CHAPTER 1

What 3D Job is Right For You?

To find the right job, you're going to have to dig deep into your skills, interests, and expectations about what kinds of work you want to do and what kinds of work environments make you happy.

One of the biggest decisions you'll have to make is whether film and television, video games, or one of the more unusual 3D jobs is a better choice for your job search. Films require highly specialized skills, an intense dedication to detail, and a willingness to work in the hard-knocks industry that hires and fires low- and mid-level employees as film projects come and go. The games industry, on the other hand, offers more opportunities, relatively good job stability, and the chance to do lots of different types of work on any given day. But to work in games, you'll have to live with a faster pace and you'll have to make major compromises in the quality of the artwork you produce. This chapter explores the different fields and takes a close look at the skills and tasks of specific jobs themselves. In Chapter two, we describe the more technical jobs in these industries, as well as 3D graphics opportunities in other fields:

- **Specializing for film and television industry jobs**
- **Getting into the video game industry**
- **Film jobs**
- **Television jobs**
- **Game jobs**
- **Job Descriptions**

Finding Your Niche in Film and Television

Only a decade ago, 3D and effects were considered part and parcel of the same discipline. In film work, "effects" referred to any part of a shot that required the effort of pyrotechnic technicians, stunt men, model makers, animatronics experts, or even computer graphics artists. The range of things you could do in 3D was limited: character animation, for example, was rudimentary. Huge, realistically detailed models, natural-looking lighting, and complex 3D environments could bring rendering systems quickly to their knees. Filmmakers thought of the computer as a tool for doing useful things like wire removal and compositing, but generally not as an alternative to other kinds of effects work. At the time, a skilled 3D artist could master the skills of modeling, texturing, lighting, and the basic animation that systems were capable of, and it wasn't uncommon for film studio pioneers to do an entire shot, more or less single-handed. When Craig Lyn, who won an Emmy for his work on *Dinotopia* at London's FrameStore, got his start in the multimedia and games businesses, and then at George Lucas' Industrial Light and Magic working on the *Star Wars* sequels, he did the whole spectrum of 3D work:

> *At ILM, I was a hard surface modeler to start with, then went into the Rebel Unit as a technical director. The technical director job in the Rebel was modeling, painting, compositing, animating, and lighting—more of a boutique style of working. From there, I went into the digital matte department, doing traditional matte paintings and 3D digital environments, and from there, went into the CG-TD department, which is basically ILM's big monstrosity pipeline thing, and from there, came over to London as a senior technical director on* Dinotopia*, and then as a senior technical director on* Harry Potter*—which was one of their larger film shows—and now I'm CG supe on* Thunderbirds*.*
>
> —*CRAIG LYN, FRAMESTORE*

Those kinds of opportunities to work on diverse aspects of a project are now exceedingly rare. The technology that has evolved over the last 10 years has become so specialized, and the associated artistry so highly refined, that if you're going to work in film, you're going to have to find a niche in which to hone and market your skills.

Take character animation, for example. Lifelike 3D character animation has only been technically possible for six years or so. (Pixar's Oscar-winning short *Geri's Game*, which it completed in 1997, proved to the world that it was possible.) It's astounding to see how far the genre has come. Watching characters in *Shrek*, Sully in *Monsters Inc.*, or Gollum in *The Lord of the Rings: The Two Towers*, it's easy to forget that you're watching a completely artificial animated creation. Body movement and expressions are utterly convincing and natural, and you can't help but feel you're looking into the eyes of real, living creatures. In part, this qualitative leap in animation has been made possible by the advance in tools used to create them. If you look at Maya's character tools, for example, there are now so

many deep-level controls for rigging, constraining, animating, and deforming a character that it's hard to imagine something a living character could do that you couldn't convincingly animate with the tools at hand.

I get so many e-mails from people saying, "I want a job in the industry." And the first thing I have to do is say, "OK, what do you want to do? Do you want to be a TD, do you want to be a compositor, do you want to be a modeler, do you want to paint texture maps, do you want to paint matte paintings?" They say, "I'd like to do all of them." Well, unless you're very good, no one's going to hire you to do all of those. Your reel has to be so focused on saying,"I'm going to be a modeler," because when you run a modeling reel, you want to see a wireframe, you want to see a rendering of it, but I really don't care about your texture mapping skills, because that's not why I'm hiring you. For the games company, or the games industry, absolutely, you're going to have to do all of those things. But here, it's so focused and so stratified that they really have to tie one thing down.

—*CRAIG LYN*

For every quantum leap in capabilities in the software, there has been an equivalent leap in the skills of the artists using them. Ten years ago, there were no tools that could animate the subtle expressions of a human face in 3D. Being a computer *animator* meant you were someone who modeled and textured spacecraft or other inanimate objects and flew them across the screen, or you rendered pyrotechnic explosions or maybe lumbering robots that could be composited with live-action footage. Now, the word "animator "has repossessed the old Disney meaning: someone who brings inanimate objects to life. And once again, the term now specifically refers to a *character animator*. In some studios, *animator* refers to anyone working on animation, even if they don't make anything move:

Where I work, everyone is called an animator. The character animators are now called motion animators to include more than just animating characters. Basically, any object or character you see on the screen that moves, and is not an FX such as wind, smoke, fire, etc., is done by the motion animators.

—*KEITH REICHER, PDI/DREAMWORKS*

A 3D character animator today knows how to animate the subtle expressions of the face, the delicate gestures of hands and body, and the natural deformations of muscle and skin when a body moves. It's no longer enough to be considered an animator if you know how to move a solid object from point A to point B or to make natural-looking smoke. With so much to learn, how can an animator be expected to even think about the complexities of modeling with subdivision surfaces, mastering the infinite possibilities of dynamic simulations, or manipulating advanced shading networks for creating the multilayered textures of a human skin? Like almost all 3D artists in the film business, the character animator has become a supreme specialist.

In today's film studios, modelers are modelers, texture painters paint, effects animators wrangle particle effects and dynamics, and compositors work exclusively in the realm of 2D layers. Even the specialized jobs are becoming stratified: there are modelers who model only hard surfaces, other modelers who model only characters, and others who specialize in architectural environments. (As we pointed out in the introduction, there are even modelers who model only cabbages, or at least cabbage-like plant life.)

Of course, there are exceptions. There are great modelers who have earned the right to do their own texture mapping, typically by taking their work home nights and proving they can do it. And you'll find studios where artists both rig *and* animate their characters. But for the most part, if you want to get hired in Hollywood, you have to master a specialty. And if your specialty is texture painting, your demo reel better show nothing but great paintings and beautifully textured models. It's no advantage to show that you're a texture painter who dabbles in character animation or particle effects.

Mastering a specialty is especially necessary for film work, where specialists are sought for an existing studio's pipeline. In a growing trend in Hollywood, however, *generalists* are also being sought out, mostly for television work, where studios have not established such rigid pipelines and artists are freer to work on their shots to completion. Commonly, shots for television tend to go through stages of production, from modeling to animation to rendering and compositing. More and more studios are turning to generalists who have proficiency in all aspects of CG (3D as well as compositing, in many cases). These generalists are called upon to create the models; texture, animate, light, and render them; and in a growing number of cases, even composite them into the live-action footage for final delivery.

