UP AND THEN DOWN

The lives of elevators.

BY NICK PAUMGARTEN

ART BY MAURIZIO CATTELAN, "UNTITLED" (2001), MIXED MEDIA/MARIAN GOODMAN GALLERY.

The longest smoke break of Nicholas White's life began at around eleven o'clock on a Friday night in October, 1999. White, a thirty-four-year-old production manager at *Business Week*, working late on a special supplement, had just watched the Braves beat the Mets on a television in the office pantry. Now he wanted a cigarette. He told a colleague he'd be right back and, leaving behind his jacket, headed downstairs.

The magazine's offices were on the forty-third floor of the McGraw-Hill Building, an unadorned tower added to Rockefeller Center in 1972. When White finished his cigarette, he returned to the lobby and, waved along by a janitor buffing the terrazzo floors, got into Car No. 30 and pressed the button marked 43. The car accelerated. It was an express elevator, with no stops below the thirty-ninth floor, and the building was deserted. But after a moment White felt a jolt. The lights went out and immediately flashed on again. And then the elevator stopped.

The control panel made a beep, and White waited a moment, expecting a voice to offer information or instructions. None came. He pressed the intercom button, but there was no response. He hit it

again, and then began pacing around the elevator. After a time, he pressed the emergency button, setting off an alarm bell, mounted on the roof of the elevator car, but he could tell that its range was limited. Still, he rang it a few more times and eventually pulled the button out, so that the alarm was continuous. Some time passed, although he was not sure how much, because he had no watch or cell phone. He occupied himself with thoughts of remaining calm and decided that he'd better not do anything drastic, because, whatever the malfunction, he thought it unwise to jostle the car, and because he wanted to be (as he thought, chuckling to himself) a model trapped employee. He hoped, once someone came to get him, to appear calm and collected. He did not want to be scolded for endangering himself or harming company property. Nor did he want to be caught smoking, should the doors suddenly open, so he didn't touch his cigarettes. He still had three, plus two Rolaids, which he worried might dehydrate him, so he left them alone. As the emergency bell rang and rang, he began to fear that it might somehow—electricity? friction? heat?—start a fire. Recently, there had been a small fire in the building, rendering the elevators unusable. The *Business Week* staff had walked down forty-three stories. He also began hearing unlikely oscillations in the ringing: aural hallucinations. Before long, he began to contemplate death.

Ask a vertical-transportation-industry professional to recall an episode of an elevator in free fall—the cab plummeting in the shaftway, frayed rope ends trailing in the dark—and he will say that he can think of only one. That would be the Empire State Building incident of 1945, in which a B-25 bomber pilot made a wrong turn in the fog and crashed into the seventy-ninth floor, snapping the hoist and safety cables of two elevators. Both of them plunged to the bottom of the shaft. One of them fell from the seventy-fifth floor with a woman aboard—an elevator operator. (The operator of the

other one had stepped out for a cigarette.) By the time the car crashed into the buffer in the pit (a hydraulic truncheon designed to be a cushion of last resort), a thousand feet of cable had piled up beneath it, serving as a kind of spring. A pillow of air pressure, as the speeding car compressed the air in the shaft, may have helped ease the impact as well. Still, the landing was not soft. The car's walls buckled, and steel debris tore up through the floor. It was the woman's good fortune to be cowering in a corner when the car hit. She was severely injured but alive.

Traction elevators—the ones hanging from ropes, as opposed to dumbwaiters, or mining elevators, or those lifted by hydraulic pumps—are typically borne aloft by six or eight hoist cables, each of which, according to the national elevator-safety code (and the code determines all), is capable on its own of supporting the full load of the elevator plus twenty-five per cent more weight. Another line, the governor cable, is connected to a device that detects if the elevator car is descending at a rate twenty-five per cent faster than its maximum designed speed. If that happens, the device trips the safeties, bronze shoes that run along vertical rails in the shaft. These brakes are designed to stop the car quickly, but not so abruptly as to cause injury. They work. This is why free falling, at least, is so rare.

Still, elevator lore has its share of horrors: strandings, manglings, fires, drownings, decapitations. An estimated two hundred people were killed in elevators at the World Trade Center on September 11, 2001—some probably in free-fall plunges, but many by fire, smoke, or entrapment and subsequent structural collapse. The elevator industry likes to insist that, short of airplane rammings, most accidents are the result of human error, of passengers or workers doing things they should not. Trying to run in through closing doors is asking for trouble; so is climbing up into an elevator car, or down out of one, when it is stuck between floors, or letting a piece of

equipment get lodged in the brake, as happened to a service elevator at 5 Times Square, in Manhattan, four years ago, causing the counterweight to plummet (the counterweight, which aids an elevator's rise and slows its descent, is typically forty per cent heavier than an empty car) and the elevator to shoot up, at sixty miles an hour, into the beams at the top of the shaft, killing the attendant inside. Loading up an empty elevator car with discarded Christmas trees, pressing the button for the top floor, then throwing in a match, so that by the time the car reaches the top it is ablaze with heat so intense that the alloy (called "babbitt") connecting the cables to the car melts, and the car, a fireball now, plunges into the pit: this practice, apparently popular in New York City housing projects, is inadvisable.

