

Chapter 6

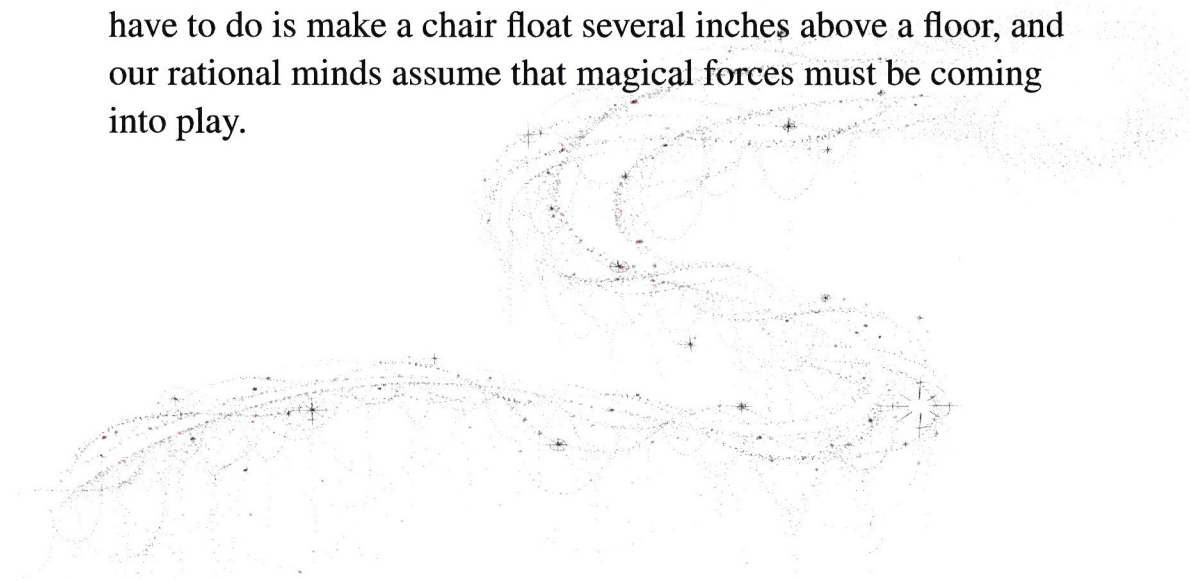
Magic

Often when I try to describe special effects animation to my friends who are not in the animation business, I will mention “pixie dust” as one of the common effects elements that we deal with. This inevitably brings oohs and aahs of familiarity, enchantment and curiosity. Humankind has always had a love affair with magic and it seems to transcend the humdrum routines that we’ve mostly come to accept as reality. In the world of special effects animation, it is no different. I have yet to know an animator who doesn’t feel a wonderful creative release when working on “magic” effects.

With magic we are able to shed the rules of physics that govern most effects animation, and invent our own set of physics or lack thereof. Magic sets us free on the page. Free to defy gravity and transform objects at will.

We are free to conjure up visions from our subconscious, free to break out from the boundaries of what is possible in our mundane day-to-day life! Magic is by far the most open-ended category of special effects animation. An entire book could easily be written about this fascinating artform.

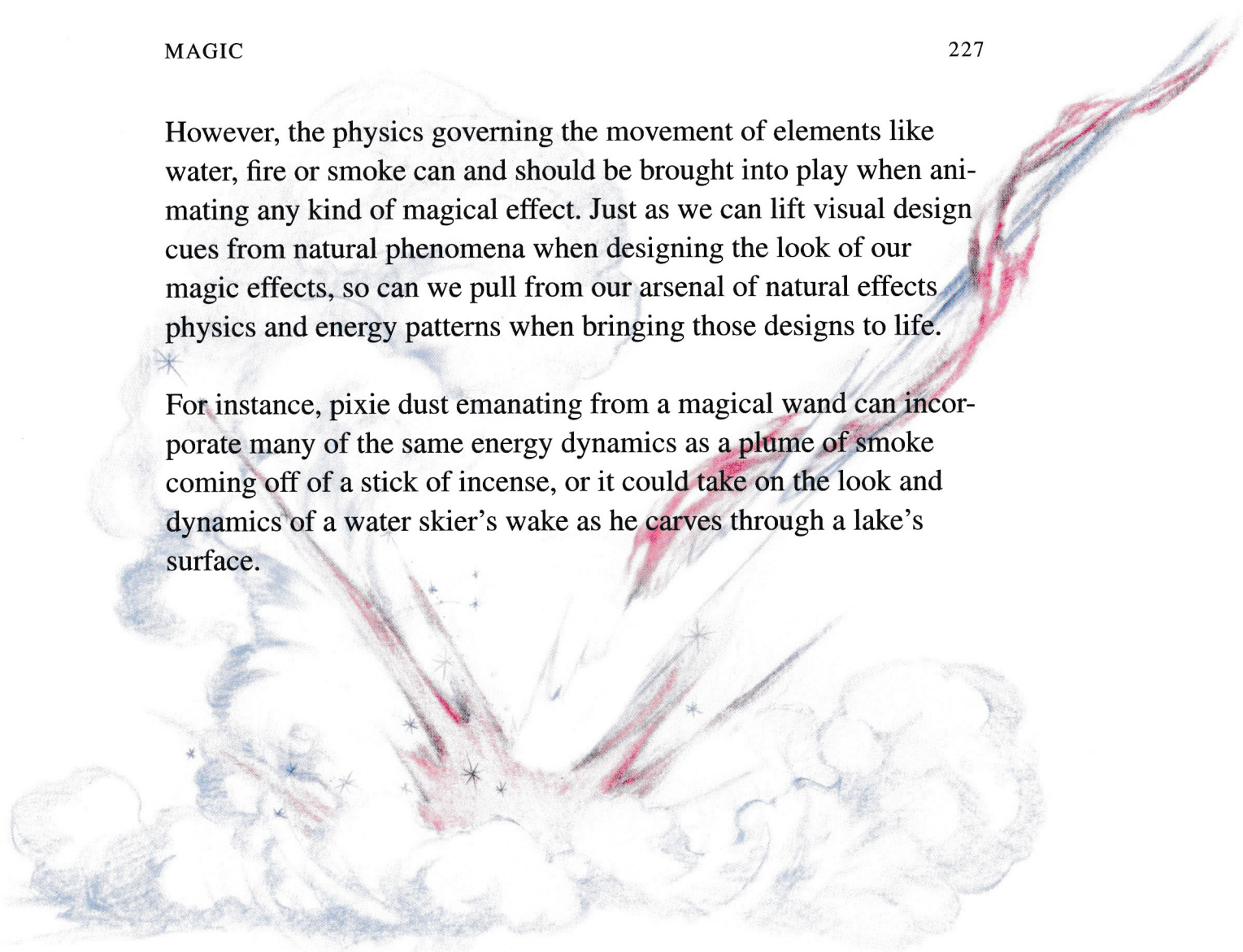
Sometimes what helps something to appear magical is the simple fact that it does not follow the same set of natural principles that govern the physics of our material world. For instance, any object that appears to defy gravity immediately appears magical. All we have to do is make a chair float several inches above a floor, and our rational minds assume that magical forces must be coming into play.



