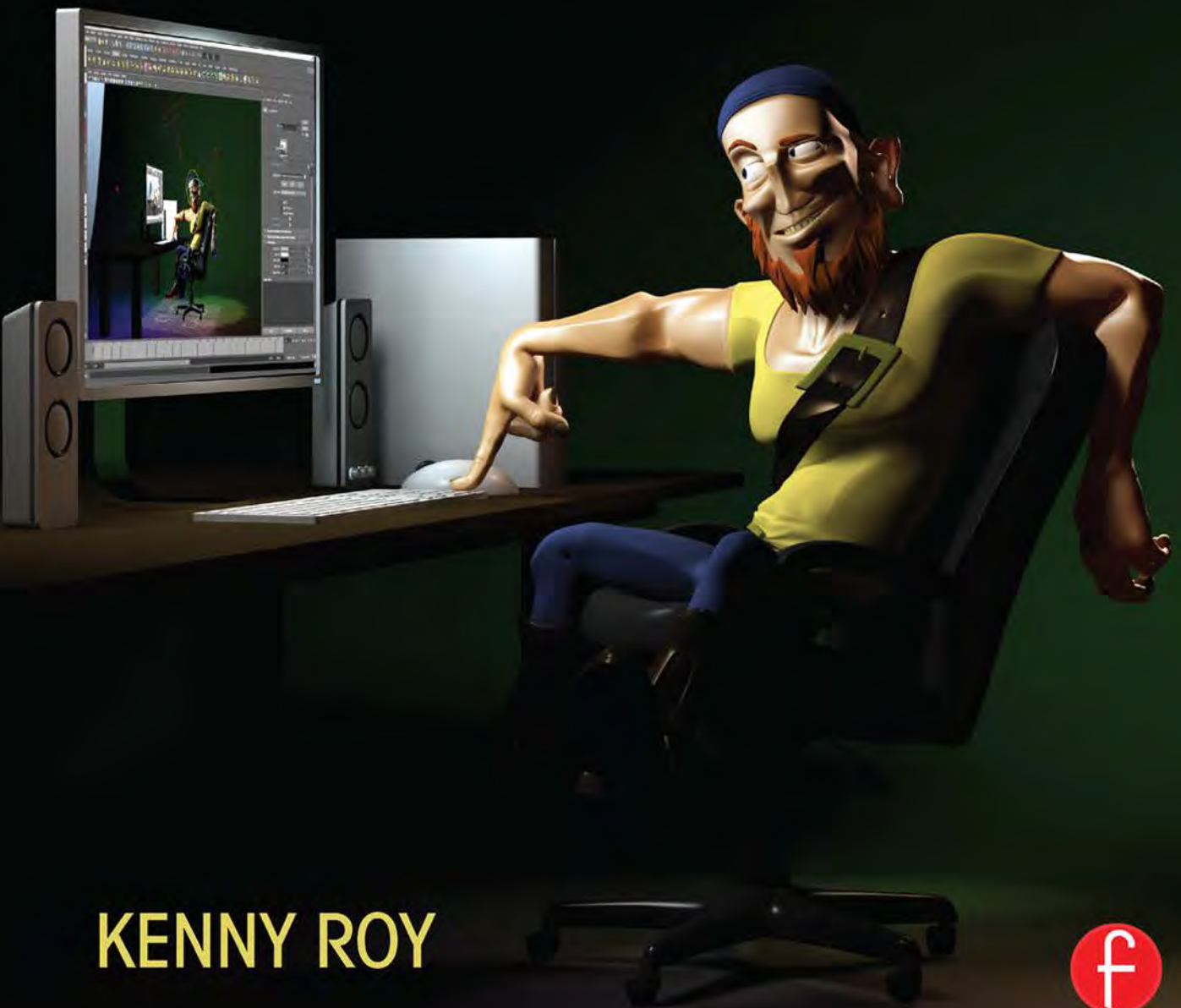


FINISH YOUR FILM!

TIPS AND TRICKS FOR MAKING AN
ANIMATED SHORT IN MAYA



KENNY ROY



Finish Your Film!

