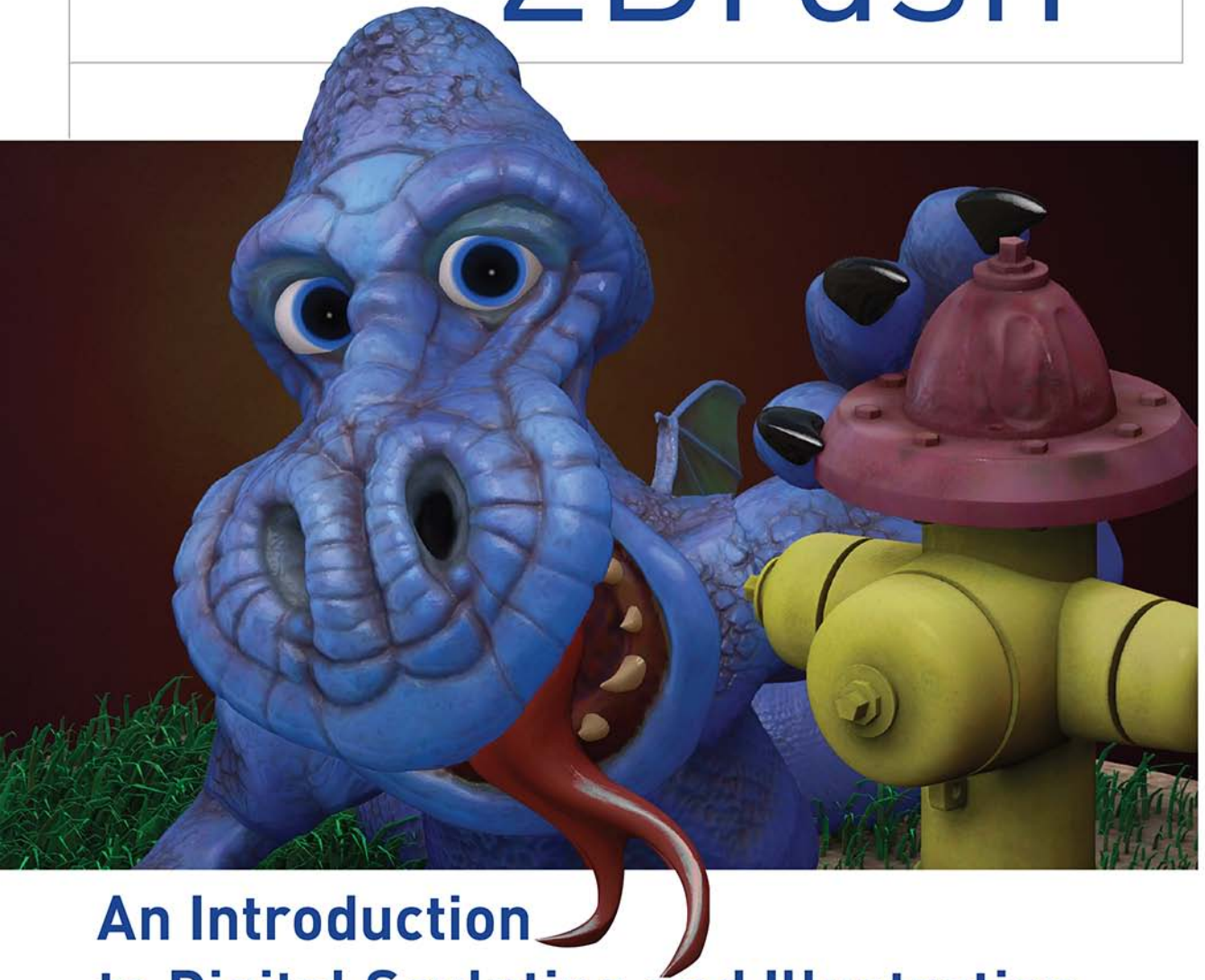


Getting Started in ZBrush



**An Introduction
to Digital Sculpting and Illustration**

Greg Johnson



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Illustration

Greg Johnson



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To my wife Penny – for her inexhaustible patience.

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About the Author

During the course of being a Professor of Game Development and Computer Art for over 17 years, I have had the privilege of teaching thousands of students a diverse array of courses, including digital sculpture, 3D modeling, texturing, game design and development, animation, rigging, visual effects, digital painting, and programming. This book is a compilation of material developed from my introduction to digital sculpting lectures and all of the good advice I have managed to cultivate over the years. I am a member of the Guild of Natural Science Illustrators and the Association of Science Fiction Illustrators, and have worked as a 3D Lead for Ascent Games while doing occasional freelance work. You can find my work online at <www.gregtheartist.com>.

