AND THEN YOU'RE DEAD



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AND THEN YOU'RE DEAD

A SCIENTIFIC EXPLORATION OF THE WORLD'S MOST INTERESTING WAYS TO DIE

CODY CASSIDY & PAUL DOHERTY

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Cody:
To Mom and Dad

Paul:
To Professor Paul Tipler,
who showed me how to inspire students
to learn science by making it interesting,
relevant, fun, and correct



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Introduction

Be honest. When you are reading a random obituary do you sometimes find yourself skipping to the bottom, searching for the cause of death, only to be frustrated by the lack of an explanation or a maddeningly vague "death by fluke accident"? Did the poor sap freeze while ice swimming? Was he squished by an asteroid or was he swallowed by a whale? Sometimes they won't even tell you!

And when they do reveal a cause of death—say the obituary provides a tantalizing detail like "tragically killed by an oversize magnet"—the story quickly moves on to next of kin while you're left wondering if magnetism even *can* be lethal. They are skipping the most interesting part!

We understand your frustration, so we set out to resolve it. We pick up where even the most elucidating obituary leaves off.

We tell you what *really* happens when you jump into space wearing only shorts and a T-shirt. We explain why Boeing

doesn't let you roll your window down on the 747, and we explore the problems with swimming in the deepest part of the ocean with as much science and gruesome detail as your stomach will allow.

In other words: Stephen King meets Stephen Hawking.

The upside in wading through all this gruesomeness is you may accidentally learn some science, a bit of medicine, and what to do if a shark begins circling you (encourage him to eat your entire leg—not just a chunk).

How did we get our answers?

When we could we used the experiences (or autopsies) of daredevils (or the unlucky) to figure out what actually happens when you go over Niagara Falls in a barrel, stick your hand in a particle accelerator, or get stung in the testicle.

For some of the scenarios there weren't firsthand accounts. So far nobody has actually jumped into a black hole, taken a bath in the world's coldest tub, or dug a hole to China and leapt into it.

To get answers to these questions we used military studies (thank you, 1950s-era U.S. Air Force, for subjecting real people to life-threatening experiments), medical journals, astrophysicists' hypotheses, and the research of professors curious about the slipperiness of banana peels.

Sometimes our answers took us to the edge of human knowledge. If this book were written just twenty years ago we would have sworn that, at least in this universe, you could not die from an oversize kitchen magnet. Fortunately, we didn't write it back then because you absolutely can and it's glorious.

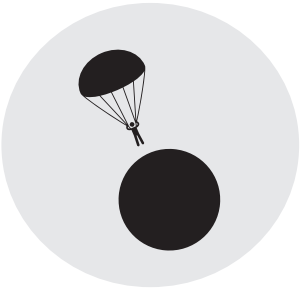
Because we were often reaching the frontiers of science in

search of gruesome deaths, we also relied on speculation—the most science-based, as-accurate-as-we-think-anyone-could-get speculation. But it's still speculation.

Meaning if you try one of these scenarios, say, if you skydive from the space station, swan dive into a black hole, or leap into a volcano, and your experience does not mimic what we have described or, worst of all, you don't even die, we sincerely apologize.

Send us a note and we will amend our second edition.

And Then You're Dead





What Would Happen If . . .
You Were in an Airplane and Your Window Popped Out?

Like most people who have traveled in a modern airplane, you have probably spent a good bit of time staring out the window at the lovely clouds, sunsets, and beautiful views. And, like most people, you have probably wondered, what happens if this thing pops out?

The answer depends on your altitude. If you were within the first few minutes of flight and still under 20,000 feet, you would probably be okay. You could still breathe for a half hour before you passed out at that altitude, and the pressure difference wouldn't be great enough to suck you out. It would be a little chilly, but as long as you're wearing a sweatshirt you should be fine.

It would also be noisy. The wind blowing past your open window would turn the plane into the world's largest flute, so getting the attention of a flight attendant would be a problem.

All in all, though, not bad, and a lot better than if the window popped out at a cruising altitude of 35,000 feet.

The air inside a plane's cabin is pressurized to around 7,000 feet because of the whole breathing thing. If you're at 35,000 feet and the window pops out, the plane rapidly depressurizes, and that leads to some issues.

The first thing you would notice is all the air getting sucked out of every orifice in your body. And because it's humid air, it would condense and come out as a fog. That would happen to everybody, so the entire plane would be a thick fog of everyone's body air. Gross.