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Tips and Tricks for Making an Animated Short in Maya

Kenny Roy

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Pain is temporary, film is forever.

Three O'Clock High (1987)

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About Anomalia

ANOMALIA, the professional training and networking lab in 3D animation, trains professionals in the field of modern CG animation with a view to increasing the competitiveness of modern animation filmmaking in an overall European context.

About Media

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Foreword by Bill Kroyer

At last ... a book about how to actually *finish* a short film. The minute I read Kenny Roy's suggestion that you should avoid distraction by working on a computer not connected to the internet, I knew I was listening to the voice of someone who knows how to get it done.

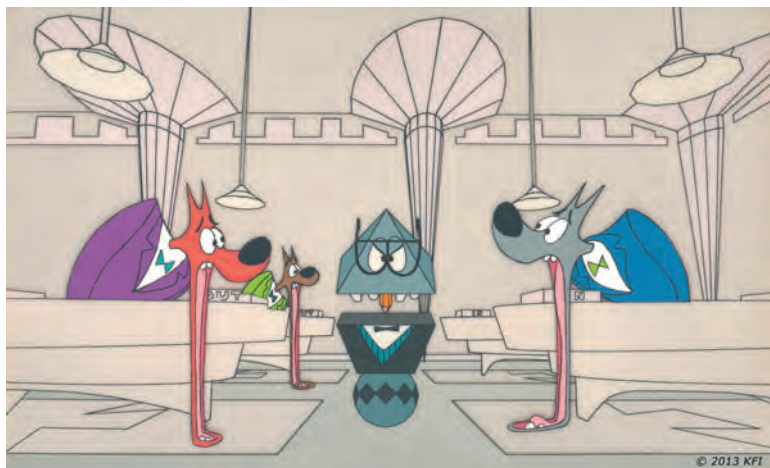
Of course, you can use your router's block settings to limit distractions, but should we get caught get up in these small details? YES! It is the small things that can stop you cold, derail your momentum, and prevent you from ever realizing that grand idea you believe you started with in the first place.

I recently spoke with a student filmmaker who had successfully completed all the animation tests for his film on his own workstation, only to discover in the last month of production that the render farm he needed to use for his finished product didn't support his rigging software. He had never tested that. He did a workaround but lost quality. His small oversight cost him, big time.

They say you can't think of everything, but actually Kenny has pretty much done that. From the big picture to the smallest tip, *Finish Your Film* is the book I will be recommending to anyone who wants to make a short. There's nothing more agonizing than having your visionary motion picture mired in production woes, and nothing more exhilarating than seeing it finished, on the screen, in front of a cheering audience.

The business is full of sad stories of projects that got derailed, and I've never seen a text that so thoroughly and deftly touches on just about every recorded pitfall—and solves them!

FIG 0.1



In the way-back-when days when I was lucky enough to train (on punched paper) with Disney's nine old men, we were taught the three steps of successful animation:

1. Idea!
2. Communicate!
3. Captivate!

You had to start with a terrific idea, one that would knock your socks off. But the greatest idea in the world is worthless if you can't *communicate* it to others. In animation, that means going through the complex process of creating and finishing an animated scene. I'm tired of being pitched "great" ideas. Show me, and let me see it being great. Let it captivate me.

In those days, doing twelve drawings for a second of movement was a lot of work. It took an infrastructure to finish a scene: desk, drawing disc, camera, lab, edit bench, movieola, projector, ink, paint, etc. Now every one of these processes lives in your laptop. Because of that we're seeing the greatest explosion of short film production in the history of the business.

The catch is that you have to know how to access, manage, and exploit all these wonderful new tools. When I made my short film *Technological Threat* in 1988, computer graphics was in its infancy. There were no online tutorials, no books on CG techniques, no YouTube how-to demos to watch. In fact,—we had to write the software we used in the film! It was a time when you had to invent your own filmmaking process.