Nonetheless, elevators are extraordinarily safe—far safer than cars, to say nothing of other forms of vertical transport. Escalators are scary. Statistics are elusive ("Nobody collects them," Edward Donoghue, the managing director of the trade organization National Elevator Industry, said), but the claim, routinely advanced by elevator professionals, that elevators are ten times as safe as escalators seems to arise from fifteen-year-old numbers showing that, while there are roughly twenty times as many elevators as escalators, there are only a third more elevator accidents. An average of twenty-six people die in (or on) elevators in the United States every year, but most of these are people being paid to work on them. That may still seem like a lot, until you consider that that many die in automobiles every five hours. In New York City, home to fifty-eight thousand elevators, there are eleven billion elevator trips a year—thirty million every day—and yet hardly more than two dozen passengers get banged up enough to seek medical attention. The Otis Elevator Company, the world's oldest and biggest elevator manufacturer, claims that its products carry the equivalent of the world's population every five

days. As the world urbanizes—every year, in developing countries, sixty million people move into cities—the numbers will go up, and up and down.

Two things make tall buildings possible: the steel frame and the safety elevator. The elevator, underrated and overlooked, is to the city what paper is to reading and gunpowder is to war. Without the elevator, there would be no verticality, no density, and, without these, none of the urban advantages of energy efficiency, economic productivity, and cultural ferment. The population of the earth would ooze out over its surface, like an oil slick, and we would spend even more time stuck in traffic or on trains, traversing a vast carapace of concrete. And the elevator is energy-efficient—the counterweight does a great deal of the work, and the new systems these days regenerate electricity. The elevator is a hybrid, by design.

While anthems have been written to jet travel, locomotives, and the lure of the open road, the poetry of vertical transportation is scant. What is there to say, besides that it goes up and down? In "The Intuitionist," Colson Whitehead's novel about elevator inspectors, the conveyance itself is more conceit than thing; the plot concerns, among other things, the quest for a "black box," a perfect elevator, but the nature of its perfection remains mysterious. Onscreen, there has been "The Shaft" ("Your next stop . . . is hell"), a movie about a deadly malfunctioning elevator system in a Manhattan tower, which had the misfortune of coming out the Friday before September 11th, and a scattering of inaccurate set pieces in action movies, such as "Speed." (There are no ladders or lights in most shafts.) Movies and television programs, such as "Boston Legal" and "Grey's Anatomy," often rely on the elevator to bring characters together, as a kind of artificial enforcement of proximity and conversation. The brevity of

the ride suits the need for a stretch of witty or portentous dialogue, for stolen kisses and furtive arguments. For some people, the elevator ride is a social life.

When filmmakers want to shoot an elevator scene, they will spin the elevator around, like a lazy Susan, so that the character can disembark into a different set. This trick captures something about an elevator ride—the way that it can feel like teleportation. You go in here and come out there, and you hardly consider that you have just raced up or down a vertiginous, pitch-black shaft. When you're waiting for a ride, you don't think that what lurks behind the outer doors is emptiness. Every so often, a door opens when it shouldn't and someone steps into the void. This is worth keeping in mind.

People don't like to ride in elevators or wait for them. Many people can't even get in one, or would really rather not. "They're not psychotic," Jerilyn Ross, a cognitive-behavioral therapist in Washington and the president of the Anxiety Disorders Association of America, said recently. "It's just a misfiring of the fight-or-flight response." Elevator phobia is a kind of claustrophobia, and as such the fear is as much of experiencing fear—of having a panic attack, in an enclosed space—as it is of the thing itself. One of Ross's board members is David Hoberman, who produced the television series "Monk," several episodes of which have touched on Detective Monk's elevator phobia. "I have it," Hoberman said recently. "It's for real. I avoid elevators at all costs." His least favorite are the ones in small doctors'-office buildings, in the Valley.

Hoberman has been undergoing behavioral elevator therapy for six months. His therapist began by taking him to the U.C.L.A. psychology department and locking him in a black box about the size of a phone booth. The first time, Hoberman lasted just five seconds. After four or five sessions, he could handle ten minutes.

Before long, he and his therapist were riding elevators together, all over campus. He just built a house in Los Angeles, and it has an elevator, because his parents insisted that it will be useful to him when he grows old. "I will never ride in it," Hoberman said. "I don't have a fear of dying in an elevator, or of the elevator losing control—I have a fear of being stuck with my mind."

Nicholas White wasn't phobic, but he wasn't exactly fond of elevators. When he was a boy, he and some other kids were trapped in one on their way down from a birthday party in an apartment building on Riverside Drive. After about twenty minutes, the Fire Department pulled the kids out, one at a time. In his recollection, he was the only person to ask the firemen whether the cables might snap.

White has the security-camera videotape of his time in the McGraw-Hill elevator. He has watched it twice—it was recorded at forty times regular speed, which makes him look like a bug in a box. The most striking thing to him about the tape is that it includes split-screen footage from three other elevators, on which you can see men intermittently performing maintenance work. Apparently, they never wondered about the one he was in. (Eight McGraw-Hill security guards came and went while he was stranded there; nobody seems to have noticed him on the monitor.)