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Introduction

Overview

This book is an understandable and easy-to-use introduction to digital sculpting and painting with ZBrush. Everything you need to get started working in ZBrush is contained in this book. The book will guide you through the process of sculpting and illustrating your own fantastic digital creations. Topics covered include a thorough introduction to the program's user interface, professional workflow, illustration, sculpting techniques, and how to customize the tools and interface to suit your own personal work habits. Written with the digital beginner in mind, this book will teach you all of the necessary information to begin working in ZBrush to create magnificent works of digital artwork! Throughout this book ZBrush will empower you to be the digital artist you always wanted to be.

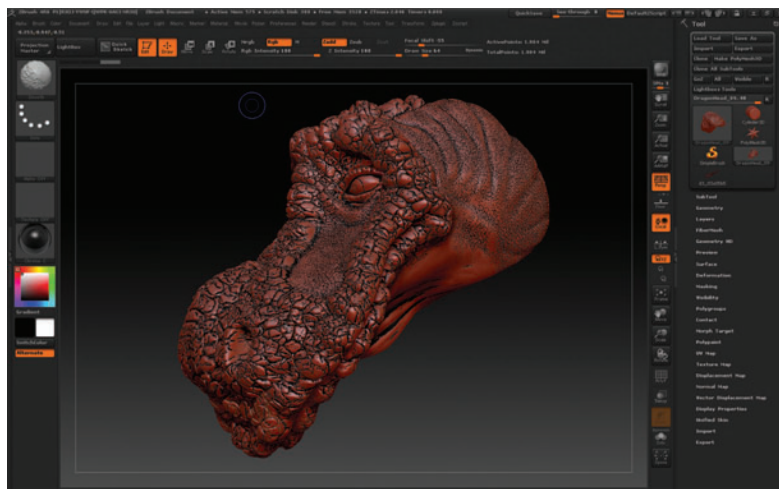


FIG 1.1 *Quick dragon head study*

ZBrush is a wondrously powerful program capable of doing things thought impossible just a few years ago. However, it is also, like other 3D programs, a very complex and deep program with thousands of buttons and options that can easily confuse and overwhelm someone new to it and to 3D in general. This book focuses on the workflows and techniques that will make you a productive artist with this program. It is not a guide to every button in the program; the official ZBrush documentation (<http://docs.pixologic.com>) already exists for that and it would be redundant to include all of this material here. Instead, this book will show you how to work with the program to produce the artwork you want to create and will serve as an entry point into the larger world of 3D. While you will not need any other resources aside from this book to become an effective artist with ZBrush, I would still suggest that you take advantage of the wealth of existing free material that can be found on Pixologic's main website (<http://pixologic.com>) and on the official ZBrush forum (www.zbrushcentral.com). You will quickly discover that the vast majority of artists working in 3D are a very friendly and helpful bunch provided that they are treated with respect.

Why ZBrush? ZBrush is an artist-orientated digital 3D sculpting and painting package. Since its inception over a decade ago, ZBrush has become a critical component of many industries such as film, video games, and illustration. The reason for this is that unlike any other 3D program on the market today, ZBrush is the only one capable of displaying millions of polygons on screen at the same time. This is due to the way in which ZBrush handles its camera since it treats everything as a 2.5D object as opposed to a true 3D object. While this imposes additional work when translating ZBrush objects into other 3D packages, it does allow for the creation of complex 3D objects within ZBrush that no other package can replicate. Because ZBrush has been integrated into so many movie and game production pipelines, it has become required knowledge for anyone wishing to become a 3D artist in these fields. ZBrush has also become a very influential player in the realm of illustration as many artists begin to adopt 3D into their workflow. What this all means is that if you want to become a professional 3D artist for games, movies, and increasingly illustration, you will need to know ZBrush. The program has been particularly useful for character artists for years, and it is now being used for all sorts of detail-oriented work, whether in character, environment, or object modeling. Simply visiting the gallery on www.zbrushcentral.com will show just how many projects ZBrush is currently being used for. Simply put, knowing ZBrush has become critical for many artists.

Let's begin learning with some basic universal advice and suggestions; then we will move on to the more technical material.

