
THE STORM BIGERT & BERGSTRÖM

INTRODUCTION
WEATHER MODIFICATION
BY CHRISTOPHER TURNER

In 1953, the émigré and dissident psychoanalyst Wilhelm Reich, then resident in America, invented a device he called the "cloudbuster." The first prototype was a Marcel Duchamp-like construction, seemingly as much an artistic as scientific object. It had a double row of five fifteen-foot long metal pipes that were mounted on a wooden turret that could be spun around with a revolving system made from several recycled bicycle wheels. When Reich pointed the battery of aluminum tubes to the heavens, massaging the sky in circular motion with his machine, he thought that he was able to control the weather. He maintained that, like Moses, he could not only redirect storms but summon them up.

That May, three of Reich's most faithful disciples flew to his estate in Maine so that Reich could demonstrate these supernatural powers. "During the operation," one of them reported:

"The gravitational pull around the cloudbuster and for some distance away seemed to increase markedly, making it actually difficult to pick up one's feet from the ground. The atmosphere around the cloudbuster was highly charged, and, in a few minutes, our lips became blue and parched, our mouths dry. Soon our faces were blue, and we became dizzy and unsteady. We kept wet cloths on our faces. Smoke appeared to be gushing from the ends of the ten pipes. Reich said it looked like an anti-aircraft gun during firing. Whether the smoke-like material was being sucked into the pipes or being emitted from them I could not be sure. It was all very impressive and made us aware again of the tremendous forces at work… how real and actually terrifying it all was and how frustrating to meet scoffers who belittle Reich's work and call him insane."

At that time Reich was being investigated by the Food and Drug Administration (FDA) for promoting a fraudulent medical device: the Orgone Energy Accumulator. It was a wooden box lined with sheet metal that users were supposed sit naked in so as to charge themselves with orgone, a libidinous energy Reich claimed to have discovered. Irradiation sessions would, Reich asserted, dissolve sexual repressions and, in turn, cancerous tumours and other ailments.

Many American intellectuals – including Norman Mailer, J.D. Salinger, Allen Ginsberg and William Burroughs - sat faithfully in orgone boxes hoping for sexual enlightenment (Burroughs claimed to have had a spontaneous orgasm in his). However in 1954 the FDA, which had commissioned a series of independent scientific of the device, filed and won an injunction that declared orgone energy fictitious and Reich's device worthless. A court decreed that all rented boxes be recalled and destroyed, and the literature advertising them burned.

Reich, then absorbed in experiments with his new cloud-busting device, fired off telegrams to the President, J. Edgar Hoover and members of the press. "Established knowledge," he wrote, "must have no authority ever to decide what is NEW knowledge." Humiliated, he threatened to prove the existence of orgone energy by summoning up apocalyptic storms with his orgone guns:

"According to the Federal Food and Drug Administration, Orgone Energy does not exist. We are drawing east to west from Hancock, Maine, and Orgonon, Rangeley, Maine, to cause storm to prove that orgone energy does exist... We are flooding the East as you are drying the Southwest. You do not play with serious natural-scientific research."

In making such threats, Reich assumed the mythic figure of the rainmaker (breaking the injunction would eventually land him in Lewisburg Penitentiary). This had a long history, dating back to the ancient shaman; in *The Rainmakers: American "Pluviculture" to World War II*, Clark C. Spence documents "the hundreds of schemes for rainmaking, hail prevention, and fog dispersal" that flourished in the late nineteenth and first half of the twentieth century, vestiges of a magical relation to the world that existed alongside the nascent science of meteorology.

In the 1890s, for example, many believed that explosions could somehow rip rainfall from the sky, which explained why it so often poured with rain during wars. In that decade there were two federal government sponsored field tests in Texas during which researchers attempted to cannonade the sky to make rain. According to a report in the Washington Post, in one of these military assaults on the atmosphere 12 hot air balloons packed with dynamite, 175 shells and 1,200 charges of "rosellite" were exploded, "and yet the whole hullabaloo did not lead to any more water than would furnish a canary with its morning bath".

Nevertheless, amateur concussionists continued to bombard the sky. Between 1910 and 1913, for example, Michigan cereal king Charles W. Post spent $50,000 in a series of "rain battles", detonating three thousand tons of dynamite in each campaign (before putting a bullet through his brain). Reich's own rainmaking experiments, which used guns that fired (or sucked) orgone energy, echoed these earlier failures.

