

MATTHEW HORNBOSTEL'S GUIDE TO MAKING MOVIES

(Advice from a “No-Budget” director to other “no-budget” directors.)

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INTRODUCTION

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Hello. My name is Matthew Hornbostel, and I'm a low-budget movie director. I am not the best out there but I'm getting better over time. This extensive text guide is based on my experience.

There's one thing that will take you from producing garbage to making great entertainment. That one thing is PERSISTENCE. Your first movies will suck, that's pretty much guaranteed. Mine did. Most of the good directors in Hollywood started off with pretty embarrassing work. The question is, do you love making movies enough to keep trying? Are you prepared to learn your craft to the point where your work is good? You need to know that the best stuff in life is hard. Success always takes a lot of work, and require personal sacrifice. What's cool about making movies, of course, is that the "work" is sometimes so much fun!

Because it's fun, though, people will tell you it's a waste of time. Don't be surprised if somebody says you can't make it in this career. Don't be surprised if people tell you your movies are awful.

It's true, this is a competitive field. There are lots of people trying to break in, the salaries are great at the top but not so great for the majority of people in the industry. Don't expect to get in easily, I've been learning for eight years and still have no "conventional" career.

But this route - making movies on a low budget - is actually the best way in. Internships pay little to nothing and don't give you the same creative freedom or diversity of practical experience. Film schools are pricey and often dated in their approach to the subject matter. (Digital is in, and film is all but obsolete)

Have you dreamed of being a movie director?

Stop making excuses and just go for it - make a movie!

It can be done cheaply.

It doesn't require millions of dollars.

It doesn't even require \$5,000.

You can make great-looking stuff for next to nothing. Salaries make up 95% of Hollywood's budgets. If you are working free, and your cast is working free, you will find that your expenses are minimal.

You can make something that is entertaining, exciting, and fun.

You can do this!

Have you seen the trailer for "Duel 2030"?

Hundreds of people have. It's an action flick with over 100 high-quality VFX shots, miniature pyro, digital extensions, costumes, a full-scale set, bluescreen compositing, props, makeup, its own musical score, and more. All in a \$550 production. It's possible to get good "Production Values" and VFX done cheaply. It's possible to make a movie that looks and feels "Hollywood"-ish, spectacular and exciting, and to do it with very limited resources. I've done that, and I'll show you how to do that, with examples from my work. (To see what I'm referring to, note that my videos are all available at <http://www.hornbostelmedia.com>. But you already know that!)

PLANNING

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Here's the thing. It's not simple to make a good low-budget movie. You can make a movie, with no plan, no script, no equipment, nothing but a used \$90 camcorder, several friends, and imovie. But it's pretty much guaranteed to be trash.

(Actually, even well-planned movies often end up as trash)

If you want to make something good, it will take some time and commitment. And some of that time should be put "up front", in planning the whole thing. I have traditionally put way too much emphasis on postproduction, not enough on story. You'll find that a lot of my advice comes from personal experience - failures and mistakes as much as successes.

Anyway, why spend hours making something if the basic plan was severely flawed in the first place?

It may actually take more time without a plan, and will invariably turn out worse. Without a plan up front, you'll have creative problems, financial problems, technical problems, etc, and you'll find yourself dealing with them during the production.

Your plan may be divided into four categories, or may just be a script (for a simple project).

Four Categories: Script, Budget, Cast List, Schedule.

If you have limited resources it means you need to be more careful and efficient, not less.

And don't tell me that "everything goes wrong, why have a plan at all"? I felt that way on the Troop 4 movies. They did not live up to the potential of the original scripts. I made sacrifices all over the place and found myself resenting the kids because they had no concern whatsoever for the quality of the movie. They didn't believe in the project the way I did.

Unpredictability is huge on no-budget movies. Your unpaid actors will decide arbitrarily not to show up at the last minute. Locations aren't on a soundstage, so weather and location owners will be problematic. You'll have to make production compromises when you don't have the money to do what you'd wanted to do.

But if you have a plan, that still is a good thing.

Just roll with the punches and know ahead of time that some things will fall through. And always have a backup plan ready in case something goes wrong.

You need to start with some essential questions. How much time do I have? How much money do I have? What people are available to me?

Start there and design your movie in context of your existing resources. Don't try to tackle too much at first, you will be discouraged. Don't aim for something you can't afford to do, logistically.

My first videos were almost all a minute or two in length, sometimes 20-30 seconds! You don't need to start that small, but you shouldn't tackle a full feature film on the first try, either.

An idea which has always served me well is to emphasize quality over quantity. If I can't do a really fun 90-minute movie, I'll do a really fun 15-minute short, instead of a slow, boring 90-minute movie which doesn't have enough content or resources to justify the length. Short videos are great fodder for internet distribution anyway.

There's something to be said for doing a little project and showing it to friends, as a stepping stone to bigger projects. That first project can serve as a hook, that makes other people want to help with the next one you do.

I did my old videos without anyone else participating. Once I'd built a reputation, though, more and more people wanted to get involved.

Tips for planning efficiency:

-Know your resources and schedule around them. If you have a person who's only in town briefly and you want them in the movie, make sure you shoot everything you need from them on the days they're around. "Send in the Clones 4" was nuts in this respect. I interviewed all cast members ahead of time so I'd know when they'd be available and when I should schedule the shoot days.

Also keep in mind that judicious editing can make the audience believe two people are in the same scene when their scenes were shot days apart. You just cut between them, back and forth, or do some compositing, like in the second Troop 4 video with Minhthien and Anthony.

-Keep in mind location shoots have the same issues. You may need to schedule around when a location is available to you. You may also want to shoot at times when there aren't a lot of people around because crowds can ruin a location shoot. Most people aren't up early in the morning right after the sun rises, so that may be a good time to go record a scene in a public place (if you can get your cast to wake up that early).

Renting equipment is an option, or buying it then reselling it.

That's a great way to keep costs down, but only if you are only planning to use the equipment for that one project.

Borrowing stuff from friends is also a good thing to try.

-Label all your tapes so you know what's on them. Store them all in one place so you won't lose them. Similarly, all project files on your computer should be well-organized so that you can find them.

SCREENWRITING BASICS

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An indie movie director is a jack of all trades, because he (or she) HAS to do everything.

So, since I'm a writer/director/producer/actor/editor/sound designer/VFX artist/distributor, I have a writing perspective built upon the design of the finished product.

I know what I write on paper must be created visually later.

Video is a visual medium.

So, my writing must reflect that. When I write a script, I see every scene in my head. I'm thinking about the people, the locations, the effects, the editing. I'm thinking about what it looks like, before I've recorded one second of actual footage.

Rule #1: Write visually.

Your script shouldn't be nothing but dialogue. Something should always be happening. If there must be dialogue, break it up so it takes place in a variety of locations with different visual components, or the characters are doing something as they talk. (drinking coffee? Walking? Cleaning a room? Climbing a hill? Driving a car?) This is much more interesting than a flat conversation in a single room.

Whenever you can convey through image instead of words, do it.

You don't need the character to speak about how they feel, have them show it in their faces. Elicit reactions. If your character has an opinion or emotional connection (or repulsion) to something or someone, find ways to convey that without words.

If you think about it, you can say a lot about a character through where they live, how they decorate, what they wear, how they behave socially and in private. This sounds incredibly hypocritical coming from me, I know. You're going to say, that I don't actually develop my characters well at all. And you would usually be right. Often the real limitations of a project force compromise in various ways. I certainly know that slim resources tend to severely damage the original vision you have for your work - but you work around your problems where possible.

The issue of actor-based writing will be discussed later, in the casting/acting chapter.

One thing to keep in mind: The better your script is, the easier it will likely be to convince other people to join your production.

In my view, some of the better works on the subject of screenwriting include "Lew Hunter's Screenwriting 434," Lajos Egri's "The Art of Dramatic Writing," and Bill Martell's practical, no-nonsense series of screenwriting "blue books".

COMEDY WRITING

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People ask about what I'm thinking when writing my comedy. I pretend that I have some master plan but I really don't know what on earth I'm thinking when I write some of the stuff, other than that it's funny to me (if nobody else).

I've tried, nonetheless, to parse what it is that makes something funny. Here's my best guess:

-Truth, releasing tension. Often comedy is a way of getting at the more unpleasant truths of a subject, of releasing a sense of tension about "serious" or "bad" things. That's the whole focus of my "Troop 4" movies, this acknowledgement that I have a really messed-up boy scout troop - and that I can cope with the frustration of the things that irk me by making fun of them. In "Send in the Clones 4", when I issue this whole pessimistic monologue, it ends in "Happy Birthday!", which completely punctures the atmosphere. And makes it funny. Over and over I trivialize violence. Action writers tell you not to do that, to make it feel "real" and painful. That's true, if you want to generate a sense of pain. But the choice to make a comedy prods me to do the opposite - to take the surface of the action flick and cartoonize the violence and make light of the pain.

-Relevance. If the audience doesn't get the joke, then it's not funny. Example: I show "Send in the Clones 4" to the youth group, they knew my references and laughed over and over. I showed it at Bohemeo's, they didn't laugh. Partly since they didn't get the jokes, also the sound played so badly the words were hard to hear.

-The unexpected. A rehab program isn't funny. A rehab program for Trekkies is. ("My name is Bob, and I am addicted to Klingon uniforms. Ker-plagh!) Take the ordinary assumptions and do something bizarre with them. I do that a lot, and sometimes the effects scenes in the comedies get the biggest laughs, because they're often the weirdest parts.

-Embarrassment. We like to see other people look like morons. It makes us laugh and feel better about ourselves. "Napoleon Dynamite" is a good example. And oddly, we can often identify with such characters. Charlie Chaplin absentmindedly eating party streamers as though they're spaghetti is funny to us, and yet he's the one the audience is rooting for! (Hurford Blumper in my video Super Soda is another example of this phenomenon.)

-Combining two different elements. How often have we seen buddy comedies? They're everywhere, for a reason. But we're not just talking characters, we're talking about everything. Try combining unexpected things, like, uh, musical pants, squirrel superpowers, or

a balloon being used as an ineffective paperweight. (Somehow pants are often funny. Just combining things with pants makes them funnier somehow.)

-Exaggeration. A classic Steve Martin article is about a headache medicine with a long list of deadly side effects, including headaches. Because that's what headache medicine is for, to cause headaches. It's funny as it is truth exaggerated - I mean, who hasn't seen ads for medications with a long list of side effects?

What isn't funny: cliché. The above listed joke has since evolved into a cliché. Making fun of it now won't be as funny because everybody has heard it before. Buddy comedies, also listed above, are a cliché. I mean, if you come up with yet another pair of quiet-slow-large character with hyper-impulsive-small character, you probably are not going to surprise anyone, you're just rehashing the most banal and predictable buddy comedy stereotype. Unless one of those characters is really unusual in some other way.

Though, I admit I've taken a fair number of cheap shots myself - I mean, what was the Hurford Blumper/Zachary Bang duo if not a variant of that same comedic stereotype I am supposedly saying you shouldn't use? But even they had a few other quirks that made them a bit "more" than the stereotype alone.

So, yes, definitely take whatever joke works, and re-use it. But if you do, keep the core of it while changing the details so that it doesn't look like you got it elsewhere. And be really original where you can.

And two other things to look for: speed and variety. Speed of humor is good, if one joke doesn't make the viewer laugh, the next one might. Making a whole string of gags raises the odds that at least one will hit the comedic mark. Variety is critical. If your jokes are all over the place, it creates a sense of the unexpected, which is great to do. And different people have different tastes, so aim for range. Note that women tend to prefer verbal humor, and men tend to prefer situational or visual humor. If you can, mix both of those two fields of comedy, the words and the images.

Dirty jokes - They can be funny, but also can backfire badly. My belief is that dirty jokes should be used sparingly. If it's funny, use it. If nobody thinks it is funny, then it is not only not helping the movie (like other types of unfunny jokes), it is hurting the movie and alienating the audience. When you look at my "Troop 4: Uncensored, pt. 4" script draft, note that I took this risk periodically and I'm not so sure it was a wise one to take. So we should use dirty jokes only when you feel the humor of it clearly outweighs the "yuck" factor of the joke.

Let's talk screenwriting. First of all is format. In my early videos I never used Hollywood screenplay format because it doesn't actually matter - if you're not working with pros, you won't offend anybody by writing in a nonstandard form.

Nonetheless, here's a format reference:

<http://www.screenwriting.info/>

One other bit of advice based on my personal failure - don't get hung up on in-jokes or things that your friends get but the public won't. That's OK for small early projects but know when to move on! When people in Redeemer watch Clones 4, they laugh - when others do, they are typically puzzled - they don't know the cast and most likely haven't seen the previous three videos in the series. So, yeah, try to focus on "universal" concepts that a lot of people will get - if you plan to show the video to lots of people. "Duel 2030" for instance, is far more accessible and shows my recent shift in the right direction.

You can write around people, as previously discussed. You can also write around locations. What are some neat places you have access to? Think about using them.

One of the core bits of advice given to writers is, "write about what you know." If you write about something you don't understand well, then do some research before tackling it. One caveat is this rule of thumb: Make occasional leaps of believability in an otherwise realistic story and the audience criticizes you for it. Ignore believability constantly and somehow the audience accepts the work as fantasy and just goes along for the ride. So go for imaginative fancy or realism, but be careful when combining the two - if you do, make sure the fantastic elements at least have an internal logic to them.

PREMISE

A story may have a clear premise or theme. A premise is usually worded in the following way: "Subject causes Result". As in "True love persists even in death" (Romeo and Juliet), or "Power corrupts those who receive it", or...

Well, you get the idea...

A theme is similar, it would be a central concept or idea. It might be "suffering" or "peace" or "truth" or "hope", it's an idea your script explores.

I don't advocate saying too much outright. You're not meant to give an argument, remember a successful movie is "entertainment-centered". Generally speaking, if your movie is fun or engaging or "interesting" in some way, it will be popular. I am a Christian and I can no longer justify avoiding moral issues completely - but I also

acknowledge the old Sam Goldwyn adage, "If you want to send a message, call Western Union."

So, if you want to have a theme or premise, weave it primarily into events, not dialogue. The characters and plot of your story, will "inadvertently" raise your theme without you saying it outright. Your theme/premise is expressed in who your characters are, and what they do, more than anything they say.

A questionable example from my work is "Traveler's Enigma". In that work, popularity wasn't my aim, entertainment wasn't my sole aim. I wanted to say some things which I felt needed to be said.

Even in that case, though, I made certain to load the product with interactivity, striking visuals, good sound design, etc. Even when I violated my own core rule of "subdue the messages and philosophy in favor of entertainment", I still DID take entertainment value into consideration.

Maybe my best example of a premise subtly integrated into an entertaining movie I made is "Super Soda". The premise is that "corporations should have concern for the welfare of their customers."

The two threads - Super Soda, and the malicious corporate empire setting out to kill people, and the more subtle "99-cent games", with its mediocre products that underwhelm its customers, tie into the premise.

Both of these companies are ruined by the movie's end, by protagonist Hurford Blumper, reinforcing the idea that, in the long run, immoral organizations are doomed to be destroyed by those who are decent and honest (if a bit obese).

But I doubt many viewers feel that I hit them on the side of the head with this premise, because the way in which it was developed was funny, with memorable characters, surprises, and cool VFX.

And I only conveyed the premise in words a handful of times - all in the context of Hurford's frustration with Zachary (another character) or his conflict with Super Soda.

If you can take a large conflict as your subject, or a historical event or social issue, you must view it through the eyes of your characters. In "Titanic", James Cameron didn't try to give us insight into the full tragedy, he limits our emotional connection to two characters he develops. When Jack dies, we are supposed to feel for him, and gain some understanding of the reality of the whole event through our connection to only two key characters.

So, yes, condense social or philosophical/moral/world conflicts to interpersonal conflicts. It often works better that way.

Keep in mind Social Learning Theory. People learn by action, result, analysis. We do something, something happens as a result of our decision, then we learn from that result.

A kid touches a hot stove. (Action) He gets burned (Result), he decides not to touch a stove again (analysis)

People also generate analysis in the same manner by watching OTHER people's Actions and Results.

That includes watching movie characters.

So the results of a character's actions tend to generate conclusions in the audience's mind about whether or not THEY should perform that action. However, the results must also be convincingly logical in context of the story.

Don't overdo it.

Definitely make things go wrong sometimes. Because real life isn't 100% fair. Movies shouldn't be, either.

So much for ideology in movies. I'm sorry, it's just that I have beliefs and values, I'm sure you do too, this whole segment just discusses how to express them in a measured way.

I might argue, structurally, that action, result, analysis, actually IS everything in a movie.

The characters play against each other, and the situation builds as a sequence of actions and reactions between characters and larger external forces.

Some writers say, that their characters are the ones writing the story. It's sort of true, because a good writer, having defined the traits of his/her character, always makes sure that character must react in ways appropriate to the character's nature.

THE HERO.

A hero (or protagonist) is a standard in movies. And a villain/opponent is standard fare, too.

Several rules about what mainstream audiences want a hero to be:

-Flawed. Your hero cannot be perfect. People find it easier to identify with someone who has some issues or flaws, who isn't perfect.

-Fundamentally Good. Your hero is usually sort of a good person, despite flaws. Not always - some movies have "anti-heroes" who are actually pretty evil. But even anti-heroes often have some redeeming quality.

-Weak. Your hero isn't particularly powerful. The villain is the powerful one. That makes the path of the hero that much more tense and engaging. You don't want a "Superman" - you want the audience to believe your hero could actually lose.

-Reactive. Your villain is the one generally responsible for the situation/problem. Your hero is reacting to it.

-Determined. Your hero generally makes up for weakness with

determination, hard work, and probably some degree of cleverness and creativity.

These are archetypal standards. Don't hold slavishly to any of these rules, of course, but they're common precisely because they tend to appeal to audiences.

One other thing to point out: Randomness and coincidences are usually unacceptable in a movie, more so than in life. Audiences like to see the outcome determined by clearly defined people/things in a story, instead of stuff that comes out of left field. You might think you're awfully clever having a showdown of wits between two characters in a jungle, only to have the villain suddenly mauled by a leopard that the audience did not know existed. But it is a terrible idea, because it robs the conflict of its anticipated climax. Events and endings must follow from the previous events, conflicts evolving from previous conflicts. Logical cause and effect should be the norm, not arbitrary surprises. Even "fantasy" films should operate in this way, based mostly on characters' actions and not random chance.

DENSITY.

The absolute WORST thing you can do is make a boring movie. Your goal as a moviemaker is to ensure that nothing in your movie - not one scene - is boring, even when it's honestly jaw-droppingly bad, it should at least be amusingly bad, entertainingly bad. So much of my work has been bad or awful, but it is at least not slow or boring. This is a constant struggle and I've failed in it a lot.

Everything in a movie should do one of three things:

-Develop the plot.

-Develop character.

-Be entertaining or emotionally involving - exciting, scary, sad, funny...

When possible, do more than one of those at a time.

If a scene doesn't do any of those things it's dead space. Cut it.

"Point of no Return" used to be 3 minutes longer than it currently is. I thought there was too much dialogue, slashed a lot of nonessentials out, and that made the video a lot better.

If a line of dialogue doesn't get anything done, cut that part of the scene. Cut out every extra second where nothing is happening at the start or end of a shot.

I'm really into VFX, and into comedy, conventionally. These seem like they have entertainment value, they add to the experience.

Good action sequences seem to be big attention-grabbers.

You can get away with cornier production values in a comedy - they may add to the campy fun of a comedy, but always detract from a serious story.

Of course, writing comedy poses a lot of challenges of its own.

Like, actually getting people to laugh. Which is kinda hard.

If your idea doesn't have enough substance to justify a long movie, then make it a short movie. Keep it dense. Keep it fast. If you want a long movie, then make the plot more complex - but don't stretch material and create a lot of filler and fluff.

DRAMA VS. MELODRAMA.

What is drama? Answer: Interplay between a character and his situation, and the way that character reacts to, and influences, his situation. Characters can and should have emotion in a drama, as a way of reacting to a situation. The character observes something happen. The character reacts in some way. An emotion? A responsive action? In some way, the character reacts. And if that action influences another character, then THAT character reacts. As I said earlier, all of this is action-reaction. That's all it is. The reason my movies fail at drama is (beyond limited emotional range, which is both my fault and the actors' fault) is because they are often cutting between so many threads, they don't develop those strings of action-reaction well. The drama is watered down by jokes and action sequences. People like those things and I like them, too, but I want to do drama better in my future movies. Because I'm bad at it and want to improve.

MELODRAMA is unconvincing drama. It's when the reactions are fake. You know what I mean? Like, a person goes from partying to sobbing to kissing in 35 seconds. Melodrama is where you don't see how the event caused the reaction. It's shoddy writing and shoddy acting that fails to take the time to get the audience to understand why the character is reacting, emotion or action-wise, the way they are. I am SO undeniably guilty of this, my characters don't often justify their actions too well, notably violence. Action movies, said Jack Nicholson, are melodrama. Not always, Jack. They only are if there's no good reason why the action is happening. Which I think is a major problem in some of my movies.

If we can come up with a good motive for an act of violence, so much the better. Insanity is an unacceptable motive unless we have some reason why and how the character is insane. Which I had no such reason for Minhthien in "Troop 4, pt. 3" (at least I had an amusing explanation for his damaged psyche in my part 4 script.)

