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The Last Chase

"Oh, my God. This is going to be a huge one."

By Robert Draper

It's shortly after six in the evening on May 31, 2013. Sitting in the passenger seat of the white Chevrolet Cobalt, the 55-year-old, bookishly handsome storm chaser momentarily gapes at the video camera that the driver of the car is pointing at his face. Then he looks back through the window at the outskirts of El Reno, Oklahoma. The wheat fields are eerily aglow and shudder from a vicious wind. No more than two miles away from the car, twin funnel clouds spiral downward from an immensity of blackness. What we hear in the man's voice on the videotape is not quite terror. Nor, however, do his words sound clinically factual, in the manner of the scientist he happens to be.

"Oh, my God. This is gonna be a huge one," he says.

The man frowns. He strokes his chin with almost comical vigor. His name is Tim Samaras, and much of his adult life has been spent in the dangerous company of tornadoes. He's obsessed with them, to be honest—to the point where his wife, Kathy, would wryly note that her husband "had an affair with Mother Nature."

The affair had resumed later than usual this spring. "Who ate all the tornadoes?" he complained via Twitter. And on Facebook: "Why can't there be wedges harmlessly roaming the open plains for us geeky chasers to observe?" But then the month that storm chasers refer to as May Magic arrived—and with it, vertical wind shear produced by southerly winds originating from the Gulf of Mexico lifting and cooling air moving east over the Rocky Mountains, thereby generating thunderstorms and, along the way, lighting up the online discussion groups of happy storm chasers all across America: Severe weather! Severely GREAT weather!

On the morning of May 18 Samaras kissed Kathy goodbye and made sure that his lucky McDonald's cheeseburger—an actual, if by now somewhat moldy, cheeseburger—was situated correctly on the dashboard of his Cobalt. Then he and two members of his crew—a 45-year-old meteorologist named Carl Young and Samaras's 24-year-old son, Paul—bolted eastward from their home in Bennett, Colorado, for the midwestern plains known as Tornado Alley, where his other love awaited.

The tornado that very evening in Rozel, Kansas, had been gorgeous, glowing tangerine against the sun while its long rope undulated like a belly dancer—and, thankfully, left Rozel largely unharmed in the process. "Wow, did you see that?" Tim said to a fellow storm chaser, Jeff Pietrowski, who would remember Samaras's jubilant expression. While logging thousands of miles over the next four days through Kansas, Oklahoma, and Texas, Samaras and his team, known as TWISTEX, would encounter at least 11 tornadoes. Then, after four nights back home, Samaras returned to the road, in a truck outfitted with a gargantuan high-speed camera for the purpose of conducting lightning research in Kansas—though, as he acknowledged in a Facebook posting, he was "bringing secondary vehicle for a 'side' of tornado chasing (I love sides)."

In the May 31 videotape Samaras sits in that secondary vehicle, the Cobalt, a storm chaser on yet another chase. A man in exuberant pursuit of his passion. And yet it could not be more apparent that something is different this time—maybe because the viewer knows something that Samaras does not.

"It's heading straight for Oklahoma City," he mutters.

The tornado is the progeny of several thunderstorms that developed along a cold front over central Oklahoma that afternoon. At just after 6 p.m. it dropped out of the tip of the southernmost supercell, where the warm and moist air was most prevalent. Now it is a dense, moist leviathan. It rotates counterclockwise in a crazed ballet across the klieg-lit plains. The trees in its path shake as if possessed by the devil. Unlike its exquisitely geometric counterpart in Rozel, El Reno's tornado is a black wedge of indistinct composition.

"OK, I'm gonna stop," says Young, who was filming the storm as he drove. "We'll get a great view of it. This good?"

The Cobalt comes to a halt. Samaras and Young climb out, along with Paul, who is peering through a different video lens. The three men stand at the edge of a gravel road and squint against the rain. As they do, a third funnel coils out of the sky.

"Three vortices!" Young exclaims.

"Yep," says Samaras. When he turns back to the camera, he looks awed by what he is witnessing. "Wow. This is gonna be a gigantic wedge."

Young agrees. "It could be a very long-lived tornado. It could be on the ground for miles."

They return to the car a couple of minutes later and, with the windshield wipers flapping, silently press on eastward, the tornado lumbering along to their south. Lightning flickers across the dismal sky. Power lines swing madly about. The wedge grows and grows, blotting out all traces of the sun, darkening the three men in the car.

"It's violent," one of them says.