Though weather control had long been the realm of charlatans and opportunists, Reich, however self-deluded, wasn't a deliberate fraud: a monomaniac, he had absolute faith in his cloudbuster. Nevertheless, Reich wasn't above marketing his rainmaking schemes. In the summer of 1954, for $100, Reich agreed to break the Maine drought with his "cloud engineering" for Ozzie Merrill, a local blueberry farmer. An article in the Bangor Daily News (July 24th) declared it a success:

"Dr. Reich and three assistants set up their rain-making device off the shore of Grand Lake near the Bangor Hydro-Electric Dam…The device – a set of hollow tubes suspended over a small cylinder, connected by a cable – conducted a "drawing" operation for about an hour and ten minutes…Rain began to fall shortly after 10 o'clock Monday evening, first as a drizzle and then by midnight as a steady, gentle rain…A puzzled witness to the rain-making process said, 'The queerest looking clouds you ever saw began to form after they got the thing rolling'."

Ironically, by the early 1950s Vincent J. Schaefer and Irving Langmuir had demonstrated that you could make rain by seeding clouds with dry ice or silver iodide initiating a new era of scientific weather modification, but endeavours such as Reich's continued nevertheless.

In their international adventures exploring the history and future of weather control, Mats Bigert and Lars Bergström blur the line between such scientific and pseudo-scientific ambitions; both are treated as equally madcap attempts to manipulate nature by playing god. Efforts to control the weather are examined through an artistic rather than scientific lens, interpreted as a form of monumental land art. In 1977 Walter De Maria created his famous Lightning Field, a gigantic grid of 400 pointed steel spikes arranged in a mile by kilometer rectangular grid in the New Mexico desert, that he hoped would harvest lightening strikes (in fact the poles aren't high enough to do so to a greater degree than the surrounding area). Might Reich's schizophrenic device not be more generously appreciated as a similar artistic endeavour, a surreal dream machine that embodies our fantasies of controlling the uncontrollable?

Reich mounted two cloudbusters on the back of Chevrolet trucks and drove from Maine to Arizona, hoping to use his guns to green the Sonoran Desert by catalyzing storms (as he grew more delusional he thought his machines could also shoot down UFOs and he engaged in intergalactic battles there using his batteries of guns). In the same spirit of adventure, Bigert and Bergström mounted their aluminum and PVC Tornado Stopper, or Diverter, on a flatbed trailer and drove into the South East of America with the aim of using their vortex-shaped sculpture to redirect twisters. They compare their eccentric device, which radiates 100,000 negative volts of electricity, to a drawing of a jellyfish by Ernst von Haeckel; they acknowledge that it looks an improbable machine for which to claim such powers: David vs. Goliath.

The Tornado Diverter was inspired by the theories of Vladimir Pudov, a research scientist at the Institute of Experimental Meteorology in Obninsk, Russia. Pudov believes that you can mitigate hurricanes by creating "anthropogenic perturbations" in front of their advance, which would deprive them of their natural energy, and he proposed certain hardware for this task. Following his ideas, Bigert and Bergström hoped that, when they set up their sculptural machine in the eye of the storm, its power source would repel the positive charge of the tornado, so as to untether it from the ground and dissipate it.

Bigert and Bergström, who dressed in military jumpsuits for their dangerous mission, make a call to arms:

"As the atmosphere heats up due to global warming, the difference in temperature between air masses might create more hurricanes, storms, and tornados. And if preventive measures to reduce CO_2 emissions fails, we might find ourselves in a situation where we have to start taking action, and using means not only to protect ourselves against the weather, but to actually modify and tame it."

Their storm-chasing journey through tornado-ravaged Missouri, Kansas and Nebraska documents the massive devastation that these severe weather conditions can cause, hurling houses and cars about like toys. Ultimately, they never got the chance to put their device to the proper test. A needle in a haystack of devastation, the Tornado Diverter is a poetic fantasy, promising to suture and repair all this damage by warding off tornadoes in the future.

The artists propose a whole series of their machines arranged in phalanxes in an uninhabited area, as in the Lightening Field, emitting a charge that would use the power of tornadoes to ground them. One can imagine the perfect scene in which a twister would be rooted in their metal sculpture, which would miraculously vacuum it from the sky. One can also imagine the more likely scenario of a tornado destroying it. Nevertheless, it would be a sublime work of land art, mute funnels pointed skyward like protective talismans.