Revenge is a pretty cliché motive for violence, and commonly used. Greed is another. A desire to rescue someone that is loved, or to "Save the world" - these four are about the most common and generic. A smart writer can develop something more interesting than this. I certainly want to get to a point where I do better than this!

It's easier to get a good motive for your hero. It's tougher to figure out why your villain wants to do evil. I am bad at this and want to learn more. I haven't done a movie in a while, but I keep

reading writing books, and directing books, and trying to figure out what movie I want to make next after "Traveler's Enigma" is released. I'll promise you this, it's NOT the Troop 4 script. It'll be something character-driven, dramatic, and relatively mature, with maybe a few glimmers of comedy and/or action.

To any of you directors, try to maximize your good points, but also try to develop skill in areas where you are weak. You need all kinds of skills to make a movie well, social skills, technical skills, writing and story-telling, visual art... It's not a simple job, in the least. It's incredibly demanding - but also sometimes very gratifying. If you're aiming to be a writer, director, whatever, do what you can to build a full, useful range of skills.

But: I have tried to be a jack-of-all-trades and that has some severe downsides. For a lot of jobs, 3d animation for instance, they want somebody specialized who is really exceptional at one specific sub-field, like character animation or texture art or modelling. So it's good to have general experience, but finely-honed specialized skills in one category are often VERY marketable.

Because if you want to go into a professional movie-biz, you're part of a team of specialists, not tasked with doing everything yourself!

But back to writing:

THREE ACTS - THE JAMES BOND STRUCTURE.

Look at a typical Bond flick. Some of them are awful. But they seem to make money somehow.

Most Bond movies start with a big opening sequence, & opening credits.

Then they shift into exposition, introducing characters.

Then a string of midrange action/FX sequences, which build up to one big final sequence.

This is three acts for action. It has a definite logic to it.

This wouldn't need to be a comedy or action movie, but pretty much every movie follows the same structure. I'm using my videos as examples, for the purposes of this demonstration.

ACT 1

Other people may argue with this. I believe Act 1 should start with a hook.

Definition - hook - a mystery or question placed in the audience's mind, or just something that looks cool - for the purpose of grabbing attention immediately at the beginning of a movie.

Or in a more simple case, simply setting up the situation immediately and interestingly after the movie starts.

"Send in the Clones 4" begins with two cool bits - the opening credits and the opening battle. These grab attention. "Duel 2030" also begins big.

"Super Soda" starts with a flash-forward to an effects sequence later in the video, to hint at future events - making the audience want to see how the exposition will lead to these events.

Once you've grabbed your audience's attention, start building your story.

Act 1 sets up the people and initial situation or conflict that will develop over the course of the movie.

"Clones 4" has an Act 1 that introduces pretty much every character, comic, or serious, all connected by the clone situation.

"Sabotage 757" begins with the pilot saying he's going on a flight and he and his copilot are tired. It also sets up the poisoning, which is revealed not long after.

"Troop 4: Uncensored, pt. 3" starts with a silly NERF gun shootout (a hook) then develops the reasons why Troop 4 is going to Hawaii - the BSA inspector has forced the troop to relocate.

"Super Soda" introduces Zach and Hurford, and at end of "Act 1" Zach is wasted on Super Soda.

Nathan and Eileen decide not to do their chores (Point of No Return) Nathan is upset with Eileen, and at night he takes coffee plus sleeping pills (Sleepwalker)

(As you can see, a lot of my stuff is downright surreal.)

ACT 2

Act 2 intensifies the situation. Act 2 is where things build up, and get gradually bigger. Usually the situation gets much worse in Act 2, not better.

Conflicts rise. You've established what's going on, and now it begins to play out.

Troop 4 (having crashlanded on a flight to Hawaii) is stranded on a desert island and homicides are happening because of the mysterious "El Fatso". (T4, pt. 3)

Hurford makes the decision to confront the company (Super Soda)

The defense of the church and the virus plan are initiated, and battles ensue (Clones 4)
Brad is captured and Austin is forced to get Josh's help (Clones 3)
The pilot is dead (Sabotage 757)
The kids discover (and decide to enter) the portal (Point of no Return)
Kids fight their parents with snowballs (Snow Siege)
Eileen wakes up injured (Sleepwalker)

ACT 3

The situation rises into a direct confrontation, and is resolved. In a tragedy, the resolution is very negative. In most movies, happy endings are standard.

Matthew and Scott defeat Minhthien and El Fatso. (Troop 4, pt. 3)
Despite losing the battle, the virus is released, the clones are defeated (Clones 4)
Hurford takes down the Super Soda company (Super Soda)
Eileen and Joel catch Nathan sleepwalking (Sleepwalker)

Or in "Point of No Return" - the twist ending leaves the audience shocked. That one has a dark ending.

HOW TO MANAGE THIS STRUCTURE YOURSELF

Understand, conventions are useful. Your creativity comes through not by defying useful guidelines, but by fitting new elements into them, like fitting tiles into a mosaic.

Inventive characters. Interesting stories and elements. Humor. Cool visuals. Cool sound design. Creatively choreographed action.

CHARACTER DESIGN

Your characters should be distinct.

Think about the nature of your character. I should do this more!

Personality: Extrovert/Introvert? Organized or messy? Emotional or rational? Intelligent? Creative? Social skills? Courage?
Adaptability in changing circumstances? Does this person have a sense of humor?

What is your character good at? What are the things your character loves? Hates? Their beliefs - Spiritual? Political?

What is the character like physically? Attractive? Athletic?

What is the character's relationship with other characters?

What, overall, is the character's life history? Think of a short list of events in his/her life that have affected him/her. Loss of a loved one? Childhood? Marriage? What about family? Education? Work experience? Financial history?

The more you lay out these aspects of a character, the more distinct

that character becomes. The point is to make these people feel distinct from each other. Pulling traits from people you know is worth considering, too, in making an interesting character. It will affect their clothing, their actions and reactions, what they say and do, how they react to each other. Your character, in essence, becomes more than a generic person. He or she becomes interesting and individual. This, among other things in this e-book, is something I want to do in upcoming work, that hasn't been done much in my movies thus far. I am still moving forward, you should move forward too.

Names - say a lot. Don't be too blatant, but names do suggest some things about a person. Short names vs. Long names. Pretty names vs. ordinary. Traditional vs trendy. Muscular vs. nerdy. Ethnicity and ethnic roots to a name. Religious connections. Similarity to an existing name of someone famous, that raises connotations. You get the idea. Names can imply things about people.

In Super Soda, "Hurford Blumper" is by no means an average name, but it certainly suggests that the character is fat and slow. "Hurford" sounds like a cow. Blumper sounds like "plump" or "blimp". "Zachary Bang" - or "Zach Bang" - sounds fast and manic and "explosive" to me. A perfect counterpoint to "Hurford Blumper". In Clones 4 - "Ridley Spielberg" is obviously movie-director-related - Ridley Scott/Steven Spielberg/Stanley Kubrick - it's also unwieldy and kind of idiotic-sounding. "Jane Garrett" - suggests G.I. Jane, suggests formality and a lack of personality.

You see where I'm going with this...
There's no hard science to it.

Just go by intuition. Maybe find a list of real names, first names and last names, on the web, and put together names that "feel" right.

Once you've got your characters set up, you have a pretty good base from which to work from in developing the plot. Just make sure that in each scene, your characters act and react based on their specific attributes, instead of acting arbitrarily. That is easier with fewer characters, harder when you have too many. That's one reason I'm not doing "Troop 4: Uncensored, pt. 4", I don't really like my script, and quite frankly don't think I can actually make a Troop 4 story work, there are just too many people I'd be obligated to include, to develop any of them well!

PLOT ELEMENTS

THE SECRET - this is when someone in the movie knows something that you want to know (as the audience member), or one character knows but

the other doesn't, or the audience knows but the character doesn't (which may cause the audience to shout at the screen - "Don't go in there!" or whatever.)

Often audience identification occurs through secrets - your hero is trying to discover the truth, and so are you, which adds to your interest in the character as an audience member.

Hurford is the anchor for "Super Soda" in this way. He wants to know what's going on with the strange soft drink - and so does the audience. That, and the way he's abused both by Zachary and by Tracy, makes us sympathize with him.

Side Note -

The more we can identify with the character's motives and feelings, the more connected we are to them.

Camera angles also help us with this, shooting the movie more or less from that one character's perspective.

URNS

Some people call them "Reversals". They're a standard part of the writer's arsenal in Act 2.

This is like a swing on a swing set. Back and forth. Back and forth. It's where a conflict seems to be going one way, but then the action of a character (or an outside influence) push it the other way, so the other side is winning.

So, it looks like it's going to all work out, and then something else goes wrong. Or it looks like it's hopeless, and then something good happens.

You know what I mean? You can string out a lot of reversals in a plot and it holds attention well.

Typically, as I said earlier, things get worse and worse and worse. And then in the last 15 minutes, everything is resolved.

Conventionally, that means taking a near-hopeless situation and achieving victory by some (believable) means.

In a tragedy, the pattern is that things look like they're finally going to be O.K. And then disaster strikes and the ending is bad. Terry Gilliam's "Brazil" does this to devastating effect.

This is the "Climactic Turn" - a Turn placed near the very end - and it makes the ending that much more happy (or shocking), because it is somewhat unexpected.

But: Avoid leaps of logic. The change has to remain plausible in some way. If the ending is happy but we don't believe it, that's a problem.

It's more satisfying if we see how it is played out - especially if it came by the direct action of the protagonist, and not luck.

Example: "Send in the Clones 4" - the mood hits a new low when most of the church defense is dead, the survivors are locked up, and the bomb will go off and kill them, too.

But, the turn: Josh and Bradley arrive with the virus. Josh quickly attaches it to the bomb and moves the bomb outside - where it detonates, spreading the virus everywhere, killing the clones. It is plausible because the audience knows Josh and Brad have the virus, they know what the virus does, they recognize that Josh and Brad logically would be likely to return to the church after retrieving it. And the idea of attaching the virus to the bomb also makes a certain amount of sense. It is somewhat satisfying because it gives the good guys a chance to win cleverly, using their opponent's weapon.

THE TWIST - There are three kinds of twists.

Character twists. Our views of a character change. This is the "Luke, I am your father" twist. This is the "Jane Garrett is playing both sides" twist.

Situational twists. Where our perspective of a situation changes. An object in the movie is not what it seemed to be - it has a bomb inside! Or the character walks up to the cockpit of the plane on an ordinary flight, to find the pilot dead! It's the situation that has changed - we see it in a new way. Something is present that we hadn't thought would be present. Or, something or someone is gone who we expected to be there.

The boundary between this and a Turn is kind of hard for me to verbalize. I'd suggest that:

Turns change the balance of power in a conflict.
Twists take the conflict in an entirely new direction.

The ABSOLUTE twist - this is a twist that applies not just to the situation, but changes absolutely everything. These are more than course alterations, these are changes in structure so drastic they stun the audience.

This is Neo finding out his world is a computer simulation in "The Matrix".

Or Bruce Willis discovering he's already dead in the "Sixth Sense".

Or if you kill off your main character halfway through the movie, the one everyone is rooting for, that comes off as a shock that's maybe as big as any other. (Like the shower scene in Hitchcock's "Psycho")

BACKTHREADING

-This is a rule of plot twists, especially big ones. They have to make sense. The audience needs to be able to look back on the previous scenes and say, "Of course! I should've known that was coming!"

And yet, they shouldn't have enough grounds to actually guess it before it's revealed.

The key is, thread the twist back as far as possible, with sufficient ambiguity.

My best twist thus far is in "Point of no Return", and it involves time travel and parallel universes.

Partway through the video, a monster emerges from the portal and is killed.

Later, we get a question from Nathan - could you send me back in time through the portal?

The answer is yes.

The twist is realizing that that monster WAS Nathan - he was transformed into a monster while passing through an alternate reality, and is sent back in time, to that scene at the midpoint of the movie.

In other words, he ends up dead. We saw his death early, but it's not until the end that we realize it was him.

So, key points to learn. We had two scenes, the monster death and the time travel scene. Both of them are simply accepted as "part of the story". The audience isn't given enough to make them connect the two elements until the end.

You have to make sure that while you insert scenes that tie into the twist ending that comes later, that those elements are subtle enough that the audience won't pick up on the twist until they're supposed to, but clear enough that they will remember those hints when the twist is revealed.

And it helps to spread those scenes out far apart enough time-wise that the audience doesn't make the connection between them.

A good example is the online short film, "Prey Alone." Go watch it. It's got great production values and a solid twist, and was done for only \$15,000.

TIMERS.

This is the key to suspense. This is the awareness that after some amount of time something will happen.

The most cliché is the bomb countdown, maybe. I had a bomb in "Clones 4" but it's played for comedy and the way it ends up going - first with the LED screen blanking out, and then with the unorthodox way the bomb is used - keep it from being a particularly trite scene.

But anyway, some timers have a number attached. Like, in six hours, terrorists will strike the White House. Others don't tell you how long is left.

Like, there's a bad guy in the woods somewhere. He's going to come after your hero, but you don't know when.

These generate anticipation, or suspense. That's all suspense is - an expectation among the audience that something important is going to happen. It's not complicated.

If you are good at using timers, you can be good at building suspense.

The ones I mentioned are anticipations of bad things, but you can also build anticipation of good things. Your character is in terrible shape, but someone will arrive to help. In this case, suspense comes from seeing if the person can manage the situation until help shows up.

Those, anyway, are four key "plot tools" - secrets, turns, twists, and timers. Use them well, and it makes a story that much more involving.

Not just action movies, either. You can use these in any genre. Violent conflict is only one conflict type. Verbal sparring and disagreement or interpersonal conflict can be the basis of an engaging movie, without any fighting at all.

How many comedies have been based on a character maintaining a secret or pretending to be someone they're not?

How many people (even close friends) can wind up in disagreements or arguments or misunderstandings? They may even agree on their goal but disagree on how to get there...

In a romance, even, there's got to be something to make the romance problematic until the ending. That's why love triangles are such a common plot element!

Know that conflict is critical to every plot in the history of literature.

One rule to consider: Nobody, absolutely nobody, wants to see a movie in which everyone is happy and nothing bad happens.

It is utterly, utterly boring. Even with beautiful visual art, it is still not too exciting.

I think that this is one of the reasons so many Christian movies are so bad - they minimize conflict.

The Bible itself is conflict-dense. It's a huge struggle between good and evil, with wars and sin and horrible things happening.

Life is conflict-rich.

Don't make a movie where everything seems to work out perfectly.

Go the Joseph route. The guy is sold into slavery by his brothers and yet (after much trial) winds up in charge of Egypt.

Or Moses? He kills a guy, goes into hiding, he's a terrible public speaker. And yet, somehow he manages to free the Israelites.

Jesus himself - the hero of the entire faith - suffers tremendously, dies on a cross - but is then resurrected from the dead.

If you want to inspire people, you don't make things go well for your hero. Don't do "watered down." Instead, you put your hero through trial after trial. By your hero's persistence despite all the awful situations surrounding him - by his willingness to stand in his/her ideals and dreams despite great obstacles and discouragement, your hero can inspire people to persevere in the hardships of reality.

By writing that way, you are saying not that everything is fair, but that it is important to do good in life, even when it doesn't seem like good things are being rewarded. Even when life is unfair.

When your hero goes through mess after mess, failure, suffering, hardship, embarrassment, pain - but eventually triumphs, THAT is what makes for a truly inspirational story, not any of this "winning from the very first game" sports movie trash..

So, yeah, I've given pointers on comedy, on drama, on action, plot, characters, on how to make "inspirational" and "message" movies not suck.

Anyway, it's only now that I'm really starting to understand storytelling. I'm a newbie. Hopefully you'll learn this art much faster than I have been learning it.

I am a student. Even the best filmmakers are still learning, the best painters, the best writers. It's never possible to truly achieve perfection. Leonardo da Vinci said of his paintings, "Artworks are never finished, only abandoned." He, a master painter, knew that nothing he'd made had gotten to the point of being perfect.

Try to absorb a fundamental palette of Western cultural reference. The Bible, Greek myth, Shakespeare. Or a great many more recent works - can give you a cultural and literary foundation. Somebody said every core plot you can think of appeared in some form in Shakespeare's work. Maybe that's true. It's good to read books, or (better yet for our purposes) watch movies (both contemporary and classic) - observantly dicing them into components and structure. If we like a work, we must know why it is good, and learn from it. If it is bad, we should analyze why it is bad. If we see some great image or sound or idea, we should pause and ask, "how did they do that?", "why is it so good", and "can I learn how to do that?" Most importantly, we should never deceive ourselves into thinking we've already learned enough. I know I'm nowhere close to having learned enough! And that's a good way to see it, it gives us motivation to move forward instead of sitting still.

I'm downright embarrassed by most of my old stuff. I think I often screwed up badly on both concept and execution. But I was trying and I kept going and my work is still far from great but it is getting better and one day, one day, I will make a movie I can be truly proud of. But even then there will be some people who don't like it.

But there is educational value in bad. There is humility in bad. I want to be humbled, criticized. I am profoundly self-critical. This is a useful way of thinking and being.

I don't want to be arrogant like Uwe Boll, who somehow, inexplicably, told everyone "I'm the only F***ing genius in Hollywood" when the truth is he has never made a genuinely good movie in his life.

So I'll tell you up front, I am NOT a genius and anyone who says different about me is very very wrong.

I'm just another sucky indie filmmaker who is trying to learn.

The reason the "Troop 4" movies, for instance, lack well-developed characters, is simple. I didn't know who would be available before shooting. Therefore, I was forced to write parts for "Scout #1", "Scout #2", "Young Scout", "Old Scout", "Scoutmaster". Now, there were a few reliable people like Minhthien, and I did something with those few people. But by and large, I was forced in the screenwriting phase to assume a lack of distinct characters.

So, know that you don't have a lot of choices in "acting talent", in a no-budget movie. Build your screenplay characters on the people you have at your disposal, not on an unfilmable imagination.

In my REALLY old stuff, like "House Trek" or "Send in the Clones 1", I was the ONLY cast member. Do consider casting yourself in a role. It's one less other person you'll have to count on, and you probably know the story better than anyone else anyway.

Find friends, and local people with time on their hands. If you have access to someone who is (or was) a college theater major, or was at least in some school plays, that's good. Find people who like you, and know you, and won't turn you down. Find people who are reliable and will show up on schedule the day they're needed. Picking the right people is critical.

So, in this way, casting ties into screenwriting, they're both part of the planning phase, and need to be lumped together in some sense.

Write based on people you know. There is a lot of merit to "casting by type", with cast members who aren't professional actors. If the character's psyche or look is similar to the actor's, it makes the part that much easier on the actor, it makes the actor that much more qualified for the part.

In a lot of my videos, there aren't really many "original" characters, the real people basically just play themselves - albeit in larger-than-life situations and personas. It's an unconventional writing strategy but sometimes it works out well.

Casting - some people have posted ads out on campuses or local areas, announcing a casting call. I've never done this, but it does work sometimes, from what I've heard. There are also databases online for actors, crew, etc.

Social networking, by finding good groups around you, social clubs or drama departments or somewhere you'll meet talented people, go out and find those talented people, connect with them, and collaborate

with them. Your work will benefit so much from finding a better writer, a better artist or actor or musician, a better set or costume designer.

Don't alienate such creative people by being a dictator! If you find someone who knows their field better than you, let THEM define it, and give them an opportunity for creative expression (but pull them back when what they're doing is a bad idea - and be sure to explain WHY it's a bad idea and not good for the project, instead of just stopping them for no reason.)

I've been so starved for creative talent. I've had to do almost everything on my own. Don't settle for that - get good people involved. And don't selfishly draw people to your own projects only, offer to help with theirs, too - the I'll help you if you help me offer is a good negotiation method for pulling talent in when you know you can't pay them a real salary for being in your project.

Some actors may work for free if they feel that the role will be good for their public visibility/career, or if it just sounds fun. People will often want to act in your movie for free, because they think it sounds fun. And, usually it is! If you're not paying the cast, and they meet you at a location for a day's shoot, the least you can do is provide snacks and drinks. Take note of the logic of "Sin City". This Robert Rodriguez film was heavy in terms of animation, and had an extensive list of well-known cast members. But it cost \$42 million, less than might be expected.

Why? First, because no sets were built. That helped. But, as far as the casting side of things, the reason it was so cheap was the ensemble format.

Most actors cost you money by the hour, day, or week. Rodriguez shot everything greenscreen, so he didn't really need to move his actors between various locations. That saved time on his shooting schedule. He arranged his cast such that they weren't all there at once. Each cast member was present for maybe 1 - 5 days. Keep in mind that it may be possible to minimize the expense of a low-end professional - be it an actor or anyone else - by condensing all their work to a minimum span of time in your project, one dense block of time. This can be done by rearranging the order in which scenes are recorded, and minimizing amount of travel involved in getting the scenes done.

Do consider the possibility of getting someone skilled involved in your project. Not a Hollywood pro, someone who could be described as "C-list" with some semi-professional talent. You might need to pay them but in some cases it might be worth it.

I have several such people attached to "Traveler's Enigma", in the

acting and music categories.

Often actors or other people choose projects because they sound "fun" or they otherwise seem like promising projects. Therefore, it helps to have a good script, and a way to pitch your project to people around you. Interpersonal skills come in handy sometimes. You'll do better at drawing in talent if you've already got something half-decent under your belt. That means you have experience and talent and an ability to get things done. Sometimes you can contract people over the web on websites like www.guru.com. It's possible to hire 3d animators that way, for instance.