Stop the tape. Pause and consider: These were not men given to violence. They were not gratuitous thrill seekers or adrenaline junkies or even kamikaze researchers fulfilling martyrdom in the name of science. In particular, the legendary storm chaser, inventor, and National Geographic Explorer Tim Samaras was known for evangelizing about safety and for bringing an abundance of caution to his vocation. Though the decade-long mission he had assigned himself—placing measurement devices known as probes in a tornado's path, which necessarily entailed putting himself in the same path—was inherently high risk, he went to considerable lengths to mitigate the danger. He practiced deploying probes incessantly, always noting the time it took. He studied the day's weather patterns as if the lives of his crew depended on it. He gamed out escape routes. And even after all that, Samaras would not hesitate to abort a chase if the roads were poor or the tornado was too rain wrapped for its path to be discernible. "I can't tell you how often we didn't deploy because he said, 'Nope, this is too dangerous,' " recalls Tony Laubach, a member of the TWISTEX crew. "It was almost annoying at times. We'd say, 'C'mon, we can do this!' But he was very cautious."

How, then, to reconcile that widely acknowledged fact with the tragic events that would overtake the three men on May 31? Did the perfectionist fatally err? Or was the storm at El Reno simply a monster that defied all calculations?

If some of the answers are finally unknowable, that would be fitting, since mystery was, and is, the true object of the storm chase. How does a tornado occur? Over the past 40 years, with the development of Doppler and other advanced forms of radar, researchers have become increasingly adept at tracking the rotating storms known as supercells. They can measure the atmosphere's "convective available potential energy," or CAPE, to determine a supercell's intensity. And after the fact they can rank a tornado's sheer destructiveness using the Fujita or the later Enhanced Fujita scales—both named after the famed meteorologist Ted Fujita, who began his career measuring the damage done by the nuclear bombings of Hiroshima and Nagasaki. But, says Howard Bluestein, one of the reigning experts on the subject, "we simply don't understand exactly what distinguishes supercells that produce tornadoes from those that do not."

That basic riddle tantalized both the scientist and the boy in Tim Samaras. From the early days, when storm chasers relied on folding maps and sought out phone booths to receive weather updates, to pursue a tornado has been to brush against a glorious if destructive mystique. "For me, it was the total beauty of the storm itself," says David Hoadley, now a retired program analyst with the EPA who began chasing in 1956 and is therefore understood to be the founding father of the storm-chasing community. The very architecture of the storm, Hoadley goes on to say, is awe-inspiring: the coherency of a gathering system as moist, warm air bursts through a cap of colder air and creates an updraft and then a massive anvil; the pillowy mammatus clouds that congregate

beneath the anvil; the cloud ribbons known as inflow bands that rush into the storm; the descent of a "wall cloud," which tends to prefigure a tornado; and the twirling and talonlike "hook echo," usually composed of hail, shredded debris, or small raindrops, that often announces the tornado's violent arrival. All of this seemingly out of nowhere, in a matter of minutes—"kind of like a magical machine," says Hoadley.

The men like Hoadley and Samaras who devote much of their lives to the pursuit of storms—and yes, the tribe is overwhelmingly male—have a scientific basis for doing so. Still, to chase a storm is also to chase innocence, romance, and immortality all at once. The sensation that comes from tracking a weather system mile after mile, from its seemingly innocuous and sunny genesis all the way to its sudden descent from the sky, is a primal experience, an axis where life and death conjoin.

"It's an adrenaline rush," storm chaser and Army veteran Erik Fox confesses. "You can feel the wind and the temperatures, hear the wind, smell the moisture in the air. You can feel winds coming out of the southeast at 25 to 40 miles per hour at the surface, and then higher up it's 70 miles per hour—and higher still, coming out of the west, at over 100 miles per hour. You've got that wind shear and 70-degree dew point indicating high humidity. You can feel all of this, and you know it's gonna be a big day."

Though tornadoes are known to occur in such disparate locales as India, Australia, and the United Kingdom, they are fundamentally as American as baseball. The country's unique climate and topography produce more than a thousand tornadoes annually, far more than anywhere else. Nearly half of these occur in the Plains states during the spring. The weather geeks descend on Tornado Alley by the hundreds, arriving in vehicles tricked out with radios, mounted laptops, and cameras. Also accompanying them is a hope that springs eternal. It is not the modest aspiration to defy the 1-in-20 odds that a chased supercell will ultimately drop a tornado. Rather it is the yearning to behold the incomparable beast that will join the holy litany of Big Ones, whose dates chasers lovingly recite like the birthdays of their children. May 24, 1973: the horrific tornado in Union City, Oklahoma, the first storm to be widely measured. April 26, 1991: the so-called Plains Tornado Outbreak that spawned 55 tornadoes and almost as many documentaries. May 4, 2007: the tornado that all but leveled Greensburg, Kansas. May 3, 1999: the savage Bridge Creek–Moore, Oklahoma, storm, about which atmospheric scientist and Doppler on Wheels inventor Joshua Wurman would dryly observe, "People who have experience in damage surveys are greatly impressed with the amount of damage that that particular tornado did."