Christopher Turner
July 2012


KEEP OUT
KEEP OUT


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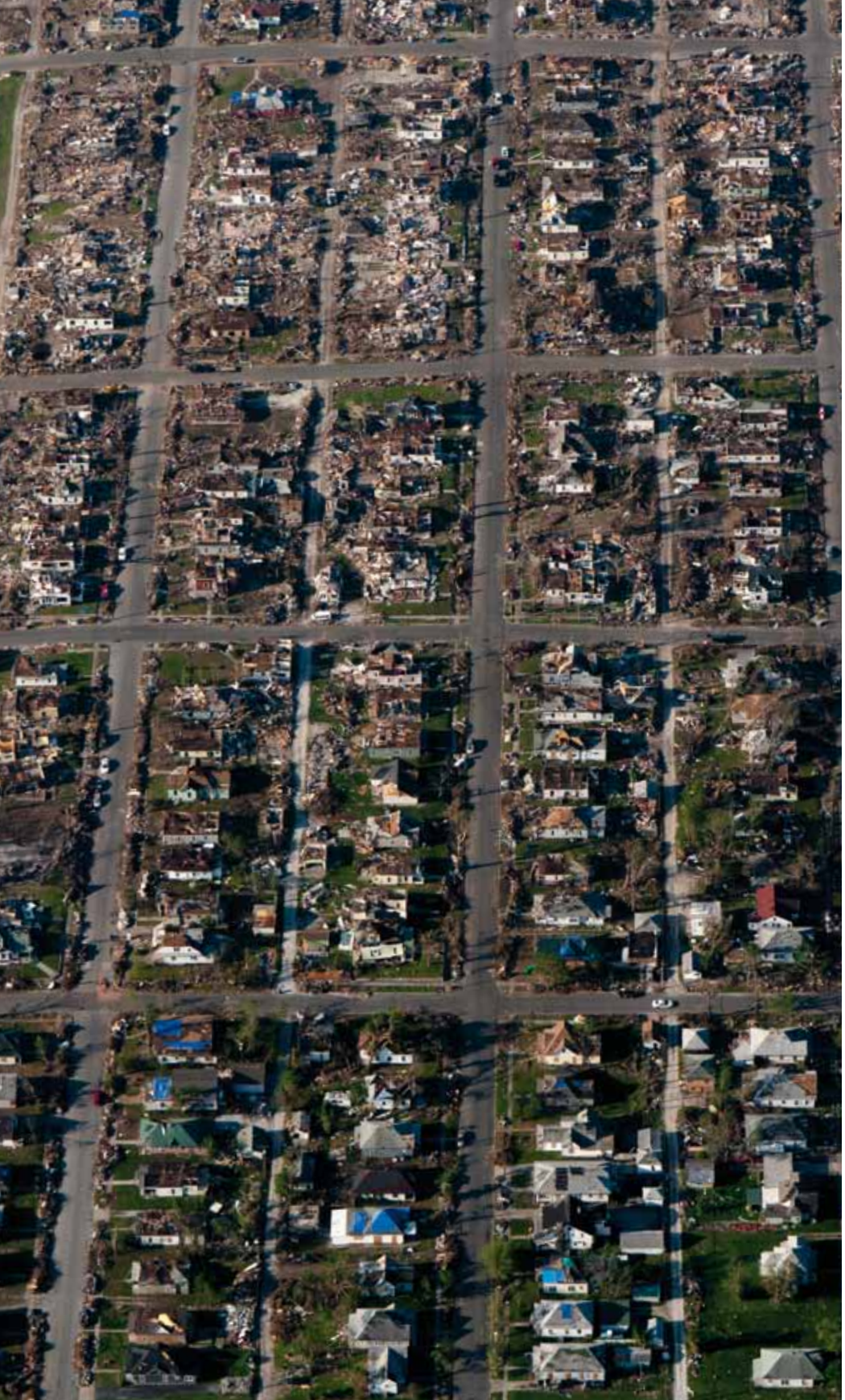
KENTUCKY



THE STORM
BIGERT & BERGSTRÖM

27/5/2011
Flying in the sliver between the tropo- and the stratosphere, our little Delta plane wedges itself into a slipstream over the Atlantic. We are in the very last row, squeezed in by a Ukrainian lady and a jumpy American backpacker; the Great Plains seem very far away. We meditate on the fact that one cubic centimeter of air at ground level contains twenty-eight quintillion particles, while the solar wind that bombards our magnetosphere only contains six particles in the same measure. As we sail down for a stopover landing in Memphis, the Weather Channel pumps out the latest news about the extreme weather situation prevailing in the country. Welcome to Tornado Alley!