Professional practices

Here's a brief set of suggestions that should be helpful to anyone in the field of digital arts. If you intend to pursue a career in the visual arts, you should keep these suggestions in mind.

Sketchbook. The ability to draw is an essential part of working in this field and it is important to always practice this skill and improve it. You should purchase a small, easily portable sketchbook and keep it with you at all times. Any time you have a minute, when waiting for food, standing in line, or just hanging out, get out the sketchbook and draw whatever you see in front of you. It is important to draw what you see, not what is in your head (that goes into your idea book)! After a few months you will start to notice significant improvements in your skill level. After two years, you'll be pretty good.

Idea book. You need inspiration. Keep a small sketchbook with you and write down or sketch out any ideas that you have. Cut out anything interesting you



FIG 1.2 *Sketch and idea books*

find in magazines and paste it into the sketchbook. You can include photographs and photocopies as well. You can also keep a file folder on your computer which you should fill with whatever images you find intriguing. Then, whenever you need inspiration or are stuck for an idea, simply open up your idea book/file folder and browse through it. Soon you will be inspired again!

Technique library. Keep a file folder and populate it with any interesting tutorials or techniques you find. If you see an interesting image that has, let's say, a neat-looking approach to doing hair, save it and put it in your techniques folder. Later, when you need to do hair yourself, you can look at that approach and some other techniques you've found and use one of those techniques or combine them and come up with your own unique approach.

Job research. You must be aware of what you will need to have in your portfolio to get the job you want. To learn this, simply select five companies you'd like to work for one day. Go to their website and search through the job postings for the position(s) you want. Most companies provide a very detailed breakdown of the skill sets and requirements for each job. What you need to identify are the common elements between each of the same type of jobs from the different companies. If there is a skill set that every one of the jobs lists, then you must be absolutely sure that you have that skill demonstrated in your portfolio. Conversely, if there are skills that only one of the jobs talks about, then that is a skill that you should focus on only if you really want to work for that specific company (since no one else will care that you have that skill set). Just remember to compare jobs with the same (or almost the same) job titles.

File-naming conventions and organization. It is important to name your files in a consistent and organized fashion. I suggest using only lowercase letters, numbers, and _ or -. Do not use any unusual characters (!@#\$%^&^*). Keep your files organized into descriptively named file folders. When naming a file, include a version number and a current iteration number – for example, *mammoth_v2_205.ztl* (the 3D file), *mammoth_v2_20.psd* (the master texture file), *mammoth_v2_03_diffuse.jpg* (color texture file for the 3D scene), *mammoth_v1_02_normal.jpg* (normal map file for the 3D scene), and *mammoth_v1_06_spec.jpg* (specular level texture file for the 3D scene), all stored in the *mammoth* folder. This name breaks down into a description of the object (mammoth, a prehistoric elephant), the version number (_v2), and the iteration number (_205). Each time you save the file (3D, Photoshop, or otherwise), increment the iteration number by one: so, from *vulcan_v6_048.ztl* to *vulcan_v6_049.ztl* and so on. If you make a serious change you can increment the version number. This way if a problem develops in the file (it gets corrupted or you make a mistake) you can always go back and find an earlier file that isn't messed up. This will save you hours' and maybe even days' worth of work.

Backups. Don't forget to back up your work! External drives are cheap nowadays so there really isn't any excuse for failing to back up your work. Personally, I use around four different external terabyte drives and back my work up to a different one each week. I also have copies burned to DVD, a backup of current files at a different location, and a copy of my working files on my portable drive. There is a wide array of online backup services now available as well. Over the many years I have been a professor, I cannot even begin to count the number of times students have lost all of their work due to a hard drive crash – a simple enough thing to fix if they had bothered to back their work up to an external hard drive or a cloud storage service. Another common mistake is to keep saving work into the same file. When something happens to that one file, their whole project is ruined and they lose hours' if not weeks' or months' worth of work. Simply using a file-naming convention and iterating their file names would have saved them. I speak from personal experience. Several of my earliest animations are now lost. Even though I backed the files up, the storage device I used became inoperable and the files are now unrecoverable. There is nothing worse than having one's files become lost after spending hours, days, and weeks working on a project – especially when the solution is so easy and straightforward.

