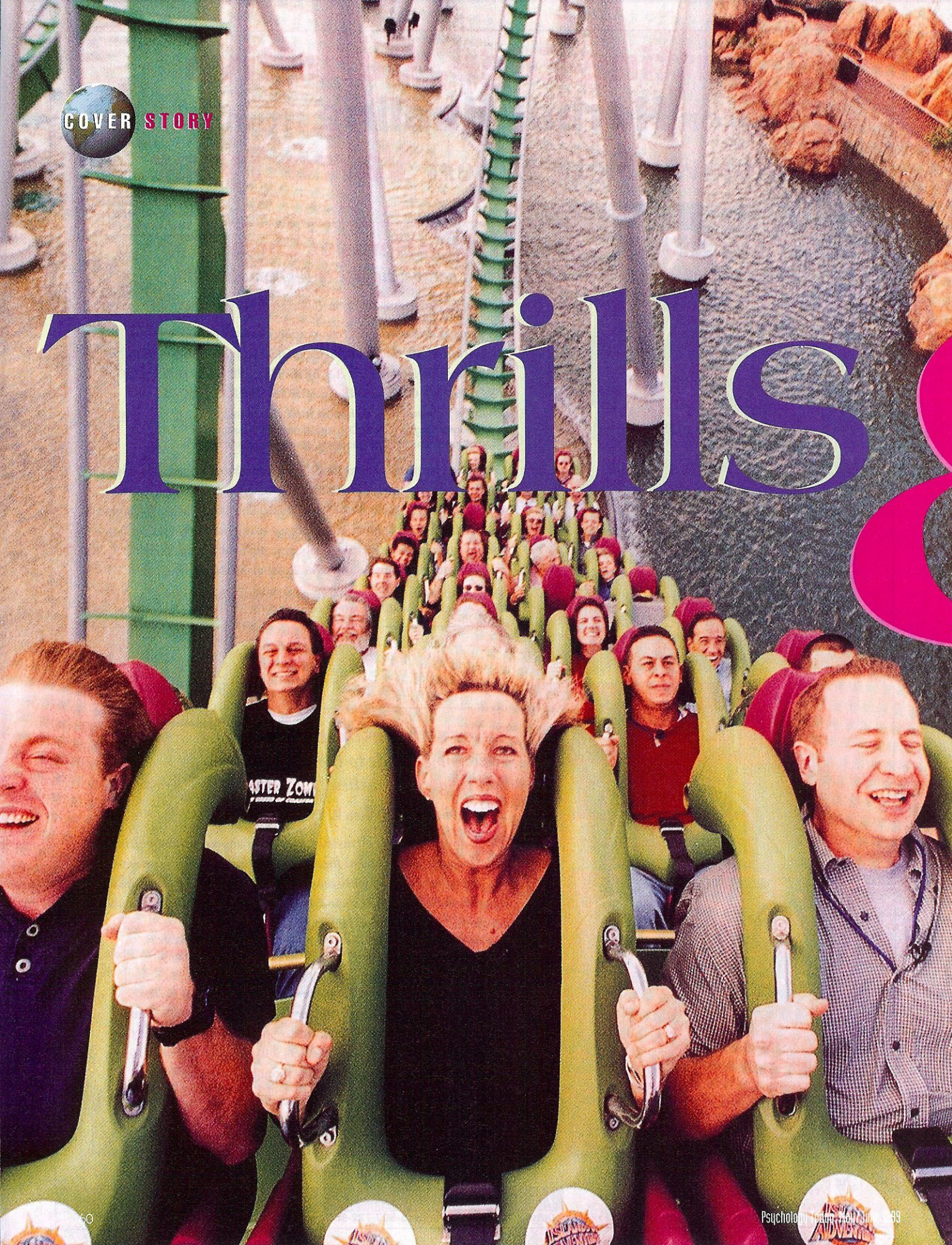
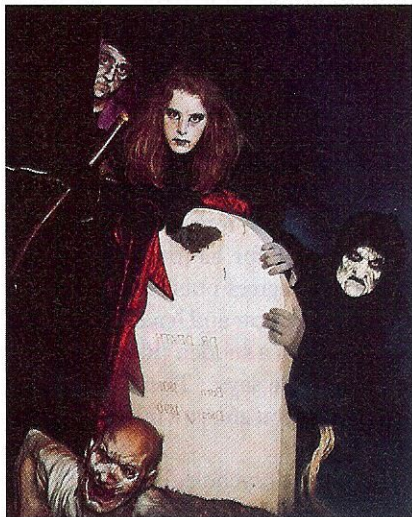


COVER STORY

Thrills





The designers behind amusement parks' most popular attractions—roller coasters and haunted houses—are master manipulators of our deepest fears.