28–30/5/2011
In Columbia, Missouri, we set up our sculpture for the storm chase. David Wilson, who together with Paul Sturz is the arranger of the international documentary film festival True/False, has lent us a fantastic studio in the wilds. Red birds, armadillos, raccoons, and turtles watch with curiosity as we assemble insulators, PVC tubing, toroid and high voltage transformer. Everything sits on a used trailer that we paint in the same graphite shade of grey as the monster of a car that we've rented. When we give this vaguely military-looking carriage a test run, the trailer jumps loose and our project is millimeters away from collapsing right at the outset. We are extremely lucky as a small safety chain saved us, and the car's undercarriage miraculously escaped damage even though the trailer is wedged under the car. We regroup, nurse our wounds, and when our colleague Lars Siltberg arrives to help us with the filming, we're ready to head out.

31/5/2011
Today we filmed at Marv Johnston's farm in southern Kansas. He and his wife Barbro Johnston have had major problems with recurring tornadoes that come sweeping through their fields every spring. Marv has something of an inventor's streak in him, which he has channeled into, amongst other things, a combination chainsaw-wheelchair. So when he heard that our machine needed a test site, he became curious and offered to let us set it up on his farm. He told us that the monster tornado selects its victims randomly, and it seems there's nothing to be done about it. His farm was just forty miles from Joplin, which was completely destroyed by an EF-5 twister at the beginning of last week, and wherever we go in the vicinity there are fundraisers for the victims of the disaster. So what can our "Tornado Stopper" do about one of nature's most powerful weather phenomena? Perhaps not stop it, but, like Marv suggested, alter its direction. We are thinking about changing the title of the piece to more accurately describe the function of the machine – The Tornado Diverter. Why not a whole series of them set up in two lines like a funnel, nudging the tornado into an uninhabited area. Like an Aikido master, using the power of the attacker to bring it down.

Now we head on north to Nebraska to meet our Canadian storm hunter Mark Robinson. We just hope that the sky's twilight shade of red doesn't fulfill the old American saying: "Red sky at night, sailor's delight."

1/6/2011
We manage to drive the last miles into Grand Island, Nebraska, by sheer willpower. It's 3 AM. We've totally misjudged our travel time and end up checking into a sleazy motel. A powerful storm called Gustado has just passed through the city and, for instance, lifted a warehouse into the air and moved it a couple of blocks. In the morning, we meet up with Mark Robinson, who will be our guide in Tornado Alley for a week. Mark is a meteorologist in Toronto, a true tornado freak and has his own TV show called Storm Chasers. He loads on a ton of computers and the luggage compartment is now filled to the brim. He places a number of different antennas on the roof of our Ford Explorer. One is for a CB radio that puts us in contact with the two other cars in our caravan. One of the cars is driven by Scott and Dave, legendary storm hunters with the most extreme tornado footage on their CVs. Scott and Dave shot most of the classic You Tube clips of close encounters with tornadoes. Their car is pimped with special protection against hail, which is the biggest hazard when chasing storms. The chances of seeing a tornado in a supercell are extremely low, but softball-sized hail balls are very frequent. In the heart of the supercell, you get bombarded and if you are unlucky all the car windows are smashed. After going through the forecasts and deciding on a cell that seems to be bubbling up in southern Nebraska, on the border to Kansas, we get going.

A hundred miles south over the vast rolling fields, on the edge of the Great Plains, we turn into a Subway for lunch, and to wait for a more precise location of where the supercell will be forming. In the parking lot, we meet a whole pack of storm chasers who have all picked the same starting point for today's chase. Everyone admires our machine and we are bombarded with questions. Suddenly there is panic and everyone jumps like firefighters into their cars. Mark sets up his GPS, radar, and computer, and our carriage is directed towards the eye of the storm. We are north of the cell, which is moving slowly eastward with an anti-cyclical movement. Things are happening fast now because we want to circle the storm and end up on its southwest side. That's where we'll find the narrow low-hanging "wall cloud" from which the tornado might develop. A tornado can be thought of as a very precise expression of the entire supercell's total power focused in one point. The rotation gradually increases and, like a pirouetting figure skater who pulls in his arms, the speed also increases until a tornado develops. Kind of like the whirlpool in an emptying bathtub.