This is the same drawing from the preceding page. Here it is right side up, as it was originally drawn. I flipped it upside down on the previous page to illustrate just how well it can work, to break the rules, and defy all natural physics, when we are creating magical special effects.

However, the physics governing the movement of elements like water, fire or smoke can and should be brought into play when animating any kind of magical effect. Just as we can lift visual design cues from natural phenomena when designing the look of our magic effects, so can we pull from our arsenal of natural effects physics and energy patterns when bringing those designs to life.

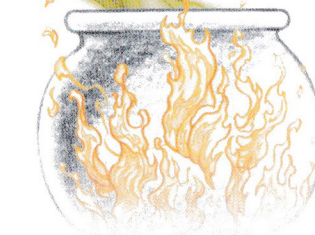
For instance, pixie dust emanating from a magical wand can incorporate many of the same energy dynamics as a plume of smoke coming off of a stick of incense, or it could take on the look and dynamics of a water skier's wake as he carves through a lake's surface.

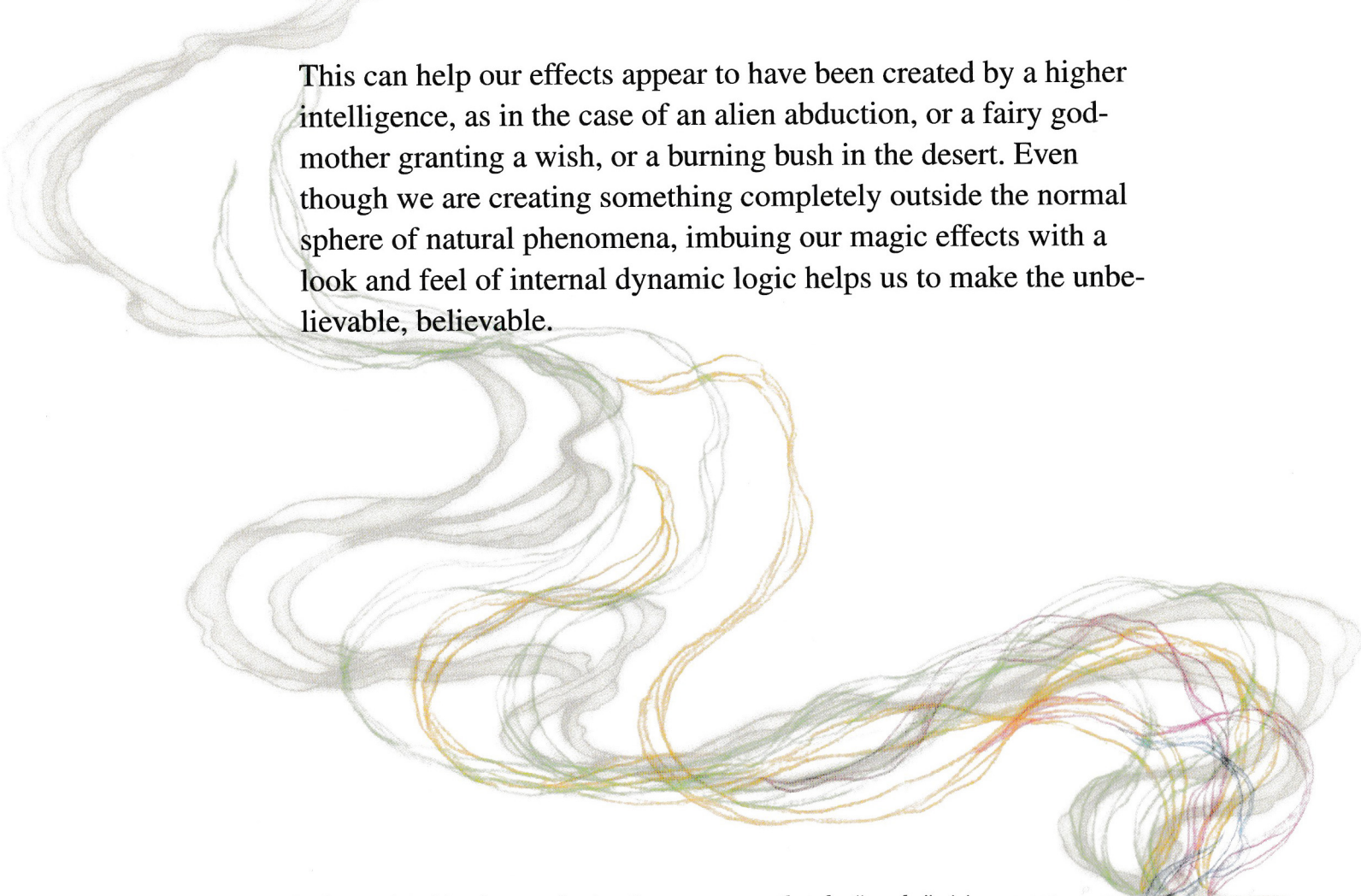


Where magic is involved, a director frequently won't really know what he or she is looking for until they see it! That is when a special effects artist with a good knowledge of elemental energy, and a loose drawing hand, can come up with something fresh to spark the director's imagination.

The difference in the dynamics is that when we are animating pixie dust, we can depart from the worldly physics of elements like smoke or water at any moment in our animation and create a magical dynamic of our own. This is of key importance when animating magic effects. To invent and describe our own set of dynamic rules, so that whatever the magical effect we create, no matter how bizarre or unusual, it will appear to have an internal logic of some kind governing its design and movement.