Spinechills

IN ORLANDO, FLORIDA, David Clevinger stands in a back corridor of *Terror on Church Street* and listens expectantly as customers make their way through the haunted house's passages. Suddenly screams erupt, sending Clevinger, the attraction's artistic director and operations manager, into gales of glee. "I love that sound," he chortles. So does Dave Focke. Watching shrieking riders hurtle through the drops of *The Beast*, the massive wooden coaster at Paramount's Kings Island near Cincinnati, Ohio, Focke beams with pride. "Guests come off breathless, hearts pounding, scared out of their wits," exults Focke, the park's vice president of construction and maintenance. "And wanting to get in line to go again!"

By Eric Minton

Call them shock meisters, terror tacticians, spookologists and boo-ologists. The small band of designers who create the roller coasters and haunted houses that are amusement parks' premier attractions are master manipulators of our deepest fears. They get us to walk through pitch black hallways and step into cutaway coaster cars that dangle our arms and legs. They exploit our most closely held vulnerabilities—and make us like it.

For designers, primarily engineers for coasters and theatrical artists for haunted houses, turning fear into fun depends on illusion. No matter how precarious a roller coaster or alarming a haunted house may appear, it must be totally safe. "We always try to make them

LEFT: ©1999 UNIVERSAL STUDIOS ESCAPE; TOP: RICHIE ERIC MINTON

look and feel more dangerous than they really are," says Michael Boodley, president of Great Coasters International, Inc. of Santa Cruz, California.

Though the experience offered by roller coasters and haunted houses diverges dramatically—it's the difference between pushing a wagon over a steep hill versus telling campfire ghost stories—the attractions are constructed of common elements. Both draw on all our senses, both rely on surprise for their shocks and both quote heavily from the movies (coasters replicate action-adventure perils, a la *Indiana Jones* and *Star Wars*, and haunted houses feature quasi-Frankensteins and *Friday the 13th* Jasons).

But the biggest common denominator is that the two feed on the same basic fear: loss of control. Once a coaster takes off, passengers can do nothing but sit or, on some rides stand, and scream. "The closest thing to compare it to is driving with an idiot," observes Boodley. Lynton Harris, director of *Madison Scare Garden*, an annual fright fest in New York City, also uses an auto analogy for haunted houses. "It's a hundred degrees outside, and you'd expect to get in a car and have air conditioning, and all of a sudden the heater gets turned on," he says. "Then the doors lock. Cocky as you are, you realize you're not in charge."

With roller coasters, the psychological games start before customers even get

into the train. Boodley purposely makes his wooden coasters as diabolical looking as possible. "It's kind of like a black widow spider web," he explains. "It's a very, very pretty thing, but when the black widow gets you..." Queueing customers at *Outer Limits: Flights of Fear*, one of 12 coasters at Kings Island, are treated to dim lights, alien noises and a video of a space station in the grip of a mysterious force. "Even after having ridden that ride probably close to a hundred times, I sit there anticipating the start, and my palms still sweat," says *Outer Limits* designer Jim Seay, president of Premier Rides of Millersville, Maryland.

Whether the traditional chain-driven wooden or steel clackers or the newer

WHENEVER I'VE BEEN FACED WITH RIDING A ROLLER COASTER, I'VE recalled the mythic Sirens' singing. I remember all too well that sailors lured by the beauty of the voices ended up crashing and perishing on the rocks.