Damage. In addition to its pleasing aesthetics—unpolluted skies, pastoral flatness, and fine, agrarian color contrast—Tornado Alley has the merciful feature of being sparsely populated. Still, the reality is unavoidable: The storm chaser who yearns for the sight of an epic tornado is inadvertently rooting for devastation. Crops and livestock are destroyed, farmhouses and barns shredded. The infamous Bridge Creek–Moore tornado left 36 dead; several of those who survived had been sprayed by flying dust and gravel with such force that their skin appeared to have been sandblasted. And on May 22, 2011, the EF5 (the highest possible Enhanced Fujita ranking) multiple-vortex tornado that paid a deadly visit to Joplin, Missouri, left in its horrific wake 158 fatalities and more than a thousand wounded.

The day after the Joplin tornado a supercell struck the luckless Oklahoma town of El Reno. State medical examiner Eric Pfeifer had begun his first day on the job when the ten casualties were rolled into his office. "Though I'd seen forensic atlases and picture books," he recalls, "until you see firsthand what a tornado can do to the human body, you don't realize how extremely violent they are. The injuries are similar to those that you'd see in a high-speed motor vehicle accident, but they're much more numerous and much more dramatic looking. Bodies can be broken apart to the extent of not being recognizable. People are picked up by the wind and propelled against trees and other objects. Things like trees, nails, glass, and steel are torn loose and can act as a cutting implement. Imagine a piece of sheet metal coming off of a Quonset hut, traveling at 290 miles per hour. It becomes a Waring blender."

On June 24, 2003, proximity to violence made Tim Samaras famous. Funded in part by the first of 17 National Geographic grants that he would receive over the course of his storm-chasing career, Samaras dropped a red, conical, 45-pound probe in the direct path of an F4 (4 on the Fujita scale) tornado on the outskirts of Manchester, South Dakota. The probe would record a 100-millibar barometric pressure drop, the most drastic such decrease ever captured at the time. Meanwhile the little town of Manchester was, as Samaras would put it, "literally sucked into the clouds."

After his feat at Manchester, Samaras traveled to Chicago to appear on Oprah Winfrey's TV show. When the host asked him how he had become interested in tornadoes, the storm chaser replied that as a child he'd been mesmerized by the tornado in the opening scenes of *The Wizard of Oz*—that it was, frankly, the only thing about the movie that interested him. Oprah replied, "See, my favorite part is when Glinda the good witch says, 'You've always had the power' "—implying that the storm chaser had missed the most poignant message in the movie.

In point of fact, from an early age Samaras had known he had the power to make his dreams come true. From boyhood in Lakewood, Colorado, he had two preoccupations—how things worked and the weather—that would one day converge. His father sold toy trains and airplanes to hobby shops, and worked as a wedding photographer on weekends. The boy held the lighting equipment while his dad took the photos and watched him build model airplanes in the basement. When the elder Samaras saw how much his son enjoyed tinkering, he took out a want ad for used television sets, then piled them all in front of Tim—who promptly took them apart, repaired and reassembled them. Meanwhile his mother had given up making him play Little League baseball after she noticed that he would spend game time in the outfield gazing not at the ball but instead at whatever in the sky interested him.

Samaras became a ham radio operator by the time he was 13 or 14, a radio repair technician at 16, a service-shop foreman at 17. He did not bother to enroll in college. Instead, in 1977 the high school graduate walked into the office of Larry Brown of the University of Denver Research Institute without a résumé. Brown saw something in the teenager and hired him. "Within weeks," Brown says, "it was obvious he could fix things that my most senior technicians couldn't." By 20 Samaras had Pentagon security clearance and was helping to test, build, and explode weapons systems. "I get paid to blow shit up," he would exult.

A day came during the 1990s—by which time both men had moved over to Applied Research Associates—when Brown took his brilliant protégé into the offices of upper management. There was a problem, Brown informed them: Samaras had begun spending all of his weekends and holidays chasing tornadoes. Likely the company's insurers would come to view him as a liability. He asked Samaras to make his case, which Samaras did: *I never chase storms at night. I never go after a tornado that's rain wrapped. I always err on the side of caution.* Upper management did not wish to test their star engineer's loyalty. They gave him their blessing to continue his new hobby.

The first big storm he pursued was in Limon, Colorado, in 1990. Subsequently he took a storm-spotting class offered by the National Weather Service in the Denver area. It wasn't long before the sight of the five-foot-seven-inch, beak-nosed fellow in the antenna-adorned minivan with STRMCSR vanity plates was ubiquitous across the plains. Samaras had inherited his father's love of photography; he shot cartridge after cartridge of tornado footage and supplied it free of charge to longtime Denver television meteorologist Mike Nelson. The two became fast friends. One day in 1996 Nelson took Samaras to a special screening of the movie *Twister*. The two weather geeks snickered at the liberties Hollywood had taken with the not so glamorous life of storm chasers. "I'm not sure it's gonna make it," Samaras predicted when the movie was over. *Twister* became a blockbuster, and the once obscure demimonde of storm chasers proliferated overnight.