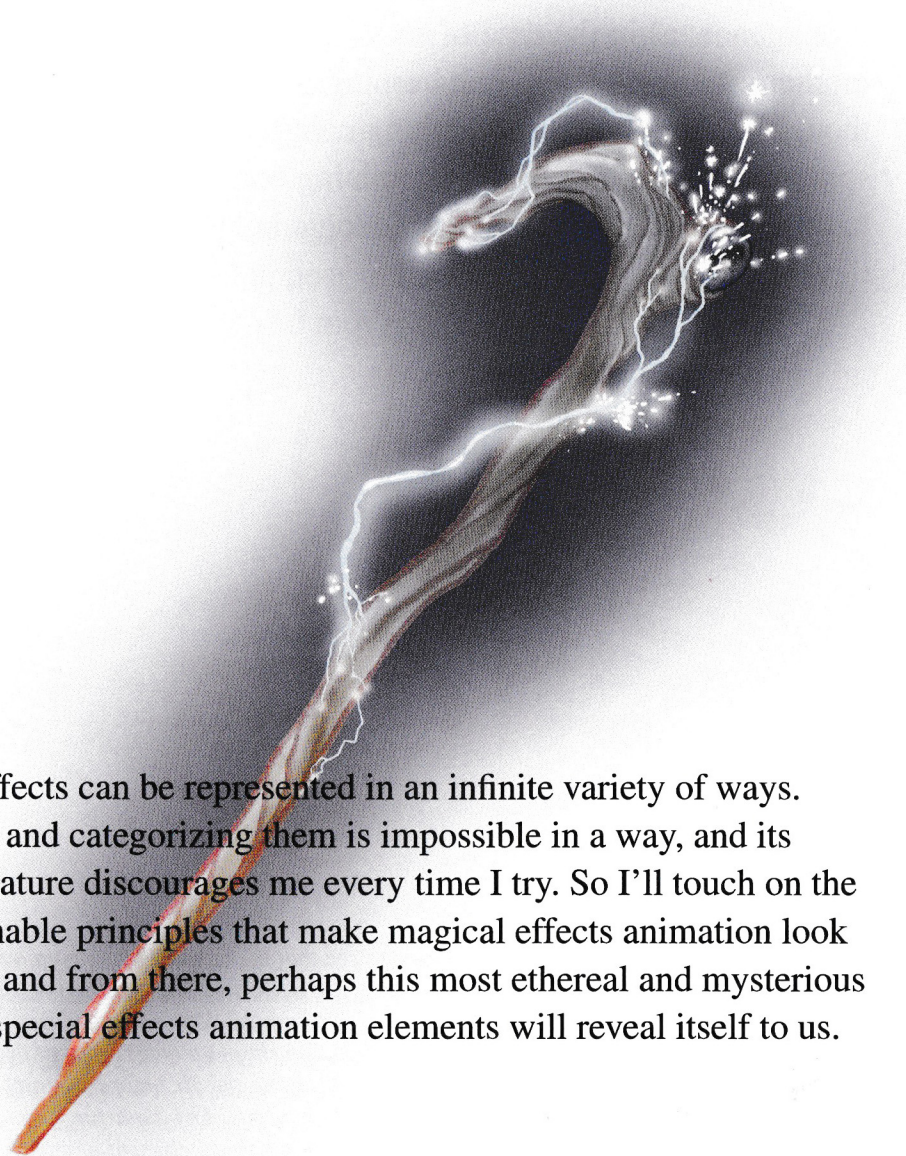
One of the best ways to proceed when animating something that you want to feel magical, is to start out with a solid design based on what you know about creating good organic special effects elements. Then, animate it in a completely different way, giving it a life of its own. I used this smoke elsewhere in the book to illustrate linear smoke design. But if we animate this smoke as if it was rising up like a snake out of a basket, pausing, hesitating, shooting forward and such, it would not feel like smoke at all, but more like a self-willed spirit rising up out of the cauldron.



A series of keyframes showing smoke rising from a cauldron. The smoke is depicted as multiple overlapping, semi-transparent lines in various colors (grey, green, yellow, orange, red, purple, blue). The smoke rises from a simple, rounded cauldron at the bottom right. The lines are highly dynamic and non-physical, curving, looping, and recoiling in ways that defy natural smoke physics. The overall effect is one of magical, unpredictable movement.

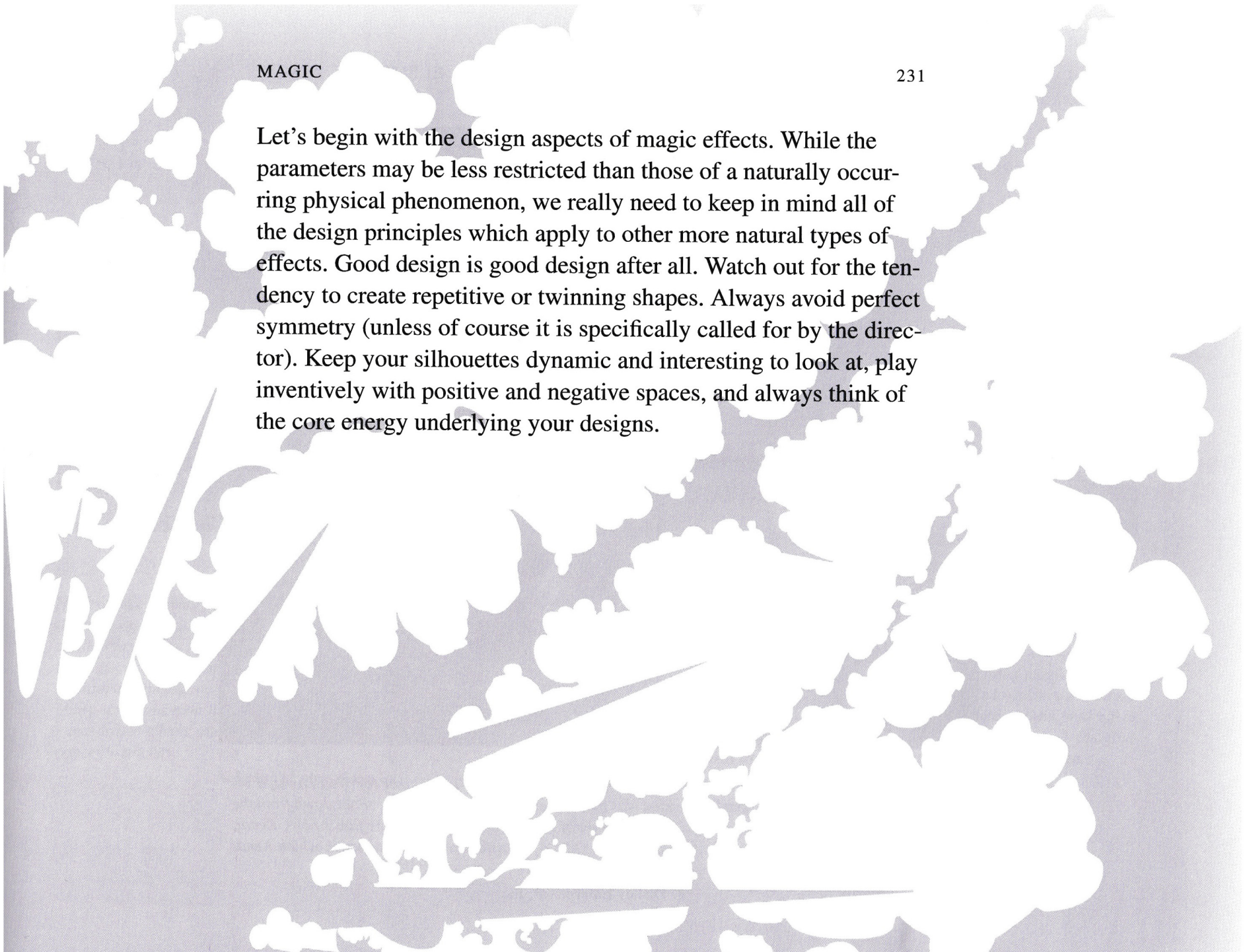
This can help our effects appear to have been created by a higher intelligence, as in the case of an alien abduction, or a fairy god-mother granting a wish, or a burning bush in the desert. Even though we are creating something completely outside the normal sphere of natural phenomena, imbuing our magic effects with a look and feel of internal dynamic logic helps us to make the unbelievable, believable.