After a while, White decided to smoke a cigarette. It was conceivable to him that, owing to construction work in the lobby, the building staff had taken his car out of service and would leave it that way not only through the weekend but all through the week. That they could leave him here as long as they had suggested that anything was possible. He imagined them opening the doors, ten days later, and finding him dead on his back, like a cockroach. Within hours, he had smoked all his cigarettes.

At a certain point, he decided to open the doors. He pried them apart and held them open with his foot. He was presented with a cinder-block wall on which, perfectly centered, were scrawled three "13"s—one in chalk, one in red paint, one in black. It was a dispiriting sight. He concluded that he must be on the thirteenth floor, and that, this being an express elevator, there was no egress from the shaft anywhere for many stories up or down. (Such a shaft is known as a blind hoistway.) He peered down through the crack between the wall and the sill of the elevator and saw that it was very dark. He could make out some light at the bottom. It looked far away. A breeze blew up the shaft.

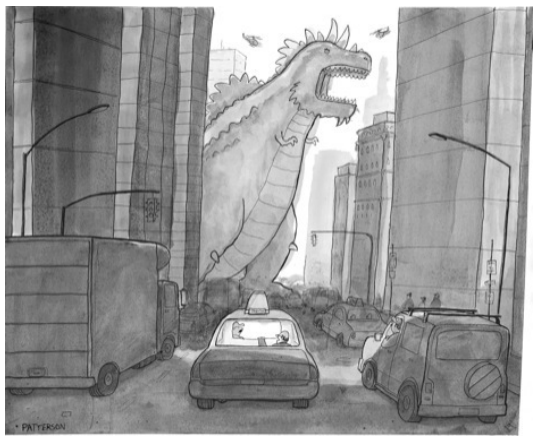
He started to call out. "Hello?" He tried cupping his hand to his mouth and yelled out some more. "Help! Is there anybody there? I'm stuck in an elevator!" He kept at it for a while.

Until recently, one of New York City's most notoriously dysfunctional elevator banks could be found at the Marriott Marquis hotel, a forty-nine-story convention mill in Times Square, built in the early eighties, where glass elevators are arrayed like petals around a stalk of concrete, in the center of a vast atrium. For years, visitors complained of waits of as much as twenty minutes.

One morning not long ago, I met James Fortune, the man who designed that elevator system, in the lobby of the Marriott. Fortune, an affable industrial engineer originally from Pasadena, can reasonably disavow responsibility for the hotel's elevator failings; a decision to put the lobby on the eighth floor essentially doubled the amount of work the elevators had to do to get guests to their rooms. ("The building's underelevatored," he told me, with a grimace. "We did the best we could.") Fortune is probably the world's busiest and best-known elevator consultant, especially in the category of super-tall towers—buildings of more than a hundred stories—which are

proliferating around the world, owing in large part to elevator solutions provided by men like Fortune. Elevator consultants come in various guises. Some make the bulk of their living by testifying in court in accident lawsuits. Others collaborate with architects and developers to handle the human traffic in big buildings. Fortune is one of those.

"O.K., O.K., let's take the F.D.R."



Four years ago, Fortune, who is sixty-six, retired as president of the pioneering elevator consulting firm Lerch Bates, but his retirement lasted just two weeks. He couldn't resist the call of the elevator. He started a new firm, with headquarters in the relatively horizontal and un-elevatored city of Galveston, Texas—the majority of his work is overseas, especially in Asia and the Middle East, and the Houston airport is relatively central. In China alone, there are dozens of cities with a population of more than two million and, Fortune noted, "every city wants an iconic tower." Persian Gulf cities like Doha and Dubai are a blizzard of elevator jobs.

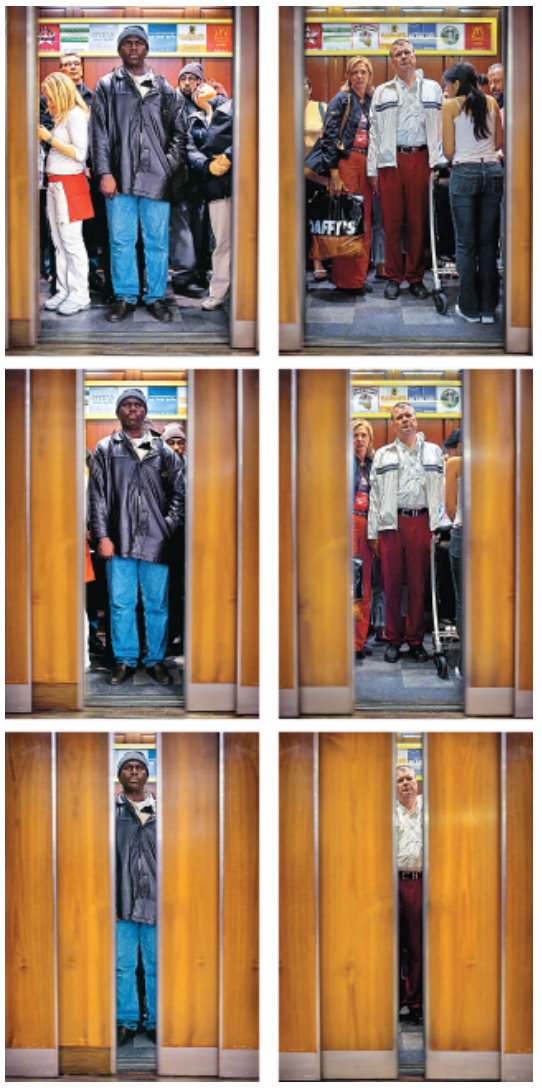
Fortune has done the elevators, as they say, in five of the world's ten tallest buildings. While at Lerch Bates, he did the tallest building in the world, the Taipei 101 Tower, which has the fastest elevators in the world—rising at more than fifty-five feet per second, or about thirty-five miles an hour. The cars are pressurized, to prevent ear damage. He also did Burj Dubai, which, when it is completed, next year, will be the new tallest building, at least until it is supplanted by another one he is working on in the region. Burj Dubai will have forty-six elevators, including two double-deckers that will go straight to the top. ("I love double-decks," Fortune said.) Adrian Smith, the building's architect, has grand designs for towers reaching