Among Samaras's storm-chaser pals was Roger Hill, who also lived in the Denver area and ran Silver Lining Tours, one of the first in the burgeoning field of tornado-watching tour groups. In February 1998 the two men conceived and hosted the first gathering of what would become the annual Storm Chaser Convention, or ChaserCon, in Samaras's basement. The event grew from about 10 attendees the first year to double that the following year to 50 or 60 the year after that. Like the rest of them, Samaras lived for the marathon chases out across Tornado Alley, followed by all-night drives home through miserable rain. During one chase he left a McDonald's cheeseburger on his dashboard; when a tornado erupted, he declared the cheeseburger to be a token of good fortune, and thereafter he always kept a cheeseburger on the dashboard—sometimes the same one for years. The walls of the Samaras house were festooned with framed photographs of whirling supercells. Each new vehicle became ever more elaborately rigged with radios, antennas, and cameras. A longtime co-worker recalls, "He told me that he would drop his kids off at school, and they'd say, 'Could you let us off a few blocks away?'—because of his crazy car."

The tinkerer began to build probes in his basement. They weren't the first of their kind. But Samaras greatly improved on the existing models by developing a more durable, aerodynamic device that wouldn't fall apart under the withering force of a tornado. After the historic deployment in Manchester, Samaras's genius was duly noted in the record books, and he became first among storm-chasing equals.

Given the new speaking gigs and National Geographic grants, there was nothing else that he could possibly want that he didn't already have. His engineering jobs—first with the Denver Research Institute, then with Applied Research Associates and National Technical Systems, and finally Hyperion Technology Group—accorded him the flexibility to take weeks and even months off. Other scientific organizations made him offers that he routinely turned down. The independence to do his storm research, build his probes, and chase storms was worth more to him than money. Besides, Samaras had become an excellent pitchman when it came to requesting research grants, and he took pride in his ability to stretch a dollar.

One proposal turned his head. In 2009 the Discovery Channel offered him significant money to be one of the lead characters in the reality series *Storm Chasers*. The series became the primary funding source for Samaras's TWISTEX operations—and along the way the Clark Kent-ish engineer became a TV star. Strangers approached him in airports and asked for autographs. Still, the experience was a mixed bag. *Storm Chasers* was TV, not science. "He always told us

when we were out there during filming every morning, 'Guys, I don't want you going out there bad-mouthing anybody. Let's keep it professional. We're here to do research, and they'll use it if they want,' " recalls Ed Grubb, who was among the TWISTEX members with cameo roles in *Storm Chasers*. But the show's producers seemed intent on ratcheting up the drama, and increasingly Samaras wondered if he had made a Faustian bargain. He expressed some relief to his friends when declining ratings caused the show to be canceled in January 2012.

At ChaserCon and on the lecture circuit Samaras seldom passed up the opportunity to inveigh against needless risks. He worried that the growing population of storm chasers would lead to clogged escape routes. But competing with his concern for safety was the considerable pride of a man who had always gone about things his own way. "The thing he told me was that he enjoyed it when people said he couldn't do something," says Grubb. "People said he'd never get probes in front of tornadoes. And numerous times he proved them wrong."

And so the fear that nagged at Tim Samaras was not related to his own welfare. Recalls Geoff Carter of Hyperion Technology Group, "He said it on more than one occasion: 'Somebody's gonna get killed doing this. A chaser, an amateur, a tour group—somebody's gonna get killed.'

"I never expected it would be Tim. He was the other end of the spectrum."

The good news for Samaras during the spring of 2013 was that he'd been liberated from the Discovery Channel and could—as he put it in a tweet—"chase without cameras in our faces." The bad news was that TWISTEX would now have to get by without Discovery's money.

Samaras requested an $80,000 grant from National Geographic to fund not only storm research in the U.S. but also "supertyphoon" investigation overseas. National Geographic awarded him half the sum, the amount in the budget for the U.S. operations, leaving the typhoon project for later consideration. Samaras delivered the news that "we've been partially funded for this year" to his TWISTEX colleagues in an April 7 email: "This means there isn't enough funding for a full-blown TWISTEX program for this year ... I wish I had better news for everyone."