Anatomy. There is simply no substitute for knowing proper anatomy. It is the difference between getting a job as a character modeler or not. Ignore studying this material at your own risk! You will need to show competency in drawing, physical sculpture, musculature, and bone structure. The best approach is to take a class in constructive anatomy. This does not mean simply memorizing the muscle groups and bone names – this means doing a hands-on *écorché* sculpture. In this process you first create the bones of the model, then painstakingly apply each and every muscle to the model to build up the form until you eventually add the soft organs, fat, and skin to finish the model. It is a laborious and time-consuming approach, but it is the best way to truly learn proper anatomy.

Skills. There's a lot to digital art that you can teach yourself – and then there's some stuff that you probably can't. Almost all of the technical stuff can be self-taught. The technical side of things is well documented and easily accessible. A good book (like this one!) will get you started and then you can pick most of the remaining techniques up from quality websites (Zbrush Central, CGSociety, Polycount, etc.) and by reading the help files that come with every reputable software package. It is an excellent idea to take an entry-level programming class though, to get a good foundation for that sort of thing (unless you just have a real knack for it as some people do and can teach yourself programming). The problem is when you start talking about learning art. It is very difficult to teach yourself proper technique when it comes to drawing, anatomy, color, and design. While there are countless books on

each subject, nothing beats having a good instructor. I urge you to pay really close attention to the fundamental art courses: color theory, 2D design, and drawing. These are the classes that make you an artist. If you learn this material well, then you're an artist; otherwise you aren't and probably never will be (though there are tons of jobs for purely technical people in the entertainment industry too). I know that as I get older and more experienced technically, the techniques I keep going back to and working on are color, design, and my drawing skills.

Education. You don't have to go to college to get a job in the entertainment industry working on digital art. All these companies care about is the art that you can bring to the table. They don't care about your grades, just the quality of your portfolio. You also have to be capable of working well with others in a group. If you cannot do that, then you will be unemployable. Having said all of this, college is still a good idea. Why, you ask? Because it will open up opportunities that would be denied to someone who doesn't have that educational background. While the entertainment industry might not care about your educational background, a lot of other employers certainly will and that is a very important thing to consider. The entertainment industry is not for the faint of heart. The hours are long and the employment contracts are short – sometimes no more than a couple of months before you are looking for new work. Reputation is everything. If you have the reputation of someone who is easy to work with, takes direction well, and who has a lot of artistic capability, then you will find getting employed pretty straightforward. If you are at the point in life where you are thinking of marriage and kids, then you might want to look at other opportunities that will provide regular working hours and good benefits, and for that college is essential. One good approach is to work in the industry until the job market crumbles (which happens about once every ten years or so) and you can't get a job. Then go back to school for a few years and earn the next degree in the sequence. Get your Bachelor of Fine Arts degree if you don't have one or your Master of Fine Arts if you already do. By the time you finish the program, the job market will have heated back up and you will be employable again with a sparkling new set of qualifications. It doesn't hurt that advanced degrees like a Masters of Fine Arts (MFA) or a Doctorate (PhD) help in getting promotions either.

You don't need to spend a fortune to get a good education. A lot of very good colleges don't require an enormous amount of monetary investment; but you have to do your research. Look into who is teaching at the college and what they've accomplished – do they know their stuff? Go tour the campus and see if you are impressed after talking to them face to face. Be careful with the "rate my teacher" sites though; most often the people complaining are the ones who did the worst in class. Find students whose work you admire and ask them what their opinion is about a professor or class. It is best to ignore

the opinion of people who aren't putting in the effort to succeed. The single most important element in success is your determination. If you are willing to put in the hard work, you can succeed wherever you go to school or you can spend a jaw-dropping amount of money at the world's best art academy and still be unemployable if you don't put in the personal time and effort it takes. Play it smart. Take your English, math, and other core requirement classes at a cheaper college and transfer the credits in. You can usually take up to almost half your credits somewhere other than the place you graduate from; but it is best to check ahead of time and find out what will eventually transfer over and what will not – just so you don't waste any of your time or money. If you're going somewhere with a great reputation, it is a bit easier to get a good education; but just make sure that you will be able to pay off those student loans eventually. There's not much point in getting a \$200,000 education in a field where the starting salary is \$20,000 a year. The point is to do your research. Find out what it is going to cost, how best to work the system, and who to



FIG 1.3 *Dragonfly*

take classes with to get the most out of your education. Make the system work for you!