Although there is frequent crossover between film and television work, it is pretty much established that film workers engage in focused specialties for the film in question, while television workers tend to cover more ground. As a matter of fact, one film CG supervisor said that one way to get a great exposure to CG and a varied demo reel was to get television work, especially in commercials. The irony is, of course, to get these jobs, your reel should already be great and varied!

Whether the reel you wish to submit is for a film or television work, however, it is necessary to focus the work you include on the reel. Even generalists should show off their strongest proficiencies rather than including areas they are merely competent in.

The *demo reel* is the 3D artist's strongest form of self promotion and is a requirement if you want to land almost any job involving animation, effects, or compositing. (It's generally not required for concept art or engineering positions.) Even texture artists and modelers need a *reel* to show that their work holds up in motion. The reel is normally delivered on standard VHS or DVD and may run anywhere from 1 to 3 minutes. We discuss the making of a job-winning demo reel in Chapter 5.

Studios and Boutiques

While most generalists are used in television work, the big studios are becoming more stratified, as the number of small effects companies grows. With the drop in cost of hardware and software needed to produce professional-level CG effects and the constant flux of talent in and out of the big studios, there has been a growth in the number of lean, mean boutiques—many started by ex-big-studio employees—that can produce high-quality effects for less money than the big studios. These small shops don't usually hire artists to fit into such tiny niches as found in big studio film productions, and they place a premium on individuals who can do more than one thing well, whether for film or television projects. Many small boutiques work regularly in both film and television, in many cases requiring that their artists know how to work in both.

Even if you're only interested in working for larger studios, the fact that they are mostly interested in hiring specialists doesn't mean you shouldn't master multiple skills. On the contrary: If you can produce a credible demo reel as a texture artist and a *second* credible reel as an effects animator, then you can hire yourself out as one or the other, depending on which skill is in demand at the moment.

> While it's crucial that your reel shows a strong specialization, it's also important that your resume reflects that you understand related skills. For example, modelers need to understand how a model is texture mapped so they can build models that will work with the requirements of the texture artists. When building models with non-uniform rational B-splines (NURBs), for instance, it's important that models have evenly spaced isoparms, so textures won't pinch or stretch across surfaces. Of course, in games, the modeler must double as a texture artist, since modeling and texturing are so tightly intertwined.

The point is that if you see that a studio is hiring modelers, present yourself as a modeler. If it's hiring character animators, present yourself as a character animator. (And if at first you don't succeed as a modeler, try, try again as a character animator!) Just don't try calling yourself a modeler/character animator hoping that that's going to impress anyone more than showing you're an expert at one or the other will. The odds are that's not how the studio is going to evaluate you, and it's an approach that probably won't get you hired.

If you are applying yourself to work in a boutique house, your reel should still be very focused on your strengths as an artist, rather than a hodge-podge menagerie of samples from all the different disciplines of CG. Boutiques look for a strong eye toward detail and a strength in lighting, as well as one other facet of CG such as animation, modeling, or dynamics. They know they have other staff who tend to lean in one direction or another, and they look to augment their in-house skill set. But because project deadlines and the

demands of shorter-term television work is sometimes ambiguous and always hard to predict, whomever they hire must be able to produce a shot from beginning to finish at some point in their tenure.

The short of it is that you should target your reel toward the company or companies you want to work for. Be prepared to make minor revisions based on the studio, whether it's a huge film studio or a small boutique. The following applies to presenting yourself specifically for the industry and environment you're targeting:

> *Several years ago, I had applied for a job with a well known company in the video game industry. One of the comments made about my reel was that it was too "Hollywood." Rather than showing that I had experience and the desire to make video games, the demo reel portrayed me as wanting to work in the film industry. I didn't get the job.*
>
> —*KEITH REICHER, PDI/DREAMWORKS*

The Film and Television Businesses

Film effects studios typically set the standard for what's possible with 3D and special effects. In an outfit like Industrial Light and Magic (San Rafael, Calif.), ESC Entertainment (Alameda, Calif.), Digital Domain (Venice, Calif.), or Weta (Wellington, New Zealand), production budgets can be huge, and the time and resources devoted to a single tour-de-force effects sequence can dwarf an entire video game or television production. Some of these studios also have divisions that take on TV effects, particularly to serve the demand for high-budget commercials, such as those featuring beer-drinking frogs, cola-guzzling polar bears, and especially new-model cars in all sorts of improbable driving scenarios.

Meanwhile, the small boutique studios do a similar caliber—in some cases better—of CG work. Most boutiques try to pick up film work for lower-budget productions, television series such as *CSI* or *Angel*, television commercials, gaming intros or cinematics, as well as *pick-up work* contracted from larger studios for high-end blockbuster films. Pick-ups are generally less involved or shorter-length effects sequences that large studios cannot find the time to generate themselves on deadline. Some boutiques can even earn contracts for various effects shots in a film from the film's producers directly, or take them over from other CG studios with whom the producers are unhappy.

In TV and video production, studios are expected to render good-quality effects with tight budgets and impossible deadlines. A generous amount of work in the video world is for commercials, where the pace is frantic and attention to detail paramount. Music videos, where the opportunities for experimentation are greater than in the product-focused world of TV commercials, usually require some amount of effects work (usually compositing,

though 3D is frequently needed to some extent). Television series, such as *Star Trek: Enterprise* and *Buffy the Vampire Slayer*, and long-format mini-series, like *Dinotopia*, are also big consumers of effects shots, and the emphasis is usually on producing effects that serve the shot within deadline, as opposed to pioneering the stunning CG effects seen in film work. Not only do television shows use a lot of 3D and CG effects, but motion graphics, such as title sequences and logos for commercials and corporate videos, are in constant demand, usually from *design boutiques* that specialize in motion graphics and typography. Studios (a.k.a. post-houses) also find work in corporate videos, which are essentially long-running infomercials, and TV interstitial (short promotional spots in between shows or right after credits of shows on TV), bumpers, and promos. These are the short TV ads you see advertising new shows or premiere times of TV movies and the like.

Even though the demand for CG effects in film and television is increasing steadily, the film business in particular has regular ups and downs that seem to strike randomly, and *job security* is an oxymoron because the employers must ride these waves as well (see sidebar on contractors). While television work can be more constant throughout the year, it is still a field mostly filled with freelancers, as is film, where contract workers can sometimes be brought on a per-day or per-week basis. Staff jobs in television and film are few and far between and usually very difficult to come by, especially because most boutiques and large studios prefer to keep their overhead to a minimum.