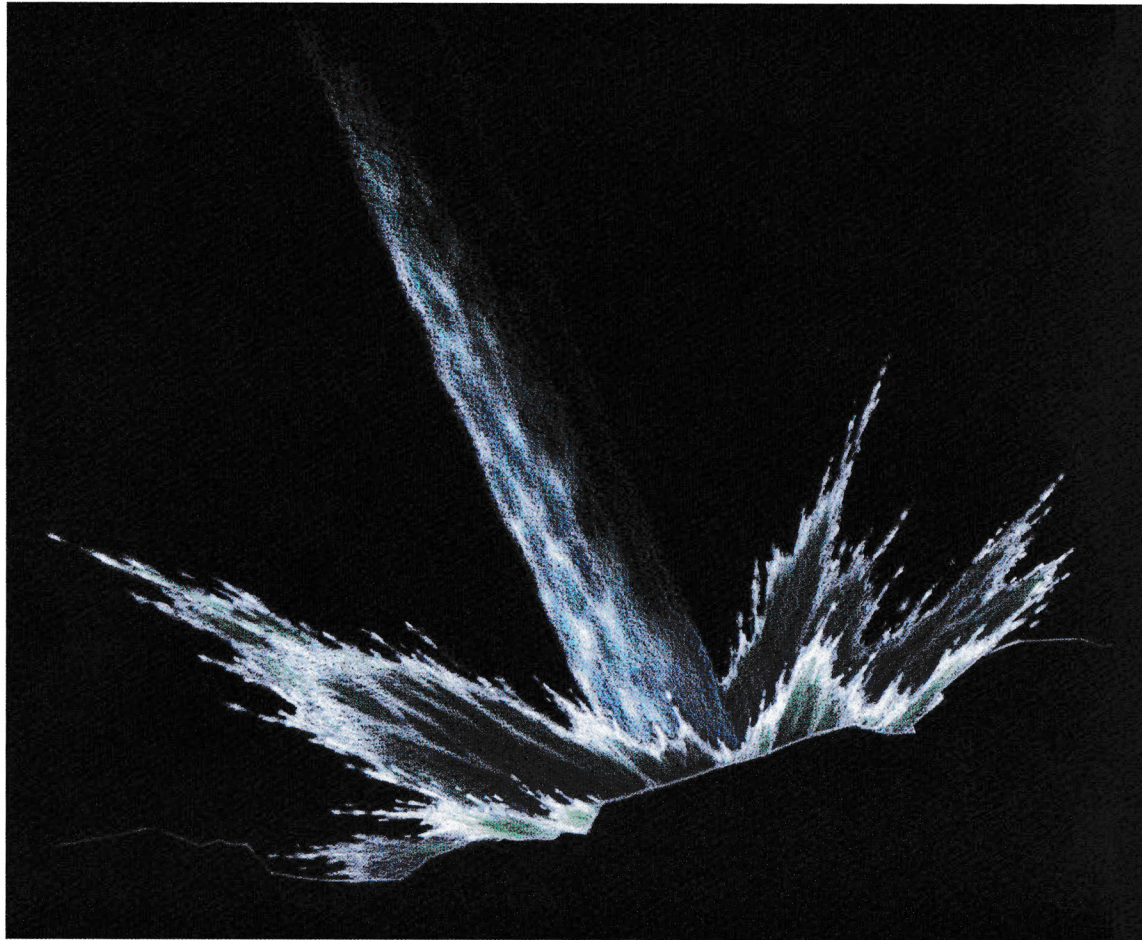
In these colored key frames of animation, we can see that the “smoke” rising up out of the cauldron does not behave like real smoke at all, but instead has somewhat of a mind of its own. Simply by breaking the rules of what smoke does naturally, we can immediately give this effect a magical feeling. It can shoot up quickly out of the cauldron, and then pause, almost as if thinking, and sniffing the air before continuing upward. It can even recoil, and pull back at certain points. Any departure from normal smoke physics will help the audience know that this is an element of magic.



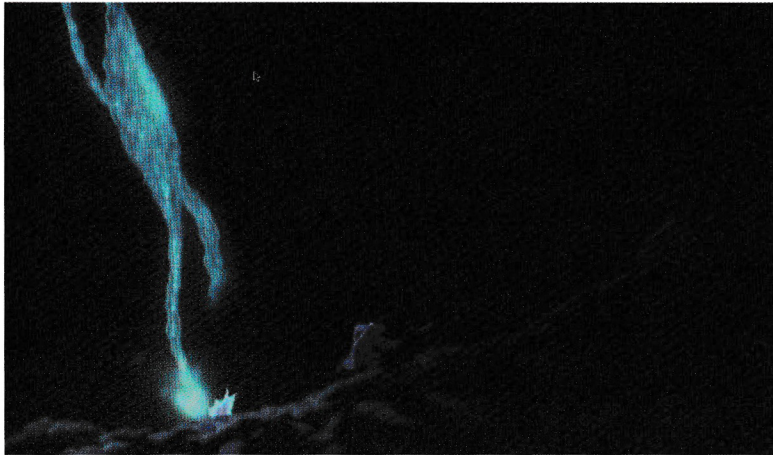
Magic effects can be represented in an infinite variety of ways. Defining and categorizing them is impossible in a way, and its infinite nature discourages me every time I try. So I'll touch on the few definable principles that make magical effects animation look magical, and from there, perhaps this most ethereal and mysterious form of special effects animation elements will reveal itself to us.