It may be possible to convince people online to contribute for free. It's not easy but I've seen it happen once in a while.

Taking care of your cast and crew, and respecting them makes them more cooperative and less likely to bail at the last minute. Remind them to show up. Not once, but as many times as it takes to make sure they don't forget. Let them know about the shooting schedule well in advance, and remind them of it the night before. It helps.

If your cast will read your script, that's a good sign. Be sure to give them guidance for the scene so they know what they're doing, and how it fits into the story. Boy Scouts never read scripts. They're thoroughly unmotivated. They don't read the script, and if they show up (by random chance) they will make retarded suggestions that have nothing to do with anything else in the movie. They will invariably butcher the script. They don't care enough to be competent, so why should I waste my time making movies with them?

If you can, avoid casting people like the young scouts in Troop 4.

I've learned the hard way how completely a poor cast can ruin a movie.

A good actor is worth a lot in terms of your production, but even an inexperienced person can do fairly well if the director is good. The director DOES have a significant influence on the performance, and if my movies have bad acting, it is partly my fault.

I listen to my cast's suggestions. Sometimes they're idiotic, sometimes great. Don't be so protective of your script that you pass up a good idea for a scene when someone suggests it. If it fits well into the story, and is fun, go for it!

Since I'm writing about actors, I'll relay some staples of bad acting

that must be avoided wherever possible.

-Staring at the camera and not the person the actor should be interacting with. Actors should almost never look directly at the camera, it is very amateurish.

-Know the lines well enough to say them correctly.

-Say them with meaning and emotional tone, not like they're a rehearsed speech. Make the line sound like it just came up naturally in the situation, not like it's something they're trying to remember! (The Illusion of the first time)

-Awareness right before action. An actor can convey thought and intent by first looking at something before performing an action. The "look, then act immediately afterward" process, makes it seem like the person is thinking about what to do, if only on some subconscious level, just before he actually does it.

As opposed to immediately doing something that seems, again, rehearsed and pre-planned. That's the odd thing about movies. It's all planned ahead of time, but it shouldn't LOOK pre-planned, it should look as if the situation is all happening for the first time right in front of the audience.

If your actor freezes up and seems nervous and flubs lines when on-camera, then the sneaky trick is the "practice take" gimmick.

It's a classic technique for camera-shy friends in a scene.

You (the director) say, "We'll do a practice take so you can get used to the scene."

Then you record the practice take, and the actor isn't nervous because, it's only a "practice", it's not the real performance.

And then, in the editing room, you can actually USE the "practice" take, because your nervous actor probably does a better acting job when not being a self-conscious worrier. And when you reveal that you actually used the practice take, they won't be mad when they realize it's the best one.

But, it is better to avoid casting such a person in the first place!

Another nice acting suggestion: Act like you're trying not to feel the way the scene says you feel.

The most "real" emotion moments, oddly, may be the understated ones. Somehow, the person who is trying to keep from crying may be more compelling than the one who is wailing uncontrollably. The character with suppressed rage and aggravation may actually come across better than the one who is yelling and throwing things. A slight giggle may seem more real than a large laugh. (I mean, how often do real people

actually LOL?)

I violate this all the time, I do characters who are very over-the-top, there's a place for that, too, of course, but it's not always the best route.

I'll also suggest that you consider getting your cast into Method acting. What this means, in essence, is that the actor must convince themselves on some level that the situation is real, even though it is fictitious. The Method actor should try to achieve in some real way, the emotion of the scene, by imagining or recalling some stimuli that induces that emotional pattern.

For instance: Bringing up a memory of isolation and being lost, when recording a scene where the character is lost.

Or: Trying to imagine something that isn't there, to stimulate a response like excitement, fear, or sadness.

I remember Jack Black once joked about this in an interview, where he said when he was trying to feel afraid he would imagine a shiger coming after him - a shark head on a tiger's body.

Whatever - the actor can find whatever causes the correct emotional response, no matter how ridiculous it sounds.

The more real the emotional response actually is, the more real it will look on screen.

The director can artificially induce this effect. When recording "The Empire Strikes Back", George Lucas gave Mark Hamill (Luke Skywalker) a fake script without the "Luke, I am your father," part.

Mark only found out about the actual plot twist seconds before the cameras rolled and the scene was recorded.

So, think about inducing surprise in that manner, or laughter, elation, confusion, exhaustion (make your actor run back and forth a while as fast as possible, then come back. They actually ARE exhausted, they don't really even need to act!)

Or mental states like panic. Give the actor two long numbers to multiply in their head, and tell them that they need to know the answer by the end of the shot. No surprise - your actor is visibly distracted and in a state of nervous concentration on something, and that mental state (who knows?) might be useful for a certain scene. Stanley Kubrick, when directing "The Shining", wanted the characters to be bored and irritable, cooped up in a hotel for weeks on end. So, to make his actors bored and irritated, he required some of the scenes to be shot over... and over... and over... in some cases over 100 times.

I shot Josh's scene for "Traveler's Enigma" at a time after he broke up with his girlfriend. He was in a bad place emotionally, and so is the character he's playing - both coping with a trauma. It made his performance, his voice, so honest and real!

Note: You don't want to overdo it. If your actors aren't paid, you can easily get them aggravated to the point where they walk out on you. Overall, you must make sure they are having fun.

And free snacks and occasional breaks add to the positive feeling of the recording session.

When offering direction, try NOT to be vague. It will drive your cast mad. "More intense" "More subtle." "Angrier" "Do whatever it is you did last time"

When trying to capture an emotion, or attitude, it is helpful to give a goal instead, a direct insight into the character's aims and thoughts.

Thoughts. Not just emotions!

Instead of telling them "be sneaky", tell them, "try to move to this place without anyone hearing you."

Instead of "be afraid" say "There is someone right THERE who wants to slit your throat with a kitchen knife."

Instead of "be angry", "That girl just called your mother a retard."

Instead of "be fidgety and uncomfortable", "there are mosquitoes flying around you and they're biting your arms."

Instead of "Act like you're attracted to him", "Imagine he's Brad Pitt."

By provoking a emotion/action-sparking thought, you create a more real emotion than telling them to be sneaky, afraid, angry, fidgety. This direction works.

It provokes a real emotional/action response, instead of provoking an attempt to FAKE one.

As a low-budget movie director, you're actually facing, in most ways, bigger challenges than the people in Hollywood. Spielberg has it easy. You have it hard. You'll need to work more cleverly than Hollywood does, to put out a good product.

And this acting stuff - you don't have TIME to get it all right! If you're pressed for time, decide which scenes are most crucial to get a good performance, and allot more to them. Do what you can with crazed schedules. "Send in the Clones 4" was, in total, maybe a 30-hour shoot with my cast. That meant moving fast. I did what I could with those parameters, and watching the movie, you get a definite sense of that speed and improvisation.

A final point to make - speed isn't totally evil. You can have all the time you want, to get the shot perfectly, and you might get it flawless technically with an unlimited schedule, which is great - but the upside to going fast and doing only a few takes per shot, not having time to let the whole thing be perfect, is that a sense of energy and improvisation and unrehearsedness into the shots, and that is good in the sense that your characters in the story are doing everything for the first time, and in that way, your actors and their takes are MORE convincing in capturing that sense that the scene is evolving chaotically right in front of the audience, that it's not all preplanned and by-the-numbers.

If you do wind up doing takes over and over, and the acting's getting into a rut, try to find some way to break it up - by making the actors do a different shot in the scene, and then come back to the one that's not working, changing their movements or dialogue a bit, or giving them a new verbal stimulus that twists the scene's context. Like awkwardness - (In this scene where you chat with him for the first time, imagine his fly is unzipped, but you don't want to tell him that because he's the popular guy.)

Your actors are a valuable asset. Get good people, who are friendly, treat them well, while still trying to get things done.

So that, is my little mini-text on acting, and gathering a competent crew.

Note that I have found in my experience that good cast and crew are hard to come by. I have had a lot of zero-experience actors usually, and never once have I actually had a real crew.

Maybe because I have poor people skills and almost no money, and I live in a neighborhood where almost nobody has any technical skill or artistic talent.

Keep in mind that the more projects you complete well, the easier it will be to attract talent. I am beginning to see that this is true. Look at "Super Soda" - it's an adult cast - not kids! (Teens are often the only people who will have enough time to join no-budget projects...) And "Traveler's Enigma" reaches another level entirely...

Be on the lookout for interesting locations - Gardens? Skyscrapers? Tunnels? Beaches? Cliffs?

If a location near where you live strikes you as interesting, take a note of it. You might be able to use it at some point.

If you've got a car, seriously consider organizing your cast and going on a campout somewhere within a 300-mile radius of your home. I mean, why not?

Locations can stand in for other locations.

The American Southwest is constantly used to represent the Middle East.

Hawaii has been used to represent just about every tropical locale in the Pacific and Caribbean.

There are some places in the Rockies that might pass as the Himalayas.

Your city might be convincing as a city somewhere else in the world. If you can find architecture in a few places that looks "foreign", you've got something cool to work with.

A lot of U.S. cities, for instance, have "Chinatowns" in them.

Consider signage. Printing off a few signs in a foreign language, or a sign pointing to, say, the London Underground, or maybe some borrowed ethnic props, can get you a lot of the way there in terms of convincing people your location is somewhere else.

Or maybe you're not trying to make a "global" story but a local one - it's still worth finding good locations.

99-cent games wasn't a real place - but it used real locations.

When I developed "Super Soda", I created a Photoshop matte altering a real building to be "99-cent games". Beyond that, I used rooms inside the local church, and plastered them with posters and work and snacks and the 99-cent games logo.

Most of that was not visible - you probably didn't catch the nerd humor poster saying, "Without C, we'd be programming in Basi, Pasal, or Obol."

But it was there and it subtly added to the "look".

Beyond that was the content on the PC screen, and the carefully rotoscoped window.

You can blend VFX and small practical changes to real places, to create an "original" area.

The reality is, sets are not dirt-cheap to build. You need materials and a place to build them. So, you'll probably want to find mostly "real" places instead of sets. There are big upsides to this:

- They are cheaper than making your own set.
- They are more real and convincing.

The downsides are:

- If they're far away, they're inconvenient to get to.
- They are subject to weather and schedule interruption by people in the area.
- You need to get permission to use a location.
- They may not live up to the requirements of your story.

In "Send in the Clones 4", I used all sorts of real Eastwood locations. Some of them, actually, I had no permission to use, I just went ahead and shot the scenes.

As you write your script and set up your budget, the list of available locations should be a major consideration.

The alternative I have used sometimes (prominently in Clones 3 and Sabotage 757) - is to avoid real places completely and shoot actors against a bluescreen or greenscreen.

This gives you a way to put actors into a unique "location", without building a set.

Don't feel like you need real Chroma paint for a bluescreen, just get your paint mixed at Lowe's or the Home Depot.

Then find a wall in your garage or somewhere - and paint it evenly.

The idea is to achieve uniform, bright, distinct color - a pure mid-range, blue or green, highly saturated.

Some studies suggest DV works better with green and film responds better to blue, but there's really not much difference.

Lighting the screen evenly is good because shadows can make it harder

to key.

Cloth or paper bluescreens are usable but they also tend to wrinkle or tear - making them maddening to key.

Painting evenly onto several 4 X 8 foot wood boards is a great option - they're portable, rearrangeable, can be used as floor or walls.

We'll go into the color keying process later. For now, just know you will probably find bluescreens to be very useful for VFX.

FLATS

These are used in set design as walls. Carpentry is one of those skills that's conventionally necessary to make good sets.

I'm not a carpentry expert. I can't tell you too much about set design, because I've never built a "real" set from scratch.

Anyway - flats have a rectangular frame, with diagonal cross braces, and either canvas or thin wood as a surface on one side.

Once you have a flat, you can prop it up, move it around, paint it different colors and textures, basically make it into a "wall".

Flats are typically 7-8 ft. tall. Low-budget sets aren't meant to be the real scale of a house floor, they're supposed to fit inside a real room - if you have a few flats set up, in essence, you've got a "room within a room".

Finding a place to build a set is a major problem.

You could build in a garage, if your set is small. If you can find a decent-sized vacant room, use that. Maybe borrow space in a warehouse - or rent temporarily. Like renting anywhere, it would cost money but you're not paying for amenities like in an apartment, you're paying for space and electricity, and that's about all you need. Even so, most of these spaces will cost over \$1000/month, so be careful before making that decision.

Asking friends if they have empty rooms may be a better choice.

An alternative to flats is buying hollow doors at Lowe's, Home Depot, something like that.

They'll cost you at least \$30 each, they're not cheap, but if your budget can stand a few hundred dollars for set building, you might take it as a serious option.

That's what I did for the bar set in "Duel 2030".

There are a lot of options for surfacing.

All these flats (or doors) are basically just wood. It's surfacing

that makes them a "Set".
You could just have paint.

Or wallpaper.

You can maybe find some silver paints, and metallic paints, and create a decent looking "metal" surface.

Varnish can give you a slightly reflective or shiny quality.

A clever person can completely fake a brick or rock surface with paint. There are some sprays available with a "rock" look.

With all of this, keep in mind the FX side. It might not be easy to have a real window cut into a flat - so paint a blue square, and do the window as a composite effect.

Or do as Hollywood has done for decades - a fake landscape/cityscape forming a rectangle on the wall.

You can take a digital photo (most digital cams now have good enough resolution for this) and print it on a grid of paper - which is glued/taped to make the "window". With a curtain or blinds, and a block of wood forming a sill, it should hold up if done right.

If it's nighttime, black paint works fine - most people will simply accept that it's "dark outside".

Remember that you may only need one or two sides to a set. You don't need a room going in all directions.

Editing is key, build only what the camera needs to see, nothing more, nothing less.

Props. Your set cannot just be walls. Clutter it up. Find appropriate furniture and objects. The more busy and lived-in it looks, the less it seems like a set.

Go to furniture stores, garage sales, whatever. Find cheap but relevant stuff.

For your sci-fi flick, go to a tech store (Best Buy?) and ask to see what they're throwing out.

A lot of those unused and somewhat dated tech items can be great set props or control-panel bits.

Or - buy props online. There are some good places out there. You'd be amazed how many things are sold cheaply - fake guns, etc - that are useful for this kind of project.

Airsoft, in particular, has superb fake guns. Some people have gotten away with making small-scale sets and bluescreening in actors. It's an unconventional route, but maybe a good one if a certain set in your story is way too big to build at full scale.

Extension - this is where you make a small part of the set, and you digitally extend it - adding halls, whole new areas, etc.

This gives you a partial reality, and you don't need FX - except generally for wide shots.

Or there's the full-CG approach.

Watch "Star Wreck 6" by Finnish indie genius Samuli Torsonnen. This Star Trek spoof is the most viewed movie ever made in Finland - and it was a \$6000 project.

His computer-generated sets are fantastic and seamless.

That's how he built his great starship bridge - it wasn't real!

We'll go into all this stuff - miniatures & CG - later. The advanced technology set stuff - in a sci-fi movie or some kind of military vehicle or aircraft. You want little LED lights? Use those tiny LED flashlights and embed them into the surface being used. They last pretty long and they're only a couple bucks each.

Or computer displays or video displays? One trick from the olden days is to have a plastic sheet with black paint covering it. Then scrape/etch out a diagram or design, removing the paint to form a line drawing. Finally, backlight it. Ta-da! A glowing line display.

The more modern technique, though, is to collect personal tech items - video iPods, Sony PSPs, a laptop - and load video files onto them. Temporarily embed those into your wall or console to form a video screen.

Or (the obvious) - bluescreen. And then composite in the other video track, which may be the easiest tactic of all.

You could even use this technique to make a set representing the interior of a train - have some bluescreen windows, and later comp in some trees passing by. Add some train noises and you've got an effective illusion.

Be creative - and one last note, try to make the set and its content look like it serves a purpose. Things in a set aren't there "just because" but because they fit the character, the type of room, etc. Do consider, if recreating a certain type of room, doing research.

Doing stuff for real is not too common in Hollywood - and is even less common in independent video.

Still, it's sometimes worth having a physical effect. The upside is that practical, full-scale effects can look REAL, and usually the more that things look real, the better. Realism in story, especially, ought to be backed by realism in design. When you are writing comedy or something very over-the-top (which I typically have) then it's O.K. To go with more stylized visual elements.

People seem to always mistakenly refer to visual effects as "special effects" and that irks me for some reason. Special effects are effects recorded entirely in-camera, during production. Visual effects are done in postproduction.

Rain - set up a sprinkler above your crews heads, punctured with a lot of holes to reduce the uniformity of the water streams. You can get good rain this way. Watch "Storm" to see where I used this tactic.

Smoke machines - the classic on-set technique of the smoke machine, for a foggy look or a "something recently exploded or caught on fire" look. Smoke machines are available under \$100. They're not too hard to find. Look in a party supplies store, that's where I found mine. Make sure nobody touches the nozzle of the machine as it is heating, those nozzles are very hot.

I used this one in "Send in the Clones 4" - Eileen's death sequence. One cool thing to try is backlighting fog, you get these great shafts of light piercing the fog.

Snow - flour works well in the foreground. In the distance, you can get away simply with shredded paper. And of course, like with rain, you can use the overlays in my "Stock Pack 1".

Wind only requires a normal household fan.

Bullet hits - you're shooting your action sequence, and stuff must get hit by stray bullets. You could have explosive squibs, but they're pricey and dangerous.

My two tendencies would be either to composite in some ricochets (look at my stock packs, or Detonation Films, or Video Copilot, or No Control Cinema, all good effects stock sources with low prices)

Or - try using a compressed air hose.

In other words, something like a bicycle pump, where you can cause a small burst of air.

Then you put whatever you want in the end - dirt, pebbles, sawdust, or fake blood.

You can composite blood as an overlay. There's some good stuff on the stock links I already listed - and my second stock pack will also be a great source.

For that time when you NEED that interaction, though, the old compressed air tube is a good way to squirt some blood mix.

Blood mixes usually aren't washable, you'll have to assume the clothes you use in the stunt will be ruined.

A typical mix is part water, part corn syrup, with red food coloring and a slight bit of blue, also.

That gets you the consistency of blood, and the color of it.

A site with several blood recipes:
<http://www.shades-of-night.com/painneck/blood.html>

The cannon hit - you can get a good "cannon hit" with a simple lever. You have a long section of plywood, one side buried in the dirt. Someone on the other side shoves their foot down hard on the other end, causing the first side to propel whatever's on top of it up.

Steven Spielberg used this a lot in his early WWII movies.
(By early, I mean, when he was about 13 years old)

There's also the spudgun route. There's a product called a pneumatic air cannon, there are many types and I happen to have one. Spudtech had a great one called the Thunderpipe FX-1 but it appears to be discontinued.
That's an extremely versatile item, but it's also over \$200.

One crazy technique - I don't normally condone live pyro, it's dangerous and reckless - but this is worth thinking about because it's "safe", and silent.

It's the coffee creamer blowpipe technique.

Coffee Creamer ignites only in midair. It burns with a nice orange-yellow. It's safe precisely because it won't set you on fire - due to its "only flammable while airborne" quality.
So you put in some coffee creamer in a compressed air tube, a lit

match attached just outside the tube, and you fire the air burst. If you do it right, you get a little fireball.

I shouldn't be advising that, but it IS safer than most live pyro. Oh well.

Another explosion tactic is using a fire extinguisher to spray that dust stuff - you know? - and that can look like, uh, a large smoke/dust burst.

In any situation involving use of fire, it's good to have lots of water on standby, a fire extinguisher, blankets or something else to cover the fire, and open air workspace so that the smoke can dissipate.

I'm an Eagle Scout, but even then I'm not 100% qualified to use live pyro. If you want to use pyro and fireworks legally in the U.S., you should be: 21 years old or more, with no criminal record, and no record of having been in an insane asylum, and you must be a legal U.S. Citizen.

In any case, be careful. I advise you to use generous amounts of fuse so that you can light one end, get away (at least 30 feet away for any pyrotechnic detonation) and if it doesn't go off as planned, DON'T immediately walk back and touch the explosive device, these things can go off unexpectedly from smoldering fuses.

Again, just generally, be very careful, and, generally speaking, don't use live pyro when you can get away with stock footage instead.

That said, I had a great time using some flash powder from Theatre FX for "Duel 2030".

http://www.theatrefx.com/moreinfo_fc01_white_flash_powder.html

You can combine this flash powder with their electric sparkle additive, for a burst of smoke and sparks, or with coffee creamer or lycopodium powder for a nice fireball. The fuse sets off the flash powder, the flash powder explosion both lights the creamer and sends it airborne. All the spectacular "Duel 2030" miniature pyro was done with some mix of these.

Sugar glass - I did sugar glass once, but it melted. Sugar glass looks like (and breaks like) real glass, but without the actual danger of sharp glass.

The downside is, it will melt easily. You should keep it at a temperature below 65 degrees. Hopefully, well below that.

You make sugar glass by mixing about one-third each of water, white

sugar, and clear (it must be clear!) corn syrup. Stir and bring to a boil. When it seems completely well-mixed and is boiling, pour it into a mold of whatever shape your glass object should be.

Then put the mold with the stuff into a cold place and leave it there for a while.