Fortunately that would clear up in a few seconds, because the air in the plane is getting sucked out of the open window. Unfortunately, it's not a neighbor's window, it's yours, and that makes a big difference.

If you were sitting just two seats away from the missing window, the wind would be rushing out of the plane with hurricane speed, but that's still slow enough that if you were wearing a seat belt you would be held fast. Unfortunately, you chose the window seat, where the air would rush out at 300 miles per hour—fast enough to pull you up and out of your seat even if you're strapped in. (One of the less-mentioned cons of choosing the window over the aisle.)*

Another reason your friend in the aisle seat would be saved is because airplane windows are smaller in diameter

*Why do a few feet make such a difference? Picture it this way: When you plug up your bathtub, the power of the water sucking the plug into place gets exponentially greater the closer it gets. Same thing when it comes to airplane windows, and you're the plug.

than your shoulders. According to research by Harvard University on the human body, the average American has 18-inch-wide shoulders, and the Boeing 747 aircraft's windows are only 15.3 inches tall—so you would not be sucked all the way out of the plane, just partway.* That's good for everyone in the plane. It would save you from a long fall, for one, and for everyone else your body would serve as a decent plug. It would slow down the air's escape from the plane and give people more time to put on their oxygen masks.

Your troubles, on the other hand, would only be beginning.

The first thing you might notice about your new environment would be the wind. The 600-miles-per-hour gale blasting you in the face would push you against the aircraft, wrapping you in a J-shaped figure around the side of the plane.†

The second thing you would notice would be the cold. The temperature at 35,000 feet is 65 degrees below zero. In that chill your nose would become frostbitten within a few seconds.

The third issue is not something you would notice but is probably the most life-threatening. In addition to the abrupt drop in temperature, there would be a more serious change in air pressure. At 35,000 feet the air is so thin you wouldn't get enough oxygen molecules per breath to survive, only you would not know you were suffocating. Your body cannot

*This is where real life differs from the James Bond movie *Goldfinger*. Goldfinger would not have been sucked out of the window; he just would have been stuffed into it.
†Instead of being pressed into the plane, you would bang against it because of something called reverberation dynamics, which is the same principle that explains a flag flapping in the wind instead of being held in one position. Even if it seems like the wind is constant, it isn't, and the flag is in a perpetual state of change and adjustment. Your changes and adjustments would be your face slamming against the aircraft repeatedly.

detect when there's too little oxygen; the only thing that gives you that running-out-of-breath feeling is too much carbon dioxide in your blood. So you would keep breathing like everything was fine, but it wouldn't be. You would have less than fifteen seconds of consciousness before you passed out—and four minutes before brain death.

That goes for people inside the plane as well. As soon as your window popped out they would have fifteen seconds to put on their masks before they passed out—maybe a bit more if your upper body formed a good seal on the window—and really only eight seconds before their brains became so oxygen starved they would be too confused to put on their masks.*

So to recap, you would be halfway out of the airplane, your face would be slamming against the side of the plane, you would have frostbite, and you would be on your way to unconsciousness. But you wouldn't be dead yet and, surprisingly, if the pilot acted quickly and got down below 20,000 feet within four minutes, you might survive the experience. We know this because it's happened.

Captain Tim Lancaster was climbing past 20,000 feet in his British Airways flight in 1990 when the front windscreen popped off. He was immediately sucked out of his seat belt and out the window. Everything loose in the cockpit flew out and the flight door jammed into the controls, sending the plane into a steep dive. Nigel Ogden, a flight attendant who happened to

*This happened on professional golfer Payne Stewart's private jet in 1999. His plane decompressed at 30,000 feet and the pilots weren't able to put their masks on in time. Because the plane was on autopilot when it depressurized, it continued flying for 1,500 miles before it ran out of fuel and crashed in South Dakota.

be in the cockpit, managed to grab the pilot on his way out and reported the following to the *Sydney Morning Herald*:

> Everything was being sucked out of the aircraft: even an oxygen bottle that had been bolted down went flying and nearly knocked my head off. I was holding on for grim death but I could feel myself being sucked out, too. John rushed in behind me and saw me disappearing, so he grabbed my trouser belt to stop me slipping further, then wrapped the captain's shoulder strap around me . . .
>
> I thought I was going to lose him, but he ended up bent in a U-shape around the windows. His face was banging against the window with blood coming out of his nose . . . and his arms were flailing.

Eighteen minutes after losing the windscreen the copilot managed to land the aircraft, with his pilot staring at him from the other side of the window the entire time.