Let's begin with the design aspects of magic effects. While the parameters may be less restricted than those of a naturally occurring physical phenomenon, we really need to keep in mind all of the design principles which apply to other more natural types of effects. Good design is good design after all. Watch out for the tendency to create repetitive or twinning shapes. Always avoid perfect symmetry (unless of course it is specifically called for by the director). Keep your silhouettes dynamic and interesting to look at, play inventively with positive and negative spaces, and always think of the core energy underlying your designs.



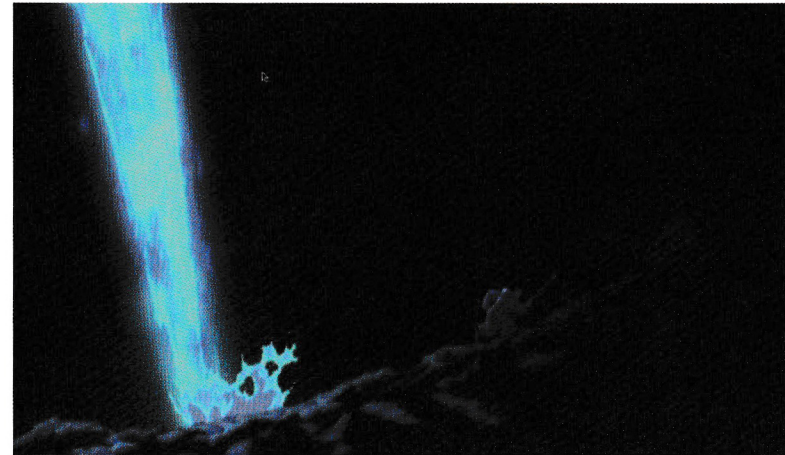


Here is a concept drawing that I did for directors Aaron Blaise and Bob Walker for Walt Disney Pictures feature film, "Brother Bear". The idea was that a beam of liquid light would shoot down from the sky and create a pool of magical liquid with a beam of light in the center, that the film's hero, Kenai, would then wade into. This was the beginning of the film's "transformation" sequence in which Kenai in transformed into a bear.



Here we see frames from the transformation sequence that ended up in the film, very similar in look to the original concept drawing. The liquid tendrils in the first frame were created entirely in 3D CGI, and then as the beam became more intense and focused, as we see in the second frame, additional hand-drawn elements were added around the CGI element. Many tests and months of development went into making the CGI and hand-drawn effects integrate together to achieve the look of the original concept sketches.

© Disney Enterprises, Inc.



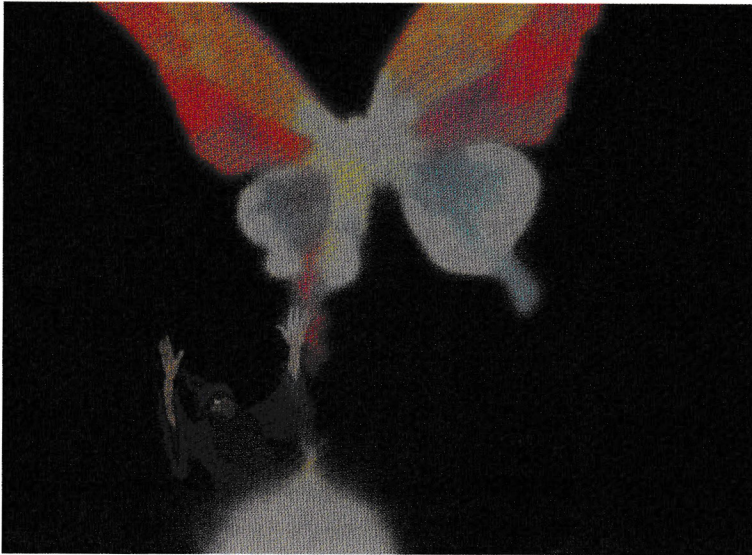
As the beam impacts the ground, the splashes that explode outward were entirely hand-drawn effects animation. This helped to keep the overall look of this magical effect very well integrated with the art direction of the film. It was felt that an entirely computer-generated magical element would have lacked the organic feel that we were able to achieve with hand-drawn effects. But no matter what technique is used for the final effect, great effects animation still depends on a fertile, well-informed imagination and a skilled drawing hand at the stage of the initial concept.

© Disney Enterprises, Inc.

Even when we are creating shapes that are intended to look repetitive, an effort should always be made to inject some variety into our shapes. We find that the shapes inherent in the natural phenomenon we study can adapt well to the world of magical elements.

A wizard conjuring up some sort of a spiritual entity from a bubbling cauldron magical brew may very well produce a shape that is very much liquid-like in its appearance, and might resemble a waterfall falling upwards! A common dynamic of many magical effects is a spiraling vortex of energy, much as we might see in a small whirlwind or a mighty tornado.





In “The Sorcerer’s Apprentice” segment of Walt Disney’s classic Fantasia, the wizard conjures up a fantastic bat-like demon creature that then morphs into a beautiful butterfly. This is magical animation at its best, starting out as simple rising smoke, but then taking on a very magical life of its own.

© Disney Enterprises, Inc.

This energy vortex could very well be added to our magical wizard’s apparition. This spinning vortex of liquid magical energy might appear to be filled with smoke or steam, or pixie dust behaving much like snowflakes. The possibilities are endless, fantastic, challenging and fun! We can imbue our effects designs with visual cues lifted from all the other natural effects elements, and add our own twists and turns wherever we please.

Attempting to imply scale and perspective in our magic effects can be extremely difficult because we don't have any of the normal reference points that we do when we are creating effects elements which commonly occur in real life. So we need to exaggerate our scale and perspective even more than we do with special effects in general, when we are animating magic.