Then, remove "glass" object from the mold. It should look like glass, and it will break like glass. But if left in heat, it will melt again and be useless. You can smash it against someone safely, though I want to remind you that smashing it into someone's eyes and face is still probably a bad idea.

Be especially certain not to leave sugar glass lying around - it is mostly sugar and as it melts, it will attract bugs. Better to dispose of it thoroughly and carefully once you've used it. Note that there are also stores online selling breakaway props.

Foam rocks - I did this once, in "Send in The Clones 4" - you can see faux rocks in the Eileen scene, and falling all over Claire in the previous bombardment.

I carved them out of, essentially, styrofoam, and painted them a mottled gray. They look real in camera, but they're not dangerous.

Gunfire - I use muzzle flashes, composited, personally.

But you can also use cap guns and that can work well.

Look at the stock sites I listed earlier for muzzle flashes. They have some good ones.

I also have some in my Stock Pack 1.

In-camera effects of other kinds.

The Miniature Effect without compositing. You can have a miniature set with a miniature backdrop, an entire miniature scene, that takes up the whole shot without need for postproduction alteration. This isn't common, but it's possible.

Backwards motion. Shooting for backwards editing gives you a method of doing impossible stunts in a simple way.

A guy catching a ball being hurled at great distance, he is actually throwing it, but play the clip backwards and it doesn't look that way, if it's done right. Ditto for impossible jumps upwards, they can be downward jumps played backwards, the catch is that the person shouldn't be looking at where he's jumping to, but where he's jumping from, during the shot. Or disorder -> order shots, like a bunch of

randomly rolling and moving objects all heading towards one central point, as if drawn by magnets, or a damaged object "healing" itself. The healing effect of the Borg cube in TNG episode "Q who" was done this way, they had the plastic model, and heat sources off screen melting the model, so that it started bending and drooping and coming apart. But they played it backwards, so it looked like it was "coming together" and becoming rigid and ordered where it had previously been damaged.

The only thing in this that's postproduction is flipping the shot backwards, other than that, I'd argue it's all an "in-camera" effect.

Forced Perspective - is a technique based on the fact that distant objects appear to be smaller. If you can convince your audience that a small object is distant, it will look big. If you can convince them that a large object is close (when it's far away) it will look small.

Look what I did in 2002, with "God and Country", I used forced perspective several times.

"Lord of the Rings" used forced perspective now and then for its pint-sized hobbits.

The forced-perspective miniature. It's a strange idea, blending a model with live-action without compositing, but it's something that's been done successfully for decades before the digital era.

The idea: You mount a miniature scene in the foreground, and leave the area behind it as live-action, composing the shot such that the model is very close to the camera. You can thus show a model that is integrated seamlessly into a live-action environment, so long as the model is in the foreground. And it looks big!

Cloud tanks - this is usually an element to be integrated, but sometimes a stand-alone effect. Look how I did the clouds in "Storm". That's milk in a jar of water, in front of a blue sheet. You'd never guess that, looking at it.

Some people tell you that a cloud tank is an expensive effect. It isn't, it can just be a rectangular aquarium filled with water, and then you dump in some kind of ink or dye that spreads through the water. I've got a water tank in my garage.

The ink looks like billowing clouds or smoke, because the same fluid dynamics that apply to water apply to air.

Some filmmakers have made convincing nuclear bomb effects just by squirting ink up through the base of a cloud tank.

Some of these effects even fooled Army personnel, who thought it was archival footage of a real nuclear bomb!

You could try setting up a cloud tank in between the camera and the scene to create a "billowing cloud" layered into a live-action scene without compositing. Again, just an unorthodox "alternate solution".

MAKEUP

40

Makeup effects are another part of the live-action toolkit for movie directors.

Bloody wound - I've done nasty wounds in "Send in the Clones 4", on myself and on Eileen.

The recipe is in the Clones 4 making of, but I reprint it here just for your convenience.

-gelatin powder
-water
food coloring, red with a little bit of blue.

Mix thoroughly.

Apply to actor.

This creates a nasty, clumpy wound effect. The gelatin will "harden" and peels off of the skin when you're done.

Search the web, you'll find these kinds of things.

<http://www.fxwarehouse.info/> <- a large, general-purpose makeup FX place.

Here's another makeup effect - the bruise.

I used some conventional makeup for Brad's cuts (after falling out the window in Clones 4) and for the bruises Eileen (Nathan's sister, not Eileen Wallace) has in "Sleepwalker".

What I had was a little kit, with some ordinary makeup colorings - kind of waxy, sort of lipstick-y.

It was \$4 at a party store. It had blue, red, yellow, green, and black.

Here's what I did for cuts - dab a pencil in the stuff and sort of slide the pencil along the actor's body a few times, adding layers - red, and a little black/blue.

It looked good.

Bruises - I dabbed the stuff onto Eileen (subtly!) - blue & red tint towards the middle of the bruise, sickly yellow and green around that.

Nosebleed - just a little red makeup down the nose. If the bleed is accompanied by a punch to the nose, you just add some bruising around the nose area.

I used the nosebleed in "House Trek 6" - it was my first makeup effect, very easy.

All the stuff I've described should come off the skin easily with soap and warm water.

I did some tests - even ordinary acrylic paint can be removed (believe it or not) fairly easily from skin.

Not from clothing, though.

Subtlety is usually important.

Experiment, I'm sure you can think of cool stuff I haven't thought of.

Skin peeling - the symptom of a strange virus? A metamorphosis? Or radiation?

Skin peeling can be done with clear glue. Subtlety, again! Spread some glue on the body part, let it dry, and then the actor picks at it and peels it. Molting skin - eww! - it looks reasonably convincing.

Stabbing - Try disconnecting the handle of a knife from the blade. (Carefully!) Then use some wax or clay to affix the handle to the body, and brush your makeup all over that, blood, gelatin, whatever.

You start with a shot, maybe from behind, of the person being stabbed. You don't see the stabbing, you have the victim between the assailant and the camera. The person swinging the knife is about a foot away from actually touching the victim with it, jabbing the knife in (as a miming action) but not actually touching the other actor with it. The reactions sell the shot, as will a sound effect.

Then you cut to the makeup effect I list above, switching camera angle.

Broken glass - clear plastic can look good enough for this, you know, cut from a water bottle. I used sugar glass with the Paul Tenney bit in "Send in the Clones 4", but it was warm and I sort of regretted it.

You can embed all sorts of things into the skin the way I described.

Not all makeup FX are injuries, of course:

AGING - encourage your actor (if it's a guy) to grow a beard (or at least some stubble) for the part with him "aged", as this always makes a young man look a bit older. You can also enhance a beard slightly with marker (I'm not joking - in "Super Soda", Zach (my) facial hair is 60% fake. If it's partly real, it's more convincing for the audience.)

Take a bit of flour and dust your hands with it, run them through the actor's hair. This will make it a bit grayer. The effect must be subtle, or else it will look fake.

Anywhere where a slight wrinkle exists, accentuate it. Tint the underside of it a little bit black.

Add any wear or tear the body might go through, muddy up the complexion a bit.

Illness - try brushing a little white coloring and spreading it on the actor's skin, spread it and make them look pale. That gives them a sickly look.

The yellow tint, or greenish, might work well, as sickly, maybe for a nauseated person.

A little bit of bluish tint under the eyes, suggests sleep loss.

Dampening the actor a little, works well for sweat and fever.

Adding little reddish dots can make for a rash of small sores. Don't overdo it.

Sometimes when I have a runny nose, the area under my nose gets kinda reddish. Maybe try that.

It all depends on the nature of the sickness...

This is easily my biggest weak point in the whole movie process. I am in no way a clothing expert. My sisters definitely make fun of me for my utter lack of fashion sense.

Nonetheless, I'd like to offer some essential guidelines.

First, somewhere where I made a moronic error - trying to use clothing without making sure it would fit the actor. As I said, a moronic error. Be sure you know your actor's body measurements before designing a costume, instead of guesstimating and winding up with something utterly useless. Be Prepared, the motto of the boy scouts. It's so hard to be truly prepared in making a movie, and you can make so many stupid mistakes like having the wrong size of costume, because there's so much you need to keep track of and prepare for - especially if YOU are the director, lighting guy, sound guy, and half a dozen other things during the recording session!

First note, that clothing says something about the wearer. Is it formal or informal? Expensive or cheap? Clean or slovenly? Is it a colorful, flashy "look at me" wardrobe, or a subtler, conservative look?

Design your clothes to match your character, and your whole world - that is, culture and time period. Your Roman soldier should not wear a digital watch, for obvious reasons.

Just like I and my dad (as pilots with supposedly 20/20 vision) shouldn't have been wearing glasses in "Sabotage 757."

Look at Hurford Blumper's wardrobe in "Super Soda". It's aggressively kitschy and ugly. It says something about who Hurford is.

Know that in many cases you can find appropriate stuff at your house, friends' houses, or garage sales.

You can often find costumes online. I got some basic army surplus stuff for Paul Tenney (the soldier guy) in Super Soda and for my "Duel 2030" actors.

Army surplus is useful for period pieces. Indeed, you can find a multitude of dedicated costume shops online - but know that a lot of this online ordering can get expensive...

Maybe you can find someone who is a capable costumer. That's nice if you can, but you can get by if that's not possible.

Amazing cheating - Look at "Sabotage 757" and the pilot/steward costumes. Convincing enough pilot costume, right? Look closely. The costumes consist of one-color shirts, nice black pants, and a bunch of paper doodads taped onto the shirts.

I kid you not. But it actually looks O.K., doesn't it? So, it is an option for you to have little insignias, patches, and buttons, and make them in Photoshop, print them out, cut them out, then attach them to the clothing. I will point out that you'll want something stronger than ordinary tape holding them - when I used tape, the costume objects kept falling off as we moved around.

If you're prepared to ruin the shirt, use glue. It sticks better and you won't have stuff fall off mid-take like we did.

The little polymer clay things are great, you can mold them easily, bake them, make faux jewelry and stuff that looks pretty good.

Polymer clay is a bit pricey, but it is more easily shapeable than real, organic clay, in my experience. It doesn't dry out ever when stored, remains malleable - but it hardens when you bake it, into something really solid.

It is good for shaping small items, but not for large things, because of its price.

Pair these elements with some basic tubes of silver and gold paint to surface things with, creating the look of something expensive and metallic, that is actually dirt-cheap clay or plastic. Mix silver-gold-red-brown and you get a good copper look. (All this advice applies just as well to set design.)

You may not need "real" detail on such things, only the appearance of detail. This is true of VFX work as well, the art of only putting detail in where people can see it.

Go to garage sales, they put stuff at dirt-cheap prices. Sift through that stuff, some of it might be useable!

Oh, one more thing - consider storing all costumes in one place instead of relying on cast members to show up in the right clothes. If they don't, continuity is breached. I've had this problem repeatedly.

So yeah, keep all the "movie costumes" in one place so they don't get lost when you need them.

BASIC EQUIPMENT, aND SOUND PREPARATION 45

You need two basic things for making a movie - a camcorder and a computer.

All right, almost certainly a third one - a microphone.

The microphones included inside camcorders are consistently poor quality. Getting a good external microphone is one of the best investments to make, besides the camcorder itself.

Usually, on a tight schedule people mount the mic on top of the camcorder when shooting, and that's good sometimes.

You usually will encounter three types of mics:

-Shotgun mics. These are mounted on the camcorder. They are convenient and time efficient. Most of them are designed to pick up whatever sound is directly in front of the camcorder.

-Boom mics. They are essentially the same, but are used differently. They're mounted on a pole of some kind and moved some distance away from the camera, closer to the actors - maybe to the side or held above. The problem with these is you need an additional person around to hold the mic while you're recording the subject of the shot.

-Lavalier mics. These are little mini-mics that are placed in the actor's clothing. They allow you to get audio really close to the actor but they are often disturbed by sound interference - the rustling of clothing - and aren't good at capturing the voices of multiple people, just the one who's wearing the mic.

In all of these categories, you can find wired or wireless microphones.

I'm not a sound engineer, it's not my strong suit. But my recent Azden mic is really good.

The more expensive, usually the better.

A good shotgun mic can work well maybe 70% of situations, it should probably be your first buy.

You can find something decent for maybe \$40, something really good for \$100+.

Your location and sound - it's good to consider the acoustical properties of a location. In "Send in the Clones 3", the audio in the Parish Hall scenes is hideously muddled and echo-prone. You can't make out a thing, and that screws up the movie badly.

You won't get comments like, "The sound quality was good" when making a movie. Normally, people only notice the sound quality when it's bad - and when it's bad, it can ruin the whole movie.

If you have noise interference behind the actor, remember that shotgun mics normally pick up what's directly in front of them.

So imagine a line moving straight forward from the end of the mic, representing the "sound zone" that will be captured.

You need to get the actor in the sound zone, but not the background interference.

One good way might be to have the mic lower than the camera, aiming up at the actor. Or, if the noise is high up, raise the mic and point down towards the actor.

Consider dubbing as an option if the audio properties are bad and you're not willing to change locations.

Or, if it's really awful, and the location is not too critical, change locations.

Sound design is one of the upsides of a set, you don't get all the wind, cars driving by, etc, that you get elsewhere.

Also, maybe it's wise to record a 30-second stretch of "ambience", the sound naturally present at a location.

This is useful for:

-Dubbing scenes over. You will want to use a little of the original location sound to lay over the track, so it doesn't sound like the voice was recorded in a studio.

-Scene cutting. You know, when you cut from a location to another (location or set) not nearby, but you want the audience to think the two places are right next to each other in the context of the movie.

Okay, 'nuff said about sound prep.

Now for camcorders.

Your ideal camcorder has good resolution and video quality, good manual controls, and is fairly easy to handle.

You shouldn't care about the internal mic, as I said, you're best off using an external one, anyway.

You don't need those cheesy included transitions, because they look corny anyway and your real editing will be on the computer.

Some terms you'll have to observe:

CCDs. This is a light-capturing matrix. Some camcorders are 1CCD, others are 3CCD, and still others use a range of new niche formats which are enhanced forms of the 1CCD - better than 1, maybe not as good as the 3CCD.

What does this mean? Well, the 3CCD format gives you better color definition. On a 1CCD camcorder, your "blue" (for instance) may include many pixels of gray, green, and purple. Your colors are clearer and more vibrant and accurate on a 3CCD camcorder, though the better tech also raises the cost a bit.

Aside from general visual quality, the 3CCD system is much, much better when doing bluescreen work.

Look at the "Super Soda" color key composites, they're not flawless, but they're a huge step up from the ones in "Sabotage 757".

Actually, that's because between those two videos, I upgraded both my camcorder, and my microphone.

Both of those things made a huge difference.

Chip size - one-sixth, one-fourth, one-third - are typical sizes. These are a factor in the real resolution of the video. The bigger, the better. Generally.

Manual focus - nice to have. I'd use it more if my shooting schedules didn't tend to be so absurdly hectic.

Effective resolution - means the actual number of pixels you're getting in a frame of video.

DVDs are 720 X 480, roughly.

That's 345,600 pixels effective resolution. Try to aim for that or better.

HD - some prosumer camcorders in the \$1000 range (as of now, early 2007) are HD. Blu-ray offers higher resolution, about 3-4 times that of DVD.

DVDs are still standard right now, but HD (in some form) will be the norm soon, and prices on HD tech will almost certainly drop over time.

Sony has some of the best HD values right now, some of them even have a slo-mo setting that captures 120 frames per second. That's real slow motion, good for miniature FX and some other effects work.

Formats.

MiniDV is the standard, it has been for some time. I use MiniDV right now.

It's a little pricey (\$5-\$8 per tape) and is better quality than other tape formats.

Then there are second-tier tape formats.

Digital-8 (I used that in the early years) is O.K.
VHS-C, several others are out there.

Then there are mini-DVDs, DVDs, and internal storage, these are the future of the industry - recording directly onto digital data discs.

They're not clearly better than MiniDV - yet - but they will almost certainly grow to dominance over the next few years, especially as HD-DVDs become cheap, digital should blow everything else out of the water.

Then there's the "old guard." VHS. Film. VHS camcorders are a joke now. They don't let you connect your content to a computer, and the resolution is poor. With VHS, editing is linear and involves hooking two VCRs together.

Hollywood uses film.

Should you?

Lots of film students do. But film is not at all cheap or efficient, and lately even Hollywood (with its huge budgets) is ditching film in favor of digital tools, like the Genesis camera.

Film stock must be stored and processed carefully. It is vulnerable to exposure to light and can easily be ruined.

Film is expensive. 35 mm, the best mainstream film stock, costs over \$7000 for one hour of stock. 16 mm is maybe one-fifth or one-sixth as expensive, and 8 mm is one-fourth that. But you're still talking expensive, vulnerable, easily damaged.

Also, it can't be processed into a computer without expensive equipment.

If you don't have the equipment and you are trying to edit film, it's a physical cutting and splicing process, and it is slow, it's a hassle, and reordering scenes is very hard once you've cut them.

My point is, for the practical, logical, non-sentimental, cost-conscious independent director - film is dead. Long live digital!

White balance - it's a tool on your camcorder. I'm controversial on this subject. I believe in recording footage as-is, without tinting via white balance - and then doing my color grading on the computer.

COMPUTERS

Mac or PC? Honestly, PCs are clearly dominant in the gaming sphere, but with movies and graphics, both systems are equally good.

Just make sure that both your computer and your camcorder have the same connection - USB 2.0, maybe, or Firewire.

Also, it would be good to have a computer with a DVD burner.

Those are pretty cheap now, and DVD is THE format for releasing a movie - I've released a lot of DVDs and people like that.

Beyond that? Try to acquire good hard drive space, video is space-intensive.

My household, with all computers and external hard drives added up, has over a terabyte of HD space - over 1,500 gigabytes.

You don't need that, but you should at least have at least 150 gigabytes of space, probably.

RAM - Random Access Memory. This is key to speed in computer processing, maybe more so than the processor itself.

Try upgrading your RAM, to whatever degree is affordable.

In my room, I have 3 GB RAM on one computer, 2 GB on the other.

Video editing and effects work is fairly processing-heavy.

I once built a 3d model with 3 million polygons, for a guy named Pastor Jackson. (How much is that? Add up all the 3d content in Myst, Jurassic Park, Terminator 2, and you have less than half that

much)

Computer tech capacity tends to double every 18 months.

That means your tools, on a \$5000 budget or so, will probably be better than what ILM was using 5 years ago.

Internet - you should have web access. But you already do, apparently, since you got this book off my website.

You can learn so much about this field from the web. There are thousands of tutorials out there, and my e-book only scratches the surface!

Some other basics worth having?

A tripod. This is so useful. The surest sign of amateurism is shaky-cam. Granted, on "24" and some professional productions, hand-held camerawork is done, but a tripod is still very useful.

Get one that can swivel well, that won't jerk in fits and starts during tilts, pans, etc.

Get one that's sturdy, can connect to your camcorder, and is reasonably tall.

Decent tripods can be found fairly cheap, but do expect to pay at least \$25 for a lower-end tripod.

-A workspace. Like I said in the "locations" bit, having a place to work is important. I have two - my "computer lab" (my room) and my "studio" (my garage)

-Finally, lights. For that, let's move on to the next section.

Lighting is a sign of "quality" in a production. I am just about the last person to be qualified to teach on this, as my shooting-at-high-speed tactics have traditionally minimized my actual use of lighting.

I do have some lights, though. The ones you will want to have are halogen lights - i.e. Old-style lights, not fluorescent (which looks bad when recorded)

Film is nowhere near as good at capturing light as the human eye - with film, you want to go a little overboard on light strength.

Digital formats require less light.

In Collateral, with Jamie Foxx and Tom Cruise, everything was recorded on digital, at night, without any additional lighting beyond the city lights in LA at night-time.

You don't have a super-camera, and you don't want to go into dim, low-lit situations. But you don't need exceptionally strong lights, either.

Try to be careful with low-light situations. You may have cool stuff in the shot, but if it all turns out black, what's the point?

Alternately, be sure not to point your camcorder directly at the sun, this will damage its perception. You don't want to stare at the sun, it's bad for your eyes. Same with the camera, but, it is only a problem if it's left pointed at the sun, completely still.

Some lights for photography are on stands. Others are clip-ons.

In the olden days, film people used clothesline pins to attach lights to poles. They called them C-47s on budgets, because "C-47" sounded more professional than "clothespins".

Thing is, there are loads of "c-47" solutions out there - ways of doing things cheaply.

You might want to aim for about 4-6 times the light strength of the average room light.

Maybe you'll need extension cords. I do.

Also think about buying a few gel filters. These are filters layered over a light to tint it a certain color. Colored light is an interesting effect to play with.

See the red and green lighting during the crash sequence in "Sabotage 757". Or Hurford in the factory, with red and yellow lighting, in "Super Soda".

Those are cases where I used color gels.

Lighting for bluescreen - backlighting helps, having lights (L) pointing at actor A, in front of a bluescreen, like this:

BLUESCREEN

L

L

A

What this does is help separate your actor (color-wise) from the background color.

(Obviously, this is still useless if your actor is wearing something the same color as the background. I have had trouble getting people to be reliable with clothing, and you may too, but do your best to make sure that they don't wear colors that resemble the color of your bluescreen or greenscreen.)

But, anyway, this is a useful thing to know, and the colored lighting shots were the cleanest composites in "Sabotage 757" - the same principle will help you.

And even non-colored backlighting helps, honestly.

What is this "Backlighting"?