My fear of roller coasters has been deeply ingrained. I suffer from acrophobia, which makes me certain I'll spill onto the ground a mile below, and a personal height (6-foot-2-inches) that makes me feel I have to scrunch down to avoid being scalped by girders. As if that isn't enough, I also suffer from motion sickness. Ironically, I'm a journalist who derives his living from writing about amusement parks, and I'm well aware of how safe these contraptions are (triple-redundancy security systems!). Still, I know that my ride will be the one time *all* the safety systems fail.

I'm not alone in that feeling, of course—and that concerns amusement parks who see dollars dribbling away. Now they're doing something about it. Universal Studios recently enlisted two psychologists, Brian Newmark and Michael Otto, to come up with a plan to help frightened riders at its new Orlando, Florida, theme park, Islands of Adventure. The park's biggest attractions are two next-generation coasters: *Dueling Dragons*, which sends two inverted trains on intertwining courses resembling the flight paths of the Navy's Blue Angels, and *The Incredible Hulk*, which catapults cars through a kelly green track that looks like gift-wrap ribbon gone berserk.

The psychologists' solution: the Coasterphobia Stress Management Program. As a diagnosis, the term "coasterphobia" is suspect, says Otto, Ph.D., director of the cogni-

tive-behavior therapy program at Massachusetts General Hospital and an associate professor at Harvard Medical School. "A 'phobia' demands you have a serious life interference," he explains. "You can go through your whole life and not ride roller coasters and be perfectly fine." But to those who fear the pretzelated structures, life is often less enjoyable. In screening participants for the course's test run, "coasterphobics" reported that their trepidations kept them from fully participating in social outings to amusement parks, and parents felt that it hindered their performance as mothers and fathers.

Fifteen coasterphobics were in the first class; I was one of them. The goal: to learn techniques that we could use before and during the ride to overcome the strain. "It's not about convincing people to get on the ride," stresses Newmark, Ph.D., a clinical psychologist in Wayland, Massachusetts. "It's about reducing anxiety."

Newmark and Otto began by explaining to us how the mind and body naturally respond to a coaster's speed and G forces, sensations coaster fans channel into a thrill but the rest of us believe is real danger. We had to learn to not listen to our instincts, said the pair. "Why do we tighten our hold on the harness handles if we're sure the coaster car is going to fly off the track?" asked Newmark. "Do we think we can really pilot the car to a safe landing by gripping harder?" I listened closely to their teachings to approach the ride as fun. Engineers design these rides to thrill us, we were told, and if we sit back and let their genius unfold, we'll enjoy the experience.

Beating Coasterphobia

linear induction motor (LIM) rides that harness electromagnetic force to blast off trains, all roller coasters play on two related—and universal—terrors: fear of heights and fear of falling. “The loops and elements, they come and go, but the coaster always has to have the big drop,” says Focke of Kings Island.

Traditional coasters provide an excruciatingly slow buildup to the plunge. “There’s a lot of self-abuse on that chain lift,” says Boodley. “Your own mind puts you in a state of paralysis.” (Wooden coasters also creak, rumble and clickity-clack naturally as they flex, but riders get a queasy feeling that the structure is about to collapse. “That’s probably one of the funniest things we as designers

get to appreciate,” says Boodley.) LIMs, on the other hand, rocket you into terror with trains that go from 0 to 60 mph in under four seconds. The big drops are actually shorter on LIMs, but the sense of speed sets hearts pounding.

Most coasters travel below 70 miles an hour, slower than many people drive, but designers heighten the sense of speed and danger with close flybys of terrain, buildings, people, even other trains. At Busch Gardens Tampa Bay, *Montu* dives riders into five trenches, one of which emerges through the patio of an ersatz Egyptian temple. “Not knowing exactly where the bottom is or where you come out is important,” says Mark Rose, the park’s vice president of

design and engineering. “If you could see the whole thing, then you could kind of play it out in your mind.” Some coasters, like *Outer Limits* and Disney World’s *Space Mountain*, intensify the fear and suspense by keeping passengers in the dark for the entire ride.

Upping the vulnerability quotient even further is a recent innovation: inverted coasters which suspend riders below the track and carve away as much of the train as possible. “There is less fiberglass, less coach around you, so your feet are just hanging out there,” notes Rose. During one stretch of track on *Montu*, passengers’ soles skim just 24 inches above the ground. Riders also get dangled over a pit of live Nile crocodiles.