When we try to circle the storm, we wind up in its eye and are suddenly exposed to a downpour like we have never experienced before. The force of the storm is beyond description and that's when we realize that this project is for real. The twisted sculpture and the anti-tornado machine bouncing around on our flatbed suddenly feel very exposed. When Mark's radar goes down, and the storm chaser we've been following makes a U-turn on a narrow road, panic breaks out. We are in the eye of the storm with zero visibility and in an area where the tornado might pass if it strikes down. After some maneuvering and yelling, we finally succeed in making a U-turn – with a trailer on a flooded road – and we go speeding westward to get behind the storm. Now the chase begins where it's all about positioning ourselves at an angle just behind the storm so we can follow its development and keep an eye on the "wall cloud." We race across the flat landscape and Mark keeps us constantly updated on the twists and turns of the storm. We decide to try to set up our machine in the middle of its path when the storm has just turned south. We find a place on a dirt road in the middle of the storm's path and get five minutes to set up The Tornado Diverter. We hadn't expected such drama on our first day of storm chasing, so we haven't practiced our set-up routine. After some fumbling, we finally get it up, plug in the high voltage transformer and drive away. We watch the storm from a distance, with our machine looking like a little David directly in the path of a speeding Goliath.

2/6/2011
In Wichita, we meet Dale Zogleman, whose company, Protection Shelters, builds concrete bunkers to protect people from tornados. His outfit is priceless: cowboy boots, company logo cap, and shirt tucked in tight blue Wranglers. We ask him to tell us about his business, and it's like turning on a tape recorder. The bunkers weigh eighteen tons each, and are placed in your backyard, or built into your house. Only $10,000! He explains how demand skyrocketed after the disaster in Joplin. Everybody is calling to get their own shelter. One woman ordered a specially designed room for herself and her six dogs. Dale also shows pictures of a bunker he built for a man and his beloved Harley Davidson. When we propose a collaboration in which we would develop a bunker into a sculpture, he is hooked right away. Maybe it could be a public work for Salina, where we will probably spend a month or two next year. The sun is setting, and after seeing one bunker after another, we are finally excused – and roll into a bunker-like motel in Wichita. Lights out, tomorrow Joplin...

3/6/2011
We roll slowly into Joplin, and initially it looks like any small town in southern Missouri. A shopping mall and the familiar row of well-known fast food chains formed a line on the strip towards the city center. But when the wound opens up, it is an unbelievable sight. We enter exactly where the tornado caused the most destruction, at St. John's Hospital. We stop at an intersection and look out over the 1.5-kilometer-wide strip of pulverized buildings that extends ten kilometers from the city's west side to the east. When the sirens sounded just after five o'clock on May 22nd, the residents had twenty-six minutes in which to seek shelter. But nobody knew that the small tornados that commenced the storm would converge in to an EF-5, the most destructive force that can occur in nature.

We spoke with Aaron Wilcox who sought refuge with his family in his mother-in-law's basement. The last thing Aaron noticed before he threw himself under a pile of mattresses and blankets was the strange whistling sound, similar to an approaching freight train. During the thirty seconds that the tornado was moving over their house, time stood still, the room was filled with swirling dust, and Aaron prayed to God. When he heard that it had passed, he ran up to meet a terrible sight. The block

that formerly surrounded the little house was completely gone and suddenly you could see the horizon again. Aaron immediately started to try and save people in distress and he reflects on how disaster paradoxically brings out the good in people. The neighbor's newly built house was completely stripped away. We think it looks like someone were just about to start building. The foundation seems to have just been laid.
The house flew a hundred yards before it shattered against a tree. The neighbors were hiding in the bathtub which came along up in the air and then landed in a block nearby. Miraculously, they survived and it is striking that so many of the stories being told about the disaster have a happy ending.
In looking at the almost total eradication of the eight thousand houses that stood in the way of the tornado, it's bizarre that "only" 130 people died. A great tragedy, but it could have ended much worse. The only word that can adhere to the maelstrom of crushed matter that surrounds us is: abstract. The sun still sets, however, and conjures up a mad image of a ball of embers descending on a landscape of wreckage.