The story of *Technological Threat* was a child of that situation. After my work on *Tron* (1982) I was hooked on the new frontier of CGI. I loved making the impossibly precise, complex, and geometric imagery a computer allowed. Being a Disney-trained animator, it pained me that I couldn't get the computer



FIG 0.2

to do organic, sensitive character acting. My idea was to exploit the best of both worlds: combine computer animation with hand-drawn animation.

So we invented a process where we'd model objects in the computer, render them as cleaned-up line drawings, then print them on punched animation paper. That way we could easily add hand drawing. That printer (a Hewlett-Packard rapidograph) could do a complex drawing in ten seconds. My character animator friends stood over that machine and felt they were witnessing their own doom. No human could draw that fast!

Thus—a story concept! I pictured a world where organic characters lived in terror of being replaced by computer characters. What could be more iconic than cartoony wolves? And for heavy symbolism we'd do the computer characters by computer and the organic characters by hand!

You'd think that would be enough, but as Kenny illustrates so well in this book, a concept is not a story! You need those classic elements of character, created world, conflict, and resolution. It took a lot of brainstorming, storyboarding, and gag sessions to make that concept (simple though it was) into a five-minute piece that explained the world, explained the conflict, and had a surprising, satisfying, provocative ending.

Remember: nothing is free in animation! Nothing just happens. You have to think of, create, and implant every last image and idea in your film. Don't think that just because you have something in your mind it will magically get on the screen. It takes work. We made a dozen endings for *Technological Threat* before we felt we got it right. The results were good; the film got an Oscar nomination, and I got into the Motion Picture Academy.

Today, as a governor of the Short Films and Feature Animation branch of the Academy I see a lot of shorts in competition. To me, the short film is the epitome of personal expression. It is every bit as artistically impactful as a feature because nowhere in the world is it stated that art must exist only as one length, or breadth or depth. *War and Peace* is 1,440 pages; the Gettysburg address is 268 words.

In an age when feature films can cost north of \$250 million dollars, with credit lists scrolling a thousand names, *one artist* can still make a short film, a film that will entertain, delight, and captivate an entire jam-packed theater.

You can do that—if you can finish your film!

Here's the book that will help you do that, written in language you can understand, illustrated with clear examples, augmented with tools and tips. Read it, read it again, and follow it. We'll be waiting for you in theater!

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Introduction to Short Film

Congratulations on embarking on the exciting journey of making an animated short film in Maya. Even though this process is long, difficult, tiring, and sometimes maddening, you are in good hands with this book. Before we dive into the technical and creative discussion of actually making your film, we should make sure you are up to speed on the overall concept of short film making. We need to be sure we know what we're getting ourselves into!

Key Characteristics of Short Filmmaking

The only technical characteristics you will find when researching short filmmaking is that the Academy of Motion Picture Arts and Sciences defines an animated short film as “not more than 40 minutes, including all credits.”¹

This leaves us with a wide-open idea of what a short should be, at least technically. In actuality, the fact is that most animated short films are between one and ten minutes long, with the average somewhere around two–three minutes for an individual effort and five–eight minutes for a group effort. Don't worry, you are *not* expected to produce a 40-minute masterpiece after reading this book!

So what are the characteristics of short filmmaking? To phrase it simply, I prefer to call what we are doing “short film making” rather than “short filmmaking.” This acknowledges the key technical and artistic differences between what we are doing and what the major studios are doing. Simply put, we are NOT just doing a shorter version of what Pixar or Dreamworks puts in theaters. We are NOT employing the same techniques and decisions throughout the process on a smaller scale. And most importantly, we are *not* operating with a mentality that our film will have the same scale as its feature-length counterparts.

The real key characteristic of short film as it applies to us animating at home is that we are going to be economical in all of our decisions. From story choices to character descriptions, our film has to convey as much as possible while still being possible to complete individually or in a small group. We will talk more about these decisions in the next few chapters, but suffice it to say that being economical does *not* mean being boring. On the contrary, some of the best short films in history are the simplest in both story and technical achievement. We will talk about how to strike the perfect balance in this book.

Learn to ask yourself, “Am I showing exactly what needs to be shown to get my point across?” and, “How can I improve the message and make it easier on myself to get this done?” These questions should be answered repeatedly throughout your production, not just at the beginning.