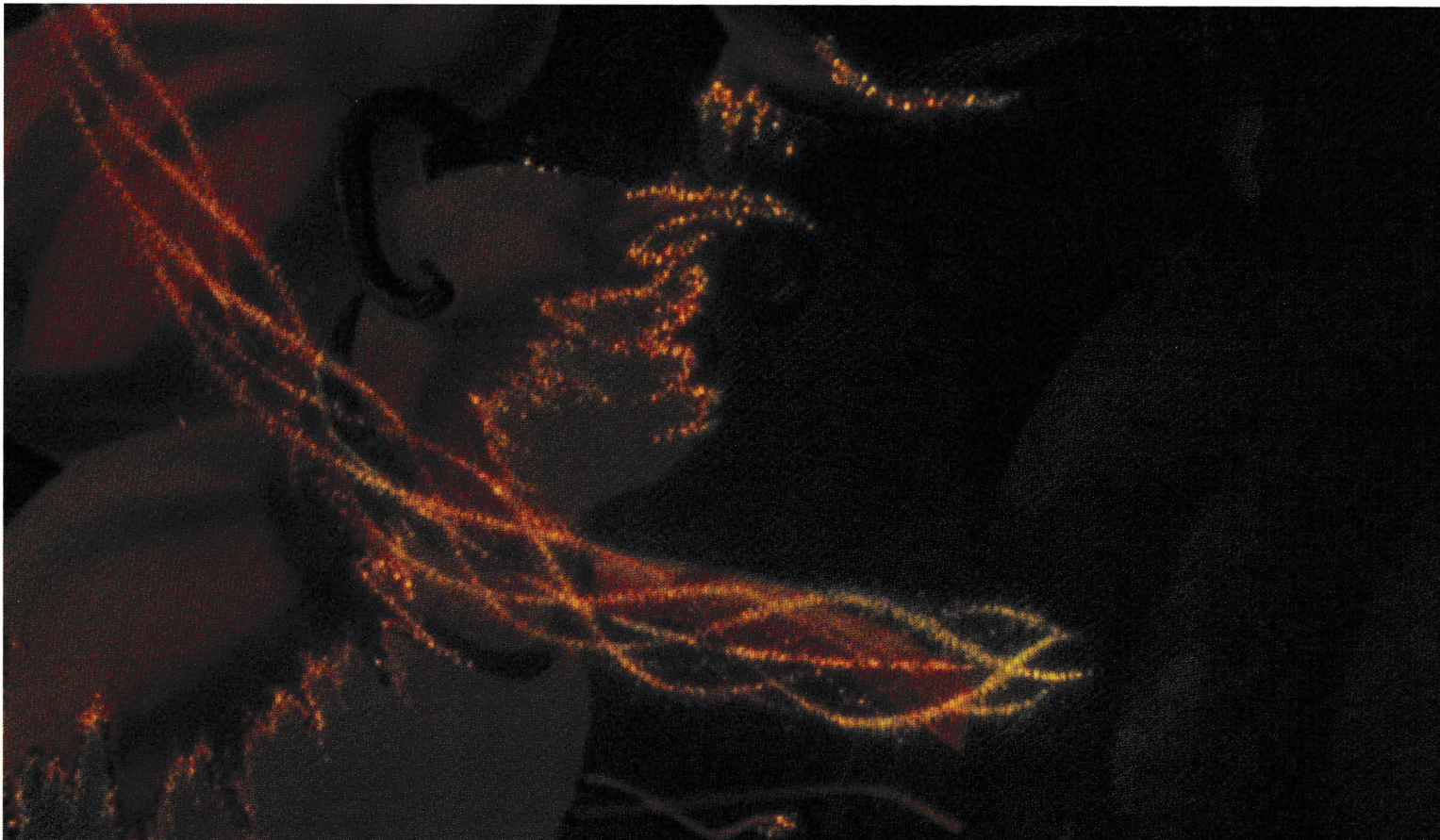
We can approach this in a number of ways. In order for our magic effects to appear massive, we can add a great deal more detail, which can be an effective way of suggesting scale. We can give our animation even more scale by slowing it down a great deal, almost making it slow-motion.

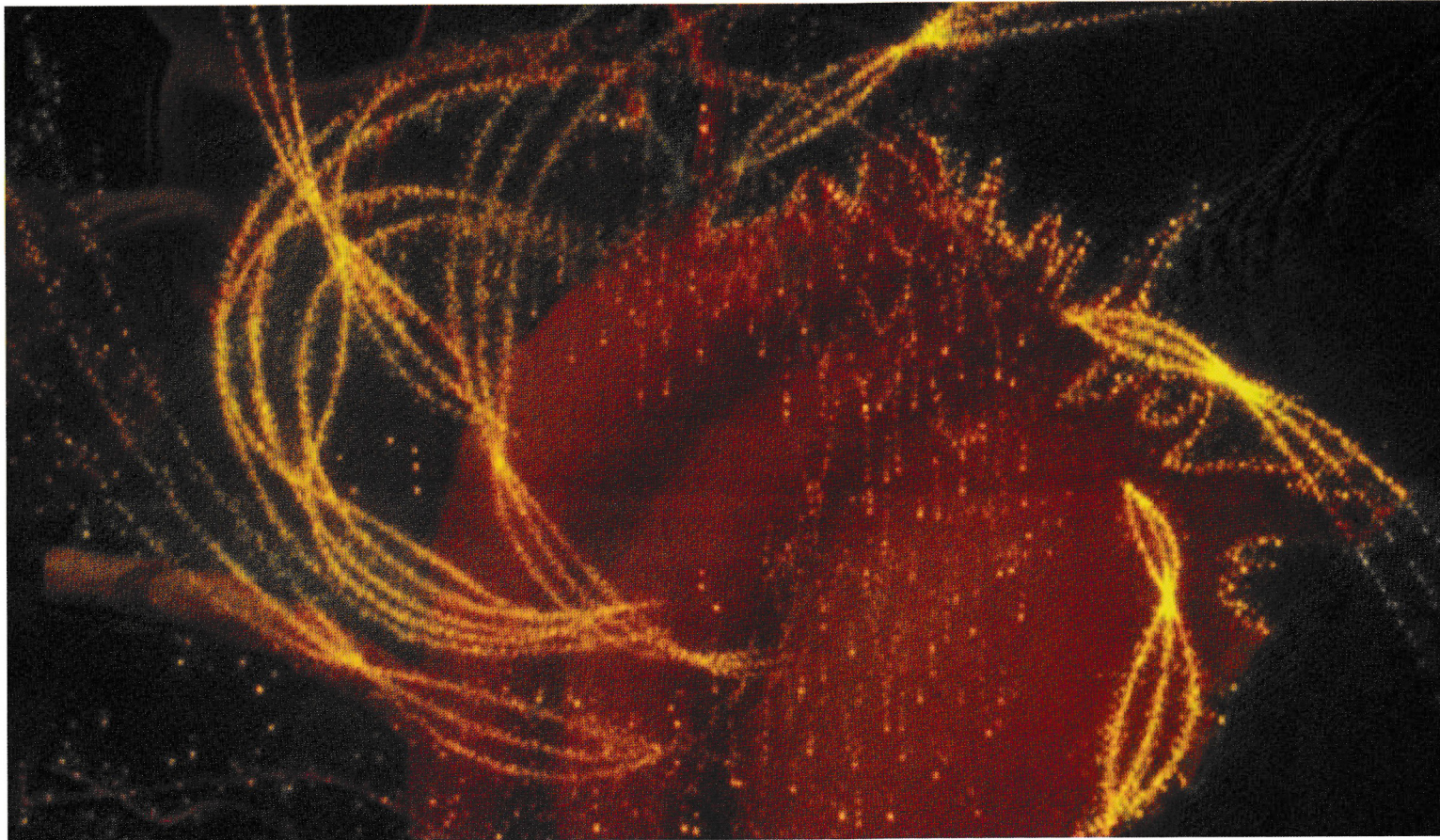
In cases where magic effects are moving in perspective, it is important to really exaggerate our drawings as much as possible, pulling closer effects out toward the viewer, and pushing and pinching into forced perspective the effects which are farther away. Don't forget, we can always push our drawings a little farther!