4/6/2011
A busted chase is still a chase. We go north at top speed from Joplin through Missouri up to Iowa and Des Moines, where Mark has stuck today's nail in the storm coffin. But to catch up with the storm described by Mark as "maybe maybe, iffy iffy," we have to test our machine's durability at high speed. When we've finally managed to push our engine to seventy-five mph the rearview mirror lights up in merry flashes and the border patrol let their lasso fly. We were twenty mph over the limit, but when the officer takes a look in our car navigated by two Swedish men dressed in military jump suits, he looks puzzled. A Swedish driver's license adds further to his confusion, and we get off with a "verbal warning." We wonder what a non-verbal warning would have been like. Onwards, towards the increasingly distant shimmering pink cauliflower head of a cloud churning away on the horizon. Mark keeps us constantly updated on the storm's movements, and it's looking worse as the storm has increased its speed to fifty mph heading east. We are still a hundred miles west of the storm and a quick calculation shows we're four hours away from "storm interception." We want to continue, but Mark closes the blinds for good, and we throw the storm system a last miserable look before we head north towards Ottumwa, the closest needle on the map with motel-spree-extravaganza.

5/6/2011
When we come down for breakfast, which looks more like an assemblage of various artificial substances, Mark looks happy, signaling that this day could give us what we most yearn for – a tornado. We leave the Days Inn motel, with its cheerful sun logo, to speed back to Nebraska again. On the way out of Ottumwa, we pass a gas station and laugh out loud at BP's logo that some genius has designed as a morph between the sun and a sunflower. The hypocrisy reaches new heights. Why not an ostrich, hiding his head in the sand? Or BP's CEO dipped in oil and rolled in feathers?

We meet up with the rest of our caravan and the CB radio is turned on. Mark talks to Daniel, who is a storm chaser from Australia. He has a custom-built car that he keeps in the US just for the tornado season. It is equipped with an aluminum roof and various mounted go-pro cameras documenting when the car is bombarded by hail. It seems to be his thing, going straight into the part of the storm producing the largest hail.

When we introduce a new term – to "release" weather – into the storm chaser's jargon, the radio traffic increases markedly. We stop to wait and see where the thunder cell will build up, and once it has been established, we drive down to North Kansas again. The dance of the storm's rotation and motion is now repeated, and by the time we find ourselves right in front of the dark wall cloud, the rotation is pretty strong. We're filming straight ahead when Mark shouts, "Tornado on the ground, to the right!" We see nothing, no tail, where is it? Mark patters out an explanation like an excited sports commentator. The tornado doesn't always have to be visible, but we suddenly catch sight of the vortex whipping up dust on the horizon, three kilometers away – a small tail pulling up into the cloud. Mark captures the image and we quickly decide to "deploy the tornado diverter" as the wall cloud might produce more tornadoes in our vicinity. We are a bit quicker this time, and our twisted machine is once again poised against the ominous sky. When we look at it from a distance, it looks like a jellyfish drawing by Ernst Haeckel.

6/6/2011
"You ancient, you boundless, you clear blue skies…" "Never a cloud, to be seen in the sky..." It's Sweden's national holiday; calm weather prevails and we decide to send our storm hunter Mark home to Toronto. He has desperately flipped and rotated every radar image of weather scenarios in the Midwest, but it's like getting blood from a stone. A high-pressure system has put a lid on any potential thunder cells, which means that they cannot reach the altitude where the jet stream puts extra spin on them so that they can grow into rotating supercells. And unfortunately it looks as if the lid has been put on for good this week. In other words, this year's chase is over, and the various storm hunters' little red markers on the GPS are scattered across the continent.

7/6/2011 Pawnee Nation
We head south from Nebraska and across Kansas before we get into northern Oklahoma and Pawnee Nation. Finally a nice little sleepy town as a change from the rosary of depressing highway food chains and motels. Maybe because it's the capital of the Pawnee reservation. Gordon Adams is the recently appointed Tribal Historic Preservation Officer and we go out to his ranch for an interview. He retells the creation myth of the Pawnee, in which the tornado plays a crucial role. Both woman and man were placed together with all living things on earth with the help of a tornado. Interesting to hear a creation myth where the most disruptive force plays a creative role. Gordon reflects on the Pawnee past as a warrior tribe – the only one whose ritual dance is performed counterclockwise, just like the tornado.