Another sobering fact is that the number of new artists entering the field is growing much faster than the industry itself. Consider for a moment that in the year after its introduction in early 2002, some 370,000 users downloaded the free Personal Learning Edition of Alias' Maya. In the same time frame, the number of Maya's educational site licenses had tripled. That's an awful lot of home-schooled artists and art-school students working on the skills needed to enter the field, and it's certain that those numbers dwarf the number of unfilled effects jobs in the television and film industry. So if all those people are going to be hunting for 3D jobs in a year or two, where will they go? More than likely, they'll go to games.

Get in the Game

If you've got the skills to do 3D for film, you've also got at least some of the essential skills to work in computer and video games. Modeling requires the ability to visualize 3D space and to translate forms into wireframe objects; texture mapping requires an eye for surface detail and color and good painting skills; and character animation requires a keen sense of timing and weight—the ability to breath life into something. What's different in games is the requirement to do more with less. Models have to be built with sparing geometric detail because every polygon counts; textures are tiny by comparison and are forced to do

CONTRACTORS: HOLLYWOOD'S GLORIFIED TEMPS

It's a cold, hard, nearly fast rule in film effects studios that there is no such thing as a new employee. There are jobs, to be sure, and new ones are filled every day. But most artists today are hired on a Project Length Contract basis, not as a permanent employee. In short, when the film is done, so are you, at least at that studio.

That's not to say that being an employee is any guarantee of job security, but you can be sure that staff employees have earned that status through experience or tenure, and contractors will always be the first to get the axe.

The causes of this lamentable circumstance are clear. Film budgets get tighter, costs go higher, and effects studios are working on ever-slimming margins of profit, even as the size of crews needed to complete a film balloons. When you're hired at a film studio, it's typically because of one specific skill, be it hard surfaces modeling, character animation, lighting, or dynamic effects. When a film ends, unless there's another project close on its heels with similar needs, you'll find yourself working "on overhead," meaning you've got nothing to do, and as far as the bookkeepers are concerned, your continued presence is all red ink.

Companies don't like to subsist on contract labor because they bear the cost of constantly finding and training new talent to fill positions when new work does roll in. But you're going to like it even less. As a contractor, you'll usually get paid a pretty good weekly or hourly rate (usually with some overtime pay as well), but chances are you won't get any benefits such as paid vacation or sick time, daycare, health, dental and vision care, or 401K retirement tax breaks (never mind matching contributions from your employer). You may also be excluded from bonuses if the film does well. In some studios, bonuses can account for 10 percent of a staff employee's income, or more in a good year. Companies typically calculate the value of benefits at around 15 to 25 percent of salary, so someone making $60,000 per year as a contractor is actually getting $9,000 less compensation than an employee with the same paycheck, and that's not including bonuses. Even though as a contractor you'll do work that's every bit as vital to the film as what's being done by the permanent staff, you're working for the company as something of a tourist, without all the rights of citizenship. On the other hand, successful freelancers who have proven themselves can demand a fantastic rate that can more than make up for the lack of benefits of a staff job, and still have the opportunity to move from project to project with as much time off in between as they can stand.

But what's the worst thing about being a contractor? Taxes. When you're an employee, you're paid what the IRS calls "W-2 wages." As a contractor, you're on the "1099-miscellaneous income" program. With W-2 income, your employer pays your taxes through withholding, including Social Security, Medicare, and unemployment insurance. But with 1099 income, it's all up to you. You may or may not get some money back when you file your returns. As a contractor, you have to pay your own taxes, typically in quarterly installments, and unless you're aggressive about accounting for and deducting your expenses when you file returns (a major, agonizing pain), you're going to pay far more tax than you legally have to. Because of this, it's imperative to have a good tax accountant and to save every single applicable receipt, including those from taking potential clients out for dinner.

In fact, as far as film studios are concerned, the IRS is actually the prime motivator for letting you go as soon as a film is finished. If the studio keeps you on after the project you were signed for finishes, you cross the line of what's considered a project-length contractor and become what the IRS considers an employee. If the studio keeps you without changing your status to a W-2 employee and paying the appropriate employee taxes, it will eventually get in big trouble with the tax man. Take heart: in the best case scenario you'll get fired on Tuesday and have a new contract with the same studio on Wednesday. Stick at it long enough, and the company will probably throw in the towel and hire you on as an employee.

Is being a contractor all bad? If you like fast-paced work occasionally punctuated by long unpaid vacations of indefinite length and don't mind switching from one crew to another, it can be an exciting life full of new and interesting challenges. It's also a great way to work if you want to travel and experience new places, since you could be working in L.A. one month, London the next, and three months later land a gig in Sydney. There are tax advantages if you have the fortitude to track and deduct your expenses. And if you're not particularly concerned with stability and job security, then occasional down time may give you the chance to develop your own artwork and skills, write a screenplay, or take a leisurely surfing safari.

On the other hand, if you do need consistency, or at least a steady paycheck, plan on putting your base somewhere near lots of different studios (Los Angeles County, San Francisco, or the Orlando area are good choices) or working on games, or other freelance or fill-in-the-blank jobs, when the film work runs dry. If money and stability are your two prime motivators, then you're far better off working in games and paying 9 bucks (plus another 12 for a tiny bag of popcorn and stale candy) to see your movies at the cineplex like everyone else.

multiple duty in endless creative ways; lighting is subject to strict controls; and animation is pared down to its essential repetitive motions. Even artists are required to do a wider spectrum of work. The rule in game art is economy, and in games you'll learn to understand that budgets can apply to art as easily as to your household finances. In games work, you'll learn to cringe when someone tells you that a coveted effect or prize-winning model is too *expensive* to make it into the game, meaning it will cost too many processor cycles. Here's what Sean Miller, Lead Artist at Sammy Studios, in Carlsbad, Calif., says about the transition between film and games:

> *I think that a lot of the people who come over to games from feature film and broadcast have a very different idea of what they're getting into, because the rules are different.*
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> *It's interesting because it's the same medium. OK, I'm working in Maya, I'm building my models, so I'm using polygons, not NURBs, I'm still making models. But what you're worried about is a lot different. And I think a lot of people who come over from the games industry don't realize that we are still low resolution. For the game industry, it's, "Wow, we've got 5,000 polys—I can put a 512 texture on that." Whereas a guy coming from Hollywood is used to using a 3,000-by-3,000 pixel texture for the inside of the dragon's eyelid. And understanding what you're getting into is important.*
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> *…It's something that I always encourage people making that transition to do. Don't say, "Oh, yeah, I can do that." The reality of it is, do you want to? I'm sure you can, but do you want to, are you going to be happy doing it? Or is it going to be like pulling teeth? We all want higher resolution stuff, but there's as much of a learning curve going down as there is going up. I mean going down specifically in terms of the budgets that you get.*
>
> —*SEAN MILLER, SAMMY STUDIOS*

Whereas film studios hire specialists who are the very best at the specific thing they do, game studios are far more likely to hire artists with a range of skills. The teams in game development tend to be relatively small compared to film work—typically 20 to 30 people—and game companies generally hire artists as permanent employees. That means once you're done building models for a game, you'll be expected to move on to texture mapping, lighting, or some other segment of the production pipeline or another game. Because the range of effects possible in games is severely limited compared to what's possible in film work, it's easier to master what's required in each of the areas but, as I'll describe in later chapters, there are lots of game-specific skills you'll need to learn to succeed in the industry.