Traditional photography suggests there should be three lights:

- The KEY LIGHT
- The FILL LIGHT
- the BACK LIGHT

The key is the brightest, it's on one side of the actor and slightly to the front.

The fill light is on the other side, and is less bright.

The back light is behind the actor.

A back light only gives a sense of mystery, it emphasizes the "outline" of the person, but doesn't illuminate anything else.

If you have ONLY a backlight, you get a mysterious quality because you can see the actor's there, but can't identify them.

Underlighting: It is creepy and "unnatural", because most people are psychologically used to light being from above.

So, lighting from below might be valuable for a "horror" moment.

Green lights also strike people as unnatural.

Yellow lights suggest heat. Red suggest danger. Blue suggests cold.

The "other" bounce light - some photographers have those little umbrella things - or reflective surfaces, in a studio.

Using aluminum foil, or other reflective surfaces, even white cardboard, can provide a weak bounce light, to reflect light from the KEY light back to the other side of the subject.

If you've got a lot of light in different directions, you get a softer look. If you light starkly from one side, you get more shadow and "shape detail" on the face, less subtlety and color detail.

Shadows as storytelling devices - or effects.

A shadow is formed when a light source is blocked by an object.

So, all you'd need to do is move the camera into a place where it picks up the shadow and not the subject.

Often movies use shadows to obscure a subject and build anticipation. Maybe at first we only see the shadow of the killer, or monster, or "unknown person".

Or we see a doorway, but it's lit from an angle, so that the room beyond the doorway is in shadow.

Mystery! What's in there?

Other times, it's a way to avoid excessive violence. If we see the shadow of the guy getting stabbed, we know he's dead without seeing him.

Shadow as stylistic effect - You can have a person stand next to a

window, have all the available light be coming through the window from outside, and water spraying on the window surface, as in the case of heavy rain.

What you get, then, is a subtle effect - light passes through the streaming water as it enters the room, resulting in a moving water texture in the lighting.

Experiment with that - obscuring lights with textures, like leaves, or other things, and using the shadows cast by them to add interest to the scene.

Smoke machine - if you've got a smoke machine, you can get light to filter through the smoke in "beams" from a light source. Think about that, and experiment with it.

It makes the light source that much more interesting.

Consider lens flare as a legitimate tool. Everyone says to avoid it, but you can use it judiciously, it can generate some neat inadvertent effects. (See "Creativity" video)

About outdoor lights - you will often shoot outdoors. I do.

Outdoors means you don't have much lighting control, but outside conditions do have some clear lighting effects.

Clear skies mean sharp shadows. Overcast skies mean better "Fill", with more detail and smoothness.

Sunrise and sunset give you great long shadows and beautiful skies, but the problem is, they don't last long. Still, you can get something from them.

Look at the "GPS" scenes in Hawaii in "Troop 4: Uncensored, pt. 3", they are shot at sunset and they're more beautiful because of it.

Another cool lighting effect - set up a container of water, point a light down into it, at a 45 degree angle, and watch how the light is reflected back up when the water is moving. You get weird shimmering lights - an effect that may be useful for something.

Reflections - the reflection in a car window or glasses - are also interesting to use. They provide a way for you to show something in front of - and behind - the camera. Just make sure the camera doesn't actually appear in the shot.

Cinematography has to do with composition and camera movement. For the purposes of this section, we'll deal with those separately.

Remember, your goal is to tell a story. The way you record scenes is a vital part of that.

Most camerawork should generally feel "invisible", focusing audience attention on the subject, not the camera - although flashy shots are fine if they convey the subject well.

COMPOSITION

Shot distance - the more wide the shot, the less personal. Wide shots are good for Establishing Shots - setting up the location of the scene and its context in the opening shot, before going into detail.

Medium shots are closer in, and close-ups are even closer, good for a moment of identification with a character.

Color composition - colors have psychological effects. Warm colors generate a feeling of excitement or agitation, cool colors are calming. Colors that are opposites on the color wheel make striking compositions when combined in one shot.

"Super Soda" has its finale drenched in red and yellow and black.

Greens and blues tend to be very pleasant. Yellow either suggests heat or happiness. Black suggests evil, White suggests purity (except in some Asian cultures, it suggests death).

Brown and grey feel ordinary and boring. There are times when "boring" is the desired mental association.

"Traveler's Enigma" makes heavy use of color transformation, going all the way around the color wheel - a yellow apartment room, a red city and brown sewer, a purple "gateway", blue caves, and a green and white garden.

The game also shifts from angular forms to organic shapes, from psychologically unnerving to psychologically pleasant.

Contrast is more interesting than having every scene look the same!

Diagonals - tilted frames and diagonals are compositionally uneasy and make the viewer feel unsettled. Watch how film noir uses loads

of diagonals and shadows in its composition.

Rule of Thirds: This is a classic composition rule. Look at your frame, and divide it by three evenly - vertically and horizontally. Those dividing lines, and the points where they intersect, are logical places to have the elements of the composition.

Don't ask me why this is, it just looks good, usually.

The cutoff rule. Assume that some of the video around the very edges will be cropped on a TV screen. Don't put anything vital on the very edge of frame.

The motion-space rule. If a person is looking, or moving (or ANY subject is moving) in a certain direction, make sure to allow more space in the direction in front of the subject than behind them.

A violation of this rule will be compositionally unpleasant.

I violated this rule repeatedly in the Robot CEO conversation in "Super Soda", which was more because I was pressed for time than for any other reason.

We all make mistakes, especially on tight schedules. Still, I try to follow these rules when I remember them.

-Cutoff Rule. Don't cut off the top of an actor's head with the top of the frame. It is bad composition. Send in the Clones (the original) contains some serious violations of this rule. You can cut off the lower parts of the actor's body with the frame, but don't do a headshot where the frame ends at the bottom of the neck. That is also compositionally uncomfortable for audiences.

-Contrast rule. If you want to draw attention to a critical element in the shot, it must contrast with the other elements, by color, pattern, light/darkness, or motion.

Remember, you can use composition to focus the audience on a specific subject.

The 180-axis rule. When recording a conversation between two people, imagine that there is a straight line between them, connecting them and extending beyond them.

All of your camera placements should be on one side of that line.

Why? If you cross it, it confuses the audience. Knowing Person A is always on the left, more or less, and Person B is always on the right, makes the scene simpler and less distracting for the audience.

The isolation shot. A wide shot with a person in a large area gives a feeling of isolation and vulnerability.

The close-up. Close-ups are good for emotion and connection to a character.

The POV. Point-of-view shots help us connect to a character by seeing things from their perspective.

The high angle. Shooting from above gives a sense of vulnerability to the subject.

The low angle. Shooting from a low angle makes the subject seem taller and more important and strong, and imposing.

It is good to record children from their eye level as it gives them a sense of dignity. In "ET", for instance, note how the camera is almost always about three feet off the ground. That signals to us that it is from the kid's perspective - not the grownups.

Association of size, distance and motion:

audiences assume large things move more slowly. A slow, lumbering person shot from a low angle might seem REALLY big.

Slowing things down is standard practice for miniatures.

Things seem faster somehow if they are near the camera. A recording of a bicycle speeding close by the camera feels faster than a wide shot of the same bike traveling the same course, even if they are the same speed.

Z-axis motion: Makes for neat shots. It's good not to just have left-to-right and up-to-down composition and motion, but also front-to-back, which is often the most interesting kind.

Cutaway shot - critical for editing, this is a miscellaneous shot that could be inserted anywhere in a sequence. Cutaways give you a way of filling in spaces where your timing is off, when you're in the editing room.

Focus - not an easy thing to use on digital camcorders (they have a much wider depth of field) - but you can have a foreground element, and distance element, and shift the focus between them, which gives you (in a way) two scenes in the same shot, letting you draw the viewer's attention to whatever is in focus. Know that most good shots have multiple layers - foreground -> midground -> background.

This is the section where we discuss moving the camera in shots. Static shots are rarely engaging, but high-strung handheld shots are much more amateurish.

You need to find a balance between dynamism and control.

The pan - you rotate the camera from left to right, or right to left. Use this to follow a subject.

The tilt - up-down motion. Also useful at times.

Handheld with sanity:

Your goal is to stabilize handheld shots by maximizing the amount of support available.

Two hands holding the camera are usually better than one.

The arm jib - a corny technique for a jib without a jib.

You must "solidify" your arms - perfectly straight, with the camera at the end. Then move your arms steadily around in different ways. Experiment. You can get a camera to move up, or side to side, a little ways without too much jitter.

Center of Gravity - the principle of all steadicams is this:

When you have weight hanging underneath a camera, equal to the weight of the camera itself, it automatically compensates for all camera jitter, counteracting it.

If the camera starts tilting one way, the weight hanging underneath will naturally, by the laws of physics, pull it in the opposite direction.

In this manner, your camera is stabilized.

I have a steadicam.

It is homemade and is \$12.

It works fairly well. These handmade solutions aren't flawless, but they can be useful.

Also, your camcorder may have optical stabilization. If it does, turn it on. Digital stabilization, usually is fairly useless on a

camcorder, but optical is good - at least for counteracting very small jittering.

Cranes - a novel approach is to use a ladder, climb it with your camcorder firmly (and carefully) in hand. There you have it - a shot from high up!

Dollies - these are devices that you mount a tripod on, and scoot it around. Nice idea, but handmade dollies are tricky to deal with and professional tools are too expensive. So, why don't you use either a wheelchair, or a shopping cart as your camera dolly?

They work well, and give you a great mobile system for your camera.

Car seat tripod - strap your tripod into the seat of a car and start driving for that car scene. It looks authentic, because it is.

Waist mount - aka the POV shot. This involves attaching your tripod to your waist. Sounds strange, no? This way, you get a POV shot (Point-of-view) that is as smooth and dynamic as, well, the way you actually walk. It can face forward, or back towards the subject's face. I used this mount when introducing Zachary Bang in "Super Soda".

Evil Dead camera mount - You attach the camera securely to the center of a long plank of wood, and two people carry the plank, one on each end.

What you end up with is an amazingly smooth, interesting camera move, that seems to glide over the ground, and moves in some cool ways.

Underwater shot - You will need to have a solid plastic or otherwise waterproof box, with one side partly or totally replaced by glass, and sealed with rubber cement or something else, so that it won't leak. Then test it by putting cloth inside the box, closing it, and submerging it in water. Pull it out. Open it. Is the cloth dry? If it is, you can probably safely have a camera in the box, too. You direct it (obviously) so that the lens of the camera is directed through the glass, and you use it underwater. The tricky bit is, you start recording before closing the box, and stop recording after you've opened it. So, no "takes", you use up loads of tape.

You can get that awesome underwater sequence in a pool, and think of the pool interior as a set design space, like any other, where an environment can be built and disassembled.

Zooms - not advisable, most experienced people don't use zooms, especially not digital zoom (which reduces image quality).

With a zoom, all your jitter and motion just gets amplified.

If you want a closer view of your subject, don't zoom - get closer!

Exceptions: The comic zoom. I used this when introducing "El Fatso" in Troop 4: Uncensored, pt. 3. It's a rapid zoom for comic effect.

The "Vertigo" shot - invented by Alfred Hitchcock for the film Vertigo, it became a cliché, in many horror films. It's the effect where the foreground moves towards the camera while the background recedes.

How you do the effect: The key is the zoom being used in conjunction with a forward camera move. You move the camera closer to the subject while zooming out. The only trick is making the motion smooth.

Camera mounts - you can mount a camera on various vehicles. An engineering-focused person could explain this better than I can, for now just search online.

Jibs - Also, search for this online. The detonationfilms.com website has some jib/crane stuff on their tutorials page.

Low angle motion - like the camera following the kid through the halls in Kubrick's "The Shining". Try mounting the camcorder on a skateboard for a moving, super-low-angle dolly.

Whip around shot - where you circle a person. You can do this with the types of dolly tools I mentioned. One of those classic "surprise" shots is when you circle the subject and "surprise", someone is behind them at the end of the shot.

Upwards reveal - use the arm jib for this. This was used effectively to reveal Mel Gibson in "Mad Max". You start low, focused on shoes/pants of the actor and raise the camera slowly to reveal the actor's face.

Swapped Subject shot - you start the camera following one subject, and then it passes or intersects with another subject, and Subject #2 becomes the focus of the shot. It's a decent reveal and has "viewer interest".

Tracking shot - simple, you're following your subject. You must always keep the viewer looking at the important elements of the shot.

Voyeur shot - You are viewing your subject through some obstruction, like binoculars, or a window, from a distance. Having something between you and the subject does more than make the shot compositionally interesting, it adds a sense of voyeurism, this idea that you are spying on the subject.

Here, we're getting into post-production. This is you sitting alone at your desk, putting together all the various shots that make up your script, into one movie. We will talk about editing first, but obviously you want to have the sound FX, VFX, etc, done before the final edit.

Editing tools

I've seen people use Avid, Video Toaster, Final Cut Pro, and other tools. I use Premiere. Find the best editing software you can reasonably afford. If you're stuck with the one that came with your computer, you can use that, but it won't give you much flexibility. I've seen people do passable work with Windows Movie Maker and the better Mac equivalent, Imovie. There was a \$200 feature-length documentary recently called "Tarnation," that was edited in Imovie.

While I would never recommend you do such a thing, if you cannot afford anything better, by all means, start with one of those cheap programs.

Generally speaking, you need to ignore any software that treats you as a baby and expects you to use presets. You're an artist! So choose flexibility and freedom over ease of use.

Premiere is good. Final Cut Pro is a little better, also a little pricier. Video Toaster I don't know too much about except that it is remarkably fast and can display most anything in real time during editing. Avid is used by a lot of pros.

With software generally, if you're a student or a teacher, look for educational discounts, because you can get a drastically reduced price.

I will say the obvious here - searching on google produces loads of cool stuff. Look for free tutorials online, because I won't tell you how to use specific software in this e-book, just the general functions.

Try some of these links, these are some of the good sites I've found on the web, for general media resources, ranging from indie filmmaker forums to media business sites to tutorial collections:

<http://www.creativecow.net/>
<http://www.dvgarage.com/>
<http://forum.fanfilmsforum.com/>
<http://www.stevengotz.com/tutorials.htm>

<http://www.adobe.com/>
<http://www.apple.com/>
<http://www.matthawkins.co.uk/>
<http://forum.fanfilmsforum.com/>
<http://www.detonationfilms.com/>

And my website, obviously, <http://www.hornbostelmedia.com>

I have some media resources there (obviously you know this, you're reading this e-book!)

Capturing - This is the phase where you load video from your camera to your PC. Uncompressed video frequently winds up capturing at 100+ megabytes per minute of video, and that's just at standard definition.

Expect to need 3 or 4 times as much space as you'd need for the length of the movie, at that per-minute rate, in order to make the movie. Why? Because you're capturing raw footage in chunks with loads of unused junk you'll ultimately need to trim out, then editing (and in the case of VFX, you create entirely "new" shots using the old shots as a base), exporting the edited sequence as its own movie, then converting that into a DVD form, which is yet another large mass of files.

So, what that means is that "Send in the Clones 4," my 35-minute movie, took up about 25-30 gigabytes of space over the course of its production, part of which had to do with the making-of documentary.

I had hours and hours of video files on my computer.

And video is space-consuming. Remember, a minute of video (not even considering sound!), in essence, is comprised of 1,800 individual image files. Get a few hours of video loaded and it adds up.

External hard drives are a good option to add space cheaply, a 250 GB drive costs about \$100 nowadays, and with Moore's law in effect, the capacity should double every year and a half.

So adding extra storage isn't impossible. When you do, though, aim big because about half the cost seems to be materials - per gigabyte, your bang for the buck goes up significantly the larger the capacity of the hard drive.

400 GB may cost roughly twice as much as 80 GB.

I have over a terabyte of combined storage on the two computers in my room.

I can hear you asking, "Do I have to edit on a computer?"

I've heard people ask this who are older folks, and still think film editing, or VHS editing is fun.

Trust me, a few hours in digital and you'll never go back.

Nonlinear editing is universal now, you'll find what you have at your disposal, on your cheap PC, is something that professional Hollywood filmmakers 25 years ago would be envious of.

Capturing is done through a USB port, or through Firewire, usually. These are two common wire connections that allow you to send data from your camcorder to your computer.

I won't tell you how to do that. Look through your tutorials.

Most editing apps, allow you a bin where you can organize your list of pics, sound clips, and video files.

They also have a timeline, where you can place them, split them into bits, shorten them, reorganize and move them, alter properties such as volume or transparency, etc.

They also have a display, where you can play back what you have on the timeline.

Usually also a list of effects that can be applied to video or sound, transitions, etc.

And of course, a file menu which lets you save/load projects, and export completed videos.

Virtually every video editing program is structured with these same basic elements, though some offer more options than others.

Final Cut Pro, for instance, offers a mass of compositing tools, audio tools, and effects - not enough to rival dedicated compositing or sound design software, but enough to certainly be useful.

Editing logic.

Editing is the last place where you can influence the form of your story.

People logically associate clips in sequence. The order you play things clues in audiences to the meaning of the scene.

So, try to edit in such a way that the scene is comprehensible and

well-developed.

Cut out the fat - I believe (as an editor) to avoid pauses and moments of nothing. Something should always be happening. So try to cut out dead space and condense to all the good stuff, the useful stuff.

Time compression - speeding things up or slowing things down is acceptable, messing with timing can be done without anyone questioning it. Movies don't need to be in real time, they're like highlight reels, only including that which is interesting and valuable.

You are here to entertain! A really fun 5-minute short film will get much more response than a huge, slow, tedious 50-minute behemoth. I never gave in to the temptation to go "feature length", I make lots of videos that are 5, 10, 15, or 30 minutes long, and guess what - they're less boring that way!

So again, you can start small, aim for quality over length.

Cutting rate - fast-cutting scenes are exciting! In high-speed sequences, rapid cuts generate energy. When you want the audience to slow down, slow down the cutting.

Parallel cutting - this is where you shoot the whole scene multiple times from multiple angles, and cut back and forth between the tracks. Hollywood editors often have dozens of forms of each moment, and can pick out the best combination from many options. You probably won't have many options. You may not even have more than one take for many shots.

The establishing shot - You can convince the audience that two places are in the same area that are actually in vastly different places.

For instance, a beautiful house exterior is your first shot. Then you cut to an indoor scene. The house in Shot #1 is not where you recorded the rest, but everyone will assume they're the same place.

Crosscutting - The classic suspense tactic. Here's where you show one plot thread for a little while, then switch somewhere else, then switch back and forth. It keeps the audience more engaged, and it builds so much suspense.

My best example is the entire second half of "Send in the Clones 4," where I have the defense of the church as one thread, and the rush to find the virus on the other. They're connected because the virus is needed to beat the clones. We keep asking, "When will they get back to the rest of the group with the virus? Will they make it in time?"

That illustrates another point. Crosscutting lets you kill everything in between - it's a good fat-cutting tactic. You cut back into each thread at the place where it's becoming interesting, and cut out at the point where it's no longer interesting, or alternately - on a cliffhanger where the audience is left hanging wondering what is going on there.

"24" is a show that is expert at crosscutting.

This is hard to describe as editing, really, as much as it is writing. If you wrote well and recorded things well, your editing, in some ways, should be a no-brainer. Just follow the script and drop in all the pieces, and adapt to the bits that didn't come out right, either by ditching them, or by other means.

You can edit around a gap sometimes by cutting to something else. Not preferable, but sometimes it's your only option.

Editing is very intuitive and your situations will vary. Just use your intuition about what feels "right", and find the best, most entertaining way to tell the story, with the material you have.

Stop-motion: Just a reminder that stop-motion capture can be done with editing tools. Stop-motion is a cool technique to play with.

Watch "Tinyville Disaster" and "Evil Park". Those were stop-motion projects.

Stop-motion is time-consuming, but it has some uses.

The primary one is to make an inanimate object - be it a clay character or a piece of household furniture - move when it couldn't otherwise.

You are capturing frames with stop-motion. One. At. A. Time. You move the object in between frames. Play the frames back in sequence, and it looks like the object is moving independently of anything else.

The other odd use for stop-motion is unnatural human motion, which is sometimes categorized as "pixillation."

When Josh Davis gets hit by the superclone in "Clones 4" what we actually did was have him jump up and down identically, over and over, in a sequence of positions, and then cut out one frame from each jump, put them together, and - voila! - he's propelled about 15 feet at high speed while about 3 feet off the ground.

Be creative with this. Stop-motion is a real option for more things than might seem obvious at first.

Bullet-time, maybe? You could have your group freeze, and then move the camera capturing frames along a sequence of positions, then play it back, and you've got a bullet-time shot.

Or hyper-speed? Capture frames each about 3 feet apart while walking over a long stretch, play it back, and you have a 300-mph zoom along the sidewalk.

These could be done by quickly hitting "Record" twice, and reducing those bits from second-long clips to single frames, or by simply recording continuously and then speeding the whole thing up (but that means the entire walk-through must be pretty steady.)

An example of this is the background of the speeder bike chase in "Return of the Jedi", which used a 3-mile leisurely walk through a forest and then sped it up from 3 m.p.h to about 100 m.p.h.

My example is in the first "Troop 4" movie, where I'm on the back of the car - and the sped-up background is moving past behind me.

It's also possible to slow things down - but it's harder than speeding things up.

When speeding up, you're removing excess frames.