hundreds of stories—vertical cities—which would require a sophistication of conveyance not yet available. Two weeks ago, a Saudi prince announced a plan for a mile-high tower in a new city being built near Jidda—more than twice as tall as Burj Dubai. Fortune is bidding on that one, too. Frank Lloyd Wright designed a mile-high, five-hundred-and-twenty-eight-story tower, called the Mile-High Illinois, in 1956, a kind of architectural manifesto of density. Wright allowed for seventy-six elevators—atomic-powered quintuple-deckers, rising at sixty miles an hour. "I ran the studies once," Fortune said. "He wasn't even close. He should've had two hundred and fifteen to two hundred and twenty-five elevators."

While the Marriott's capsule-like elevators sped up and down, Fortune explained some of the rudiments of elevatoring. The term "elevatoring" refers to the discipline of designing a building's elevator system: how many, how big, how fast, and so on. You need to predict how many people will be using the elevators, and how they'll go about their business. It isn't rocket science, but it has its nuances and complications. The elevator consultant George Strakosch, in the preface to "The Vertical Transportation Handbook," the industry bible, refers to it as the "obscure mystery." To take elevatoring lightly is to risk dooming a building to dysfunction and its inhabitants to a kind of incremental purgatory.

In elevatoring, as in life, the essential variables are time and space. A well-elevatored building gets you up and down quickly, without giving up too much square footage to elevator banks. Especially with super-tall towers, the amount of core space that one must devote to elevators, in order to convey so many people so high, can make a building architecturally or economically infeasible. This limitation served to stunt the height of skyscrapers until, in 1973, the designers of the World Trade Center introduced the idea of sky lobbies. A sky lobby is like a transfer station: an express takes you there, and then

you switch to a local. (As it happens, Fortune was working on a project to upgrade the Trade Center elevators when the towers were destroyed.)



"Eleven billion elevator trips are made each year in New York. Otis Elevator estimates that it transports the equivalent of the world's population every five days." Bill Sullivan, "Down 4124, 4125, 4126", "Down 4120, 4121, 7122" (2004)/Brancouni Grimaldi.

There are two basic elevatoring metrics. One is handling capacity: your aim is to carry a certain percentage of the building's population in five minutes. Thirteen per cent is a good target. The other is the interval, or frequency of service: the average round-trip time of one elevator, divided by the number of elevators. In an American office building, you want the interval to be below thirty seconds, and the average waiting time to be about sixty per cent of that. Any longer, and people get upset. In a residential building or a hotel, the tolerance goes up, but only by ten or twenty seconds. In the nineteen-sixties, many builders cheated a little—accepting, say, a thirty-four-second interval, and 11.5 per cent handling capacity—and came to regret it. Generally, England is over-elevatored; India is under-elevatored.

Fortune carries a "probable stop" table, which applies probability to the vexation that boils up when each passenger presses a button for a different floor. If there are ten people in an elevator that serves ten floors, it will likely make 6.5 stops. Ten people, thirty floors: 9.5 stops. (The table does not account for the exasperating phantom stop, when no one gets on or off.) Other factors are door open and

close time, loading and unloading time, acceleration rate, and deceleration rate, which must be swift but gentle. You hear that interfloor traffic kills—something to mutter, perhaps, when a co-worker boards the elevator to travel one flight, especially if that co-worker is planning, at day's end, to spend half an hour on a StairMaster. It's also disastrous to have a cafeteria on anything but the ground floor, or one floor above or below it, accessible via escalator.

An over-elevatored building wastes space and deprives a landlord of revenue. An under-elevatored building suffers on the rental or resale market, and drives its tenants nuts. In extreme cases, when the wait becomes actually long, instead of merely perceptibly long, things fall apart. The Bronx family-court system, for example, was in a shambles last year because the elevators at its courthouse kept breaking down. (The stairs are closed, owing to security concerns.) This led to hour-long waits, which led to missed court dates, needless arrest warrants, and life-altering family strife.

Fortune took me elevator riding. Riding elevators, even when you are supposed to be paying attention, for the purpose of writing about them, is a pretty banal enterprise. So it was hard to focus on the matter at hand—not to just ride, expressionless and empty-brained, per usual, noting nothing, except that on the Captivate screen the word of the day was "sitzmark." Otis has conducted research to find out whether people might better enjoy their time in elevators if it were more of an experience—if it would somehow help to emphasize that they're in an elevator, hurtling up and down a shaft. Otis found, to little surprise, that people would rather be distracted from that fact. Even elevator music, designed to put passengers at ease, is now so closely associated with elevators that it is no longer widely used.