Should you still have a specialty if you're going to work in games? Yes. As a rule, game companies will take an interest in all the things you can do, but they will also evaluate your candidacy based on the strength of one core area of talent, whether it's the role of a 3D artist, technical art director, or character animator. 3D artists are modelers that are also expected to texture map their models; level builders are expected to model, map, and light their environments, plus populate them with props. Animators may animate characters with key framing or by manipulating and managing motion capture data, and they're often expected to rig the characters they're animating. As in film, your demo reel and portfolio should emphasize your depth in only one of these core disciplines (the one they're hiring for!), but make sure it covers all of the bases in that discipline.

The Games Business

In many ways, game art departments are like those of film studios, but the specific demands of real-time artwork are different from those in the film business. For example, where a film studio may spend weeks to build and texture a single important 3D model of a car to exacting detail, a game artist will use the same amount of time to build a dozen different cars, each of which is limited to a few hundred polygons and a tiny handful of low-resolution texture maps. Although the jobs have similar titles and job descriptions, the film artist might be modeling in nonuniform rational b-splines (NURBs), while the game artist works in polygons. Game companies are constantly dreaming up new games, but most of those that are of interest to the 3D and effects specialists are a couple familiar types.

Real-time 3D games feature virtual worlds and 3D characters that are rendered by the game engine and 3D graphics hardware as the game is being played. Examples of this type of game abound, but good ones to look at include Unreal Tournament, Halo, and the Grand Theft Auto series. Many other 3D games use prerendered artwork, which can benefit from higher-resolution models and textures, and characters that are rendered as 3D sprites. Classic examples of this type include Diablo and SimCity, but there are many others.

Now that you have a sense of what to expect from game and film and television companies, the following section introduces the jobs in these industries and the relevant skills you'll need for each position. You'll also see what real-world companies look for in some of the positions. In the next chapter, we describe some of the jobs outside of the film and games industry, including entirely new areas where 3D skills are being put to work. Later chapters, and the book's website (`www.3djobs.net`) list some great 3D job resources where you can find even more job descriptions.

3D Job Descriptions

While every company and job has unique requirements, the following generalizations will help you see what professions are most suited to your skills and interests. We'll discuss each job and then show a representative job posting. The following jobs are loosely presented in the order of those that have fewer technical requirements to those that have more, although this is arguable in the case of the visual effects directors and art directors. These lead roles don't typically require hands-on technical work, though most used to be artists themselves. And since they deal with very technical issues and have to communicate with technicians as well as artists, people in these positions tend to be more successful the more technically savvy they are. Starting with the concept artist position, which really requires only traditional art training, we end our list with technical directors, who are a strange hybrid of artist and engineer. (Chapter 2 discusses actual engineers, as well as jobs in other industries.)

Visual Effects Director; Film and Television

A visual effects director is a position unique to the film business. The in-house director in an effects studio and the person directly reporting to the director on any shot, the visual effects director coordinates the artistic efforts of the entire effects department. In big studios, the director may have captains in the role of animation director, CG supervisor, and practical effects supervisor. In smaller studios with fewer separate departments, or studios that solely work with digital effects, the visual effects director may serve as chief of the technical directors, making the ultimate decisions on how any effect should get done. Like an art director, a visual effects director has to divide time between directing creative work and performing other management tasks. While the visual effects director is ubiquitous in film effects studios, most game studios have no comparable supervisory position, unless there is a creative director to which the group leads report

Art Director; Film, Television, and Games

At the head of the art department is the art director. This person provides the artistic vision to guide the other artists on the team and needs a wide array of fine art skills, along with a capacity for project and team management. The art director is concerned not only with the ultimate appearance of artwork, but is endlessly occupied with mentoring, schedules, and providing the artistic vision to drive the work of the other artists.

In the film business, the art director is solely concerned with the look of the film's artwork. It requires lots of film design experience but almost no technical understanding of how 3D effects are created.

The games art director, on the other hand, will probably have worked their way up to that position by doing lots of game art and is likely to have more technical experience than most of the artists on his team.

INDUSTRIAL LIGHT AND MAGIC (SAN RAFAEL, CALIF.): VISUAL EFFECTS ART DIRECTOR

Summary Responsible for design, development, and presentation of concept art, storyboard, environments, creatures, vehicles, hardware, etc. for both commercials and feature films. Involved in guiding design work through model/miniature and stage processes. Supervises/mentors others where necessary in the creation of artwork and other presentation materials.

Education, Experience, and Skills Required Prior experience in visual effects art direction a must. Prior miniature and stage experience a must. Bachelor's degree in art, industrial design, theatrical design, or painting. Three-plus years storyboard and conceptual artwork experience. Knowledge of production design, computer graphics, animation and filmmaking. Excellent presentation skills. Strong interpersonal and communication skills. Proven ability to lead and mentor artistic talent. Demo reel and portfolio required.

The following ad for an art director was posted by Electronic Arts, one of the world's most successful gaming companies:

ELECTRONIC ARTS (WALNUT CREEK, CALIF.): ART DIRECTOR

Summary The ever-popular and best-selling SimCity team is looking for an experienced Art Director. The successful candidate will be the heart and soul of the Art team and is someone who is a hands-on director willing to get directly involved with some of the day to day art tasks. A person who leads by doing not just directing through others. And a person that is really interested in the environment and design of a game rather than the characters.

Skills/Experience Needed Previous experience in console games. Knowledge of 3D Max and Maya. Background or education in Architecture, 3D Design, UI Design or related environmental design experience. Technically inclined and can or has worked with Software Engineers. Keeps up technology advances in the world of graphics. Has interest, knowledge, and focus on the environment, not the characters of a game. Familiar with previous versions of SimCity and/or other Maxis games!

Requirements Skills: 3D, 3D Studio Max, Maya, MEL Scripting. 6–10 years experience. Expertise: Artist-2D/Front End/Texturing, Artist-3D/Worlds/InGame Modeling, Artist-Art Director. Education: Associate or equivalent work experience.

Production Assistant; Film and Games

A *production assistant* is the 3D studio's equivalent of a *gopher* or a *runner*. 3D studios use PAs to organize collections of images; scan artwork; clean up sketches; process frames of video into animation for rotoscoping; perform simple compositing, cleanup, and rotoscoping tasks; research reference material; and perform a thousand other thankless but essential jobs such as running tapes around town and making dubs (duplicating tapes). Before you scoff at a production assistant job, consider the opportunity to work beside and learn from other artists in a studio that might otherwise not even consider hiring you. Many an artist has found their way into a career in graphics through one of these positions, and the connections and friendships you can make are probably more valuable than any paycheck you might earn. This is one of the jobs that you're likely to be offered as an internship at a 3D studio.