This pixie-dust sequence is from the Don Bluth film, "Thumbelina" that was released in 1994. As a directing special effects animator, I was given the task of animating a great deal of pixie-dust. At the time, CGI animation was still very much in its infancy, and creating pixie-dust like this using 3D particle emitters, as is frequently done today, was not yet an option. This scene in particular was extremely difficult and painstaking, as it was over 30 seconds long and all of it had to be

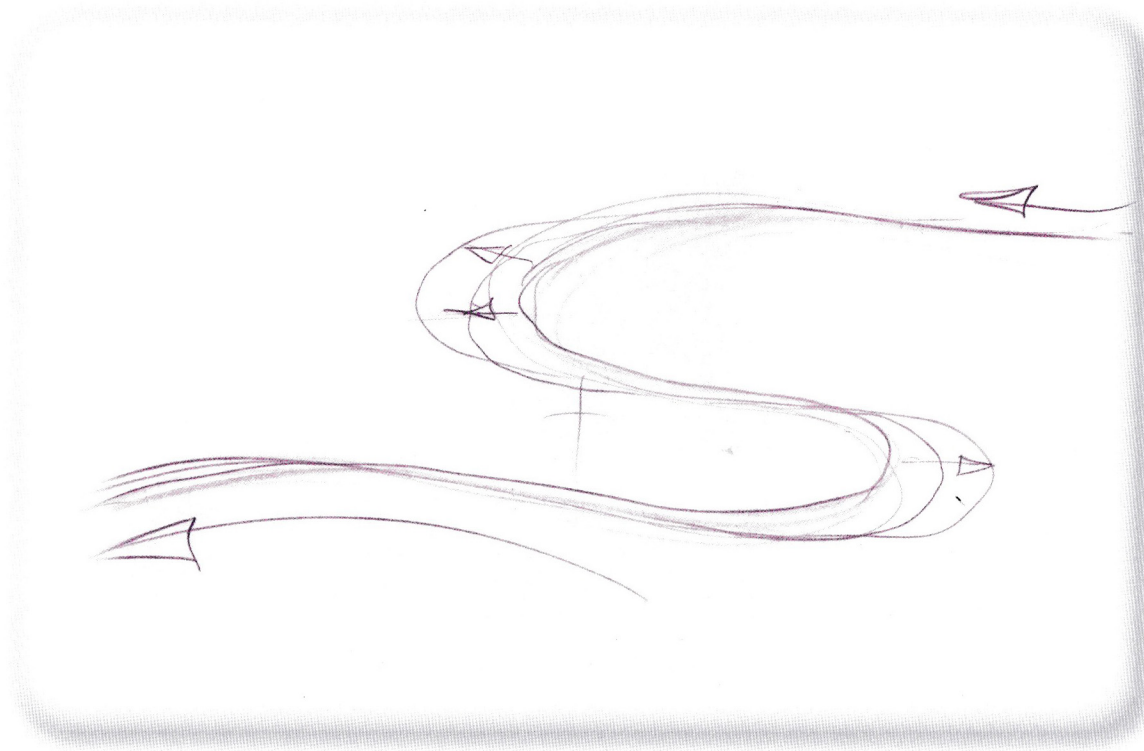
drawn on one's, that is to say, 24 drawing per second, because the artwork was panning and would strobe disturbingly if not done this way. In the last couple of decades I have had the opportunity to work more and more often with computer-generated special effects, and in particular, on pixie-dust. When I was special effects director at the Walt Disney Animation Services department, one of my tasks there was to digitally create pixie-dust that looked exactly like classically animated