But there were a few attention-getting features at the Marriott. One was that the glass cabs allow you to see the elevator's various components, and also how fast you're going—a thrill or a trial, depending on your temperament or, according to Fortune, your gender. In his experience, most women face the door, away from the glass, to avoid the sight of the mezzanines flying by.

The other was the "destination dispatch" system that the Marriott introduced, a few years ago, becoming the first hotel in North America to do so. Such "smart elevators" have now been installed in a dozen buildings in New York, among them the headquarters of the *Times*, of Hearst, and of the News Corporation. Destination dispatch assigns passengers to an elevator according to which floors they're going to, in an attempt to send each car to as few floors as possible. You enter your floor number at a central control panel in the lobby and are told which elevator to take.

With destination dispatch, the wait in the lobby may be longer, but the trip is shorter. And the waiting may not grate as much, because you know which car is yours. In Japan, the light over your prospective elevator lights up ("arrival immediate prediction lantern," in the vulgate of vertical transportation), even if the elevator isn't there yet, to account for what the Japanese call "psychological waiting time." It's like a nod of acknowledgment from a busy bartender.

Smart elevators are strange elevators, because there is no control panel in the car; the elevator knows where you are going. People tend to find it unnerving to ride in an elevator with no buttons; they feel as if they had been kidnapped by a Bond villain. Helplessness may exacerbate claustrophobia. In the old system—board elevator, press button—you have an illusion of control; elevator manufacturers have sought to trick the passengers into thinking they're driving the

conveyance. In most elevators, at least in any built or installed since the early nineties, the door-close button doesn't work. It is there mainly to make you think it works. (It does work if, say, a fireman needs to take control. But you need a key, and a fire, to do that.) Once you know this, it can be illuminating to watch people compulsively press the door-close button. That the door eventually closes reinforces their belief in the button's power. It's a little like prayer. Elevator design is rooted in deception—to disguise not only the bare fact of the box hanging by ropes but also the tethering of tenants to a system over which they have no command. The biggest drawback of destination dispatch, besides the anxiety of novelty, is that once you are in an elevator you cannot change your mind. To amend your floor choice, you must disembark, and start again. Elevator mind-changing—the sudden lunge for the unlit button—is rare enough; still, the option is nice. Also, when you get used to this system, you get into an elevator with buttons and forget to press one. But sometimes that happens anyway.

Destination dispatch, strictly speaking, was introduced eighteen years ago, by Schindler, the Swiss conglomerate, but a version of it was developed in the thirties, by the A. B. See Elevator Company, founded by the noted anti-feminist A. B. See ("If the world had had to depend on the inventive and constructive ability of women, we should still be sleeping on the plains"). Without the microprocessor, however, it was hard to implement. Schindler's version, the Miconic 10, was developed by an engineer named Joris Schroeder, who has written dense essays about his "passenger-second minimizing cost-of-service algorithm." Schindler claims that its system is up to thirty per cent more efficient than standard elevators. The other big manufacturers have come out with similar systems and make similar claims. In each, every bank of elevators has its own group-dispatch

logic—which elevator picks up whom, and so on. "They have to talk to each other," Fortune said. We have to trust that they are reasonable.

The first American building to use smart elevators, the Ameritech building, in Indianapolis, hired mimes to help people navigate the system. They are still rare enough so that the Marriott has an attendant on hand to assist bewildered guests. "It's tricky putting this system into a building where people are always unfamiliar with it," Fortune said. "By the time they know it, they leave."

Fortune suggested that we go see 7 World Trade Center, a two-year-old building, of unspectacular height (fifty-two stories, seven hundred and fifty feet), because, he said, "it is the most advanced system going." The elevators were Otis—Larry Silverstein, the building's developer, is a longtime Otis man—and their destination-dispatch system is integrated with the security system; it reads your I.D. card at a turnstile and assigns you to an elevator. "The next phase of this is face-recognition biometrics," Fortune said.

Otis had a full-time mechanic on site at 7 World Trade. His name was Sean Moran. He was hanging out by the turnstiles when we walked in, and Fortune asked how it was going with the dispatch system. "People are sheep," Moran said. "They look, they go."

We rode up to Floor 38, on Elevator D1. Facing down the urge to press a button in a buttonless elevator felt a little like quitting smoking. Fortune explained that, newfangled as destination dispatch may seem, it is in many respects a reversion to the old ways. "This is going to sound crazy, but we're coming full circle," Fortune said. In the early days, you'd have an operator in each car and a licensed attendant, or dispatcher, in the lobby, who would tell people where to go. The operator typically was a woman and the dispatcher a man,

and he tended to know the name, face, and status of each tenant. He could assign elevators to contiguous floors and tell the gals when to leave and direct the boss to an empty, momentarily private elevator. "He was the logic," Fortune said. When systems converted to automatic, in the middle of the last century, and operators and dispatchers disappeared, that central logician was lost, and lobbies descended into randomness.