A PA should have a world of patience and an untiring spirit that allows them to stay later than everyone else and learn new things from the artists around them. Most new entrants into film and television CG come in as PAs if they don't have either substantial CG experience from school or a mind-blowing reel. But a good studio will appreciate the efforts of their PAs and slowly move them into more creative roles. It can take some time, but it can be a good way into a good studio, especially for those straight out of school lacking professional experience.

Because production assistants do so many kinds of work, there is no specific set of requirements for landing a PA job, although a strong student portfolio with an emphasis in at least one relevant area of 3D production is a good place to start.

> Another similar entry-level job is *render wrangler* or *render support*, which is described in the next chapter.

INDUSTRIAL LIGHT AND MAGIC (SAN RAFAEL, CALIF.): PRODUCTION ASSISTANT

This entry-level position provides administrative and backup support to the production team while providing an opportunity to learn about the production environment and process at ILM. They can be temporary positions but may evolve into longer term project positions (from as short as two weeks to as long as one year).

Principal Duties and Responsibilities: Provides administrative and backup support to the production team including typing memos, documents, and schedules and photocopying and filing tasks.

Inputs storyboard information into the computer including shot description and element breakdown. Prepares, maintains, and distributes storyboards to the appropriate personnel.

Assists with day-to-day activities, including the distribution of various reports, entering Daily Report notes, and organizing dailies.

Assists with the preparation of live action stage and location shooting as needed including craft service, running errands, and catering setup.

Completes special projects as needed or requested.

Education, Experience and Skills Required: Bachelor's degree in film production or equivalent preferred.

Minimum two years of related experience.

Computer literacy; word processing and spreadsheet experience helpful. 50 wpm typing.

2D/Concept Artist; Film and Games

Film projects employ a great many traditional artists and designers. These range from set and prop designers to the character and costume artists for animated features. Art department artists need traditional training in drawing, illustration, painting, clay sculpture, character design, fashion, architecture, and industrial design. Many concept artists are engaged in storyboarding, creating the visual comic-book version of the project's script. Others are traditional illustrators with an emphasis in design and color. In general, art department artists have little or no need for 3D software, and their computer work may never call for more than basic Photoshop skills.

The concept artist's job in games is similar to the role of the 2D artist in film studios. The concept artist sketches and draws characters, environments, and props. However, concept art for games rarely demands the level of detail seen in film-studio art, since the finished product has a comparably low level of detail. While practical models and 3D scans of clay sculptures, or *maquettes,* are often employed in films, the relatively low resolutions and coarse modeling details in the current world of games mean these techniques have little application except where relatively hi-res game characters need to resemble their celebrity inspiration.

Once a game's characters and sets are designed, a concept artist may move on to painting textures and backgrounds, or to creating artwork for promotions, packaging, and props.

INDUSTRIAL LIGHT AND MAGIC (SAN RAFAEL, CALIF.): STORYBOARD/CONCEPT ARTIST

Summary: Create characters, vehicles, environments, and/or storyboards for film and television under the supervision of the Visual Effects Art Director.

Education, Experience, and Skills Required: Strong creature/concept drawing and storyboarding skills a must. Proficiency in Photoshop required. Demo reel and/or portfolio required.

Previsualization or Layout Artist; Film and Television

Very fast and versatile, *previz* artists are the virtual cinematographers who take art department concepts and screen direction from a script and turn them into low-resolution 3D animations—*animatics*—designed to let directors and cameramen visualize and work out the problems in technical shots before they happen. The ideal previz artist is a film school or animation graduate with an eye for staging, timing, and camera work, and with enough training in 3D animation software to extend those principles into animatics.

A previz artist needs a demo reel that includes animatics showing interesting camera angles and moves that are possible and likely with a real camera, continuity in shot sequences, an eye for action and timing, and character animation that gives a sense of lifelike weight and motion. Film-quality rendering and high-resolution artwork are not an important consideration for this position, but it won't hurt as long as your animations adhere to the other requirements. A *flat portfolio*, or a book of physical artwork, is also sometimes required to show your layout and design skills.

TIPPETT STUDIO (BERKELEY, CALIF.): LAYOUT ARTIST

Qualifications Experience with SoftImage, Maya, or similar 3D animation software is essential. Proven knowledge of cinematographic techniques and principles is essential. Experience working with CG cameras, including lenses and editing animation curves, is necessary. Experience with CG model building and basic rendering skills desired. Knowledge of Unix operating system and general scripting literacy desired. Experience with traditional camera operating is a plus. Proven ability to be detail oriented and to work efficiently within a production environment.

Responsibilities Create and edit camera moves within CG environments to match storyboards and shot descriptions. Set dressing: creating and moving set pieces and models to match storyboards. Place and animate stand-in models for all characters and effects in a shot. Organize and track revisions of all sets and model pieces used in a shot. Render shots with basic lighting to check composition and timing. Follow up on directorial notes and instructions for composition and timing of shots.

3D Modeler; Film, Television, and Games

3D modelers build wireframe models in NURBs, subdivision surfaces, and sometimes in polygons, to bring the art department's 2D designs and sculptures into the third dimension. Modelers, like technical directors, tend to bridge the gap between visual artist and technical problem solver. Modelers are sometimes stratified into the specialties of

environment modeling, the creation of architectural and exterior sets; hard surfaces modeling, the construction of vehicles and props. Character modeling, the creation of lifelike 3D people and creatures, is often treated as a separate job.

Modelers need to have an intuitive understanding of how objects are put together and the details that make shapes look real. Film modelers require a near-obsessive attention to detail, and minutia as small as nuts and bolts and small chinks and dents are often modeled into important objects.

For games, the requirements are very different. All games models are ultimately converted to polygons before they're inserted into a game, so even if you're modeling in subdivision surfaces or NURBs, you'll ultimately have to convert your objects to seamless polygon meshes. This requires a thorough understanding of polygon management and the ability to retain the integrity of a shape while adhering to strict resolution budgets. You'll also have to master UV mapping techniques for assigning textures to various regions of a model. There are few studios that draw clear distinctions between character modelers, hard surface modelers, and environment modelers, so you're better off if you can do all of them well.

One particular mistake recruiters see artists make on modeler demo reels is that they feel compelled to texture and animate their models. As you'll read throughout the book, a modeling reel should show models mostly in turn-table animations (where the model is turned 360 degrees in front of a camera) or with the animation of a bona-fide animator (who should be credited with the animation, of course). If your textures and animation are subpar to your models, don't go through the extra steps. Light your models well, and leave it at that. A flat book of printed model sheets is not a bad idea, either. Remember to send out copies, and always keep your originals.

TIPPETT STUDIO (BERKELEY, CALIF.): CG MODELERS

Summary Modelers will use technical expertise, artistic ability, and knowledge of animation to create models that meet the needs of production.

Qualifications 2-3 years of experience with Maya and Paraform. Basic knowledge of Unix operating system. Ideal candidate would also possess knowledge of construction techniques, and traditional 3D art skills such as sculpting. Proven ability to be detail oriented and to work efficiently within a production environment.