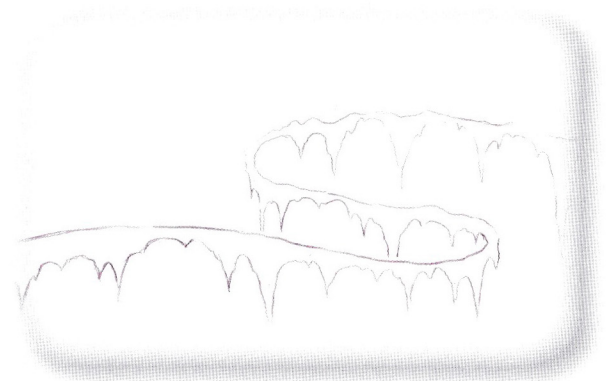
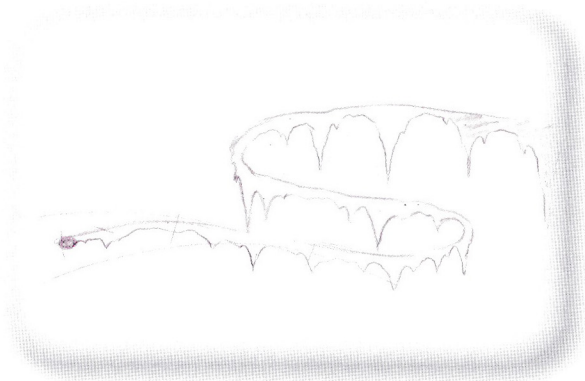
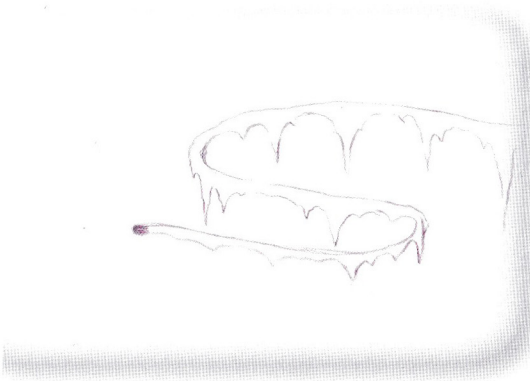
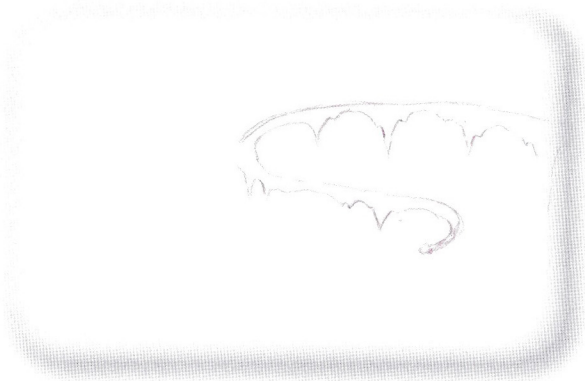
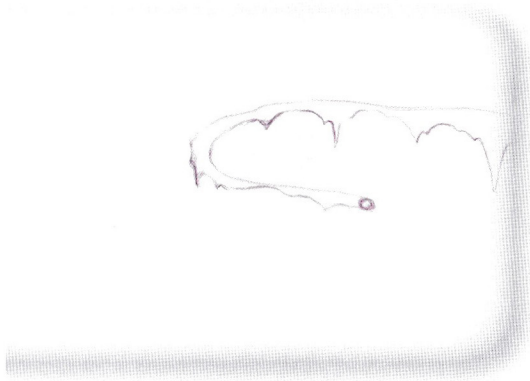


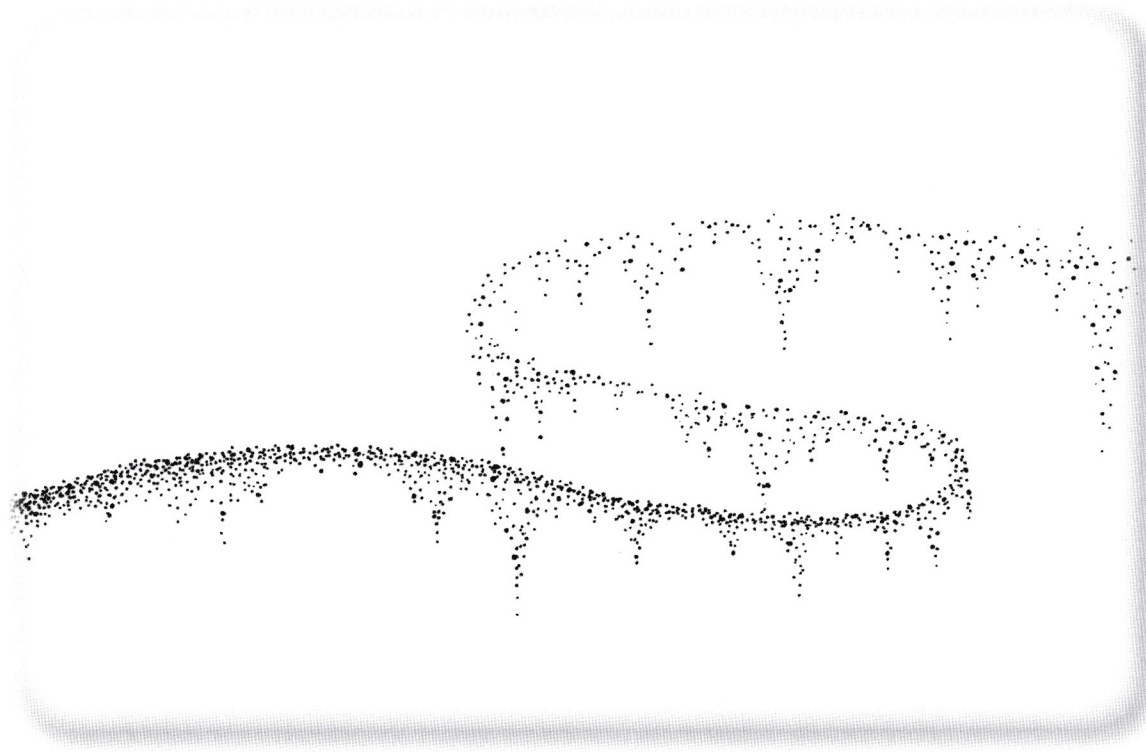
pixie-dust from the Disney classic, “Peter Pan”. What I found out was that to create pixie-dust as complex, variable, and organic—as what is pictured here, was extremely difficult using CGI particles. The difference was that as I was drawing the pixie-dust by hand, I was able to improvise. I split the pixie-dust into several streams, spiraled them around each other, and varied the speeds and behaviors of all the particles intuitively, spontaneously, and at will.

To do this with computer animation, the behavior of every individual particle needs to be described to the computer. This is not impossible, but when we are doing it by hand, it is a split second creative decision, rather than a technical exercise of figuring out precise mathematical coordinates. Fantastic organic-looking effects can be achieved digitally, but tweaking individual particles intuitively, and unpredictably on the fly, is far more easily achieved by hand.



When animating classical pixie-dust, it is best to begin with a very rough path of action—loose and fluid. This drawing will provide the underlying structure of your effect. When you are ready to animate, don't start out by drawing lots of little dots of pixie-dust! As with any and all special effects animation, the looser and more energetic your initial drawings are, the more fluid and dynamic your animation will be. So forget about the details at first, and just animate with as much fluidity as possible.





Once you are satisfied with your rough animation, the difficult task of adding thousands of pixie-dust points begins. However, this need not be as tedious as one might imagine. Keep in mind that a certain amount of randomness will add to the magical, sparkling effect that makes pixie-dust look so fantastic. Only about 10% of the dots you draw actually need to follow through precisely from one drawing to the next, the majority can be very random, as long as they support and follow the basic structure of your animation.