Fortune and I changed elevators and went to one of the top floors, a vacant expanse with views in every direction: a forest of elevator shafts. The elevator professional sees the city with a kind of X-ray vision, revealing a hidden array of elevator genera—an Otis gearless, a Schindler, a Fujitec. For him, buildings are mere ornaments disguising the elevators that serve them. Below us was the pit where the Freedom Tower would go, but to Fortune it was ThyssenKrupp, which had recently underbid Otis for the job.

Passengers seem to know instinctively how to arrange themselves in an elevator. Two strangers will gravitate to the back corners, a third will stand by the door, at an isosceles remove, until a fourth comes in, at which point passengers three and four will spread toward the front corners, making room, in the center, for a fifth, and so on, like the dots on a die. With each additional passenger, the bodies shift, slotting into the open spaces. The goal, of course, is to maintain (but not too conspicuously) maximum distance and to counteract unwanted intimacies—a code familiar (to half the population) from the urinal bank and (to them and all the rest) from the subway. One should face front. Look up, down, or, if you must, straight ahead. Mirrors compound the unease. Generally, no one should speak a word to anyone else in an elevator. Most people make allowances for the continuation of generic small talk already under way, or, in residential buildings, for neighborly amenities. The orthodox enforcers of silence—the elevator Quakers—must suffer

the moderates or the serial abusers, as they cram in exchanges about the night, the game, the weekend, or the meal.

Bodies need to fit. Designers of public spaces have devised a maximum average unit size—that is, they've figured out how much space a person takes up, and how little of it he or she can abide. The master fitter is John J. Fruin, the author of "Pedestrian Planning and Design," which was published in 1971 and reprinted, in 1987, by Elevator World, the publisher of the leading industry magazine, *Elevator World*. (Its January issue came with 3-D glasses, for viewing its best-new-elevator-of-the-year layout, of the Dexia BIL Banking Center, in Luxembourg.) Fruin introduced the concept of the "body ellipse," a bird's-eye graphic representation of an individual's personal space. It's essentially a shoulder-width oval with a head in the middle. He employed a standard set of near-maximum human dimensions: twenty-four inches wide (at the shoulders) and eighteen inches deep. If you draw a tight oval around this figure, with a little bit of slack to account for body sway, clothing, and squeamishness, you get an area of 2.3 square feet, the body space that was used to determine the capacity of New York City subway cars and U.S. Army vehicles. Fruin defines an area of three square feet or less as the "touch zone"; seven square feet as the "no-touch zone"; and ten square feet as the "personal-comfort zone." Edward Hall, who pioneered the study of proxemics, called the smallest range—less than eighteen inches between people—"intimate distance," the point at which you can sense another person's odor and temperature. As Fruin wrote, "Involuntary confrontation and contact at this distance is psychologically disturbing for many persons."

"O.K., who' the designated whiner?"

The standard elevator measure is about two square feet per passenger—intimate, disturbing. "Elevators represent a special circumstance in which pedestrians are willing to submit to closer spacing than they would normally accept," Fruin wrote, without much parsing the question of willingness. The book contains a pair of overhead photographs, part of an experiment conducted by Otis, of elevators loaded to capacity (by design, cabs are nearly impossible to overweight, unless the passengers are extremely tall). In one, a car is full of women, each of whom has 1.5 square feet of space. In the other, there are men as well as women, and each passenger gets 1.8 square feet per person: men are larger, and women, in their presence, try to claim more space, often by crossing their arms. It is worth noting that, in experiments with prisoners, researchers found that violent or schizophrenic inmates preferred more than fifteen times this area.

There's a higher tolerance in Asia than in the United States for tight rides and long waits. "In China, you'll get twenty-five people in a four-thousand-pound car," Rick Pulling, the head of high-rise operations at Otis, told me. "That's unheard of here." Pulling said that at the Otis headquarters in Hong Kong people wait patiently in line for the elevators, behind a velvet rope overseen by an attendant, and cram in. "New Yorkers wouldn't stand for it," Pulling said. "He'd have two broken legs."

Nicholas White opened the doors to urinate. As he did so, he hoped, in vain, that a trace of this violation might get the attention of someone in the lobby. He considered lighting matches and dropping them down the shaft, to attract notice, but still had the presence of mind to suspect that this might not be wise. The alarm bell kept ringing. He paced and waved at the overhead camera. He

couldn't tell whether it was night or day. To pass the time, he opened his wallet and compared an old twenty-dollar bill with a new one, and read the fine print on the back of a pair of tickets to a Jets game on Sunday afternoon, which he would never get to use. He imagined himself as Steve McQueen in "The Great Escape," throwing the baseball against the wall. Eventually, he lay down on the floor, intent on sleep. The carpet was like coarse AstroTurf, and was lousy with nail trimmings and other detritus. It was amazing to him how much people could shed in such a short trip. He used his shoes for a pillow and laid his wallet, unfolded, over his eyes to keep out the light. It wasn't hot, yet he was sweating. His wallet was damp. Maybe a day had passed. He drifted in and out of sleep, awakening each time to the grim recognition that his elevator confinement had not been a dream. His thirst was overpowering. The alarm was playing more aural tricks on him, so he decided to turn it off. Then he tried doing some Morse code with it. He yelled some more. He tried to pick away at the cinder-block wall.