Somehow, after firefighters managed to extract the pilot from his awkward position, he survived with only frostbite and a few broken ribs.

Because of the smaller window, you may not need to rely on heroics from your fellow passengers—with just quick action from your pilot, you could enjoy an uncomfortable but scenic trip down.



What Would Happen If . . .
You Were Attacked by a Great White Shark?

Like all predators, sharks are not interested in fair fights. Even for the winners, fair fights lead to injuries, and injuries mean a slow and hungry animal. So predators prefer devastating blowouts with as little risk as possible, which makes you the perfect opponent: You're slow, weak, and completely oblivious in the water. Fortunately, you don't taste very good. You're the squirrel of the ocean, too much bone and not enough fat. Still, sharks are curious creatures and attacks happen—usually from the smaller species that aren't as dangerous.

But not always. Big sharks *can* attack. The great white can grow to twenty feet, and even its exploratory nibbles are devastating. Why might the shark go for a bite?

It probably would not be for food. Researchers have stitched shark victims back together and discovered not a single morsel

missing. When great white sharks bite a human, they are like children scrambling peas on their plate. Careful reconstruction reveals nary a pea eaten. We must taste so terrible to sharks that, frankly, we should be a little insulted.

So if we taste so horrible, why bite us at all? One popular explanation is that it's a case of mistaken identity. The theory goes that sharks mistake human swimmers for normal seal prey and take a bite, only then realizing their error and spitting the person out like a diner mistaking the salt for the sugar. It is plausible, but there is little science to back up this theory. There are visual similarities between a surfer and a seal from a shark's point of view, but that does not explain important differences in the way a shark attacks a swimmer versus the way it strikes a seal.

Researchers placed dummies in chummed water to observe the way sharks approached them. Unlike seal attacks, in which the shark comes from below and hits the animal with one devastating surprise attack, the sharks swam in circles around the dummies—checking them out with multiple passes before striking. The nature of the bite was also a more exploratory, open-bite slash as opposed to the full-gusto chomping bite a shark uses with a seal—like the difference in how you approach a carton of fresh milk as opposed to one close to its expiration date.

So far the evidence suggests that it is not confusion at work when a great white shark attacks, but mere curiosity. Sharks can sense movement by detecting small changes in water pressure, and swimmers are moving, particularly if they have just spotted a fin. This motion can pique a great

white's interest, and sharks seem to operate under a "when in doubt, bite it" policy.*

Incidentally, this is common behavior for many predators—if you have a cat you may have seen this explore-the-world-via-biting behavior. But exploratory biting by sharks significantly differs from your cat's. There aren't any reliable measurements of exactly how strong a great white's bite is, but the few experiments that have been done all come to the same general conclusion: It's strong enough. In at least one instance a great white bit a man in half as clean as any guillotine.

So let's say you're splashing about in the waves and, unbeknownst to you, you attract the attention of a curious great white.

First of all, you would have every right to be upset. Not because you could be slashed to death in a moment, but because the odds of this happening are *infinitesimal*. If you're headed for a day at the beach, you're ten times more likely to fall down your stairs and die on your way to your car. Once you get in your car you're way more likely to die in an accident driving to the beach, and once you get to the beach you're far more likely to die in a collapsing sand pit on your way to the

*It's important to note that we're talking about great white sharks here—which kill the most people but don't appear to do it out of hunger. Another breed of shark, called the oceanic whitetip, has intentionally killed and eaten humans. However, attacks from whitetips are uncommon (usually survivors of shipwrecks) because they frequent open ocean, far away from people, whereas great whites often patrol beaches.

The most famous oceanic whitetip attack occurred in 1945 just before Japan's surrender when a navy ship, the USS *Indianapolis*, was torpedoed near the Philippines. Nine hundred men hit the water alive, but because of a miscommunication they weren't rescued for four days. Oceanic whitetip sharks, attracted to all the commotion, began feeding on the sailors. By the time the survivors were rescued, the sharks had killed and eaten as many as 150 men.

water. And even if you avoid those sand pits and make it to the waves, you face the greatest threat of all: drowning. Once you hit the waves, you're a hundred times more likely to drown than die from a shark attack.

But let's say you're lucky and dodge all these bullets. And then you get really unlucky and a great white decides to go for a nibble.

Sharks like to attack from below and behind, so you would probably be struck in the legs. They also have bad table manners: They don't chew. They tear and rip by thrashing their heads from side to side and rolling their bodies. From spiral teeth markings on bone we can see that sharks like to saw flesh off and then swallow it whole.