One of the last characteristics of this process that is worth considering is that it is *very* intensive and difficult no matter how much preparation you make or how economical you are in your choices. There are literally tens of thousands of animators around the world who have the technical skill to pull off a short film, but for some reason we don't see thousands and thousands of shorts every year. We see a couple of dozen. This should be a sobering fact and make you really consider if you are in the right place to make a film. Not just technically or with a good enough idea, but in the right place in your life to embark on this journey. To get a film completed you must sacrifice a lot of time and energy. You may work many late nights and weekends to finish it. Especially if you have a full-time job and a family, starting a short film should be a decision taken very seriously. The entire aim of this book is to get you to *finish* the film, so if you do not feel like you are in a good place to finish, you should not start.

Finish by Making a Plan

The first thing you need to do is create a plan to finish your film. The best advice I can give, repeated by all of the filmmakers in this book and by the many artists I've encountered in my career, is to set a rigid schedule to follow. If you are taking time off of work to complete your film, make sure you start at the same time every single day. Even if you only have nights and weekends to work on the short, the most helpful thing to do for yourself is to set aside time every day for your work. This schedule should be explained to your loved ones so that there is no conflict; a short film can be as stressful for a spouse and kids as for an animator. Better yet, post your schedule up where everyone can see it. This has the double benefit of not only helping everyone see your plan but also making you probably a little bit more responsible in keeping to the schedule since your family is watching!

Workspace is Essential

Having done a lot of freelance work from home, I can state with certainty that you have to separate your work area from the rest of the house. A room that can serve as your office is the best situation: you can go inside, close the door when it is time for work, and emerge only when you need to. Get yourself completely out of the way of distractions for the best chance of success.

If you don't have a separate room that can be utilized as your workstation, or if you have a shared workspace with a spouse or family member, the schedule will come very much into play. If you are a young animator still living at home with your parents, for instance, and your siblings have to use your animation computer for homework, then it is good for you to schedule your work time right after school; more than likely homework is going to hog the computer "until it's done," meaning that once your siblings get on the computer, they aren't getting off for the night. In this way you will get some work time in before the computer is hogged.

Older animators living on their own should still heed the workspace warning. From experience I can say that even when there are no distractions, having your workspace in or near your common area can lead to huge problems. First, you are probably more likely to take unnecessary breaks when you are staring over your monitor in the kitchen or the bathroom hallway. Second, you will more likely be able to keep your schedule if there is at least an area partitioned off for work; experience has shown that when you go into a certain area *just* for work, you are more likely to stick to the task. Your mind sort of switches modes when you enter your space. This also means that you should not be using your workspace for common purposes. Hopefully you have an animation computer and then as well a laptop or tablet

(or even another desktop) that you can use for other purposes such as emailing and web browsing. You should not be going into your work area to watch YouTube or catch up on Facebook posts in your breaks. Lastly, and perhaps most importantly, if you are working in your house all day without a separate workspace, you will start *hating* your house. I know it sounds weird, but there's a feeling that starts creeping in as you work for long hours in your home with no separation between workspace and living space. Your short film will be filled with struggles, frustration, and a ton of hard work (and that's if everything goes right). In the same way, you do not want your home life to encroach on your work: you have to be able to unplug after a long work session and feel like you are actually getting away from the film. A chance to unwind, relax, gather your thoughts for the next time you sit down for work. Earlier in my career I would really "burn out" my house by trying to work in the middle of the living room. The result was a very distracted animator always feeling like he was not getting anything done and then stewing on the work when it was family time. To really feel like you are getting away from the film when your work session is over is to give yourself the benefit of a daily sense of accomplishment.

Further Removing Distractions

There are even more ways to remove distractions from your work. If you have more than one computer it is much easier, simply because you cannot connect your work computer to the internet. This solves 90 percent of all problems to do with focusing. YouTube, email, Facebook, etc., are all going to be things that stand in the way of your finished film. You may not think it's possible to work on a film without a connection to the internet, but believe me, it is; in many VFX houses I've worked for, computers are disconnected from the internet to protect the secrecy of projects that clients are trying to keep under wraps. At those studios there are normally internet kiosks that you can use to check email or look at for reference once a day or so. Think about it; depending on which point of production you are at, there is very little need for internet access.