At a certain point, he decided to go for the escape hatch in the ceiling. He thought of Bruce Willis in "Die Hard," climbing up and down the shaft. He knew it was a dangerous and desperate thing to do, but he didn't care. He had to get out of the elevator. The height of the handrail in the car made it hard for him to get a leg up. It took him a while to figure out and then execute the maneuver that would allow him to spring up to the escape hatch. Finally, he swung himself up. The hatch was locked.

A vertical-transportation axiom states that if an elevator is in trouble the safest place to be is inside the elevator. This holds even if the elevator is not in trouble. Elevator surfing—riding on top of the cab, for kicks—is dangerous. This is why the escape hatch is always locked. By law, it's bolted shut, from the outside. It's there so that emergency personnel can get in, not so passengers can get out.

You can get a fair sense of the perils of an elevator shaft by watching an elevator rush up and down one, its counterweight flying by, like the blade on a guillotine. The elevator companies I talked to wouldn't let me ride on top of a car or get into a hoistway; just to see a machine room, I was required to sign a release and don a hard hat, safety glasses, and steel-toed boots. For a good look at the innards, I had to leave New York, city of elevators, and drive up to Otis's testing center, in Bristol, Connecticut.

The Otis test tower rises twenty-eight stories above an office park, at the base of a wooded ridge. It's the only tall building for miles around. Its hazy-day gray color and near-windowlessness suggest a top-secret military installation, a bat tower, or the monolith from "2001: A Space Odyssey." In one way, it's the most over-elevatored building in the world; all it is, really, is elevators—twelve test hoistways, plus a regular elevator. That one gets busy. The wait can be as long as thirteen minutes.

Otis was founded by Elisha Graves Otis, who invented the safety brake in 1853, and who is therefore usually thought of, in the simplistic way of historical innovation accreditation, as the inventor of the elevator. Mechanical hoists go back at least as far as Archimedes, and many men, not all of them employed by Otis, did their part to make the elevator work. Otis, having absorbed or outlasted all its native rivals, and gone through one of the first-ever hostile takeovers (by United Technologies, in 1976), is the last big American elevator company. Its major global competitors are Schindler, ThyssenKrupp, Kone, and Mitsubishi—Swiss, German, Finnish, and Japanese. The action is overseas. Otis does about eighty per cent of its business outside the United States, especially in the high-rise boomtowns of the Gulf states and in China. (Fortune had

told me that, prestige aside, the super-tall tower jobs are basically loss leaders for the elevator companies: "Very few high-rise jobs are money makers. You give 'em away for the maintenance contract.")

It was Rick Pulling, Otis's felicitously named high-rise man and the company's chief envoy, who took me around the test tower. He has worked at Otis for twenty-three years. He has an air of world-weariness, earned perhaps in complicated dealings with foreign builders and governments, but it gave way to fervid evangelism when the subject turned, as it did very quickly, to elevators. "We'll wait ten to fifteen minutes for a train, without complaining," he said. "But wait thirty seconds for an elevator and the world's coming to an end. Which means, really, that we've done a good job. We deliver short waits. But why are we held to a different standard?"

Our first stop, on the ground floor, was the so-called "drop car," a rudimentary elevator platform stacked with dozens of hundred-and-fifty-pound lead plates. The Otis engineers use it to test overspeed stopping—free-fall prevention. The drop car shares a hoistway with another half-elevator, from which a tester can examine the performance of safety brake shoes. Piles of them were on the floor, like discarded lobster claws. It takes just a couple of feet for the brakes to engage. Over several weeks, the drop car lurches down the hoistway, from the top of the building to the ground, in mini-free-fall intervals that make the notion of an eighty-floor drop seem both ludicrous and newly horrifying.

To the age-old half-serious question of whether a passenger barrelling earthward in a runaway elevator should jump in the air just before impact, Pulling responded, as vertical-transportation professionals ceaselessly must, that you can't jump up fast enough to

counteract the rate of descent. “And how are you supposed to know when to jump?” he said. As for an alternative strategy—lie flat on the floor?—he shrugged: “Dead’s dead.”

All through the building, you could hear the clicking and whirring of elevators. We rode up to the twenty-eighth floor, a single vast room, with various hoistway openings in the floor, like crevasses. Men in hard hats were futzing with a control panel. “We’re interpreting the data before we proceed,” one of them said. In a corner was the 70T, a fourteen-ton turbine of steel about the size of a VW Beetle, capable of hauling seventy tons at fifty feet a second. In another corner there was a full-sized working replica of the “Improved Hoisting Apparatus,” a suspended wooden platform that looked a bit like a gallows, which Elisha Otis had débuted at the Crystal Palace, in 1854, to demonstrate his new brake. Standing on the platform, high above the ground, he had an assistant cut the hoist rope with an axe, and before the platform could fall a wagon spring engaged a toggle on a cogged rail, and the hoisting apparatus held.