The budget-conscious Samaras decided that he would spend the latter part of May on two different projects. The primary focus would be lightning research, funded by the Pentagon and conducted on a wind farm in Concordia, Kansas, among other places, using the truck, a converted former moving van equipped with a titanic high-speed camera that he dubbed the Kahuna, which could capture up to 1.4 million frames per second. Storm chasing would be on the side—with a stripped-down crew on a tight budget, in a single car that did not guzzle gas the way his heavy-duty Ram truck did. That meant driving in one of the small fleet of Cobalts—inexpensive, fuel-efficient cars—that Samaras had purchased for the TWISTEX team back in 2009. Samaras had always envisioned using his truck as the only vehicle in the twistex convoy that would deploy probes at close proximity to a supercell. The Cobalts were to be used only when taking meteorological measurements at a safer distance. But by the conclusion of their mid-May chases, Samaras and his crew had already exhausted half of the National Geographic grant. They decided to switch from the heavy-duty truck to the high-gas-mileage Cobalt.

On May 26 Samaras tweeted, "Off to KS to chase lightning—with tornadoes ... gawd I love my job." Accompanying him on the trip were two other members of the TWISTEX team—both of whom were grateful to be along, if for entirely different reasons. Carl Young had met Samaras around 2002 at ChaserCon. Though Samaras had ten years of storm-chasing experience over Young, the latter's brilliance as a meteorologist greatly aided the former's ability to forecast the day's weather events. Young had been devastated by the cancellation of *Storm Chasers;* acting had been his first dream. The photogenic, cleft-chinned Young, whom fellow TWISTEX member Matt Grzych playfully nicknamed Hollywood, was not afraid to challenge Samaras, particularly when evaluating the riskiness of a chase. "Carl was definitely the one to push the envelope," says Grzych, "and Tim would be the one to rein him in, especially for safety reasons. And Tim always had the veto power."

At the beginning of 2013 Young had promised his girlfriend, Dalia Terleckaite, that he was done with chasing. Young's brother, Eric, saw through this. As a boy growing up on the shores of Lake Tahoe, he had watched his older brother become transfixed by the flickers of lightning across the night sky, willing on torrential evenings to spend hours out on a pier on the lake. And so when Eric quizzed his brother over lunch that May about his promise to Terleckaite, Carl dispensed with rationales. "I truly love it," he confessed. At that moment the younger brother realized that Carl had no intention of quitting.

The same could be said of the other passenger in the Cobalt. Paul Samaras had been born on the same day as his father, 31 years later. When Samaras's two daughters, Amy and Jennifer, were young, he had taken each of them out on a storm chase. Amy became noticeably scared when a fist-size ball of hail cracked the windshield; her first chase would be her last. But young Paul took to the experience immediately. He had inherited the Samaras passion for photography, and it was quickly apparent to everyone else on the TWISTEX team that the shy, scruffy-bearded younger Samaras possessed a creative gift that

they lacked. "He just captured things," remembers Tony Laubach. "He made us look like heroes even if we were just taking a piss on the side of the road." Paul sold some of his images at ChaserCon—at bargain-basement rates, since, like his father, he cared deeply about certain things, money not among them.

By the late afternoon of Thursday, May 30, fellow TWISTEX co-founders Bruce Lee and Cathy Finley had completed a long day of storm chasing and were driving along Highway 105 a few miles east of Guthrie, Oklahoma, when they saw a white Cobalt parked along the side of the road. Three familiar figures stood nearby, gazing from their elevated post at a new storm firing up to the north near Interstate 35.

"You killed the storm!" one of them moaned as the two researchers joined their colleagues. Lee and Finley acknowledged ruefully that, yes, it did appear that the storm was petering out. That was par for the course, as it had been a somewhat disappointing storm-chasing string for Samaras's crew thus far. They had missed an EF4 tornado near the Oklahoma town of Shawnee, on the 19th—having been, as Samaras reported to National Geographic that evening, "20 minutes too late. Storm chasing can be very frustrating at times." The following day the TWISTEX team misjudged the weather patterns and, like numerous other chasers, followed a storm down to Duncan, Oklahoma—thereby missing the tornado that leveled much of the town of Moore. Another storm-chasing pal who had been at Moore, Lanny Dean, called and gave his account to Samaras, who then proceeded to lecture Dean for having risked venturing into a metropolitan area. "Lanny, you know better!" Samaras said. But then he began cursing himself: "Damn it, I missed it!" In more than two decades of storm chasing Samaras had witnessed only one other F4 tornado—in Hallam, Nebraska, on May 22, 2004. He had yet to lay eyes on an EF5 like the one in Moore.

That day, May 30, at sunset over the Oklahoma highway, it was already evident that the following day would bring weather that only a storm chaser could love. The forecast called for hot and humid conditions, which would build up tremendous energy in the atmosphere. There would be enough wind shear to make a thunderstorm spin. Somewhere in this state, perhaps close to Oklahoma City, Mother Nature would, in all likelihood, put on a glorious horror show.