When slowing down, you're either spreading frames out and making them more jerky, or you're generating "in-between" or interpolated data.

Final cut Pro has a tool for this. On the pro end, there's Twixtor, and on the value end there's the \$30 Dynapel slo-motion program. After Effects Pro can do this. Actually, there's a sneaky way you can do this with any good editing program, and make it look passable.

Here's what you do - you layer three layers of the same clip on top of each other, slow them all down by 50%, and set the opacity to: 33% (top layer), 50%(middle) and 100%(bottom). Then offset each layer by 1 second forward from the layer below it. You get a motion-blurry blend that looks smoother than staccato motion that normal slowing-down produces, without a special slo-mo tool.

I used this quick-and-dirty approach on many CG shots in the "Faithful" video, and nobody noticed.

Video clips can be played backwards. Day shots can become night shots, by reducing brightness and adding a bluish tint. Color grading can be used to make grasses greener, or scenes warmer or

cooler, or "older" with a sepia or lower-saturation setting. Go ahead and play with these things.

Killing the digital look - DV has these annoying "jaggies" on fast-moving objects, and they look terrible. To ditch them, you can give everything a slight vertical directional blur. It makes the video look less like DV.

Beyond that, you can use a subtle film overlay, ramp up the color saturation or kill it completely, do a lot of other things for a filmish look.

Just know that most inbuilt transitions are horribly tacky and a straight cut or fade suffices for most things.

Point is: Use effects, they are fun and they can enhance your project. But use them tastefully and integrate them into your story, and don't put them in there for effects' sake. Use them when they have a valid reason to be there - use them in ways that make the movie better, not worse.

They must be part of the entertainment that's solidly integrated, not a distraction that doesn't fit into it.

Now, why is it, that a section on editing turns into a discussion of effects?

Because VFX are my specialty, and I'll be emphasizing them a lot in these later chapters.

Audio is a peculiar area of moviemaking. If you do it right, nobody notices it. If you do audio badly, everyone complains.

What's amazing is how much sound gets dubbed in feature films. It's insane. "Star Wars" is 70% dubbed, because of the Darth Vader and C-3PO suits.

You can get dubbing to work well. Or, you can go the "Super Soda" route and do it really badly! In that movie, my microphone was not functioning during 6 hours of recording. I ended up dubbing 40% of the movie as a result. Most of my dubbing was rather careless, but it is actually possible to dub well enough that nobody can tell the difference. Mostly that involves having the actor look at their take in the editing room (on the computer screen) and then recording the line to match what they saw.

This may be more effective than reshooting, and there are times when a location looks great but is acoustically poor - and you can get the best of both worlds by dubbing the scene!

Dubbing is an acceptable fix on takes where the microphone was accidentally turned off, or where it turns out in the editing room that the actor's voice was quiet or muffled, or there was distracting background noise during the line.

Believe me, you will sometimes run into these issues.

About 5 or 6 of Bradley and Josh's lines in "Send in the Clones 4" are dubbed. Watching the movie, you will probably not be able to tell which ones I'm talking about.

Foley - Foley is a term that refers to recorded audio that is used to stand in for something in a shot. Not many indie people record their own foley anymore. But you can if you want to.

If you've got a great effects sequence, you'll need to find good sound effects. You could record them yourself but there are a lot of free audio files floating around on the web.

I've used the .mp3 preview clips on Sounddogs.com repeatedly and shamelessly. .mp3 files are not the best quality - 48+ khz .wav is best. But if you aren't willing to pay for effects, sometimes you can get by with some lower-quality sound files, especially when you've got dialogue and music at the same time.

Editing/Sound Editing software packages like Premiere or Final Cut

Pro or Soundtrack, are usually equipped with some good audio editing functions. Review these functions in whatever documentation you have in your software.

Some good ones:

-Many programs have a tool that lets you mess with the levels of different frequency ranges. You can use this in several ways. One is to raise or lower the overall pitch of the sound. High pitches suggest smaller sources. A slightly higher-pitched modification can transform an adult voice to a near-convincing young child voice in some cases.

Also, if you've got a nasty hum or background noise in one specific frequency range, you can cut out that frequency in order to "clean up" the sound file.

-Reverb or echo. You can alter a sound to add reverberation and echo. This can be useful. It has a hauntingly odd quality with voices. See my video "Creativity" for an example of this.

-Speed. Slowing down a sound makes it seem bigger or slower. (The same applies to slowing down a video clip, which is why miniature pyro is routinely shot at high speed). Speeding it up makes it faster/smaller. Keep in mind that drastically shifting the speed of a sound can often yield an unexpected effect. I've heard thunder slowed down to the point where it sounds like a shovel digging through gravel. It's bizarre!

Speaking of gravel, backing a car through gravel produces a convincing "crackling fire" sound. You can't actually record real fire. It never seems to be audible to microphones, the sound is too subtle.

There are all kinds of wacky techniques that are used by foley artists. Smashing fruit with a hammer to make the sound of an animal exploding into bloody fragments. Using a bunch of beans inside a long pole and shaking it to create the sound of raindrops.

I don't feel a need to do foley work, generally. There's too much free stuff out there.

Here are some sources for sound clips:

www.sounddogs.com <- Free .mp3 previews, or buy them for high quality. A tremendous selection of FX and music.

<http://amazingsounds.iespana.es/> <- Over 1000 free .wavs.

<http://www.partnersinrhyme.com/> <- Music and Sound FX

<http://www.stonewashed.net/sfx.html> <- links to various FX sites.

<http://www.commoncontent.org/> <-an archive of free stuff that you can use legally in your projects under the Creative Commons license.

<http://filmsound.org/> <- A website devoted to professional Sound design. Very Informative.

<http://www.sound-ideas.com/sfxmenu.html>

<http://www.smartsound.com/> <- two sites with buyable sound material.

<http://www.freeplaymusic.com/> <-Music tracks

<http://www.soundfx.com/> <- Sound FX collections.

Hopefully the ones I just listed will get you started. Keep in mind that you can get a lot of other peoples' content and use it - under certain conditions.

Condition #1 - stock purchase (royalty-free) - you buy the right to use the content. This is legal and I've done it some of the time.

Condition #3 - "Fair use" use - if the original owner does not feel that sales of their product will be diminished by your use of it, they are likely to leave you alone. Fair use is thorny and its boundaries are often unclear. But if you are:

- Not selling their music but including it in a free product, or a low-profit product (which means they have less to gain from suing you)

- Using it for parody or humor purposes. (This qualifies as free speech somehow. They legally cannot prevent people from spoofing them)

- Using the sound in such a way that it cannot be easily extracted from your work. (A big deal. If you (like me) tend to overlay sound FX, etc, over the music, then people won't be ripping it off of your video and stealing from whoever made the music. The fact that it's in part of a video at all and not as a standalone file also is a deterrent to copying.)

- Giving credit to the original creator of the content. The author may perceive your reference as free advertising and allow you to use the music because they feel doing so will benefit their business.

Meeting at least some of these conditions qualifies your use of the content as "fair use" and therefore defensible in a court of law. However, if you have money to buy your content royalty-free, that's preferable. I couldn't afford to do so in many of my videos, and I am now (in retrospect) concerned about this.

Perhaps making your own content is wiser. If you can do your own

foley work, so much the better. If you're a musician, that's also really good.

I'm not a "real" musician. I have never played a musical instrument. Yet, as clueless as I am, I can still use Garageband (from Apple) to compose decent-sounding music. I've used it for "Creativity", "Matt vs. Matt", "Super Soda," "Sleepwalker," and "Troop 4: Ultimate Edition". I also composed music in "Troop 4: Uncensored, pt. 2" and "Psychotic" inside Premiere, by taking a music loop and meticulously splicing notes around. Garageband is a pretty good tool for composing music, but there are others out there. The Garageband jam packs are useful, too, if you are willing to pay for them.

I believe that in low-budget productions, music composition is best done on the computer. Programs like Garageband and Soundtrack give you the ability to form an orchestral soundtrack with hundreds of usable instruments and a high ability to fix mistakes (individual notes, etc) non-linearly.

This is a fairly solid investment if you plan to make a lot of videos. I even bought a MIDI keyboard - GarageKey - for Garageband. Or you could ask a talented friend to help. Or acquire content that is free AND fully legal online. Like material under the "Creative Commons" license, for instance.

There are lots of choices.

The upside to original work is that you have the copyright. The downside is that making it takes time. Figure out what's best for your project.

You can license other people's work. Or find an indie musician who hasn't taken off yet. If you've got a reputation for getting decent-sized audiences to watch your stuff, then an indie artist might let you use their song just for the exposure, to be listed prominently in your credits! It's free advertising for them, a free song for you.

Also, know when to use music and when not to. Use it to underscore and support the mood of the scene (not overwhelm it)

Just go by instinct. So many things just involve messing around until it "feels right".

In "Traveler's Enigma", I made about six of my own tracks, used some by Iain Morland, and beautiful stuff by an indie artist named Melissa Eason. All of it is useful, all of it enhances the game.

I've been told that "Visual effects ruin movies, they kill the story of a movie". I don't believe that to be true. I believe visual effects are great because they allow us to tell a wider range of stories, stories that couldn't be told any other way.

There are some really great VFX movies. The "Lord of The Rings" trilogy immediately comes to mind. There are lots, actually. And a lot of bad ones are out there, too.

My explanation is that making a movie is like making a cake. The fundamental elements - story, characters, acting, etc, are the cake itself. The VFX, production design/cinematography, musical score, etc, are icing on the cake.

They are decoration and they enhance the flavor of the cake. If your cake is good, great production values make it even better. But if your cake tastes bad to begin with, or isn't there at all, heaping extra icing won't really help much.

Bottom line: If a VFX movie is a bad movie, it's not generally the fault of the VFX. It usually comes down to the same fundamental mistakes that make any movie bad - a bad script, bad acting, bad directing.

Two reasons why VFX are more critical on a low budget, not less critical.

#1) Low-budget movies have low budgets. You can't afford a large, three-story set. You can't build a "Rear Window" apartment complex or a "Spy who Loved Me" submarine hangar. So VFX may be needed to create locations or elements you don't have the resources to construct for real. VFX, in short, are cheaper than the existing alternatives. They give you a way to create visual elements, locations, and events that otherwise are either too expensive or flat-out impossible to include in your film. VFX are a way of coping with limited resources and making something entertaining with very little at your disposal.

#2) Promotional Value. Okay, you may have a good story, but how will you get it out there? Movie trailers and ads are key to success and visibility for any media project. What do movie trailers have? They may be able to display the "hook" or main idea of the plot. If you have a good "catchy" concept, that goes a long way. If your movie's story can be summarized in a one-sentence tagline, that's good for advertising.

But let's say you don't have this.
What else?

-Actors. If you have recognizable stars, you have a basis for your ad. But you are on a low budget. Your actors are all unknowns. So scratch that idea.

-A famous property. If you're adapting a hit novel, or a comic book, or a famous news story, you have something that may have potential ad value. But on your budget, you can't afford to license a well-known property. (Except for something really old and no-longer-copyrighted, like Charles Dickens/Edgar Allan Poe/Jules Verne/various fairy tales. Which is why Disney did so much with fairy tales. No need to buy rights.)

-Flashy imagery and intriguing sound design. Movies are a visual medium. If you have something neat to look at in your movie, you have a way to promote your movie. Seriously. The flashy images can draw attention as well as anything else. And they're not expensive (relatively), they're more based on work and talent than money.

More on promotion later.

Visual effects generally fall into several categories. Pretty much anything in postproduction involves one of these three, maybe all three combined:

- 3d animation
- Compositing
- Miniatures

I've used all of these. I've done over 1500 VFX shots. So I have more than a little experience.

I have limited the detail in much of my effects work. I could do better, but I see myself as an entertainer more than an effects artist. So, I try to get the idea across well. I know I can only do a limited number of FX shots, and there are limits on how high the quality can be. The reason is that all of this stuff takes time. So don't go so overboard on effects (or other time-consuming areas) that you can't get your project to a point of completion.

As I said earlier - start small. Work your way up...

That said, effects are a great way to make a movie that feels big, without too much money. Duel 2030 - a \$550 movie. That one actually looks expensive.

The other secret to why it was that cheap, though, is this:

Keep in mind that many moviemaking assets, whether cameras, microphones, editing tools, computers, or VFX software, are reusable and can be a part of your arsenal for years after you first buy them. I had \$3500 in equipment and software before ever starting "Duel" - so although that specific movie cost \$550, it was made with over \$4000 worth of total assets.

3d animation began taking a place in the visual effects field with a minimum of fanfare in the 1970s, with films like "Westworld" and "Star Wars". These early uses of CG technology never attempted to use computer graphics to represent anything other than computer graphics.

Then, in the early 1990s, films like "Terminator 2" and "Jurassic Park" changed perception of the potential of computer graphics to create compellingly realistic images.

Before long, computer-generated graphics became the most common visual effects elements - more so than miniatures.

CGI allows for a flexibility of movement that is not possible with the constraints of physical models.

CGI is cheaper in the sense that it does not require purchase of model-building materials.

I've had CG fans tell me not to bother with miniatures anymore because they're "obsolete". I've had model builders tell me that I should avoid CGI because it looks synthetic.

Neither of these, in my opinion, is a valid argument. With regards to #1, miniatures still look very good when done well and are perhaps no more difficult to construct than CG is. Miniatures have an inherent "reality" to them - a sense of randomness and physicality which can be tough to match on a digital 3d model.

CG is good because it is more flexible in movement. Also, most of the complaints against CG I've heard lately are increasingly irrelevant. Computer Graphics are getting increasingly good at creating almost any type of object or surface or dynamic imaginable.

Bottom line - I've seen bad models and bad CG. And good models and good CG. I think miniatures are good for some things, CG for others. And both can be seamless in the hands of a great artist. Why not use both? I believe combining elements - live-action, miniature, CG, is the most convincing direction to go in, by shaking it up you prevent the audience from figuring out exactly how you did everything. One VFX artist congratulated the "model maker" on "The Day after Tomorrow" for his miniature helicopter crash (It was CG.)

Michael Bay couldn't tell, in an effects test, which aircraft were CG and which were models in "Pearl Harbor" - both looked perfectly real. If your work looks good in the final shot, who cares which VFX method you used to do it?

With 3d animation, the costs are generally all up front. You need to buy the software and there's a big starting investment. On models, the investment is small but accumulates over time as you keep

building new stuff.

So, what are some good 3d programs?

I'll list a few:

FREEBIES

Blender - <http://www.blender.org>

Anim8or - <http://www.anim8or.com/main/index.html>

Milkshape 3d - <http://chumbalum.swissquake.ch/>

Terragen - <http://www.planetside.co.uk/terragen/>

Of the three free programs above, Blender has the best feature set. I feel that Blender's interface is rather clunky, and its texture system is maddening, but it is free and probably the only free tool that comes anywhere near pro-level features.

Terragen is a terrain generator, mostly. Useful for a few things.

Anim8or is rather feature-poor. Milkshape is mainly useful to low-poly modelers, i.e. Game developers. There's also a Strata 3d version, Strata 3d base, that is free. Also look out for free low-poly modeler Gmax on the 3d Studio Max website, a free old version of Truespace at Caligari, and free trial editions of the professional "big apps" like Lightwave and Maya. Also, Softimage XSI has a free version, I'm pretty sure. And check out Amapi.

MIDRANGE APPS

These are a bunch of 3d programs that cost money but aren't fully high-end, "professional" programs.

Bryce 6 -

<http://www.daz3d.com/i.x/software/bryce/b891332fd8e5d4b585b7a118cb813a8b/>

I used Bryce 3d and Bryce 4 back in the day - it was the basis for the House Trek 1-5 CGI, and the Titanic video, CG City, a few other things. Bryce is cheap and mainly good with organics and textures. Its modelling and animation tools are rather poor, last I saw of them. But it is user-friendly and not a bad first start.

Cinema 4d -

http://www.maxon.net/pages/dyn_files/dyn_htx/htx/welcome_e.html

Cinema 4d is seen by some as a true competitor to the high-end programs, worthy of comparison to the high-end apps. I've never used it myself.

Strata 3d - <http://www.strata3d.com/> - I used this briefly between Bryce and Lightwave. Several original VFX in "Troop 4: Uncensored, pt. 1" (like the flythrough of the wall) and the whole "Innerspace" effects video, and a few other 2003 things, were done in Strata 3d. I had a beautiful gallery of Strata art once, most of that is gone forever.

Strata 3d has decent modelling tools, pretty much everything in Strata ranges from "mediocre" to "pretty good".

Vue D'Espirit - <http://www.e-onsoftware.com/> I think this, like Bryce, is a landscape-centered program, good in some ways, poorer in others. But it has some tremendously nice rendering technologies and is so good at generating 3d vegetation that in certain fields, it blows nearly everything else out of the water. Better than Bryce, but it's best thought of not as a standalone app but more of a niche tool for certain types of organic VFX tasks, that can complement a more general program well.

Amapi - http://www.e-frontier.com/go/amapi_hpl - a low-end general modelling app. Older versions are free.

Truespace - <http://www.caligari.com/> - this is a decent midrange program. A fairly standard all-around middle-of-the-road package, I guess.

Animation: Master - <http://www.hash.com/2007web/> - This is primarily an animation program, not a modeller or texturer. It is best at character animation but there are other things you could do with it.

Poser - A character generating tool. The point is to generate human figures. That's basically the main function of the program. It does that really well but you don't want JUST poser.

PROFESSIONAL-GRADE 3d SOFTWARE

Modo - <http://www.luxology.com/> - an inventive and relatively new offshoot of Lightwave, this program is famous for the extremely high level of customizability in its interface. It can mimic the interface of all major 3d tools, which means that someone used to Max, Maya, Lightwave, etc, will be able to use Modo fairly easily.

Zbrush - <http://www.pixologic.com/> - an apparently revolutionary new modelling system. Makes modelling feel almost like sculpting (or so they say)

Softimage - <http://www.softimage.com/> - an old workhorse in the industry. I remember that the dinosaurs in the original "Jurassic Park" and all of "Riven" were done in Softimage. Its heyday was the 1990s. It's still good now but not as competitive as it used to be. Their current version is called XSI.

Lightwave - <http://www.newtek.com/> - I happen to be using Lightwave 9 lately. So, look at my CGI from "House Trek 6" onward and it's Lightwave. The educational version is a fantastic deal at \$200, and the rendering recently has been much improved (along with a lot of the core engine.) Lightwave was used by winners of about 10 VFX Emmys in the last 16 years. The program is fairly solid in all areas. Nearly on par with 3ds Max or Maya, but is significantly cheaper and a better value overall at its current price.

3d Studio Max - <http://usa.autodesk.com/adsk/servlet/index?id=5659302&siteID=123112>

3d Studio Max is dominant in the video games industry, much more so than any other program, but is also commonly used in VFX. It's a

great program and is the most-used professional 3d software around, with 100,000 users. (Lightwave is #2, with 80,000) That means not only do you get great stuff in the package, but also a fantastic number of other programs/plugins are compatible with it, if you want to extend your toolset.

Maya - <http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=7635018>

Possibly the single best all-around 3d animation program in the world, at least the top-end versions anyway. Maya is also by far the most expensive, although there are stripped-down forms of the program available. This is the favorite of many of the largest VFX companies, like ILM and Weta Digital. Superb, but you're an indie filmmaker and this (like some others on this list) is almost certainly out of your league. But the cheaper, stripped-down version may be worth a look.

Plugins and rendering tools to take note of (please do the searches yourself to find the websites):

Vray - a rendering and lighting tool sometimes used with 3ds Max. I hear it's pretty efficient.

Brazil - Lighting and Rendering tool.

Renderman - Pixar's renderer.

G2 - By Worley Labs. Lightwave lighting effects tool.

Fprime - The fastest renderer anywhere. Hands down. Lightwave only. Maya and Max users had their jaws drop to the floor when they saw this. None of them could understand how on earth the tool could render an image of a 600,000 polygon scene made out of reflective surfaces with radiosity simulation - in under 20 seconds.

Realflo - by Next Limit. Fluid simulator. Superb. When dealing with lots of water in the future, I'll use this, and not a miniature effect. Because this tool is almost perfect in its realism (even though once you go into hundreds of gallons of virtual water, it slows down significantly.)

A.I.Implant - an A.I. Tool that is a cheaper alternative to Massive (the Lord of the Rings AI program).

Syflex - by Next Limit - Hair and Cloth simulation.

For more, check out <http://www.3dplugins.com> and start exploring.

3d plugins basically are external tools designed to extend the capabilities of existing software. Usually, they are made available for a few key apps like 3ds Max, Lightwave, and Maya - not everything out there.

Don't worry about those first, first, choose a 3d program. I probably overwhelmed you. Just think about how much cash you can afford to spend on a 3d tool. None? \$50? \$100? \$200? \$1000?

Then find the best option you feel you can afford. Remember, like me, you can start small and work upwards as you save up cash.

I spent \$400 when I originally got Lightwave 7.5. It's half that now, AND it is better than it was then. Everything is getting better, or cheaper, or both. These things may sound horribly costly, but I've used my tools so much that I feel nearly everything I've bought has turned out to be a good investment. Research helps, too, in making your choice.

Most home PCs can handle at least several million textured polys in a scene (even if that takes a long time to render).

In the old days, the technology was the main limitation in CGI. Nowadays most of the tech limitations are gone, at least if you have good software. Usually, it's the artist's skill (and the artist's schedule) that are the primary limitations.