During training, would-be riders scream as loud as they can in order to release some of their tension. Yelling while on board a coaster has another benefit: it forces paralyzed riders to breathe.



Coasterphobic Renée Berkowitz grabs psychologist Michael Otto’s hands after her first trip on *The Hulk*. Fearful patrons can take advantage of a special “calming zone,” where they can talk about their fears with a trained park staffer, do relaxation exercises and mentally rehearse the ride.

Then we trained. We tensed and untensed muscles to learn to relax. We did breathing exercises. We circled our heads to induce dizziness. We rocked back and forth in our chairs to simulate a coaster’s motion. Then we circled our heads while rocking. We screamed, which Otto pointed out not only forces you to breathe on the coaster but is part of the ride’s fun. We watched a passenger perspective video of *The Incredible Hulk*, rocking as we did so. At this point the hitherto-willing participants started swallowing hard. Eyes grew wide and wary, and when Otto turned the video’s sound on, one woman tensed up so much she forgot to rock.

Next came our graduation exercise: riding *The Incredible Hulk*. I settled into my seat, the harness lowered over my shoulders and mechanically locked into place. Have fun, I reminded myself, and instead of feeling trapped or worrying that you’re among the first people to ride this coaster (guinea pig? sufficiently tested?), just let the adventure happen. With the catapult up that first lift, I began a yelled-out running commentary that continued through the ride’s sudden rotating twists and countless loops, corkscrews and dives, all the way back to the station. Sure it was gibberish, but normally I ride coasters with clenched teeth.

To the psychologists’ surprise, all 15 of us coasterphobics rode *The Hulk* not once, but twice. Several even took a third turn, and one couple hit the track five times. As for me, on both my trips I arrived back at the station with a happy heart but a queasy stomach. Motion sickness isn’t imaginary, sad to say, and just writing this brings back that woozy feeling. Nevertheless, I no longer regard coasters with apprehension. I’m even ready to take on *Dueling Dragons*, which looks even more diabolical than *The Hulk*. Maybe I’ll get a little ill from the motion, but now I can handle the emotion.—E.M.

TO CONSUMERS, ROLLER COASTERS AND HAUNTED HOUSES ARE fright fests. To the proprietors, they're a business, and however much designers delight in their craft, they ultimately must make sure the attraction turns a profit. Many haunted houses are stand-alone attractions and get their income from direct ticket sales. Some houses—as well as virtually all coasters—are included in the single-price admission at most amusement parks. In that case, whether or not the customer rides a coaster or visits a haunted house has no direct impact on that day's income. A dazzling attraction, however, drives up the season's gate by creating good word-of-mouth publicity that entices new customers to come and try it out. It also draws repeat customers who want to relive the thrills and chills.

Quality, therefore, counts. "We have found through experience that some coasters are so rough people will ride them once and not want to get back on," says Mark Rose, vice president of design and engineering for Busch Gardens Tampa Bay. "We want to have a ride that's smooth and comfortable. Our experience here is when it's done right, people do it 10 times a day." The park has set two parameters for its major coasters: to reach a maximum of 3.85 vertical G's (the gravitational force that pushes riders back into their seats) and a maximum of 0.5 lateral G's (the side-to-side force). Keeping the lateral forces to a half G makes the ride smooth, and engineers further assure the effect by adjusting the track's tilt by millimeters.

Length of ride is another issue. The laws of physics determine that coaster trains can only go so far powered by gravity (and after their initial blastoff, Linear Induction Motor coasters rely on gravity to complete the course), so no matter how tall the track, rides can only last about one minute from the first drop to last brake. This can be lengthened by extending the time to the first drop or after the last brake, though doing the latter tends to dilute the ride's overall thrill. *The Beast* at Paramount's Kings Island uses two lifts to double the length of the average ride to just under five minutes.