Lee and Finley told the others that they didn't intend to stick around. There were way too many storm chasers already in the vicinity—hundreds of them. Doing safe and honest research while navigating through the gawkers sounded like a nightmare to them. For his part, Samaras didn't let on what his crew's plans would be. The lightning truck was parked near the courthouse steps in Alva, Oklahoma, two hours north of where they now stood. Their motel in Concordia, Kansas, lay another four hours to the north. The TWISTEX team had two more evenings' worth of lightning research ahead of them. But in the meantime Samaras had been discussing with Lanny Dean a possible deployment of devices they had been developing that measured a tornado's low-frequency sound waves. It happened that Dean was also a tornado tour-group operator, and on the 31st his bus was fully booked. If the two storm chasers were to deploy their experimental devices that day, it would fall to Samaras and his team to do so.

If. The plans were not firm. Still, the man who four days ago had tweeted, "gawd I love my job," was disinclined to miss out on what tomorrow's weather might bring.

"See you in June," Young said to Lee and Finley, as they departed.

> Storms now initiating south of Watonga along triple point. Dangerous day ahead for OK—stay weather savvy!
> *—final tweet from Tim Samaras, May 31, 2013*

From beginning to end, the storm was a thing both magisterial and brutish. Conditions had been ripe for a supercell all day—held back by a high cap of warmer air that, once finally punctured by the surface air, guaranteed a furious updraft. By 1:30 in the afternoon, with the skies a moist blue, the meteorologists at Channel 9 in Oklahoma City were already forecasting that heavy chunks of hail would pummel the region 20 miles west of the metropolitan area and that one or more tornadoes might well rumble into the city. The convective available potential energy had risen to an alarming 4,000 joules per kilogram. North of El Reno a dark anvil materialized over the town of Kingfisher. A heavy rain shaft off to the west drenched Greenfield; farther westward a separate storm fell on Weatherford. All signs pointed to the storm organizing itself into a supercell and pushing east toward El Reno. Meanwhile a large gaggle of storm chasers huddled together and compared notes at the Conoco station in El Reno, seeking to discern the storm's path and thus their own.

By five the number of storms had dwindled to three, stretching diagonally from Hennessey at the northeast to Hinton at the southwest—a 25-mile-an-hour battering ram whose midsection was destined for El Reno. By 5:30 a large wall cloud developed under a supercell updraft and hovered spinning and low to the ground six miles west of town. Other wall clouds formed to the north, at times obscured by thick curtains of rain. West of Kingfisher the first tornado dropped, multiple vortices whirling. A second funnel appeared near Geary.

Southwest of El Reno something else was happening. But for several long minutes an impenetrable rain wrap obscured the form of the storm. Then, at about five minutes before six, the curtain lifted slightly, and a bloblike structure appeared, dangling like a wispy rope over the eerily illuminated pea green farmland. It sat there, not quite yet declaring itself—a warped and blurry sword of Damocles twirling wickedly over a trembling countryside.

At just before 6:04 p.m. the sword fell. An ebony wedge slammed down onto the pavement of Reuter Road and the wheat fields on either side of it, three miles south of Interstate 40. Multiple vortices slithered out. As the tornado materialized to the south, more moisture flowed into it. The tornado remained shaggy and semicoherent. It seemed, in its sluggish and muddled state, unsure of what to do next.

Then it revealed its deadly intentions, mauling wherever it went. Brick homes were pulverized. A big and sturdy dairy barn disappeared entirely. Near the intersection of 15th and South Airport a local deputy stood outside for a bit and watched the storm approach. When his ears popped from the sudden loss of pressure, he hastily ushered his family into a neighbor's cellar, where they sat for several minutes listening to the howling winds overhead tear their home to ribbons.

The monster's appetite was at once growing and oddly fickle. In the 40 or so minutes it had left to live, it slapped bales of hay into a wheat field, disassembled machinery and scattered the parts for miles around, tossed a truck into a pond, lopped off the entire second floor of a home. And during its waning moments on Earth, after savaging an RV park on the south side of Interstate 40, the tornado crossed the freeway, barreled into the OKC West Livestock Market, apparently hoisted seven cattle and a 32-foot stock trailer into the air, and deposited all of them in a pasture a half mile south of I-40—the trailer reduced to rubble, the cows alive with nary a scratch on them.

But 25 minutes before that improbable feat the storm had spewed baseball-size hail at the town of El Reno as its funnel spun southeast toward the regional airport. Just to the north, three pairs of eyes watched its progress from a little white car as the tornado crossed South Chiles Road, traveling eastward at a speed exceeding 20 miles an hour. It was 6:12 p.m.

Roll the tape.

"Barely missed that airport," observes the driver, Carl Young, as the car pushes north toward Reuter Road.

Tim Samaras answers his phone. It sounds like a member of the media. "Yeah, yeah, the tornado's about 500 yards away—I really can't talk right now," he says. "It's just south of El Reno ... It's gonna be on the ground for a long time, and it's heading right for Oklahoma City."