The good news is that 70 percent of attacks are one bite only. The bad news is that a single bite and rip from a great white shark is more than enough to remove your leg. However, that can actually work *for* you.

The great danger in a leg chomping is a cut to your femoral artery. In general, injuries to arteries are more dangerous than those to veins because arteries carry blood *from* your heart and are under pressure, so when they're severed they squirt—as opposed to veins, which just drool.

The femoral is one of the worst arteries to sever. It's responsible for oxygenating your entire leg, and nearly 5 percent of your blood volume passes through it every minute.

Exactly how the shark bites your leg would determine whether you have any chance at all. The human body cannot afford to lose 5 percent of its blood volume per minute—that

equates to death in four minutes—so you would think that if your femoral artery was severed, your story would be a short one. But that's not always the case.

Right now, as you read these words, your femoral artery is under a small bit of tension, like a stretched rubber band. If it were severed *cleanly* by the shark, it would snap back into the stump of your leg, where your muscles could pinch it shut—slowing the leak and giving you time to get a tourniquet on. But if it were slashed *unevenly,* or at an angle, it wouldn't recede correctly—that's bad. You would black out in thirty seconds. From there you would go into circulatory shock—a deadly positive feedback loop wherein your tissues die from lack of blood, swell up, and compound the problem by blocking blood flow elsewhere in the body.

Four minutes after the attack, if your femoral was cut unevenly, you would have lost 20 percent of your blood and you would enter a critical stage. Your heart needs a minimum blood pressure to keep beating, and once you lost 20 percent of your blood volume you would drop below that threshold. After that it would only be a few minutes until complete brain death.

All of this assumes you were lucky and the shark did the expected and attacked from behind. A frontal attack on your head and torso is less likely but worse. Losing your head is bad because, one, your brain is in it and, two, tourniquets are far less effective on your neck than they are on your legs (for details, see Wikipedia for "Hanging").

Lawyer's note: Seriously—do not put a tourniquet around your neck.



What Would Happen If . . .
You Slipped on a Banana Peel?

If you see a banana peel on the floor, how concerned should you be? If the cartoons are to be believed, the answer is, of course, very. Cartoons might understate banana peel danger by overstating the strength of your skull, but the cartoons aren't kidding about the slipperiness of banana peels. Rigorous scientific study has confirmed bananas as the most dangerous of all fruit peels.

Slipperiness is measured by placing a block of a given material on a ramp of another material and then slowly increasing the angle of the ramp. The tangent of the angle of the ramp when the object starts to slide gives the coefficient of friction (CoF), and it usually scales from 0 (the slipperiest) to 1 (stickiest), though in some stickier situations it can go as high as 4.* Rubber on a cement sidewalk has a near slip-proof CoF of 1.04.

*A CoF larger than 1 means the object slips at an angle greater than 45 degrees. The highest CoF we can find is the rubber on the tires of top fuel dragsters, which when spinning have a CoF on pavement of 4 (they could climb a 75-degree wall).

Then there's the other end of the spectrum. Sliding on socks across a wooden floor has a CoF of only 0.23, and ice is even slipperier. A walk across an ice rink can have embarrassing consequences because rubber on ice registers a potentially painful CoF of 0.15.*

Banana peels put all that to shame.

We know this thanks to a few daring professors at Kitasato University in Minato, Japan, who decided to double-check the cartoons. Dr. Kiyoshi Mabuchi and his team peeled a bunch of bananas, threw them on a wooden floor, and stepped on them with rubber-soled shoes (hopefully they had a spotter). Then they measured the forces involved.

It turns out Elmer Fudd might not have been as clumsy as we all thought. Banana peels on wood have a CoF of only 0.07—twice as slippery as ice and five times slipperier than wood. Mabuchi and his team of researchers weren't done, though. Was the banana peel slippery merely because of its water content? Would other fruit peels result in similar slippage?

To find out they peeled apples and tangerines and ran the same rigorous experiment: They stepped on them. The apple peel came in a distant second, at 0.1, and the tangerine peel was by far the stickiest, with a CoF of 0.225 (about the same as stepping on a wooden floor *without* a peel).