Many people don't have more than one computer or it might be prohibitive to unplug completely. The next best thing is to block sites on a schedule using your router's block settings. Almost all modern routers have a setting that will allow you to add keywords or URLs to a schedule that will block them. I am not afraid to admit that I have Reddit.com blocked at the office 100 percent, and that Facebook is only available on a schedule (I post status updates to my friends letting them know about new content and webcasts on kennyroy.com, so I do need a *little* bit of Facebook every day). A simple and easy way to make sure you are not wasting time on the internet is to adjust your router's blocking schedule to coincide with the work schedule that you have created. *Et voilà*, when you sit down, there are no cat pictures clawing your attention from your precious short.

Sound is even more distracting when you are in the zone. A pair of noise-cancelling headphones and a great playlist can also mean the difference between piddling along on your film and having really productive work sessions every day. Make sure the headphones are really comfortable though; even the best ones that I've found end up making my ears sore after six hours or so. I can't even *imagine* what a pair of clunky headphones would do to my poor earlobes.

For music, I've seen animators who can work to every type of music that exists. Death metal to dubstep, rock to reggae—all that matters is that you can concentrate. I have a very hard time focusing if the music I'm listening to has lyrics. But give me some sweet drum and bass and I go straight into the zone.

Beginning to Understand Short Film as a Medium

We are going to embark on a journey that hundreds if not thousands of animators begin each year but never finish. We will excel where others fail because of our understanding of short film as a medium, combined with the technical workflows lauded in this book.

What are some of these first considerations?

To start with, we should cast off any expectations of making a film that looks like a shortened version of, or a scene from, a feature-length animation. From a technical as well as story standpoint, trying to replicate the scope of a feature film, even a shortened version, almost guarantees us an extremely tough time. Our goal should be to tell a simple story using the most effective visuals possible. We should not measure our success by comparison to our favorite animated films.

As a medium, shorts endeavor to propose a very simple story with a clear standpoint on the part of the writer/director (in this case, it's the same person, so we will use just "Creator" when referring to you, both writer and director). Instead of a comparison with animation we see in the theaters, we will measure our success by how clearly and succinctly we tell our story. And to measure this is very easy; your friends, family, and fellow animators are wonderful critics to help you hone the film you want to make.

If a feature seeks to establish a world and tell a story about characters in that world, then a short builds on a world we are familiar with. That does not mean you have to base your short on Earth; it means that as far as possible you rely on the preconceived notions of the audience to fill in the blanks. Your story will therefore be simpler because you do not have to go against our notions of our world. I'm already getting ahead of myself; let's save that good stuff for Chapter 3 (Story).

As far as subject matter goes, shorts are wide open. They can be as silly and meaningless as you wish, or they can be serious and highly dramatic. A funny short is expected to have a big payoff. Serious shorts are generally expected to exhibit a point of view more dearly held by the Creator, since his/her singular vision is on display.

How to Use This Book

Whether you bought this book with a short film in mind or are planning on starting the entire process from scratch, you should definitely read the first three chapters all the way through. There is a lot of information presented in them that I have not seen assembled in a concise manner before. Many of the techniques for working with story apply even to stories that you have already created. It will be good practice to apply these story-strengthening techniques to your film even if you've had a clear idea of what you want to create for a while. Also, the Introduction to 3D Production chapter will give you a good overview of the whole process and inform you about areas which you might be lacking the technical knowledge to complete.

Once you have read the first three chapters, you should begin to plan and design your film. Then, when you are ready, you can move on to each chapter in turn as you arrive at those points in production, referring to the tips given whenever you are stuck. I do recommend, however, that you at least glance over the chapters before you begin any part of your film. This book was designed to help you avoid the common pitfalls of making a short on your own. For that reason you should consider almost all of the information presented to be much more than helpful hints; in some cases the techniques and strategies are the difference between newcomers finishing their films or not. When you have finished your film, hang on to this book! Doubtless you will want to do another, and you can refer to the book whenever you need a refresher or inspiration.