Samaras hangs up. The tornado to the south has soaked up so much moisture that it has become shrouded in precipitation. "It's pretty well rain wrapped," Young says as he squints through the smudged windshield. "In fact, it's hard to tell what the hell it's doing now."

"OK, stop sign up here," Samaras says loudly as Highway 81 comes into view. "If there's any chance to deploy, we've gotta go east and drive south, and deploy our instruments when the tornado's due west. That's our only chance."

As they slow down near the intersection, the black wedge fills their line of vision to the south. "Wow," murmurs Young. "What a beast."

But no one in the car can tell how big the beast beneath the dark rain cloud really is. They can't see the tornado, which is uprooting telephone poles, slamming one of them into a pickup truck that contains two amateur storm chasers—and then hoisting the truck and its passengers into the air, flinging them 300 yards, sucking off their boots before hurling them lifeless to the ground. They can't see the tornado sling hail clear through the windows of a second car and strip it clean of its engine while rolling the vehicle for 15 to 20 seconds. They see only the dark, blurry implication of violence.

Highway 81 is uncluttered. In fact, it's closed to southbound traffic. Northbound lies their immediate escape route. By now virtually all the other storm chasers have elected to flee El Reno's environs. Samaras and his team could do the same. They've done the same many times in the past. But there are other factors to consider. The road is drivable. The tornado is epic. They are near its path. It's understood: The TWISTEX team will deploy their probes.

"There you go," says Samaras approvingly as Young eases the Cobalt across the highway and continues along the gravelly road. Anticipating rough road conditions, Young has laid his camera on the floorboard. But he says with measured optimism, "All right, so this is dry out here. Hasn't been impacted by any

rain."

"This thing is moving 30 to 40 miles an hour to the east," Samaras mutters. He's clearly puzzled. The sky to the south is a swirling gray cauldron. The wedge and the rain wrapping have effectively blocked the tornado from view. "Ah, I see it," he declares. Then, annoyed: "Arrgh. Maybe I don't. Sorry—just a bunch of rain here."

What he sees, when he does at last see it, is something that Tim Samaras has never seen before and will never see again. It is the sight that has sent experienced storm chasers at safer distances scurrying. The tornado suddenly bends its path to the left—the sign, ordinarily, of a dissipating vortex, except in this case the tornado grows.

In the span of a minute it swells grotesquely, from less than a mile in diameter to two and a half times that size—larger than any other on record. Around the mother tornado—which has suddenly begun to move at 40 to 50 miles an hour, with internal wind speeds four times that—four or five subvortices whirl up and down with wind speeds approaching 300 miles an hour. The storm turns hard and with unrelenting velocity charges north up Alfadale Road, chewing up everything in its path, bound for Reuter Road, the street where it first touched down.

As the Cobalt approaches the intersection of Reuter and Alfadale, Tim Samaras stares out the passenger window toward the south. When he sees what he sees, his voice is both calm and urgent. "In fact, uh, keep going," he says. "This is a very bad spot."

The tape clicks off at 6:20 p.m., three minutes before the storm and its chasers meet.

Less than an hour later, at 7:06 that Friday evening, a sergeant with the Canadian County sheriff's office who had just paid a visit to his newly destroyed farm was cruising along Reuter Road when he saw a crushed vehicle sitting in a canola field north of the road. But because the sky was still spewing rain and hail, the field was too mushy for him to cross. He came back later that evening and made it to the driver's side of the car. There was no one in that seat. Then he saw the passenger. The sergeant got on his radio and advised that a corpse would need to be cut out of a wrecked vehicle.

A lieutenant arrived on the scene and happened to notice a body in a ditch a quarter mile to the west of the vehicle, lying facedown in a creek. Concerned that flooding would wash the body away, the lieutenant and the sergeant pulled it out of the water and carried it over to the roadside near the car. In the pocket of the corpse was a wallet with identification for a Carl Young of South Lake Tahoe, California. The VIN of the white car came back as belonging to Tim Samaras —which matched the driver's license found in the pocket of the passenger.

A mile south of the mangled white car, Union City firemen had found another crumpled vehicle and nearby, floating down a creek, a 35-year-old oil field worker and amateur storm chaser named Richard Henderson. Two other men were found dead in separate vehicles a mile west of where Henderson had been killed. And on Interstate 40 the tornado had sucked a mother and her infant out of a sports utility vehicle, whereupon they were found battered to death amid a field of debris. All in all, the storm killed 22 people, including a family of six Guatemalans who had taken shelter in a drainage ditch, only to be swallowed up by floodwaters and carried several miles downstream to the Deep Fork River.