Creativity

Creativity does not occur in a vacuum. You must continually feed your brain with fresh ideas and stimuli if you want to develop content that is original and unique. It isn't enough to simply play video games or watch movies. If you only do that, you will simply end up regurgitating the same sort of material that you've seen. There's plenty enough repetition in the industry as it is and there's no need to add another space marine, robot, or monster that looks like everything else already out there. So how does one break out of the rut? Find fresh material to serve as input, read, and be inspired by original work.

Go out and research as wide a variety of topics as possible. Almost anything can serve as an inspiration, but there are some areas of study which can be especially useful for a digital sculptor. One of the most beneficial areas of study is zoology and anatomy. Studying the shape and forms of the myriad creatures that make up our beautiful biosphere is greatly rewarding on several levels. It will help to teach you more about anatomy. Learning how muscles and bones work on other creatures will help to inform your decisions when it



FIG 1.4 *Spiders*



FIG 1.5 *Fungus*

comes to designing your own creatures and make the ones you create all the more believable, so much so that if you have the opportunity to study some animal anatomy or comparative anatomy classes, I'd suggest you take them. Knowing the visual elements that define a predator versus a prey creature will allow you to create creatures that possess the correct set of traits for their role. Let's take a few examples. A rabbit is a prey animal. As such, it has large ears that swivel about to enable it to detect the stealthy approach of a predator early on and to pinpoint the direction it is attacking from. The rabbit possesses powerful legs so it can flee from danger and a sensitive nose for additional detection abilities. One of the most telling attributes of a prey animal is how its eyes are set upon its head. Most prey animals like the rabbit have their eyes set far apart on the side of the head. This gives the creature a very wide field of vision in which it can easily detect the movement of a potential predator. Prey animals can also possess a wide range of defenses such as armor, camouflage, mimicry, poison, a bad smell, or even ink. Teeth are another vital clue to a creature's habits: blunt teeth for herbivores, a mixed set for omnivores, and lots of sharp pointy teeth for predators. Looking at predators, you can tell what kind of prey a creature eats from its teeth: lots of small sharp teeth for eating small slippery prey, big cutting teeth for ripping chunks out of their victim, or a pair of saber teeth for delivering a killing bite to the throat. Predators typically have their eyes set in the front so that they can have stereoscopic vision and good depth perception for judging how far it is to the prey animal for the final pounce. Combine this with additional senses such as a capable nose, sensitive ears, or something more exotic like a bat's radar or a dolphin's sonar for locating their prey. Add in some powerful claws for grabbing and holding onto their prey and you have an efficient predator. Predators usually fall into either pursuit or ambush types which can be used



FIG 1.6 *Shieldback katydid: Note the ruler used to determine scale*

as a marker to give the creature either good camouflage and blinding reflexes (ambush types) or powerful legs and high endurance (pursuit types). Some of my personal favorites for inspiration include the strange creatures from the deep sea.

Searching a scientific term relating to oceanic studies such as “bathypelagic” or “abyssopelagic” will turn up lots of wonderful and exotic animals. Looking up a zoological term such as isopod, nauplius, or arthropod is a good start, as well as searching for paleontological phrases such as the “Cambrian explosion”, “Arthrodires”, or “terror birds”. Studying zoology, biology, paleontology, and their related fields will provide invaluable insight into your own creature designs.

It is also worth reading the best of the science fiction and fantasy genres. Knowing the work of such luminaries as Arthur C. Clark, Isaac Asimov, and Robert Heinlein will not only provide endless amounts of inspiration, but will educate you as to where most of the current themes in science fiction come from. Authors such as Edgar Rice Burroughs, H.G. Wells, Larry Niven, and many others have defined the genre and are well worth reading. Fantasy authors such as J.R.R. Tolkien, Robert E. Howard, Michael Moorcock, Fritz Leiber, and Jack Vance are the origin point for most of the themes found in modern fantasy games and movies. In the same vein, Edgar Allan Poe and H.P. Lovecraft defined the horror genre. Reading the books written by these authors will help you to understand where most of the ideas in modern video games and entertainment come from and inspire you to create your own unique creative visions. You can find a lot of these works for free at Project Gutenberg (www.gutenberg.org).