I do believe that there is such a thing as innate talent, but I also believe that most supposedly "talent-based" skills (like art) can be learned by anyone who is reasonably intelligent, given sufficient practice.

I'm glad I believe that to be true, or I never would have tried to compose music!

Do keep in mind that you can do 3d animation without needing to be a programmer. Pretty much everything in a modern 3d app is GUI-based, like the operating system on your computer. That is, point-and-click, click-and-drag.

Even physics stuff like fluid simulation is mostly GUI-based, now.

There are some very basic categories in the 3d field. To a 3d person, this sounds very basic, I'm only offering fundamental concepts. Truth be told, I am not in a position to offer tutorials for all the software you might use in VFX. I'm trying to stick to fundamentals that are applicable to any program.

Modelling - based on points, lines, curves, and surfaces. All the 3d shapes in a model are based on mathematically-calculable 3d geometry. Modelling can be done with flat surfaces bounded by straight lines, or curved surfaces bounded by curved lines.

Common modelling tools include extrusion (taking a shape and stretching it along one direction), booleans (defining a shape based on the interaction of two other shapes, either the intersection (area shared by both) or subtraction (one removed from another), etc, lathing (extending a 2d shape into a rounded 360-degree shape), subdividing, beveling, copy/pasting, attaching, and lots of other

tools and techniques. Much of the terminology often used in 3d modelling is derived from sculpture. In a lot of ways, that's what 3d modelling is, sculpting shapes out of points, lines, and polygons.

Texturing - applying images or surface properties to a 3d shape. It's like having a flat gray sculpture and painting onto it to give it "life".

Often done by selecting certain shapes, defining them as a surface, and applying attributes to that surface. Some typical surface properties include transparency, reflectivity, and brightness/luminosity.

The surfacing tools conventionally allow users to map surfaces onto an object in different ways - planar, spherical, cubic, or custom-designed UV. These maps determine how the map is spread onto the surface of an object.

Lighting - applying light sources to a 3d scene or object. Choosing location, strength, color, type, etc.

Animation - moving the objects. Animation in CGI is typically based on keyframes. So, 30 frames per second in video - one second of time passes over 30 frames. You change properties by setting keyframes. An object might be at a certain position, rotation, size, etc. at frame 41, and be given different settings at frame 57. The computer will try to generate in-between data for whatever keyframes you give it. Animation can be done with skeletal simulation (Inverse or Forward Kinematics) or Morph sliders, or mathematical expressions, simulations, any number of options.

Rendering - You set up the camera in 3d space, and animate it (if it's supposed to move), choose its settings, and the types of rendering simulations that will take place. Usually these have to do with lighting simulation - how carefully will the computer need to simulate the material in the scene? Will it output a still image or a video file? How large should the file resolution be?

Once all settings are chosen, the computer will begin processing the scene and generating the video imagery frame by frame. While computers today are pretty fast, it's still not too hard to completely bog them down in a rendering process, especially with highly detailed scenes and complex simulations.

This sounds complicated. It isn't really, once you get into it. You could learn it but you also might be able to get someone else to do this type of art for you. Or not deal with CGI at all. I personally am really interested in VFX and enjoy doing this kind of graphics work.

About 3d: Keep in mind that there are loads of free 3d models, and purchasable 3d models online.

There are also free textures and purchasable texture libraries, and free and buyable plugins, on the internet.

Check out <http://www.turbosquid.com> for instance. Or <http://www.3dcafe.com>. Both have 3d model archives that you may find useful. I am big on using other people's stuff where it is appropriate. Using stock footage, stock pyro, purchased 3d models or prefab miniatures, sound clips, etc, all can be useful ways to acquire content that makes your work that much faster, if a little bit more expensive.

(But hey, as they say, time is money. Your time is worth something.)

Textures and models are also buyable from <http://www.doschdesign.com/> and

You can also create your own textures in Photoshop. I've found Photoshop indispensable for texture art, 2d graphics, and matte-painting for videos.

More on that later.

Some things to keep in mind while doing 3d:

-Realism is best managed with reference. I have found it useful to find pictures of an object I am recreating in 3d. Animators frequently try to find video of animals or people, and other living things, that most resemble their 3d characters, in order to make the movement of their 3d creatures more lifelike. I personally recommend Richard Williams' "The Animator's Survival Kit" as a guide to recognizing the way things move, and how to animate characters. Be observant about the real world when replicating real stuff in CGI.

-Keep in mind that lighting and shadow are key to integrating a 3d element into a real-world scene, or vice-versa. Matching lighting makes things feel like they belong together. One of my biggest problems (in *Send in the Clones 4*, for instance) has been having 3d objects that don't cast shadows on the real-world ground. Shadows are often key to a convincing integration of elements.

-Keep in mind what the camera sees. Shots that last longer require more detail. Objects closer to the camera need more detail. Put your work in areas where the audience will see it. There was a guy working on "Sky Captain and the World of Tomorrow" who had a 3-second shot with a hot dog stand in the background. He was modelling the mustard on the hot dogs. Nobody could possibly have seen that work who watched the movie. So, keep in mind that you can sometimes get away with a lot on small, distant objects.

-Try tracking inside your 3d app. Compositing a 3d element into a

moving shot often works best when compositing is done inside the 3d program. Lightwave and some other software give you this option.

-Consider LOD (level-of-detail) object replacement or multiple passes if your scene is rendering at a snail's pace. I remember doing this fantastic (uh, seemed fantastic at the time) Star Trek battle with 20-odd spaceships against a Borg cube (like the battle of Wolf 359). That video is lost forever but the point is - all these 3d models I'd acquired couldn't be rendered in one pass, I did 2 or 3 passes per shot and it actually went faster. If the camera in the shot is still, that makes it even more logical to do it this way. Render the background part of the 3d scene as an image and use the flat image in place of the model for the actual scene! I did that in "Traveler's Enigma" - the last few panos have an illusory (flat pre-rendered) area outside them, because that just made it faster. That said, you'll find that with modern PCs, this will rarely be an issue (except with very complex scenes).

-Don't be worried if your first 3d work is terrible. I went through loads of bad 3d. Even now, I still think a lot of my work is kinda poor. Don't expect to be a master in three months. Make sure that your aims on a project (in any area, not just 3d) are always a few steps ahead of where you currently are. Try to stride the balance between aiming for improvement and keeping things manageable.

-Try to learn through tutorials and documentation. Trying to learn by trial and error works for some things, but for most 3d apps, it's better to head straight for the tutorials. Usually, like with editing or compositing software, it gets easier each time you have to learn a new program, because they do have some fundamental similarities.

-Also keep in mind that faux-2d cartoon techniques are sometimes available in 3d programs, either with filters or with texture art and flat lighting. Look at "Relativity" and how I used pencil textures on 3d objects. Not every CG artwork must aim for "realism".

-Try to get the lighting and composition done well. Squint at your work from a distance to pay attention to the "overall effect" because sometimes we effects artists get so fixated on details in the shot that we don't consider the overall look of the shot.

-Know when to contract work out to somebody else. As I said earlier, there are FX people out there who can help. Do take a system like www.guru.com into consideration, and think about asking for help on web boards. Maybe if you've got a really interesting project, you can even contract some work out to me - look at my contract page!

There are 3d art-related communities on the web. Check out <http://www.cgsociety.org/> and <http://www.cgchannel.com/>

Also, I'd advise you to check out <http://www.3dtotal.com>. They've got good resources, tutorials, and some really nice texture art. If you want to buy textures but find 3d Total's prices exorbitant, consider <http://www.texturemonk.com>

For news or articles related to the movie or vfx industry in general, check out any of these (not all 3d-related, some are more general): <http://www.fxguide.com/index.php> <- lots of VFX articles. A superb source.

<http://www.vfxworld.com> <-great VFX articles. Free registration required but well worth registering.

<http://www.cinefex.com> <-THE VFX industry journal. Their issues are thick, full-color, more book than magazine. They also are sort of collector's items due to limited print volume and they tend to grow in value over time. Some free articles from a short-lived newsletter a few years ago, are also available.

<http://www.vfxhq.com/> <- An old website which did VFX "reviews" from around 1996-1998. Which means you get VFX articles for some slightly older stuff like "Independence Day," "Star Trek: First Contact", "Titanic," and "Armageddon."

<http://www.comingsoon.net/> A solid movie news/trailers site. One of my more frequent movie sites to visit. Nice all-in-one source for movie trailers, brief clips, interviews, and previews.

<http://www.imdb.com/> <- The Internet Movie Database. Often considered the definitive movie website. This lets you search the resume of pretty much anyone in the movie industry - seeing, for instance, all the movies a certain actor has been in.

<http://www.aintitcool.com/> <-Harry Knowles' movie biz site. Reviews, previews. Often has info on things before others do. But is also prone to being very emotional/too-enthusiastic/full of insults and curse words. When these guys say "amazing" it means good. When they say "horrible" it means "fairly bad." Just thought you should know.

<http://www.rottentomatoes.com> <- The definitive movie reviews site, this tallies up the ratings of every professional critic out there, giving you clear info - what percentage of reviews of a movie were positive. Also some news stuff.

<http://www.raph.com/3dartists> <-a beautiful 3d art gallery.

<http://www.animwatch.com/index2.php> <- 3d animated short films. Just about all the best ones made in recent years, all referenced on one page.

http://members.shaw.ca/lightwavetutorials/Main_Menu.htm <-superb archive of hundreds of Lightwave tutorials

<http://forums.creativecow.net/index.html> <- graphics community. Some tutorials.

<http://www.tutorialized.com/><-loads of tutorials of various kinds

Compositing is really simple in concept. It is the process of combining multiple layers of imagery. Think of it as taking a bunch of photos, cutting them out, and layering them on top of each other. I once did that with scissors, photos, and a scanner to create hoax photos of family members in surreal locations. That was also lost in my hard drive crash. (Wow, writing this e-book brings back memories!) Anyway, all of those sorts of things are actually much easier to do in digital tools like Photoshop.

There were all kinds of crazy compositing techniques in the past. Rear projection, optical compositing, forced perspective, matte paintings painted on glass. Today, just about all compositing is digital, and it is cheaper, faster, and better that way - and non-linear!

Photoshop is great for matte design. It's easy to create fake scenes from photographic elements. However, when digitally extending scenes nowadays, it is more common to go the full 3d route, making a 3d extension for a scene.

I also recognize Corel Painter as a very handy tool for creating digital artwork.

Keep Wacom tablets as an option for dealing with digital art. These tools allow you to use a pen as a cursor input, in effect allowing you to naturally "draw" directly onto the computer image.

I have often constructed compositable elements in Photoshop for use in compositing. Other times, I've taken a frame out of a locked-down (still) movie shot, brought it into Photoshop, and edited it. After that, I bring it into After Effects and combine the altered still with the video. A good example of this is the beer cans shot in "Troop 4: Uncensored, pt. 2" - where the beer cans are a Photoshopped section of the shot layered back into the video. After my mom had watched the movie, she said, "Actually, I liked the effects scenes you did, but my favorite scene was the beer scene with Scott." I then had the fun of telling her that it WAS an effects scene. Or look at the clip (same movie) where the tents are in the foreground and the mountain is in back. That's another invisible matte shot, designed to convince audiences that two disparate locations were in the same area.

Do definitely keep in mind that you can mess with the audience's understanding of "place" through compositing. In "Super Soda" the windows are composited out. Compositing windows can be a neat way to convince people that a room is somewhere other than where it really

is. Digital extensions are a fantastic tool that make places seem "bigger" or more interesting, or allow the audience to believe they're somewhere other than where they really are.

While elements, layers, or segments of locked-down shots can be done this way, most compositing requires a motion compositing tool like After Effects, Combustion, Shake, Boris Red, or any number of other compositing tools.

Personally, I'm a fan of After Effects. It's a really solid all-around program. Check out Photoshop and After Effects at www.adobe.com

I think, on the low end, I should mention some useful tools.

Axogon Composer: The tool I used for split-screening in the very first "Send in the Clones". The tool was bought and sold by some company but as far as I know there are still downloadable copies of the original free program floating around on the web. Axogon had some standard basic compositing features.

CompositeLab DV / Effects Lab DV. - In some ways, these are inferior to the older tool, AlamDV2, but in most ways far superior. These are the best values on the compositing market, hands down. Particle effects, chroma keying, a good list of basic, useful features.

After Effects. The gold standard, the most common compositing tool. Pros use it a lot. So do I. As with almost any software, try to find a student discount (If you are a student, you can save a lot of money on software.)

There are some other tools out there I haven't tried. Go out and search, see what you find.

Common tools and concepts in compositing:

-Keyframeable layers. These are simple properties of images or videos - size, rotation, etc, that can be keyframed. I've found that often it is possible to export a composited video and then take it through a second pass, in which basic rotation, or motion, on a slightly larger form of the video allows for a slight motion in what otherwise is a locked-down shot.

-Color/Chroma keying. This is a process in which certain color ranges of pixels are made transparent. In a scene shot bluescreen, you could select the shade of blue and the program would make all blue areas in the shot invisible, leaving only the foreground element. But color keyers (especially cheap ones) are often rather poor at dealing with shadows and other inconsistencies in DV.

I am a big supporter of the DvMatte plugin at www.dvgarage.com. It's a keyer that's much better than most of the other ones out there. Is it a little pricey? Yeah. But it is high-quality and when compared to multi-thousand-dollar tools like Shake, it's a bargain.

-Rotoscoping. This is a process in which a boundary is set around an object, and you (the bored effects person) move the boundaries frame by frame (or every few frames, with interpolation). I have had to do a fair bit of rotoscoping on a lot of projects. Look at the scene in "Clones 4" where I fight two clones of myself, for instance. Some definite rotoscoping in that scene. Speaking of which, there was also a lot of rotoscoping on the "Clones 2" fight, also... Rotoscoping is very labor-intensive and tedious. It's maybe the dullest task in visual effects.

One intriguing trick I used in "Clones 2" was designed to allow two copies of me to physically interact with Bradley in the same shot. I had clone 1 fight Bradley, then the moment the two of us disconnected, Bradley froze in place, and I kept moving. Then I walked all the way around to the other side, moved towards him, and he began moving again the moment I hit him. I then combined the various parts of the shot so that, in effect, two of me hit him in the space of about 2 seconds.

Keep in mind that this combination technique - "retiming" can often be used in various ways to combine multiple takes or multiple segments of one take into one sequence. It's possible to morph a person between two points in some cases - or to ramp speed, or do any other number of things to "tweak" the pacing of a scene. I once did a video where I blended the start of a take with its end, layering the same clip over and over itself, retimed, to produce a sequence of copies of the same person marching in a line with no apparent end. (That's another old video which no longer exists. Nearly half of my work circa 2000-2003 no longer exists. The point of referring to that over and over? Well, I guess I feel terrible about it even now and I want you to take seriously my general advice to save everything often and in more than one place, and back up your computers, particularly anything you've worked really hard on. It is incredibly easy to lose stuff and you need to be careful. Few things are more frustrating than working on something for ten, twenty, or a hundred hours and then suddenly losing it. So learn from my mistakes...

Back to relevant topics:

-Motion tracking. This is where you keep moving a layer to match other layers that are being moved. This was a tactic I used for the

overlay of "Jumbo Gumbo" in the restaurant scene of "Super Soda", and for nearly any other shot where there are a lot of layers and the camera is moving.

Some high-end tools, like After Effects Pro or Boujou, will give you automatic motion tracking. Others will require you to do it frame-by-frame. That's not a horrible limitation (you can work around the lack of a motion tracking tool), but it is time-consuming.

Interesting compositing tricks:

Parallax. Observe the opening shot of "Evil Park". It's an example of the value of parallax.

What is parallax? It's a fundamental concept of perspective. It allows a moving shot to be constructed out of flat images or video.

In effect, creating an illusion of 3d space and a moving camera using flat layers.

The idea is based on a simple rule, that when you are moving, nearby objects will pass by you faster than distant ones. It's why the moon seems to follow you when you drive your car.

So by having foreground items move past, and midground items moving (in the same direction) slower, and a non-moving background, you have an illusion of 3d space - even if all the layers involved are 2d.

So, keep that idea in mind, you never know when it might come in handy...

Pivot points. In After Effects, you can set pivot points in 2d just as a 3d program like Lightwave lets you place pivots in 3d space. This allows you to create simple cartoon character animation - even if you don't actually have a conventional cartoon animation tool.

-Filters. You can do so much with filters in a program like After Effects. I'll let you explore the filters in your software on your own - suffice it to say that you can emulate various film formats and other effects using filters.

-Photoshop batch processing. In "Matt vs. Matt" I used the history tool in Photoshop to batch process a filter technique on a list of hundreds of frames. Keep in mind that it is possible to apply movie filters in Photoshop if you can't find the right effect in your compositing app.

-Layer Modes. "Normal" mode is standard, but you might want to consider that if you've got a stock element on a black background, applying "Additive" mode to that layer can give you a better

composite. Often for best results I layer an additive layer over a semi-opaque luma-keyed "Normal" layer.

Also note that sometimes the layer itself can be stretched, distorted, etc, and inverted in order to create a shadow.

An obvious point: Lights don't cast shadows. They cast light. You might want to set up a subtle glow around an explosion to make it seem that the pyro clip is casting light.

The stars in some of the House Trek videos actually cast shadows onto the house. Oops.

To integrate elements, consider: lighting, how it might cast light or shadow onto nearby surfaces. Interaction. How will it connect to the surfaces in the scene?

I've found that many of my best pyro shots had a stock-footage pyro element combined with CG debris. Try mixing and matching elements in that way.

Enough thoughts, I guess. Here are some links to compositing resources:

<http://www.fxhome.com>

Home of some value-priced effects tools.

<http://www.apple.com/shake>

The gold standard for compositing. Very pricey.

<http://www.adobe.com>

Home of Photoshop, After Effects, and loads of other solid tools in various digital media categories.

<http://www.eyeonline.com/Web/EyeonWeb/Products/fusion5/fusion5.aspx/>

Eyeon's Fusion. Another pro-level compositing tool.

<http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=5562397>

Discreet (now Autodesk) Combustion. Another alternative.

<http://www.apple.com/finalcutstudio/motion/>

Apple's other compositing tool.

<http://www.thefoundry.co.uk/promo/nuke.html>

Nuke - Digital Domain's compositing tool.

<http://www.dvgarage.com/>

DV garage - home of the dvmatte keyer I mentioned earlier.

<http://www.worth1000.com> <-a great Photoshop art place. Learn from these guys!

<http://www.good-tutorials.com/> <-More tutorials for Photoshop, Flash, etc

Not sure what else to say...

There's something inherently tactile and fun about miniatures. They are "real" in a way that other effects aren't. And, you get to keep them around as memorabilia/decoration after the project is over!

When I talk about CGI or compositing, I find it very tough to say anything directly relevant. That's because the fields contain so many different software packages. With miniatures, though, your tools are much simpler and more straightforward.

Nonetheless, I'm hardly a great authority on the subject.

Before I even get into the nitty-gritty of building models, I'd like to discuss their use in VFX.

Models are used to represent some other object which cannot be recorded or built in the correct or "real" scale.

Most model work is used to represent large objects on a smaller scale. But occasionally, models are used to represent very tiny things (as in 1971's "The Andromeda Strain")

Often, miniatures are blown to tiny bits. Destruction of miniatures is quite common - often that's the entire reason why something is done as a miniature instead of CGI.

Physical objects are able to interact in ways that traditionally have been difficult to replicate with CGI. However, as 3d tools continue to advance, we will no doubt wind up with 3d pyrotechnics, etc, that are every bit as convincing as the real thing.

Until then, miniatures are a good bet.

However, pyro and water don't scale very well. Usually this means that an effects shoot will not make the model any smaller than 1/3,1/4, maybe 1/6 scale. If it's a huge object, if there is a lot of tiny debris in the model, or if it is far away, you can fudge the scale more. In "Independence Day" the Empire State Building model is at about 1/50 scale but for the reasons described above, they could get away with that.

Traditionally, recording something like that is done at high speed. That's problematic in digital but some Sony HD camcorders give you a 120 frames-per-second slo-mo setting, and that type of option is likely to become increasingly common over time.

Also, Dynapel SlowMotion (\$30), Final Cut Pro, After Effects Pro, and

Twixtor all allow for slowing down a shot in post. Or you could use the poor-man's slow-mo technique I mentioned earlier.

High speed recording produces a sense of scale in a miniature event. It makes it seem bigger, somehow. My pyro sequences in "Duel 2030" were slowed to around 30% of the original speed.

The square root rule of miniatures is this:
Take the inverse of the scale, then take the square root of that. Multiply that number by the number of frames per second that is normal (i.e. 30 FPS in video) to get the correct number of frames to shoot per second. Confusing? Not really. Let's give some basic examples.

1 / 3 scale miniature ->inverted is 3. -> Square Root: 1.73
 $1.73 * 30 = 51.9$ FPS

1 / 4 scale miniature -> inverted is 4. -> Square Root: 2.
 $2 * 30 = 60$ FPS.

1 / 6 scale miniature -> 6 -> 2.45 -> 73.5 FPS

1 / 9 scale miniature -> 9 -> 3 -> 90 FPS.

You get the idea.

You can also try blending the miniature pyro element with additional pyro and sparks at a size that suggests that the model is full-scale. That mixing of elements often makes it more convincing and less "miniature-ish". You can see this in the vehicle explosion in "Duel 2030" - firstly, that I had multiple cameras and I slowed the effect down and I augmented the pyro, all of which resulted in a very believably large explosion.