At dawn the weary lieutenant decided to take a look one last time along Reuter Road. As the sky lightened, he discovered another body, also facedown in the creek, 15 feet from where the first strewn corpse had been found. He called the medical examiner's office and waited for the car to arrive.

The medical examiner, Eric Pfeifer, received descriptions by phone from those believed to be the families of the deceased found along Reuter Road. The hook nose of the corpse in the passenger seat matched that of Tim Samaras. The cleft chin, that of Carl Young. The black, scruffy beard, that of Paul Samaras.

Kathy Samaras and her daughter Amy flew down to Oklahoma City three days after the tornado. They wanted to visit the scene of the accident. It surprised them to see, laid on the ground at the edge of Reuter Road where the Cobalt and Tim had been found, three long-stemmed roses. It also surprised them that the Oklahoma City mortuary director, who had done his level best to make Tim presentable for viewing, refused to be paid for his efforts.

"He was doing research, trying to save lives in our community," the director said firmly, and that was the end of the matter.

Other matters are not so cut-and-dried. Despite three additional videotapes that have surfaced since the tragedy at El Reno—one by a storm chaser whose car was about a quarter mile from the Cobalt when it disappeared from view, another by a storm chaser whose footage appears to show a small vehicle falling out of the sky, and a third that was recovered from Paul Samaras's camera—no one will ever know for sure what happened at 6:23 p.m. on May 31, 2013. Was the TWISTEX team able to see the tornado before it hit them? Were they attempting to deploy their probes at the time, or to outrace the tornado, or to stay put? Had the Cobalt been sucked up by one of the ferociously spinning vortices? For others in the storm-chasing community, one question was most excruciating: If it had happened to Tim Samaras, couldn't it also happen to them? Every one of them knew the answer. Yet not a single one of them vowed to give up the chase. Nor, in truth, would have Tim Samaras.

During the funeral of father and son Samaras, the pastor placed a McDonald's cheeseburger near the podium, where storm chaser after storm chaser paid tribute. Among the others who said a few words were Kathy Samaras, daughters Amy and Jennifer—and, standing alongside them, holding their hands, a 35-year-old man whom few in the audience knew.

His name was Matt Winter, and he was Tim Samaras's other son, though he himself had learned this fact only seven years earlier. Growing up in Des Moines, the boy had maintained an odd fascination for severe weather that his parents had not nurtured. On his 11th birthday a tornado had blown through west of town; while everyone else at his birthday party had clambered into the basement, Winter pleaded to be allowed to stand outside and watch. At the age of 26 he followed National Geographic's online coverage of Tim Samaras dropping his probes in the path of the Manchester, South Dakota, tornado. Three years later, in 2006, at a Doppler weather conference in Des Moines, he heard Samaras speak. It was after this event that Winter's mother figured she should sit her son down and tell him about the man she used to date in Lakewood, Colorado, before either of them was married.

After that conversation, the woman called Samaras, to whom she hadn't spoken since learning she was pregnant nearly 30 years earlier. He requested that she purchase a DNA kit. When the results came back as a 99.9 percent match, Samaras sent an email to Matt: "I want you to know that I'm very happy and proud to find out that you're my son." The Samaras family welcomed Matt into their home. Thereafter the two men got together whenever they could. Samaras sent Matt photographs of lightning and tornadoes. As a birthday present, the son received the father's book, *Tornado Hunter*. The inscription inside read: "This gives you an insight into who I am, and why I do what I do. Love, Dad."

Like the surviving Samarases, Winter spoke for a few minutes as they stood together before the 800 gathered that somber day in early June. He did not, however, share his most poignant story. Just the previous September, Samaras had gone to visit Winter in Des Moines. They were eating dinner at an Applebee's, chatting about the weather and science as they tended to do, when Winter decided to ask Samaras point-blank, "If something ever happened to you out in the field, how do you think Kathy would handle it?"

Samaras did not seem startled by the question. "Matt," he replied, "Kathy's a strong woman. She understands this is my passion. And if something happened to me, she'd move on."

On the drive back to his hotel, Samaras returned to the subject unprompted. "If something did happen to me or my team out in the field," he said, "I'm going to go down getting my data. That's the only reason I chase. It's for the data."

But then, Samaras added a new thought—a flash of elemental romance within the man's stoic scientific core. "And it better not be a little rope tornado that does it. It better be a multivortex or a wedge," he said. "I don't want to be taken by a skinny little rope."

Regaining the engineer's stolid composure, he concluded, "And if it happens, I'm going to go out collecting my data."

The storm chaser left his son with that forecast—a perfect one, as it turned out—and thereafter drove off, to an eternity of awaiting roads and severely great weather.

Robert Draper's last story for the magazine was an essay on photography. Photographer Carsten Peter went on 13 assignments with Tim Samaras. With additional reporting by Samantha Larson.