Introducing *Booty Call* and Our Supporting Films

Booty Call

In late 2011 I contacted the organizer of Anomalia, a workshop-style CG and animation course given every year in the Czech Republic. David was very receptive to the idea of me creating a Short Film Production class. He and I and 16 students from all over Europe gathered in the small town of Litomyšl and, in just two weeks, animated the film that is the case study for this book. The film is called *Booty Call* and is the tale of a greedy pirate named Babinksy who steals treasure from a ship.



FIG 1.1

I employed every single one of the strategies that are lauded in this book and for that reason we were able to complete the film in a short time. Of course, every production has its ups and downs, but in a production time of about ten workdays, our 'downs' normally only lasted an hour or so. In the end we all learned a lot, worked extremely hard, and are proud of our film.

All of the practical technical advice will be given in the form of tutorials and demonstrations, using the assets from *Booty Call*. When I have a modeling tip, I'll give you a demonstration using a model employed in the film. The same applies to our story discussion; I used the same story strategies to write the film you see here. When it comes to texturing, you will see the techniques described in this book in action.

You will also have access to these assets. I have included all of the Maya scene files and textures, etc., that you need in order to follow along with the book. Using these assets, you should be able to get up to speed very quickly even if you don't yet have your own film ready for production. By practicing with the assets included here you will develop the skills you need to habitually apply to your own short.

Supporting Films

Our book would not be the same without the filmmakers who have graciously allowed us to use their shorts to demonstrate concepts and further our discussion of the medium. Chosen for both the circumstances under which they were created (by either individuals or small teams) and their quality, these shorts will surely inspire and entertain you.

Adrift

Adrift is a beautiful short by Creators Ben Caset, Matt Smart, and Ben Clube. Set atop a flying whale, the short tells a sweet tale of the lengths we go to for love.



FIG 1.2

Beat

This incredibly imaginative short by Or Bar-El tells the tale of a worker caught in the drone of his everyday life breaking his routine and finding excitement in drumming his own beat.



FIG 1.3

Crayon Dragon

It's rare to get such a touching story in a simple package, but *Crayon Dragon* by Toniko Pantoja succeeds. Our only 2D animated example in this book, it holds up great among its 3D peers.



FIG 1.4

Devils, Angels, and Dating

This short, created by Michael Cawood and a team of artists spread around the globe, pits the Devil against Cupid in a fight for the affections of the alluring and buxom Lady Death. A great example of a full-blown home production gone right!



FIG 1.5

Drink Drunk

When all else fails, beg! That's the motto behind this simple yet entertaining short film from Leonardo Bonisolli. I admired the pushed style and the freedom in the posing, which is why it's included in the book.



FIG 1.6

Dubstep Dispute

All right, maybe this film is one of my favorites because I love dubstep. But on top of the awesome soundtrack, filmmaker Jason Giles shows you can lean heavily on visuals and a few gags to get an entertaining piece.



FIG 1.7

For the Remainder

This moody short by Omer Ben David exhibits an extremely poignant style choice paired with a morbid plot. It is a testament to how a strong vision can carry a film.



FIG 1.8

Meet Buck

This hilarious and stupendously animated short from Denis Bouyer, Vincent E. Sousa, Laurent Monneron, and Yann de Preval almost defies description. Suffice it to say, your day will be better after watching it.



FIG 1.9

Our Wonderful Nature

One of my favorite types of short is those that have a twist in the middle that throws the audience for a huge loop. Tomer Eshed executes this perfectly in this hysterical short.



FIG 1.10

Paths of Hate

Paths of Hate was created by multi-award-winning filmmaker Damien Nenow. Many aspiring filmmakers create a short with humor and appeal, whereas Damien's film is a powerhouse of intense visuals and a serious message that leaves you thinking for a long time after watching. Truly great.