Remember, again, the rules that I maybe gave earlier about pyro safety.

- Do this stuff outdoors, not in an enclosed area.
- Use lots of safety fuse, never light a charge directly.
- Have water / blankets / fire extinguisher on standby.
- Stay at least 30 feet from any pyrotechnic event as it goes off.
- The camcorder should be far away too. Optical zoom features can compensate for the distance.
- Have a professional/semi-professional adult handling the explosives if at all possible. Think firefighter, or scoutmaster, science teacher - somebody who knows what they're doing...

Just some friendly reminders!

I do advise that a miniature that you plan to blow up, should be pre-scored. That means that it is structurally weakened prior to the pyro event, so that it will come apart easily. That means that you can generate a powerful-looking blast with somewhat less pyro.

Try adding appropriate tiny debris, like plaster dust/bits for concrete or rock, or sawdust for wood, or finely powdered sand as dirt, or little miscellaneous plastic kit bits for a spaceship. Insert them into the nooks and crannies of the model so they'll go flying when the charge hits.

It's hard to decide on a scale for your model sometimes. Fundamentally, you're limited by the cost of materials, and the amount of workspace you have access to.

When your object is NOT going to be blown up/shredded/drowned in water, then you can get away with nearly any scale, as long as your eye for detail is good enough.

Making a landscape or scene. This is one of those standard parts of model work - finding ways to recreate natural scenes in a smaller scale.

Here are some tips I've gleaned from personal experience.

#1: Model Railroading and hobby shops are great sources for model builders. No question. Oftentimes, their products are useful for all kinds of stuff. So try to find a store like that in your area.

#2: Real stuff is good at representing itself. Small branches make good tree trunks. Pebbles are good rocks. Dirt and sand are good dirt and sand. Water is good water. Moss (some kinds) make for good grass but moss does die quickly so shoot fast. There are little flowers that can look good on a small scale, little fernlike leaves, small leaves, etc, lots of stuff that can come across well on reasonably big scales like 1 /3 - 1 /6 scale. Lichen is fantastic bush material. A dishwashing sponge can become a good hedge. There are lots of things you can try.

#3: Try using straightforward base materials. Foam, plaster, and clay are all carvable or moldable materials that are great for developing rocks, structures, etc. Then there's balsa wood (kinda expensive). And FIMO (artificial clay) which is good for various interior/manmade surfaces. Do consider mixing powders and materials into a clay-type substance, experiment with that for various texturing effects.

Keep in mind that a lot of these materials are sticky at first - that surface property is great for attaching objects to a clay or plaster base.

Also, consider found objects as a base. A drink bottle, a ping-pong ball, a box, a length of PVC pipe - sometimes, differently-shaped household items can be a good base element to a model building or spaceship. You can use those things as a starting point and then add to them.

#4: Try manipulating lighting in interesting ways when building a manmade structure.

Try using reflective tape or reflective paint as a way of easy "lighting" without electrical lights. Also see what you can do with LED lights. Those little LED lights are about \$3 each, not too expensive. Consider (when building a spaceship or skyscraper) having just one internal light, and punching tiny holes where you want light to shine out.

#5: Add bits to your model. The little details that give an object a feeling of reality are often referred to as greeblies or nurnies. There are lots of things, toys, etc, that can be useful. Plastic model kits are valuable too. Look for the cheap "throwaway" kits with bits missing - they're cheap and great for kitbashing (building models out of spare parts.)

Try using toys, doll stuff, etc, in model man-made environments. Note that plastic can be weakened by holding it near fire, and made (at least somewhat) bendable.

Also, look through the various screws and little bits at a place like the Home Depot or Lowe's. These little bits might once in a while suddenly turn out to be useful for something.

Try cutting out bits of styrene sheet, or rods, to make little extra layers to put on top of something.

Unusual thing to think about, but Photoshop might be useful for miniatures, not just CGI. Consider printing small visual elements onto paper and then layering those printed bits onto a model as computer screens, signs, lettering/decals, control panels, etc.

#6: Use surface textures where appropriate. Certain objects have interesting and useful textures. By pressing them against clay, you get a useful indentation or texture on the physical surface of the model. Try engraving lines and holes etched/poked into the surface of a model. Digging into the surface of an object may at times be as useful a method as adding layers to it.

#7: Molding. Try using plaster and hardening it inside molds. There are premade molds, but you can also make your own, by carving wood or by imprinting an object into a pliable surface. Then let that surface (clay?) harden and use it as a mold for future not-yet-hardened material. Or mess with silicone. That stuff smells bad but it is useful for creating flexible molds.

It's also possible to built a mold by carving tougher styrene/balsa foam. That's a toughness factor somewhere between clay and wood...

Also keep in mind that there are services out there that have prefabbing machines. It is possible to model an object virtually, and then pay a fee to have that same shape molded as a physical object. Or to buy the prefabbing machine itself (though us peeps could never afford that) I'm serious. Research it!

#8: Painting. As with a digital model, the surface of a miniature makes it come alive. Start with normal base paints, but make sure to weather models a bit. Miniatures look less like miniatures when they are grungy and "used". Find a paint set with oil, mud, rust, aluminum oxide, color shades like that, that are part of a "weathering kit". Use them judiciously.

Try letting paint be watery and drip in cases where water damage is supposed to be part of the object. Use sand, grit, other stuff where it is appropriate. Consider how the object has been used.

One of the key reasons George Lucas's "Star Wars" models seemed more "real" than earlier movie models was the weathering and damage on them. Try airbrushing. It's a worthwhile technique. Keep some contrast, don't make the paint scheme even and dull. Try mixing other stuff into the paints. In some cases, that can produce good effects.

#9: Be willing to buy pre-built models or specific model kits. I bought six model cars for "Send in the Clones 4". That was a good purchase. Sometimes pre-designed models are the best option. Usually, if a miniature needed for a sequence is something well-known, like a vehicle or ship or airplane, it's not necessary to build it yourself. There are some nice RC vehicles available. You can actually fly radio-controlled model planes in a sequence, like Spielberg did in "Empire of the Sun".

#10: Don't forget what the function of the model is. Make sure that the model is "plausible" in terms of its function - all vehicles, for instance, probably have areas that contain occupants, some kind of propulsion, and door(s) of some kind for occupants to get in and out of the vehicle.

#11: Basically, summing up the previous rules - be creative. Try new things. You can use all kinds of stuff in building models.

Recording and Camerawork.

Okay, you've got your model. Now, how do you record it?

I'll tell you - it takes planning. Blending elements in a composite takes some thought beforehand.

One option for a model is just to have a lock-down shot. That is certainly good enough for some things. But what if it's moving?

I confronted this issue repeatedly. I'll give some examples.

The cars in "Send in the Clones 4" - I tied fishing line to the cars and pulled on it. Usually, the camera cannot make out the fishing line. It's a near-flawless method. Even Kubrick in "2001" used fishing line for floating objects.

The airplane in "Troop 4: Uncensored, pt. 3" - I held it carefully with my hand and moved it. I kid you not. Then I composited out the improvised support and used the rest as a greenscreened layer in the composite. It came out pretty well.

The spacecraft in "Star Wars" or "Star Trek" - Hollywood VFX people have access to something called motion control. Like motion capture and many other pro-level VFX techniques, this can be faked by a clever independent filmmaker.

The key is stop-motion. By moving the object carefully, frame by frame, or moving the camera frame by frame, or via a combination of both, we can create an elaborate camera move around an object that makes it seem as though the object is moving.

Know that the motion of the camera can appear to be the motion of the object, and vice-versa. If it's all shot greenscreen, there's no difference distinguishable between the two. The models in "Star Wars" never moved. It was the camera that was moving.

It's possible to plot a frame-by-frame camera and object motion that is accurate. Usually, the only limitation is that you'll only have two axes of motion. Learn to work around that limitation.

Zero-G explosions. This is an effect that's simpler than it might seem. You just need to record the pyrotechnic event from below and gravity won't be evident in the shot.

The problem with shooting from below is that you don't want your camera underneath a pyrotechnic event. So, try setting up a large (reasonably large) mirror four or five feet under the explosion object, at a 45 degree angle. Then aim the camera at the mirror, not the pyro object above it.

Like this:

Pyro

Camera < /
 /
 /Mirror

Water sequences. I remember the dam sequence in "Dante's Peak" as the most impressive single miniature water effects sequence I've ever seen. The bridge and dam were at 1/3 scale. You could barely tell they were miniatures at all.

The problem is, they used a multi-million gallon dump tank in that production!

Personally, I think that any really big water effect nowadays is best done the CG way. Check out RealFlow (by Next Limit) - an incredible software package. Look at the water sequences in movies like "The Day after Tomorrow," "Poseidon," "X-men 2" and many other recent blockbusters. See a pattern? Most of the water is digital!

If you're trying to do a water effect that's not colossal, go for the miniature (or even full-scale) route.

But if you want to do a huge water effect, try CGI.

I'll have a pack of liquid effects available someday on my website. So, check that out. I'll be releasing a bunch of big-scale water elements in that pack - huge splashes, seacapes, tsunamis, water rushing down a hallway, and so on.

Miniature Links and Resources (hardly a definitive list, do some searching of your own):

<http://www.scalemodel.net/> - A superb resource, links to buy nearly any model kit/prebuilt model you could think of.

<http://www.totalmodel.com> - A modelmaking website

<http://www.misterart.com> - A large art supply store.

<Http://www.createforless.com> - Another big art supply store.

<http://www.stopmotionanimation.com/> - a community devoted to stop-motion/miniature effects

www.modelaces.com - website for scale-model aircraft

<http://lyzrdstomp.com/> - a model-building/ art/music website. Some good tutorials.

So, you've made a movie? What are you going to do with it?

My advice early on - don't try to sell your work. You need to look at your project in a very critical way - considering, what would people actually pay for this?

If it's one of your first movies, I'll guess the answer to that question is, "nothing."

Which is okay, since you probably didn't spend much making it, either.

Even if you're not selling your work, I'm sure you'll still want to show it to people. When you do that, it draws attention and interest from people, and that will make subsequent projects that much easier to organize.

Part of the fun of making a movie is watching it with the first audience and seeing them entertained, knowing you created something that people actually enjoyed.

How will you show your movie?

The easiest choice, of course, is on your computer screen to family members, but the limitations of that are obvious.

VHS is extinct. At the moment, HD-DVD and Blu-ray are not especially common yet. (And they're expensive anyway) And it is not too convenient to show your work in a real movie theater.

There are three venues to use when showing your work to friends early on: DVD, Projector/Home theater, and the internet.

I've done all three.

As for #2, the projector, it requires having or borrowing a projector and hooking it up to your camcorder. It is possible to transfer an edited movie back onto a camcorder tape when your camcorder is attached to your PC. I won't go into that as it varies from system to system but know that it's possible. Keep in mind that a local venue or a friend's house might have a projector.

I've done screenings at church before. Many churches have projectors - they use them to project words during worship services.

Some upper-class friends may have projectors in their home theaters. And art houses/coffee shops are available in some areas. In my area

of Houston, TX, I live some five blocks from a coffeeshop/art gallery/theater called Bohemio's. They allow people to screen videos for free on their projector.

Back to #1. DVD burners are around \$30 these days. They're pretty cheap. The discs themselves are about 40 cents each. DVDs use the file extensions .VOB, .BUP, and .IFO. It's not enough to simply have a burner, you need software that can be used to construct a DVD structure, with video, audio, images, all assembled into buttons, menus, transitions, and all the other usual DVD components.

I use DVDlab Pro, and the TMPEG encoder. DVDlab is a fairly non-flashy, efficient DVD program that is very open-ended.

I personally hate it when software gives you pre-made "templates" and arbitrary design restrictions, as if you aren't creative enough to design everything from scratch. DVDlab is good about this - it gives you a lot of freedom, and is strongly practical and functional, at a reasonable price (very low considering that it allows you to do almost anything that CAN be done on a DVD)

That said, there are loads of programs out there that can be used to create DVDs. One solid high-end tool is DVD studio Pro. Also, in the freebie category, there's Apple's iDVD, which comes with any DVD-burner-equipped Mac. Like imovie, it's not so great, but is certainly usable.

There are others out there. Just search.

#3. The internet. The web is THE venue for short films today - it's pretty much spearheaded the resurgence of that format. Look on the web and you'll find millions of short video clips.

You have two choices. The easy one is to post on a service like YouTube or Google Video. To do that, you'll need to compress your video to the appropriate resolution and upload it. It's easy to do.

As far as file conversion is concerned, look into VirtualDub, a great free converter. Also seriously consider putting up \$30 for Quicktime Pro, it has some good conversion options. Or you can just output the video directly from your editing software with the appropriate settings.

I really like MPEG-4 and H.264, they are really efficient video formats. Others favor DIVX. Just keep in mind that your viewers do not want to spend hours downloading your movie. If it's not efficient, it'll just annoy people - though that's less so lately now that 80% of web users have broadband.

About setting up a website - it's a very logical thing to do. After all, it seems like everyone has one these days, or, at the very minimum, at least a MySpace page.

I've chosen HostGator as my host. They're way better than my old host, iPowerweb. You should consider that video files are big files, so if you are trying to make a website for your movies, it makes sense to have a fairly large amount of storage and bandwidth.

There are so many web hosts out there, I won't try to discuss all of them.

When you have a web host, you can try setting up your website either in simple HTML (like I do) or in a dedicated GUI web tool like Dreamweaver.

Some HTML tutorials are available here:<http://www.w3schools.com/html/>

Search the web for applets - made with Java or other code. You may find some useful ones.

SELLING ONLINE

You, of course, seeing that I have sold you this e-book, know I know how to sell things online.

I used a password protection applet I acquired from another website. There are a lot in places like <http://www.javafile.com/>

I then set up products on www.KAGI.com to sell them securely. KAGI delivers the password/entry data via e-mail to the buyer once the sale has been made.

The buyer then can log into the secure password-protected area.

This is an easy way to do online sales.

You may want an internet bank account, a credit card, and a PayPal account (and maybe an Ebay sellers account).

[Www.paypal.com](http://www.paypal.com) www.ebay.com

It's a reasonable alternate method - sell products on Ebay, and have a link to the sale location on your website.

Also take note of DVD duplication services and DVD supplies. Depending on the situation, either tactic might be preferable.

You can burn your own discs, print labels (either stickers, or

inkjet/thermal printing) and package them.

Look into DVD printing here: <http://www.summationtechnology.com/>

You can find these sorts of things easily at places like Office Depot. With DVDs and packaging, like MiniDV tapes and many other things, it is usually cheapest to buy in bulk.

Some people use DVD duplicators but that's only really worthwhile if you'll be churning out hundreds or thousands of DVDs per month.

Look into CustomFlix as a simple all-in-one movie sales method.

<http://www.customflix.com/> For \$50, they provide you with a hosting space, and a sales system, and they print copies of the DVD you give them, so you can sell and mass-produce it with nearly no effort.

Designing your own website involves some basic rules:

- Keep file sizes efficient. A webpage loaded with media will load more slowly. Compress your files and try to maintain a good balance between visual interest and loading speed.
- Avoid overly esoteric interface designs. The standard "links on top and left side, content in center" design is predictable, but it is convenient and is used for a reason.
- Provide readable text. It's not "pretty" to have pink text on light purple background. It's aggravating. The text must contrast with the background so it is readable.
- The website should not be too wide. Asking your users to scroll down is fine, asking them to scroll left and right repeatedly is cruel.
- Make sure your links are functional. Nothing says "bad web designer" like dead links.
- Except maybe frames. Don't use frames, they drive people nuts. Use tables instead.
- Make sure to specify what plugins visitors need. It annoys people to go to a video website and find they don't know what program to play the videos with.

These rules are good basics for developing a website that is clean, user-friendly, and won't drive visitors nuts.

Note that you can also gain some income from simple advertising. Don't overdo it, of course, (a website drowning in ads will terrify even the bravest web surfer) but it is an acceptable method. Just be aware that likely only 1 out of every 500 visitors will actually click on an ad.

That goes both ways, you can earn money by letting people put ads on your page, or draw traffic by buying ad space on other peoples' pages.

You can try that with Google AdWords/AdSense. Yahoo! Sponsored Search is another, similar option. I've used both.

Some financial advice:

Web banking is a reasonably intriguing prospect. There are some major security risks in a cashless society, of course, and I would never recommend you keep all your funds online, but a place like NetBank, www.netbank.com has less overhead than normal branch banks and potentially better interest rates.

Make sure your passwords for all these financial sites are not easily breakable. The ideal password is a sequence that seems meaningless to others but is memorable to you. A good example is an acronym - taking the first letter of each of a sequence of words that logically fit together to you - a list of names or a sentence...

Be careful not to fall victim to a scam artist. I've made this mistake before. It's important to check out any new web business you're planning to make a transaction with to see if they are legit. A good site for this is www.RipoffReport.com.

Try to make all your passwords different. You should, of course, have a way to remember them, but that record should be somewhere other than a digital file. Some kind of safe or hidden spot where nobody else would ever be expected to find it.

One security thing to try: Having two bank accounts, a personal reserve and a buying account. The buying account never has much in it, any excess is wired to the other bank. The buying account is the one that connects to any place where you need to make a transaction with someone else. So, if somebody somehow gets that info maliciously, your second-tier account will remain intact.

All this doesn't sound a lot like it's relevant, but, hey, finances are part of this, as it is a business. I think you should take them seriously.

So anyway, you've got your work, you can sell it. I sell mine, but I keep most of it free. For me, the free stuff is good because it draws traffic. The sale stuff on my site is fairly cheap.

I figure that the loss of income on free stuff will draw additional traffic and compensate for itself. I also believe low pricing actually can bring in more profit because it raises the volume of people willing to risk buying your stuff.

I want to offer a media site that makes people want to come back, an honest place that generates solid growth and repeat business.

Advertising tactics:

- Word-of-Mouth. Just tell people about what you have. And if it's actually good, people will tell each other and interest in your work will grow organically. This is the best kind of advertising as it's free!
- Cut-rate Public events. Offer something free. Let people see your stuff, at no cost. This will draw attention.
- Sneaky papering of local areas. I'm serious. Putting paper in mail slots announcing what is going on, can work wonders. A few hours of papering may reach 1600 people or so.
- Newsletters online. Keep people informed by offering a way on your website to sign up for newsletters. As you amass your mailing list, you can send them updates and generate immediate traffic.
- Alternative papering, i.e. Posters. Try putting up posters in traffic-heavy public areas. Make sure they are protected from rain so they'll last a while. I tried having strips of easily removable paper with the web address on the bottom of the pages. That can make it simpler for interested people walking by.
- Your own circle of friends and relatives. Harness their energy. Somehow. They're always the easiest people to get interested in your movie.
- Web adverts. The kind I mentioned earlier.
- Online PR statements and classified listings. Just submit your message.
- Web forums. If you traffic a particular web board, consider adding a sig with a link to your website. Don't sign up for a web board just to post ads and then leave, you'll just annoy people. Actually participate a little.
- Opt-in email marketing. There are a lot of bogus/scam sites in this field (like the infamous InetGiant) but there are some good ones. The idea is you pay for temporary access to a mailing list in a targeted category (say, Entertainment) and you get a list of e-mail addresses of people who subscribed to that mailing list. It's not legally considered spam because all of those people actually signed up to be on the mailing list (that's why it's called opt-in)
- Newspaper advertising. I've been listed a bunch of free or cheap methods, this is the most expensive one on the list. But it's still not near as expensive as radio or TV ads. You see classifieds in papers all the time, so obviously it's cheap enough that individuals use newspaper adverts. I think with a really small black-and-white ad, you'll end up paying \$1 for every 300-500 people the newspaper reaches in circulation. With bigger, color ads you spend more to reach the same number of people but you might get more attention from those individually who are reading the paper.

- Traffic exchanges (I list some on my site, www.hornbostelmedia.com, in the "About" section.)

Anyway, those are just some decent advertising options.

It is possible to buy space in a theater, but that is only a really profitable choice when you've amassed a large enough following of people that will turn out to see your work while it's there.

You can also submit movies to film festivals. Don't even bother submitting your work to Sundance or Cannes, they're flooded with submissions that get rejected. Worse, they actually charge you to submit your work.

Try focusing on smaller, regional film festivals. They may charge little or nothing, and your movie will be more likely to be accepted, and receive positive response. (That is easier when you have less competition!)

And do consider looking for groups of professionals who are in the fields you're in. You can learn from them! Finding a club of other creative people can be extremely useful. I myself am connected to a number of media professionals and semi-professionals. In some areas, I teach them. In others, they teach me.

Some of them are stunned when they find out what I can do.

They'll probably be impressed with you too. You now know more than before, what you're doing when creating and distributing a movie project - and you have the capacity to leave Hollywood folks stunned by what you can do, and how cheaply you can do it. So go out there, make movies that look good and have fun stories, and raise the bar on what can be achieved with limited resources and a lot of determination.

Your first work may not be great, but keep trying and you'll get better. I'm still getting better. I've heard my share of criticisms, but I didn't give up. I genuinely believe that despite all my screw-ups, my mental illness, all the people who've told me I'm not going to make it, that I can find a niche in this exciting entertainment field. And so can you, if you really go for it.

So what are you waiting for? Go out and make your movie!

And have fun!