FIG 1.7 *Arthrodire fossil*



FIG 1.8 *Arthrodire model*

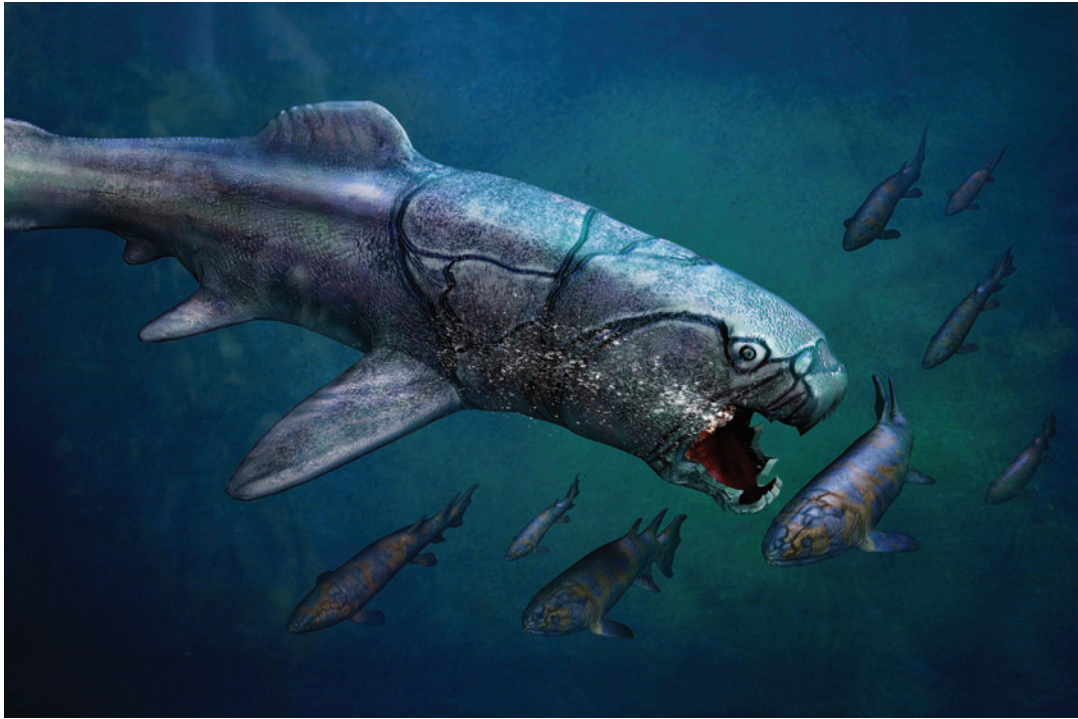


FIG 1.9 *Arthrodire illustration using ZBrush and Photoshop*



FIG 1.10 *F-94C Starfire fighter airplane*

History is replete with colorful examples from which to draw inspiration, from the ancient warriors of Assyria to the Polish Winged Hussars, or perhaps the F-94C Starfire fighter airplane, the SR-71 Blackbird spy plane, or the M-4 Sherman tank. Few things can be imagined that haven't cropped up somewhere in the history of humankind. A good starting point for discovering ancient cultures is *The Golden Bough* by Sir James George Frazer. A broad study of mythology and religion, it offers an interesting introduction to the very diverse subject of cultures and beliefs that humanity has at one time or another manifested. Best of all, it is freely available on Project Gutenberg (www.gutenberg.org/ebooks/author/1241). Searching for the term "Arms and Armor" in Google books will also turn up a number of historical books on the subject of weapons and armor. It is well worth familiarizing yourself with how weapons and armor are really worn and used so that you can make your own creations believable. This brings us to the subject of proper reference materials.

Reference material

If there is one common failing I have noted in students over many years, it is a consistent lack of proper reference materials before they start a project. Every professional artist I know keeps a well-stocked library of reference images and objects that relate to their subject material. For example, an artist working on a dragon will do thorough studies of snakes, alligators, lizards, and such in an effort to make their creatures as realistic and believable as possible.

FIG 1.11 *Rattlesnake*





FIG 1.12 Alligator

A team working on a sports racing game will schedule visits to professional race car shops and will usually have a licensing agreement with specific teams to actually use the appropriate logos, insignia, drivers, and vehicles. A professional studio creating a modern military first-person shooter game will have real machine guns, clips, backpacks, and uniforms available to their artists so that they can actually have the item they are modeling on the desk in front of them as they do so. I guarantee you that a studio that focuses on a certain type of subject or upon a specific time period will know *everything* there is to know about the subject. If you were to submit a portfolio piece to them as part of a job interview, they will know immediately if you have not done your research and if you get any detail wrong. I have literally had clients look up the serial number on the airplanes I have made paintings of! If you are doing a medieval knight, then you better make sure that you get the armor and clothing right. Your warrior will need a long sleeved undershirt, a gambeson (quilted under armor padding), proper chainmail, and a surcoat to go on top, plus his sword belt, knight's spurs, cloak, and other accoutrement as befits his station, the type and look of which will vary depending upon exactly when and where the warrior is from and his rank. You will have to do proper research to get the details right – it is all about the details. Make a point of gathering as much reference material on your subject as possible before you start. It is the difference between making a good model and a great one that could get you a job. For example, if I wanted to model the historic M42 Duster anti-aircraft armored vehicle, I'd make a point of visiting every museum I could