From one incarnation to the other, the basic principles—car, sheave, rope, safety—remain the same. With the exception of a few quantum leaps—steel cable, electricity, microprocessing—elevator advancements have been subtle and incremental. On the twenty-fifth floor, we came across evidence of one: spools of flat, rubbery-looking cable. In recent years, Otis has introduced flat hoist belts, made of polyurethane threaded with steel, which are lighter, stronger, and more energy-efficient than the old steel ropes. (Otis gave its employees gifts of belts made out of the cable.) The flat cables have made possible much smaller machines, facilitating the proliferation of what are called, rather inelegantly, “machineroomless” elevators. A machine the size of a marmot, rather than of a moose, can be

installed in the shaft, rather than in a room of its own, freeing up space for architects and landlords. This is what passes for cutting edge.

The big ideas tend to falter on the laws of physics. A single elevator can climb no higher than seventeen hundred feet. A hoist rope any longer is too heavy to be practical; at thirty-two hundred feet, it will snap, like a stream of spit in a stairwell. A decade ago, Otis developed a prototype of a conveyance called Odyssey, which could slide out of its shaft and travel on a horizontal track to another shaft, with the help of a linear induction motor. It was scuttled by the 1997 Asian financial crisis. The rising cost of electricity has confounded other lofty dreams, like the ropeless elevator.

We rode downstairs, to an immaculate warehouse space called the Quality Assurance Center—"The engineer's playground," Pulling called it—where Otis components were subjected to wear-and-tear tests. Kiln-like machines exposed parts to heavy doses of heat, dust, and salt fog. Hoist belts underwent twenty years of jerking and pulling in a few months. The only hint of novelty, of futuristic aspiration and delight—of Willy Wonka's flying glass elevator or Colson Whitehead's black box or the long-imagined elevator to the moon—was a hundred-foot-long gray mat. It happened to trace Odyssey's vestigial test course—the abandoned big idea. Perhaps the ambivalence, if not aversion, that people seem to feel toward the elevator derives from a sense that it isn't as fabulous as it should be, near-perfect though it already is.

At a certain point, Nicholas White ran out of ideas. Anger and vindictiveness took root. He began to think, They, whoever they were, shouldn't be able to get away with this, that he deserved some compensation for the ordeal. He cast about for blame. He wondered where his colleague was, why she hadn't been alarmed

enough by his failure to return, jacketless, from smoking a cigarette to call security. Whose fault is this? he wondered. Who's going to pay? He decided that there was no way he was going to work the following week.

And then he gave up. The time passed in a kind of degraded fever dream. On the videotape, he lies motionless for hours at a time, face down on the floor.

A voice woke him up: "Is there someone in there?"

"Yes."

"What are you doing in there?"

White tried to explain; the voice in the intercom seemed to assume that he was an intruder. "Get me the fuck out of here!" White shrieked. Duly persuaded, the guard asked him if he wanted anything. White, who had been planning to join a few friends at a bar on Friday evening, asked for a beer.

Before long, an elevator-maintenance team arrived and, over the intercom, coached him through a set of maneuvers with the buttons. White asked what day it was, and, when they told him it was Sunday at 4 P.M., he was shocked. He had been trapped for forty-one hours. He felt a change in the breeze, which suggested that the elevator was moving. When he felt it slow again, he wrenched the door open, and there was the lobby. In his memory, he had to climb up onto the landing, but the video does not corroborate this. When he emerged from the elevator, he saw his friends, with a couple of security guards, and a maintenance man, waiting, with an empty chair. His friends turned to see him and were appalled at the sight; he looked like a ghost, one of them said later. The security guard handed him

an open Heineken. He took one sip but found the beer repellent, like Hans Castorp with his Maria Mancini cigar. White told a guard, "Somebody could've died in there."

"I know," the guard said.

White had to go upstairs to get his jacket. He demanded that the guards come with him, and so they rode together on the service elevator, with the elevator operator. The presence of others with radios put him at ease. In his office he found that his co-worker, in a fit of pique over his disappearance, had written an angry screed, and taped it to his computer screen, for all their colleagues to see. He went home, and then headed to a bar. He woke up to a reel of phone messages and a horde of reporters colonizing his stoop. He barely left his apartment in the ensuing days, deputizing his friends to talk to reporters through a crack in the door.

White never went back to work at the magazine. Caught up in media attention (which he shunned but thrilled to), prodded by friends, and perhaps provoked by overly solicitous overtures from McGraw-Hill, White fell under the sway of renown and grievance, and then that of the legal establishment. He got a lawyer, and came to believe that returning to work might signal a degree of mental fitness detrimental to litigation. Instead, he spent eight weeks in Anguilla. Eventually, *Business Week* had to let him go. The lawsuit he filed, for twenty-five million dollars, against the building's management and the elevator-maintenance company, took four years. They settled for an amount that White is not allowed to disclose, but he will not contest that it was a low number, hardly six figures. He never learned why the elevator stopped; there was talk of a power dip, but nothing definite. Meanwhile, White no longer had his job, which he'd held for fifteen years, and lost all contact with his

former colleagues. He lost his apartment, spent all his money, and searched, mostly in vain, for paying work. He is currently unemployed.

Looking back on the experience now, with a peculiarly melancholic kind of bewilderment, he recognizes that he walked onto an elevator one night, with his life in one kind of shape, and emerged from it with his life in another. Still, he now sees that it wasn't so much the elevator that changed him as his reaction to it. He has come to terms with the trauma of the experience but not with his decision to pursue a lawsuit instead of returning to work. If anything, it prolonged the entrapment. He won't blame the elevator. ♦

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