So if you're walking through a fruit factory and have a choice

*Lubricated surfaces have even less friction. The synovial fluid that lubricates your joints, for example, is one of the slipperiest substances in the world—registering at a CoF of .0003, which is a good thing, otherwise it would give cracking your knuckles a more literal interpretation.

of peels to step on, remember this: It's not just a joke; banana peels are the worst. Under pressure, a banana peel oozes a gel that turns out to be extremely slippery. Your foot and body weight provide the pressure. The gel provides the humor.

Why is slipperiness so important? Walking is really just a series of falls and catches. With each step you fall forward, and with the next one you catch yourself and begin the process over again. Banana peels mess up the catching part. If you just stand on a slippery surface, you will probably be okay. But if you take a step, you initiate a fall. To stop it, your leading foot hits the ground with forward momentum at a strike angle of 15 degrees. If you know you're walking on a slippery substance, you will change your gait to decrease that angle, demand less friction from the floor, and lessen your chances of taking a tumble. Stray banana peels have a way of sneaking up on you, though, and research suggests that taking a normal step on a substance with a CoF of less than 0.1 results in a fall 90 percent of the time.

Of course, the real danger with falling is injuring your brain, an essential organ that lives high off the ground. Learning to walk upright sometime 4 to 6 million years ago was a big advancement for the human species, but it did introduce the problem of a slip-and-fall. If you were, say, the height of a small dog and you fell, your head would not build up enough speed to do any damage when it hit the sidewalk.* You could dance on banana peels, because the difference between falling twelve inches and hitting your head and falling

*This is where bugs really have us beat. No bug in the history of bugs has ever fallen to its death.

six feet on the same organ is the difference between a bruise and a broken skull.

The force generated by an unrestrained falling adult onto something solid is more than enough to crack a skull. In ballpark terms (everyone's head is a little different) your skull would crack with as little as an unrestrained three-foot fall onto a hard surface. The skull is stronger in the front and back, and weaker on the sides, but even if you fall onto the stronger frontal bone, a fall of six feet is enough to crack it—especially if you pitch forward.

Either way, if you cannot protect your head from a fall of six feet, your skull would fracture. Fractures are dangerous for a few reasons, but bleeding is the big one. Your brain is a blood hog, which means cracking it results in a lot of bleeding inside, putting you in immediate and deep trouble.

Bleeding inside your skull can be far more dangerous than bleeding anywhere else. And it's not just because you can bandage a leg wound and you can't an internal skull bleed. It's because your skull is a solid container carrying fragile cargo. If your head starts filling with blood, your brain gets squeezed. Too much blood within your skull creates pressure that strangles the rest of your brain and chokes off and kills critical brain functions, like remembering to breathe.

Of course your brain knows how fragile it is, and if you slip it works very hard to put something in the way to break your fall—hands, elbows, knees—anything but itself. Which is why you see more bruised butts than broken heads and why banana peels are usually funny, not lethal.

But "usually" isn't the same as "always." And that brings us to Mr. Bobby Leach, the English daredevil of Niagara Falls.

Since 1901, roughly fifteen people have attempted to go over Niagara Falls for the fame or the thrill (see p. 57 for what happened when they did). Five of them drowned; most never went back. ("I'd rather stand in front of a cannon and be blown to death," responded the first survivor, "than do that again.")

But Bobby Leach was a professional stuntman, daredevil, and circus performer who cheated death for a living. In 1906, he climbed into a steel barrel and went over the falls. He survived, although he needed six months of hospitalization to recover from two wrecked knees and a broken jaw.

Afterward, he went on to a successful lecturing career, touring the world with his barrel and posing for photos. In 1926, he was in New Zealand when he slipped on an unidentified fruit peel on a sidewalk in Auckland and gashed his leg. A few days later, Bobby Leach died from the complications.



What Would Happen If . . .
You Were Buried Alive?

You can measure your pulse by putting two fingers on your jugular vein in the crook between your chin and neck. In a minute you should count around seventy beats. If the count is lower than twenty-six, you should finish this chapter in the back of an ambulance.

If you cannot feel anything, your finger is probably in the wrong place, but even if it isn't you're not necessarily dead. Sometimes a pulse is so weak it cannot be felt.* This posed a problem for doctors in the Middle Ages, when feeling for a

*Maybe you suffer from sleep paralysis. During parts of sleep the body is paralyzed, which is fine unless the brain makes a mistake and you wake up during this paralysis and your muscles don't turn on. On average this happens to everyone once in their life and it usually lasts less than a minute, but in some cases can last up to an hour and can really confuse EMTs. In one case a woman made it all the way to the morgue before she woke up.

pulse was the only way to determine if a patient was alive.* Occasionally comatose patients were declared dead, only to wake up in the morgue sometime later. Soon, concerned people asked to be buried with a bell above their grave and a string running into their coffin, just in case.†

Doctors today have more sophisticated means of deciding whether you're dead (they look for electrical signals from your heart and brain). But let's say your physician has an early dinner reservation and cuts a few corners. He signs your death certificate, grabs his coat, and jumps in a cab, headed for dinner and a show. You, meanwhile, are in a gurney being wheeled down to the loading dock and then placed in the back of an ambulance, headed for the morgue and a hole in the ground. What would happen next?