that had one, and photo documenting every aspect of the vehicle from top to bottom, taking literally thousands of digital pictures. It is only through this process that you will learn what the object really looks like. There is no substitute for firsthand experience of something. I'd also read as many books as I could about the vehicle and do a very thorough job researching the various unit markings the tank used during its decades-long career. The result is a very thorough knowledge of the different variations of the vehicle and being able to create an extremely accurate 3D model.

The current standard for making a professional model isn't just making a perfect 3D version of the object. It is making a perfect object that has a personality and conveys a mood. It isn't just any object – it is a specific object, with a unique history, a distinctive look and emotional feel. It is not, for example, just modeling a tank; it is modeling a tank with the right unit markings; the dirt from where it has seen service; the long scrapes on the side armor skirts



FIG 1.13 *M42 Duster armored vehicle: Note that vehicles put on display in museums usually do not look like they did when in service; wear and tear, bad paint jobs, and missing equipment are the norm in a lot of museums*



FIG 1.14 M1A2 Abrams tank: Major Ellis Gales, U.S. Army, November 21, 2011 (111101-A-IQ400–502)

Source: Retrieved from www.defenseimagery.mil/imagery.html#guid=ba8c0f09825a6c23bb6083619b449fd62f53f79b

where it has rubbed against buildings or obstacles; the shiny spot on the lip of the barrel where repeated firings of the gun have blasted the paint off; the boxes, crates, and gear that the crew has accumulated; the exhaust grime; the oil leaks; and so forth. You have to create a rich visual description full of detailed information that describes the history of the object. It is not enough to describe what the object is; you must also describe where it has been, who it has been with, and what it has been doing as well. This is true not just for objects but for any characters, monsters, environments, and architecture that you want to create. Everything should tell a story. Do that and you will be a successful modeler.

Copyright

There are a few things that everyone working in the digital arts field should know about copyright. The first is that you automatically have ownerships and copyright to the work that you create. It is a good idea to put the copyright symbol (©), the year of the first publication of the work, and the name of the

copyright holder somewhere on the work (e.g., © 2014 Greg Johnson) to make it obvious that the work being published is under copyright. The flip side of that equation is: don't infringe on anyone else's copyright. It simply isn't worth it. If a company even suspects that you have infringed upon their copyright, they will sue you into the ground – the operative idea being that they bankrupt you, whether the case against you has any merit or not. Most companies who engage in these types of lawsuits have far deeper pockets than the people they sue and can afford the money, time, and effort required, while you simply cannot. If a company that you work for thinks you have infringed upon someone else's copyright, they will not only fire you, they will spread the word of your infringement to the point where you will be unemployable in the entertainment industry. I have seen it happen. The entertainment industry is a fairly small one, where your reputation is priceless. Everyone knows everyone else or knows someone who does, and your reputation will precede you. It is critical to make sure that your reputation regarding copyright is spotless.

The easiest way to make sure your work isn't infringing upon anyone else's copyright is to always use your own original images whenever possible. Take a camera with you wherever you go. If you see something interesting – an old sewer cover, a rusty steel wall, an old brick wall, a section of sidewalk – simply take a snapshot of it for later use. There are a few general guidelines for taking images for reference or texture use. Usually it is best to take the images in diffuse light: light which has no obvious source. The best time of day for this is the hour immediately after sunrise or before sunset, often called the “golden hour” in photography. Otherwise any cloudy overcast day or taking the picture in the shade will suffice. The worst times are at noon or in strong light that creates dark shadows. It is more trouble than it is worth trying to paint out or fix bad lighting later on when you need the image for a texture or reference.

The rules are different for students, but don't cultivate bad habits. If you are a student, you have some limited usage rights to copyrighted work; but it is still a bad idea. While you are allowed to use copyrighted works for educational purposes, anything you create with someone else's images will be something that you can never enter into shows or even put into your portfolio. If you include the image in your portfolio and someone recognizes the other work, then that would raise questions about your integrity and probably end your job chances immediately. So even though it is technically allowed, it still isn't worth doing. It is far better to go ahead and just create and use your own images. Not only is it safer, but it gets you into using proper professional work habits, which you will need to develop anyway.