Designers must weigh three factors in determining a ride's length. Customers who have queued for up to an hour want to get their wait's worth. Second, a person can tolerate only so much fright time. "The one thing that gets people on is they know there's a limit to how long it lasts," says Michael Boodley, president of Great Coasters International, Inc. "It's like they have this threshold to a fear that they normally wouldn't want to experience, but because they know there's an end in sight they're willing to go for it."

A coaster's effects, though, are not all illusory. Passengers pull close to 4 positive G's on some plummets. They turn upside down on loops and rotate head over heels through corkscrews. They lit-

Scaring Up Business

erally feel the wind in their hair and, on a LIM coaster launch, the air in their eyes. Human bodies don't commonly experience such acrobatic maneuvers, and that in itself is psychologically dis-

Finally, operators want to move as many customers as quickly as possible through the ride. That not only shortens patrons' wait, keeping tempers in check, it also gets them—and their wallets—circulating in the park. People standing in line can't spend money on souvenirs or food. To maximize the flow, some larger coasters, like *The Beast*, stagger runs by two trains.

"Throughput" is also essential to a haunted house's economic success; the faster groups exit, the faster more paying customers can enter. As much as designers love to see terrified guests fall on the floor, they know such halts cut into an attraction's bottom line. For designers, the trick is to keep guests moving without making them feel rushed. To do this, the theatrical wizards often employ the "scare-forward" precept: startling groups from the rear or sides sends them plunging ahead rather than drawing back. A frontal strike, on the other hand, will cause a person to veer left or right—perfect for when the exit lies laterally. To vary patrons' pace, designers use light (people naturally move faster when visibility is good) or darkness (they slow down). Similarly, curtains will retard movement; people approach them hesitatingly.

Edward Marks, president of Jets Productions, Inc., says he first used drapes as a barrier for light, sound and smoke between scenes, but in high-flow houses he removes them altogether.

No topic is totally off limits for a haunted house, but regional differences and local demographics may temper presentations. Religious matter is generally taboo in all American haunts. "I'm lucky I have a cross in the cemetery," says David Clevinger, artistic director and operations manager of *Terror on Church Street* in Orlando, Florida. Topical subjects can strike too close a chord, too. "We wouldn't have a locker room with a dead kid on the ground and another one holding a gun," notes Marks, referring to the recent spate of school shootings. "That's real, not escapism." To make sure people know a fright is staged, Marks sometimes goes over the top in his presentations. For example, if he does a car wreck, he'll put zombies in the seats.

Another no-no is touching the customer. Squirting or dripping warm water on a guest is acceptable, and people bump into hanging corpses in *Terror on Church Street's* morgue, but actors are uniformly coached that no matter how close they want to get to a customer, they cannot make physical contact. Nor can the fake cleaver or bladeless chainsaw they sometimes wield. You can scare people witless, stress designers, you just can't mess with their safety. —E. M.

orienting. "Anytime you put a rider in a situation they're not used to, there's an element of the unknown," declares Boodley. "And for 80% of people, fear is the unknown."

The biggest unknown of all is death, and creators of haunted houses are masters at exploiting our fear of dying, especially in a gruesome manner. To unnerve guests, designers depend on two elements. The first is setting a spooky mood with sights, sounds, smells and “feels”—“all the things that make you uneasy,” says Drew Edward Hunter, co-chairman of the International Association of Haunted Attractions and design director of haunted attractions at Sally Corporation of Jacksonville, Florida. “Then you have the second part, the attack, the out-and-out scare. I don’t think you can have one without the other.”

For the “creep-out” effect, haunts are always dark; skeletons, skulls, fog, ticking clocks and screaming ghouls abound. “On my sets, I try to capture a claustrophobic feeling,” says *Terror on Church Street’s* Clevinger. “I bring my ceilings low, the walls close.” To further emphasize the sense of enclosure, he hangs tree branches, Spanish moss, rags and spider webs.

Just the suggestion of something loathsome will give customers the screaming meemies. “Do the sounds of insects, and people scratch their heads all the way through,” says John Denley, president and owner of Boneyard Productions of Salem, Massachusetts. Run a soundtrack that whispers of rats, turn on ankle-aimed air hoses and professional football players tap dance. A strong whiff of formaldehyde and you have the scent of death, “no matter what country you’re in,” says Clevinger.