FIG 1.11

Reverso

Rounding out our example films is *Reverso*, a brilliant blend of humor and wit from creators Kim Honma, Clément Lauricella, and Arthur Seguin. I really admire the animation style, and what a strong concept!



FIG 1.12

Finish Your Film!

No matter what brought you here, you are here to Finish Your Film. I promise that nothing will be more satisfying than the feeling of having completed your project. No pain is too great, no span of sleepless nights too long, no eyeballs too dry from staring at the monitor to make creating your own film not worthwhile.

I will be here with you every step of the way. And so, without further ado, let's get to work.

As always, Rock On.

Note

¹www.oscars.org/awards/academyawards/rules/rule19.html

Interview

Paths of Hate by Damien Nenow



FIG 1.13

What was your first experience of creating a short film?

As soon as I discovered the world of 3D graphics I got the impression that those tools were made for film. I ignored high school for several months doing flying spaceships and flights along complex corridors. My first film recorded as a video file was *UFO nad czajnikiem* (*UFO over the kettle*). The amazing epic about an ordinary kettle from the 3ds Max programme v2.5 was three seconds long, during which a spotlight moved over the kettle from point A to point B But seriously, I made my first short film in the last year of the art high school. It was about five seconds long and its title was *Ars Creativa*. The most important experience I gained working on that project was waking up from the “high” of slickness. It is very easy to relish the availability of the many effects in computer animation. *Ars Creativa* was crammed with all things possible. I’m ashamed of it even today. I learnt that films are not made of special effects and technological show-off.

When you felt technically challenged or blocked, what was your go-to resource?

The biggest problem with *Paths of Hate* was the fact that I wanted to create something fresh and artistically new at all costs, using a technology that is optimally designed for photo-realistic pictures. It was difficult to find any sources that would have made this task easier. All problems were solved by applying many techniques intended for completely different purposes. Those were weeks or months even of tests and trials. There are no handbooks describing the creation of new solutions.

What were some of the biggest challenges in creating your film?

It is probably easy to guess that the clouds sets were, definitely the most difficult and challenging elements to create in this film. It is always difficult to create clouds in 3D. Especially if you want them to look photo-realistic. Having them realistic and stylized at the same time was even more difficult. Choreography and dogfights and camera animation in *Paths of Hate* are very spacious and dynamic. So the clouds sets had to be completely three-dimensional. There was no way to use any kind half measures such as flat, fake, matte painted plates or stock shoots. Of course, you can always use

volumetric solutions. But they are very hard to control, and very slow to render. For clouds sets that big, it is almost impossible to control. I wanted to have full control over the shape and lighting in my clouds; they had to be geometry-based.

What was your main focus in completing this project? Completing a film? Making a statement? Getting a job?

Pure artistic calling. This is not a joke. I really wanted to make a film out of passion and so I did. That gave me huge satisfaction. From more down-to-earth motivations: I'd already had a job and had done several shorts. I dreamt about festival success. I wanted to create a film which would be watched by thousands of people, not only my friends and viewers at local screenings.

Did you employ any organizational tools such as charts or calendars that were pivotal in staying on deadline?

Paths of Hate had a lot of takes for a short—over 200. Plus there [are] a myriad composition layers—sometimes over 40 per shot. There are no such masters who would have it all in their heads. Fortunately, I managed to fit it all in one huge spreadsheet table. We would change colours of rows from red to green. We were sometimes so excited by the number of “greens” that we'd remove singular “red” shots so that they didn't spoil the green whole.

Was there another medium you considered for this short film? What were the benefits of working in the medium you chose?

I was thinking about combining 3D animation with classical, frame-by-frame 2D animation. These were just a few attempts. The effect was distracting. It focused the attention of the viewer who would wonder about the reason for applying the technique instead of focusing on plot and narration. Frame-by-frame animation is a particularly time-consuming medium. It complicates the pipeline of the project and makes it difficult to gather the team. I decided to make the whole film in 3D. Such a dynamic and dimension-focused theme as plane fights requires a three-dimensional medium. There was no other choice here.