Responsibilities Responsible for building three-dimensional computer graphic models of characters and props to be painted and animated for visual effects shots. The modelers work within a team and are supervised by senior members of the Art Department.

FILM MODELER MEETS GAME MODELER

Modeling is one of the beachheads where the technical differences of film and game work come face to face. In film, the final look of the rendered image has the last word, and that means detail is everything. The rule is, if there's a detail you can see, model it. That means features like bevels on edges, dents in metal surfaces, holes in smooth skins, wires and screens, moldings around windows, and sticks and stones are often modeled in detail and then texture mapped with even more painstaking care. Film models are often modeled in NURBs or subdivision surfaces because these surfaces are perfectly smooth and resolution independent—no matter how close the camera gets to the model, you can't see the faceted edges the geometry. This is particularly true of characters, whose muscular and facial expressions and gestures demand smooth, seamless surfaces. If you're building architectural or mechanical objects, you might use polygons, but forget about lazy modeling that leaves razor sharp edges on the corners of a building. In film, the lack of a highlight on an edge is a dead giveaway that a model is a fake. That edge needs a bevel to throw a specular highlight, and depending on the age of the building, it might also need cracks, chips, and a bunch of rusting metal brackets bolted on to hold the corner together. Anyone who has done much modeling for film will tell you that putting the edge on the edge of the box is a lot more work than building the box in the first place.

In games, modeling is a constant trade-off in detail versus economy. Models have to adhere to strict performance guidelines, specifically, polygon counts. For a particular model, a car for example, you may have a budget of no more than 1,000 polygonal triangles, which is roughly like saying you have to build a life-sized Porsche out of 500 8.5-by-11-inch sheets of unbendable aluminum that can be cut and welded only across their diagonals. Sounds like plenty, until you realize that to model a single tire and wheel that looks more or less round, you'll need 32 polygons (16 more if the wheel needs a hubcap). There goes 192 polygons, just for the wheels! Really want a nice specular highlight on the top edge of the car's bumper? That beveled edge is going to cost you 20 polys. Need an air duct in the car's fender? You could model it for 32 additional polys (per side), or here's a budget-minded solution: just paint it into the 128-by-128-pixel texture map! For game artists, a new challenge has recently begun to develop—the need to build models at both high and low resolutions. Many games now feature elaborate prerendered cinematic animations, with visual qualities approaching those of film, and the game engines themselves are undergoing exponential increases in rendering power. As the trend continues, game modelers will be working with methods and at resolutions that more and more closely mimic their film counterparts while still having to sample models down to in game resolution budgets. For example, it's now possible to render normal maps based on high-resolution geometry, and to apply these to low-res surfaces to make them appear like high-resolution models. This technique requires both high-and-low-resolution models. In the future, having command of detail at low polygon counts will have to complement an eye for detail.

Character Modeler; Film and Games

Character modelers have to be intimately familiar with physiology—the way bone, muscle, and skin hang together to form a body and a face. If you're going to model characters, you have to be sensitive to the subtleties of expression and the intangible qualities of character appeal. It's relatively easy to model something like a human head, especially with the latest generation of subdivision surface modeling tools, but it's not so easy to master proportions or the details, such as how lines and wrinkles crease a brow, or how the muscles under the skin of the face push and pull on eyebrows, eyes, cheeks, and lips.

In film, character modelers must be able to model realistic human and animal bodies and faces, in correct proportion, with a firm understanding of skeletons, muscles, and skins. In the past, film character modelers have worked primarily in NURBs, and some studios still require NURBs-based character modeling, but that technology is quickly being supplanted by subdivision surface modeling, which can be faster and easier to use for this type of organic surface creation.

Character modelers in real-time games usually work with very low-resolution models where the challenge is to preserve a character's proportions and details while paring polygon counts down to a minimum.

In this ad from Industrial Light & Magic, applicants are warned about heavy use of the keyboard. You know you're in trouble when the job description requires a disclaimer.

INDUSTRIAL LIGHT AND MAGIC (SAN RAFAEL, CALIF.): CREATURE MODELER

Summary With an emphasis on anatomy and form, the creature modeler will create three-dimensional CG characters to be painted, enveloped [rigged], and animated by the creature development team.

Primary Responsibilities Creates three-dimensional creatures for the Animator and Technical Director. Employs specific software tools to build the geometric structure of the object and ensures that the model will satisfy the requirements of the production. In building creatures, the modeler must incorporate technical expertise, artistic ability, and a basic understanding of animation. Works with production team (Sr. Modeler, Technical Directors and Animators) to determine the "look" for an object. Builds the geometry of computer graphic models, with an understanding of how the geometry will be used in the production process. Performs other tasks related to the creation of computer-generated animation.

Education, Experience, and Skills Bachelor's degree in Fine Arts or equivalent with a thorough understanding of anatomy, character design, and animation. Portfolio demonstrating traditional artistic skills including illustration and sculptural abilities a plus. Proven

experience creating digital creatures or characters in a feature film or production environment. Requires familiarity with film and video post -production techniques and with computer graphic techniques. 2-3 years Alias, SoftImage, Maya, or XSI experience and/or a demonstrated desire to develop computer skills. Knowledge of Unix is a necessity to navigate through ILM's production pipeline.

Physical Requirements Uses computer keyboard 95 percent of the time.

Environment Artist; Film and Games

In many game companies, modelers are also responsible for texturing and lighting their models and are referred to as *environment artists.* These are the architects and stage designers of the game world. The environment artist builds the sets in which the game's characters live and move. This might include both interior and exterior architectural models and props, as well as the background scenery, textures, lighting, and atmospheres that make the environment interesting to look at.

Some film companies have a position that's analogous to the games environment artist, called a *3D environments artist*, or *digital environments artist*, but this is a highly specialized job that's often combined with the role of matte painter. These artists create digital scenery and populate it with 3D models, often of architecture or natural features, such as trees, mountains, or waterfalls. They must have both the eye of a painter and lighting artist and the technical director's ability to render the scenery with realistic effects and animated props.

ELECTRONIC ARTS (WALNUT CREEK, CALIF.): ENVIRONMENT MODELER/TEXTURE ARTIST

The ever-popular and best-selling SimCity team is looking for an experienced Environmental Modeler. The successful candidate will be a critical part of this incredible team! And a person that is really interested in the environment and design of a game rather than the characters. (Please note this position is located at the Maxis studio located in beautiful Walnut Creek, CA, about 25 miles east of San Francisco.)

Skills/Experience Needed Previous experience in console games. Knowledge of 3D Max and Maya. Background or education in Architecture, 3D Design and/or related environmental modeling experience. Keeps up with technology advances in the world of graphics. Has interest, knowledge, and focus on the environment not the characters of a game. Familiar with previous versions of SimCity and/or other Maxis games!

Requirements Maya. 3–5 years experience. Expertise: Artist-3D/Worlds/InGame Modeling. Education: Associate or equivalent work experience.