Once you're placed in the airtight coffin you would start using up its oxygen. A typical coffin has 900 liters of air and you take up 80 of it, so you would have 820 left. Your lungs take in a half liter per breath, but you use up only 20 percent of the oxygen per breath, meaning you could rebreathe the same air a few times before completely depleting it.

Of course, you wouldn't need to breathe every last bit of oxygen before running into trouble. Air is 21 percent oxygen and that's where you're happy. Once you began using up oxygen you would quickly run into issues. Breathing air with 12

*Another test: Doctors would hold up a mirror near your mouth, and if you were breathing, your humid exhalation would "fog the mirror." Thus the origin of the phrase "Anyone who could fog a mirror could do this job."

†Edgar Allan Poe was one of them. He had a thing about being buried alive.

percent oxygen would give you headaches, dizziness, nausea, and confusion as your brain cells began to starve.

Your coffin has enough oxygen to last around six hours before you start to asphyxiate—as long as you stay calm. You would think that you would last longer holding your breath, but that actually increases your oxygen usage when your body overcompensates for the CO_2 buildup with bigger breaths than it needs. Slow, controlled breathing is the way to go.

Once the oxygen drops to 10 percent you would go unconscious without warning and quickly fall into a coma.* Sudden death happens at 6 to 8 percent oxygen.

But here's where it gets interesting and a little complicated. There's another issue competing to kill you. By breathing, you are replacing the oxygen in your coffin with CO_2.† That's a problem.

The excess CO_2 you are breathing binds with your blood and limits the amount of oxygen it can carry into your tissues—effectively asphyxiating your vital organs. Air with 0.035 percent CO_2 is normal, but in your airtight coffin that percentage rises quickly. Once the CO_2 level rises to 20 percent it will render you unconscious in two to three breaths and can kill you within minutes.

Along the way it will also poison your central nervous system, which would manifest as confusion and delirium—so perhaps you would see a ghost in your coffin?

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*Q: What if you were buried with a few potted plants—would that help? A: Sadly, no, they don't create oxygen quickly enough to make up for the amount of space they take up.

†This was the same issue the astronauts on *Apollo 13* faced after they were forced to move to the lunar excursion module.

Between the increasing CO_2 levels and decreasing oxygen, it's a close race to kill you, but in the end you will be poisoned to death by your own exhales first. The CO_2 level will rise to lethal levels in only 150 minutes, killing you two hours before your coffin ran out of oxygen.

It could be worse, though, if your grave diggers were really in a hurry and skipped the whole coffin part. That might sound like a better alternative—maybe you think you could escape? However, in reality you would die far faster.

Under six feet of dirt you might as well be encased in cement. Six feet of dirt weighs about five hundred pounds on your chest. In other words: You are not getting out. Regardless of any zombie movie you might have seen, if you ever see an empty grave you can be sure it was an outside job.

But some good news: You would not immediately suffocate. Most of your muscles are too weak to lift five hundred pounds, but your diaphragm isn't—which is important. You need it to lift the dirt and allow your lungs to inflate. So you could still *physically* breathe. Unfortunately, there would not be much *to* breathe.

In snow avalanches, which resemble dirt burials, victims who live through the initial slide but are buried under snow have a predictable survival pattern: Every hour the survival rate drops in half, so if you are buried for an hour, your chances are 50 percent; two hours, 25 percent; and so on. Those survival times would probably look even worse in dirt burials, because fresh snow is 90 percent air while dirt is mostly just dirt. Either way, in ice or dirt, forming an air pocket with your arm is key.

Of course if you're worried about being buried alive, fear

not. You would die long before you made it to the grave. Even if you have a lazy doctor, trips to the morgue are fatal. Before you were buried they would give you the world's worst blood transfusion. To preserve your tissues, morticians replace your blood with formaldehyde, which is, sadly, or perhaps mercifully, fatal.