The second part of the equation is the scare, which, say spookologists, is really a “startle.” “All scares are primarily based on two things,” instructs Edward Marks, president of Jets Productions of Chatsworth, California. “One, it’s there and does something you don’t expect it to do, or two, it’s not there and it appears.”

In *Terror on Church Street*, customers come upon Hannibal Lecter, the cannibal psychiatrist of *Silence of the Lambs*. He yells and lunges against his cell’s bars, drawing yelps from viewers. The cries



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quickly subside into nervous tittering. As guests make their way around the bars, Lecter follows along inside. Then, just when viewers feel safest, Lecter opens the cage door and steps out. “The guys who were taunting him usually scream the loudest,” observes Clevinger.

In the second type of gag, designers have people or objects suddenly emerge from in front, beside, above or below patrons. A surefire gag—and the simplest of all—is dropping a spider on a person’s head. “We call that a \$2

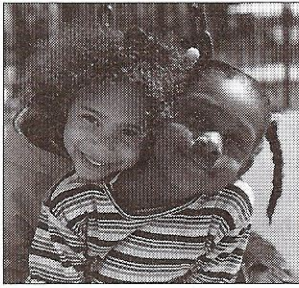
scare,” says Harris of *Madison Scare Garden*. “It’s the best value-for-money scare we’ve ever used.”

Another never-fail gotcha goes by the generic term “UV Dot Man.” Guests enter a dark room with ultraviolet dots on the wall (variations would be skeletons or geometric patterns). A black-masked actor wearing a black bodysuit, likewise bearing UV dots, stands against the wall and jumps out. “You are actually looking at him before he leaps out at you,” Marks says. “It works every time, and it’s so simple.” (Another certain scare that designers hate, but feel compelled to use, is the hockey-masked goon waving a whirring chainsaw. Customers complain if a haunted house doesn’t have one.)

For designers, combining the two types of gags may be the most satisfying scare of all. In his favorite trick, Denley once draped sheets over padding, topped them with masked and wigged heads, and attached the forms to the caging on oscillating fans. He plugged the fans into a power strip, but left the cords clearly visible. These “monsters” started moving in unison when people entered the room. After the initial surprise, guests noticed the power strip and began mocking the amateurish set up. Suddenly, the middle white-sheeted monster—actually a man with one of the plugged-in extension cords tied to his leg—leaped out.

“It was hilarious,” recalls a chuckling Denley, who is also known as Professor Nightmare. “We had a woman hyperventilate. We had people wet themselves. They thought they knew the gag—and, bam! we hit them with something totally different.” Guests losing control of their bladders is considered a badge of honor among haunt producers. “We call it yellow control,” Clevinger says. Getting an entire group to cower on the ground is another measure of success.

While the live actors who sometimes assume roles in haunted productions are forbidden to touch patrons, they are encouraged to invade their personal space. “Everybody’s got this wonderful circle around them,” says Denley, who



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Thrills & Chills

likes to have actors suddenly appear as close to a person as possible, then disappear. "We want to leave you thinking, 'What was that?'"

Designers also like to pick their victims. "We call it 'slicing the group,'" says Marks at Jets Productions. "We actually can single out a person from 20 people. A guy and girl clinging together—I can slice them apart with the right scare." A trained actor watches their body language, whether they tighten up, stare him down, or avert their eyes.

Male customers are a favorite target. "We try to take the guys who are hecklers and make examples of them," observes Denley. "If you nail them, the rest of the group will follow." Men also pose a special challenge. "Guys are harder to read than women," Denley explains. "They don't do body language as much. Women are more animated, more intent on being scared. Guys play it cool." Designers usually get them with strikes



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from above or below, but they're careful. Men sometimes lash out with their fists.

"The scariest things come from your mind," sums up Edward Hunter. "With the right setup, the right imagination, the right story, your mind creates things we couldn't possibly show you." "No matter how good the makeup or

the costume, nothing is more effective than your imagination," echoes Denley. One proof: guests at *Terror on Church Street* scream loud and long when, at a particular point, they catch a glimpse of lurking monsters. The fiends: themselves, reflected in strategically placed mirrors. ■