Texture Artist

Texture or *surfacing* artists paint and shade the 3D objects created by 3D modelers. Texture artists need a thorough understanding of what makes surfaces look the way they do in life—the effects of wear and tear and the accumulation and layering of dirt and grime are important concepts. Technical underpinnings of surface qualities, such as specularity, luminosity, reflectivity, and displacement, are part of the texture artist's daily vocabulary. Texture artists often combine understandings of photography and painting with a command of the complex tools, shaders, and techniques used to translate real-world and imaginary surfaces into 3D-rendered textures.

In years past, texture art in games has been severely hampered by the limitations of games' rendering engines and hardware, and many artists working in the games industry have only limited comprehension of effects like bump mapping, environment mapping, and specular mapping. As game hardware makes quantum leaps in performance and capabilities, game textures are requiring more and more of these film-style effects. For example, nVidia's hardware used in the Xbox and many desktop PCs allows for the use of *normal maps*, which can be used to influence the apparent bumpiness, specularity, and environmental reflections on a surface.

The game texture artist is a Zen master, making do with almost nothing to create an interesting and immersive world. For example, a game artist has to be able to reuse a single texture map in many different ways, and to tile small textures seamlessly across large areas of geometry.

TIPPETT STUDIO (BERKELEY, CALIF.): CG PAINTER

Creates the textures, colors, and organic surface qualities needed in the completion of creatures and/or objects used in production.

Qualifications Background in Art with strong composition skills required. Strong technical knowledge of Command files as relating to Renderman. One year experience as a CG Painter in a film production environment. Familiarity with film post-production techniques and with computer graphics techniques preferred. Knowledge of Photoshop, Painter, Studio Paint, and Maya. Experience with Unix and Renderman. Must be able to work as a team, with strong communication skills and attention to detail in a fast-paced environment. 2D drawing and sculpture knowledge a plus.

Responsibilities Works with production team to execute the desired look of an object. Participates as a team member in determining various design solutions. Creates and maintains texture maps and command files.

FILM TEXTURE PAINTER VS. GAME TEXTURE PAINTER

By now it's no news to you that film and game art differs in its technical demands and limitations. Here's another one: texture painting and mapping. In games, texture memory is one of the most tightly constrained budget items. The Sony PlayStation 4 offers 2MB of texture RAM. To put this in perspective, that's the equivalent of two 1,000-pixel-square images, or about two photographs (uncompressed) from a cheap 1 megapixel digital camera. Now imagine trying to represent all of the textures in an entire 3D world—walls, floors, ceilings, props, vehicles, and characters—within those two photos. Game texture artists are masters of making do with the resources at hand. The same texture map might be used to portray concrete on the ground, stucco on the walls, and the coarse, grainy leather of a car's upholstery. Texture maps are often forced into unnatural aspect ratios (usually powers of 2), so every texture image has to be either a square or a square cut in half: 64-by-64, 128-by-128, or 128-by-64, for example. Texture artists have to make a single texture work for entirely dissimilar objects. For example, one map may serve to texture the entire surface of a car, with fenders, windows, headlights, and other features, all painted on different portions of the single texture map. Current game engines are quite limited in the types of rendering effects they will support. Bump maps and specular maps have a dramatic impact on the quality of rendered surfaces, but they're supported in only the most sophisticated rendering systems. (Keep in mind that those effects maps also get subtracted from your texture memory budget.) But things are looking up for texture artists in games. As nVidia, ATI Technologies, and Sony (the major players in game rendering hardware) drive up the power of their chips, real-time procedural effects and advanced texture mapping are pushing game rendering to higher levels of realism. Game artists are rapidly getting more flexibility and creative freedom. Microsoft's Xbox, for example, has 64MB of texture RAM and uses advanced nVidia rendering hardware that supports more advanced texture effects than previously possible. And for computer games, 3D hardware with 128MB texture RAM and advanced programmable shaders is becoming standard in new systems.

In film, there are hardly any limits on what can be done in textures and procedural surfaces. There are shaders for realistic skin, hair, fire, water, and every type of surface imaginable. For these artists, the challenge is not how to do more with less, but how to achieve the utmost realism, regardless of the surface's complexity. A surface texture in film effects might include channels for color, bump, specularity, luminosity, reflectivity and glow, plus ramps to modify the attenuation of reflectivity based on the surface's angle to the camera, and the degree of glow based on the color of the underlying color map. All of this might be animated, so that the surface takes on a life of its own. Painting a surface in such a world requires not only an ability to paint a picture that looks realistic, but an ability to paint and manipulate the underlying surface qualities that make metal look metallic, corrosion look corrosive, and oil look oily, as these surfaces move in and react to their environments. Depending on the studio, film effects artists may also work extensively with procedural shaders, such as those used by Pixar's Renderman software. These shaders are pure computer code that may have only limited visual interface elements, and they are controlled by manipulating procedural values, rather than through painting of bitmapped textures. In this world, creating new materials is the work of programmers with a sophisticated understanding of rendering algorithms and complex math.

Matte Painter or Background Artist; Film and Games

Like art department artists, matte painters are primarily traditionally trained artists who specialize in painting background scenery in films and television productions. While it's important to be able to do realistic painting, the matte painter is usually more concerned with being able to paint scenery that fits the style of the film. Increasingly, matte painters incorporate 3D elements into their scenes and use traditional painting techniques to blend 3D and 2D elements into a coherent realism.

In smaller studios and games companies, this job is often combined with that of the texture artist, the theory being that if you have the painting skills to paint realistic scenery, you can also paint realistic textures and surfaces.

DIGITAL DOMAIN (VENICE, CALIF.): DIGITAL MATTE/TEXTURE PAINTERS

Digital Domain is looking for skilled Digital Matte/Texture Painters with 2–3 years experience in feature films/commercials and in their respective resolutions, i.e., NTSC, 2K, etc. Candidates should have a highly developed photorealistic painting style with knowledge and ability in perspective/motion and proficiency in matte painting and/or creating and applying textures. Knowledge of Deep Paint 3D, Amazon, and/or Photoshop is required. Familiarity with 3D modeling packages relative to texturing a plus.

Lighting Artists; Games and Film

Lighting artists set lights and fine-tune highlights and shadows within a scene. They may also manipulate light-related effects, such as glows and flares. Lighting artists are often former students of photography or stage lighting, and they have a keen sense of color and contrast and know how to use lights for dramatic and artistic effect.

Frequently in film work, the task of the lighting artist is to match the lighting in CG scenes to that in live footage, so that the CG elements blend seamlessly into the live plates. Current standards of lighting in film work call for the use of advanced lighting and rendering methods such as global illumination, radiosity, ambient occlusion, and high dynamic range image (HDRI) rendering.

In games, the lighting artist's job is much different. Games usually allow a few light sources at most to be rendered in real-time in any scene. Anyone with experience in lighting will vouch that "a few "lights is too few to produce effective or dramatic lighting. The solution in games is to bake lighting into a scene, so that it becomes embedded in the scene's texture maps or attached to vertices of the model being lit. This allows a game artist to use advanced lighting, and many lights, without impacting the game's performance.