If you are desperate or simply cannot get the correct references you need, then you can buy reference images and textures from certain websites. Always check their terms of use to make sure that you are legal in the application

you are using them for. These are a few of the websites where you can obtain good imagery for money:

- www.3d.sk;
- <http://dirtytexel.com>;
- <http://handpaintedtextures.com>;
- <http://gametextures.com>.

There are a few places you can get legitimate texture references for free. One of the best is CGTextures (<http://cgtextures.com>). But again, always check the terms of usage on the website before you use the image. You can also use Google's advanced image search with the usage rights search restriction set to "free to use, share or modify, even commercially"; but I would be *extremely* careful about doing so and verify conclusively that the image you want to use is, indeed, free to use for that purpose. The penalties for being wrong are severe and this isn't something you want to take any chances with.

United States government work does not have any copyright restrictions on the reproduction, distribution, display of, or creation of derivative works from their images, and these make excellent reference or texture sources. You always need to thoroughly check and make sure, however, that there aren't any other copyright holders on the work before you use it. These are some of the best and safest places to get high-quality images from. Here are a few good sources for government images:

- NASA's image gallery (www.nasa.gov/multimedia/imagegallery/index.html);
- U.S. Department of Defense's image library (www.defenseimagery.mil/index.jsp);
- National Oceanographic and Atmospheric Administration's photo library (www.photolib.noaa.gov/).

Publicizing your work

Once you get started making artwork, make a point of posting your work online in professional forums. Some of the best forums for posting ZBrush artwork are ZBrush Central (www.zbrushcentral.com), Polycount (www.polycount.com/forum), and Cg hub (<http://cg hub.com>). Once you post your work, make sure that you pay close attention to any constructive criticism that is offered and quickly fix any problems that people point out. This will help you to develop a reputation for working fast and taking critique well. These are two qualities that any company treasures in their employees, and if you can display those principles on these forums there is every chance that people will take notice. It may take a while and you will have to be persistent and

consistent in your work and online habits. Keep in mind that a lot of human resource people peruse these sites looking for talent, and having a good reputation on them will help you to get a job.

Make sure that you have a good portfolio website. Either purchase yourname.com or some variation thereof and host a simple gallery, or you can use a free hosting service such as Wix (www.wix.com/) to do so. Put only your best work on display. You will always be judged by the worst thing people see, so include only your strongest pieces. Include an Adobe PDF and/or Microsoft Word DOC of your current resumé and a valid email address where you can be contacted. Don't post your telephone number unless you really want everyone on the World Wide Web to have it! It also helps to have a business card. Even something as simple as your name, website gallery address, contact information, and job position or artistic title printed on a plain white card will suffice. A couple of good places to get your cards printed cheaply are VistaPrint (www.vistaprint.com) or Moo (<http://us.moo.com>). The website and business card don't have to be fancy – you're not trying to be a graphic designer or web designer. They just have to get people to your website where you can show your work off and let people know who you are and how to contact you.

The last thing to do is to get yourself out there. Go and talk to the companies and professionals in the entertainment industry. A good place to do this is at some of the various conferences that are held every year. Two I can wholeheartedly recommend are the Game Developer's Conference, or GDC (www.gdconf.com/), for video games and ACM SIGGRAPH (www.siggraph.org/) for everything else. Both are good conferences attended by thousands of people from the entertainment industry and are great places to meet people and make connections.

Resources

There are a lot of great ZBrush resources available for anyone interested in the program. The best place to start is Pixologic's own forum ZBrush Central (www.zbrushcentral.com). Before posting any questions, do a very thorough search through the forum's existing posts for the answer beforehand. Nothing irritates experienced posters like being asked a question for the hundredth time, so make sure that your question hasn't already been answered previously. Check out the tutorials section (www.zbrushcentral.com/forumdisplay.php?19-ZBrush-Tutorials-Forum); the ZBrush documentation website (<http://docs.pixologic.com>) is also a great place to learn what each button in the program does. Another great Pixologic resource is the ZClassroom site (<http://pixologic.com/zclassroom/homeroom>) for more learning resources. Once you have come to grips with the program by completing this book, these are the places to go to further your knowledge of ZBrush and to expand your