What were some of your favorite tools to work with? What did they do to increase the quality of your film?

Almost the whole film was made using 3ds Max. Composition in After Effects. These are basic, well-known tools. We managed to do without specialist programs and plug-ins. I love mixing simple techniques and tools used for extremely different goals. I like 3ds Max a lot. It gives a huge field for using the tools “against the instructions.” Some effects could not have been achieved with the use of existing tools, e.g. the clouds. It designed a pattern of creating my stylized clouds consisting only of the available tools, sometimes very surprising or old-fashioned ones. This effect still cannot be achieved even with the use of specialized tools for generating atmospheric effects.

What were some tricks to keeping you/your team motivated during this film?

Passion. If you carefully pick a team of people for whom work is more than making money you know you hit the spot. Shorts are rather not profitable; it's a job for real enthusiasts.

What sort of problems will someone likely run into when creating their own short film?

Shorts are sometimes a trap. They are usually flexible when it comes to deadlines and you make them with passion. You can easily fall into a never-ending process of perfecting things. It's a vicious circle. Frequently the author or individuals on the team are in control of huge part of the final effect. In such

conditions it is easy to lose the distance. Many short films were never made because the authors would incessantly correct the already perfect elements and forget about the rest of the film. Young authors of computer animations are frequently impressed with the inexhaustible resources of options and effects. I know it from experience. They forget what their film is and create meaningless technological show-offs. It also happens frequently that the directors of animated films are at the same time very good graphic artists: they make a lot of graphic-related work in their films. They are so excited with the production that they ignore conceptual work and immediately start generating assets. Then they work on details for months, create beautiful sets and then realize that they haven't even written the script yet.

In your opinion, what are the must-have skills that a person needs to create their own short, and what can be learned along the way?

You can learn or work out almost everything. Animation is a very visual medium. You can certainly use a bit of artistic sensitivity. On the other hand, an animated film is still a film. Animation is just a technique. Film language and certain rules are the same. You need to know about editing and directing. It is worth remembering that animation broadens the spectrum of available means of expression in film almost into infinity. However, I think that it's like running—first you have to learn to walk. Picasso first perfected his workshop creating realistic images of nature and only later started deforming reality. It's like that with film: it's worth know[ing] the basic, academic rules of the art.

How did your workflow/pipeline for this short differ from other pipelines you have been a part of? What do you think was the reason behind this change (if any)?

Workflow in *Paths of Hate* was definitely simpler than in case of a standard 3D project. Mostly because of a small team. I wanted to control a lot of elements so I worked on them alone. In such situation workflow is an abstraction, really. Everything is in my head so I know what I have and don't have, what I'll need in the next stage. The small team was also the result of the limited budget and people's availability. The majority of my colleagues were busy working on commercial projects of higher priority.

Was there a moment you knew your film was going to be a success?

In a sense—positive reception of the first teaser. We knew then that we'd hit the spot. If the film worked could only be checked after finishing the layout. During its first local screenings the audiences loved the film, but we only found out if it was a success after its first big festival screenings.

Describe your process for coming up with the idea. Did you build around a simple idea? Cut down from a larger idea? Explain.

The idea appeared six years ago, when I was still studying at the Polish National Film School. It was my own idea. A very simple one. It is not complicated, dynamic and surrealistic anecdote. A story about [a] duel which may not be completed without losing one's humanity. I'm a huge fan of aviation. So, let's say that I just couldn't imagine a greater subject for dynamic animation than a duel of two fighter planes. I don't want to spoil it now, so I won't tell how the story goes and how it ends.

I want to show one thing, however, which might be considered as the most direct reference for the story and idea behind Paths of Hate.

There was a photo that I saw, somewhere. These are pictures taken probably in London during [the] Battle of Britain in 1940. As you can see, there are hundreds of white lines left by fighting planes. It looks a little bit like scars. I thought that some of them were the only remains that were left after planes and pilots who didn't survive this fight. There must be thousands of stories behind them. These white trails are the most important elements in *Paths of Hate*. I have named the film because of them. These are the paths, from the title.