What follows is ESC FX's ad for a lighting artist during its work on *The Matrix* sequels II and III:

ESC FX (ALAMEDA, CALIF.): COLOR AND LIGHTING TD

Duties include but are not limited to: Design and implementation of complex shading networks and lighting schemes for realistic object appearance as required by production's needs. Work with complex rendering pipeline, both at the application and scripting levels. Receiving many elements from other departments and assembling virtual scenes for shots often using scripting languages for automation.

Position Requirements Ideal candidate will have photography/visual arts or computer science degree or relevant experience. Minimum 3+ years experience in a production environment. Broad, practical knowledge of rendering theory. Both eye for lighting and technical skills are important. Should be familiar Maya scripting and Perl, and working in an environment where 3D and compositing work closely together. Experience especially with Mental Ray renderer but also Renderman and scripting languages (e.g., Python, Tk) very useful. Good interpersonal/communication skills necessary.

2D/3D Artist; Games

The term *3D Artis*t, or *CG artist*, is sometimes used as a catch-all name for an artist who may do all kinds of 3D work in a game studio, and that job is even sometimes combined with the job of the 2D concept artist and painter. This position may require any or all of the following: storyboarding, sketching, painting, modeling, texturing, lighting, character modeling, animation, and technical direction.

For us here at Sammy Studios, we're very interested in artists. Artists first, more than technical people, although we do have some technical artists. It's very important to us that they have really strong art skills. We are very interested in artists who have a traditional background, if not professionally, at least traditional skills that they can demonstrate on their reel or their portfolio. Most come from art schools: we have people from Savannah College of Art and Design, from Art Center of Pasadena, from the Academy of Art in San Francisco. We put a high premium on artistic skills and artistic talent, because if you know good art, you're going to be able to create good art, regardless of what tool you use.

I'm more willing to train someone to use the tool than to train them in art. It's much more difficult to train someone to be a good artist.

There are exceptions to the rule, where you have guys who didn't need to go to art school who are phenomenal artists, but in general it's certainly helpful.

—*SEAN MILLER, SAMMY STUDIOS*

These days, there's almost no equivalent position in large effects studio based films (as opposed to boutiques), unless you consider technical directors, who sometimes have their hands in every aspect of 3D, or previsualization artists, who do some of everything at game resolutions.

MICROSOFT XBOX (SEATTLE, WASH.): 2D/3D ARTIST

It takes an unusual creative talent to know how to build an inscrutable alien race of characters. It takes an even more unusual talent to know what happens when they atomize their enemy with an arsenal of bad-ass alien explosives. If you think you are unusually creative and talented enough to address this difficult task, we have a job for you. Inscrutable alien references are a plus, but not required.

Major Responsibilities Concept, build, and texture characters and character permutations. Concept and paint 2D and 3D effects. Requirements: Be an excellent artist. Be able to work with a team. Have experience with 3D Max and Photoshop. Have two years or more of professional experience. Possess the ability to work well under pressure and deadlines. Must be willing to take art direction well.

Character Animator; Film and Games

Character animators breathe life into inanimate objects. A character animator's job is to extend a character from the realm of *action* into the world of *acting*. As animated 3D characters are becoming the stars of films, character animators are being asked to infuse their characters with the emotional expressiveness equal to that of a human actor.

In some ways, character animators in film are animation's equivalent of concept artists. At least in theory, they aren't required to be highly technical in their skill set, but they are required to have a mastery of the principles of animation (as defined so clearly by Frank Thomas and Ollie Johnson in their classic book *The Illusion of Life: Disney Animation*). This means understanding the subtleties of weight and timing, anticipation, slow-in and slow-out, moving in arcs, and the other principles that are the focus of any first-time animation class. But the reality is that the setup and rigging for character animation has its own world of technical requirements and issues, and a character animator equipped to troubleshoot, or at least explain the nature of problems in a character's rig, is going to be far more useful in production than one who has to report every problem to a TD and wait for assistance.

In many studios the job of rigging is given to a TD and the animator does nothing but animate. Still, getting to know the technical aspects and rigging of character animation is a huge plus. If you want to learn character animation, and the rigging behind it, you'll have to study bone and joint setup, inverse kinematics (IK) and forward kinematics (FK), as

well as skin weighting and deformation systems. You may also need to familiarize yourself with motion blending and motion capture tools and techniques.

In real-time 3D games, the majority of hard-surface animation is generated by in-game physics simulations, so animators in games are primarily character animators. This may involve key frame animation, where animated moves such as a karate kick are saved as individual clips that can be replayed when the player pushes a particular button sequence, or it may mean directing motion capture performers and manipulating motion capture data to blend performances into 3D action sequences.

In games, character rigging is simpler than in film work, since most game engines won't handle sophisticated deformations in real time. In many game companies, character animators also do their own rigging.

ESC FX: CHARACTER ANIMATOR

The Character Development Animator is directly responsible to the Animation Supervisor and is instrumental in developing the behavior and personality of the computer generated characters.

Duties include but are not limited to Review the previz with the Animation Supervisor to understand meaning, emotion, action, continuity, and plot as they relate to character development and storytelling in the assigned sequences or for assigned characters. Work with Animation Supervisor to define personality, create fluid motion and organic movement of character(s). Work with modelers/riggers to ensure that characters are equipped with the necessary range of motion for their performance. Maintain awareness of the characters' behavior and motion throughout the assigned sequences to ensure consistency of performance. Prepare tests of proposed animation to show to the Animation Supervisor and the CG Supervisor for approval. Confer regularly with the Animation Supervisor to apprise him/her of progress.

Position Requirements Minimum 2 years experience with character animation for feature films required. Experience with traditional character animation techniques such as stop motion desirable. Experience with character set-up required. Experience with Maya and Mental Ray required. Knowledge of Windows NT and Unix required. Ideal candidate should have strong artistic sensibilities in the areas of character movement, storytelling, modeling, and lighting.

Cinematic Artist, Games

In games, the cinematics artist does pretty much exactly what a character animator does in film work, only they'll generally have to do it faster, with less attention to detail. Cinematics are the story-based movies that give meaning to the game play that is the meat of any video game. Often cinematics are rendered in real-time (by the game's engine), but it's

also common to see prerendered cinematics that play out as a movie while the game loads, or in between levels. Depending on the game, the cinematic artist will need character animation skills, as well as the ability to do screen direction and camera work.

Summary

As you've seen in this chapter, the skills and techniques used in film, television, and games work are closely related, and most art jobs have analogous positions in all three industries. However, the need to specialize is pronounced in film work and much less so in television work. In games, you need to acquire a breadth of skills specific to the games market. The specific jobs described in this chapter can all be considered more or less visual arts positions. For the most part, none of them require extensive programming or scripting, although they may require extensive knowledge of technical subject matter, such as advanced shading and rendering systems, or hard-to-master modeling skills. The next chapter introduces truly technical jobs, many of which require at least some knowledge of programming, or a mastery of the very technical aspects of the 3D production process. Chapter 2 also describes some of the 3D jobs outside of the film and video game industries.