 468  
 468 + 12 =  
 480  
 480 + 12 =  
 492  
 492 + 12 =  
 504  
 504 + 12 =  
 516  
 516 + 12 =  
 528  
 528 + 12 =  
 540  
 540 + 12 =  
 552  
 552 + 12 =  
 564  
 564 + 12 =  
 576  
 576 + 12 =  
 588  
 588 + 12 =  
 600  
 600 + 12 =  
 612  
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 1116  
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 1128  
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 1140  
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 2052 + 12 =  
 2064  
 2064 + 12 =  
 2076  
 2076 + 12 =  
 2088  
 2088 + 12 =  
 2100  
 2100 + 12 =  
 2112  
 2112 + 12 =  
 2124  
 2124 + 12 =  
 2136  
 2136 + 12 =

KIDNEY DROPS  
FRUIT DRAGON

laying down  
active telerig. then falling

102, 75

m/s

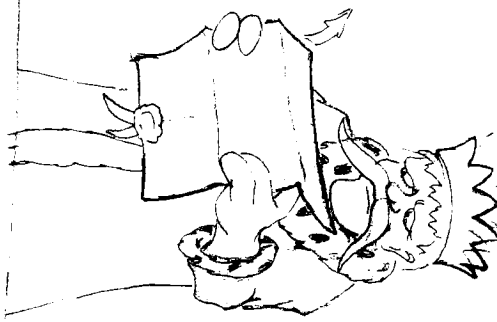
KIND'S SERVANT  
RETRIEVING  
LITTER



3110

64, 77.





m/s  
KING OPENS  
LETTER.  
(servant hands  
king the letter)

4"

65, 78

3170



KING LAUGHS  
AT LETTER'S  
CONTENTS.

"2x6"

66, 79

3230

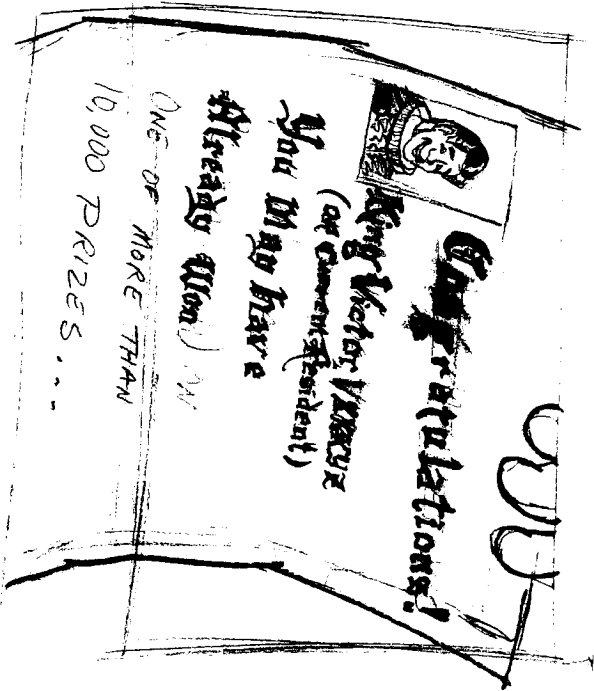


m/s  
KING SHOWS  
LETTER TO  
ACTIE / BRAGON  
LOOKS OVER  
HIS SHOULDER.

4"

67, 80

3208



4-5"

68, 81

3208



4224' x 14.6' x 14.6'  
 349'  
 3435 x  
 @ 15' x 500

DON'T FORGET  
 TO WORK OUT  
 THE END (2/4/4)  
 24

69 / 82

3577  
 3440

# **Production Stills**