In the evening we shoot pool and drink beer with a bunch of Pawnee, and Danny T, the owner of Cool Beer Pool and Darts, says that the Pawnee were the only tribe that could navigate by the stars – a big advantage at night on the vast prairies without landmarks. Perfect for a gang of horse thieves. He tells us how late one night, drunk, he met two longhaired Native Americans who inquired about his tribal affiliation:

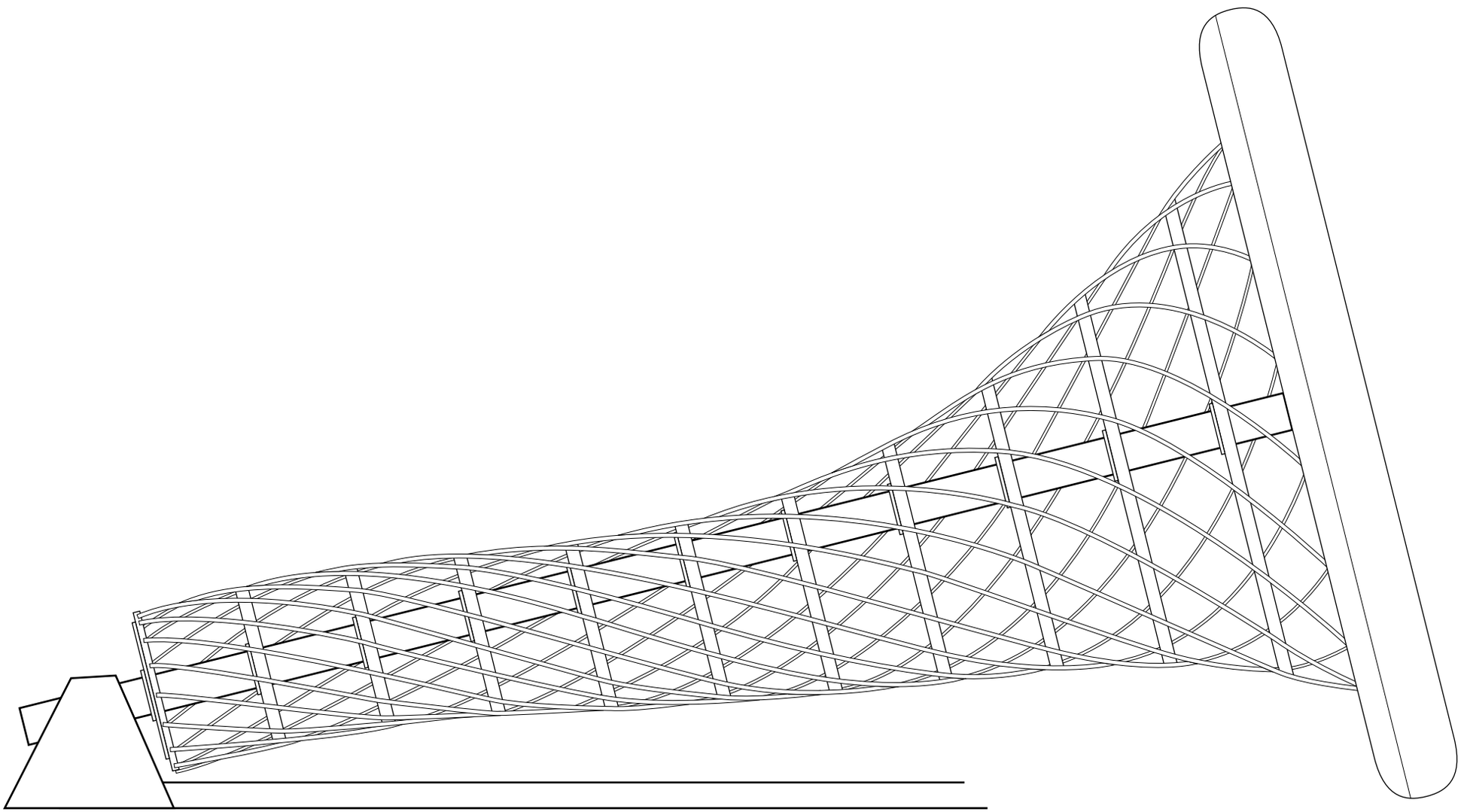
Danny – I'm a Pawnee.
The two Native Americans – Oh, one of those horse thieves!
Danny – Well, we stole your women too.

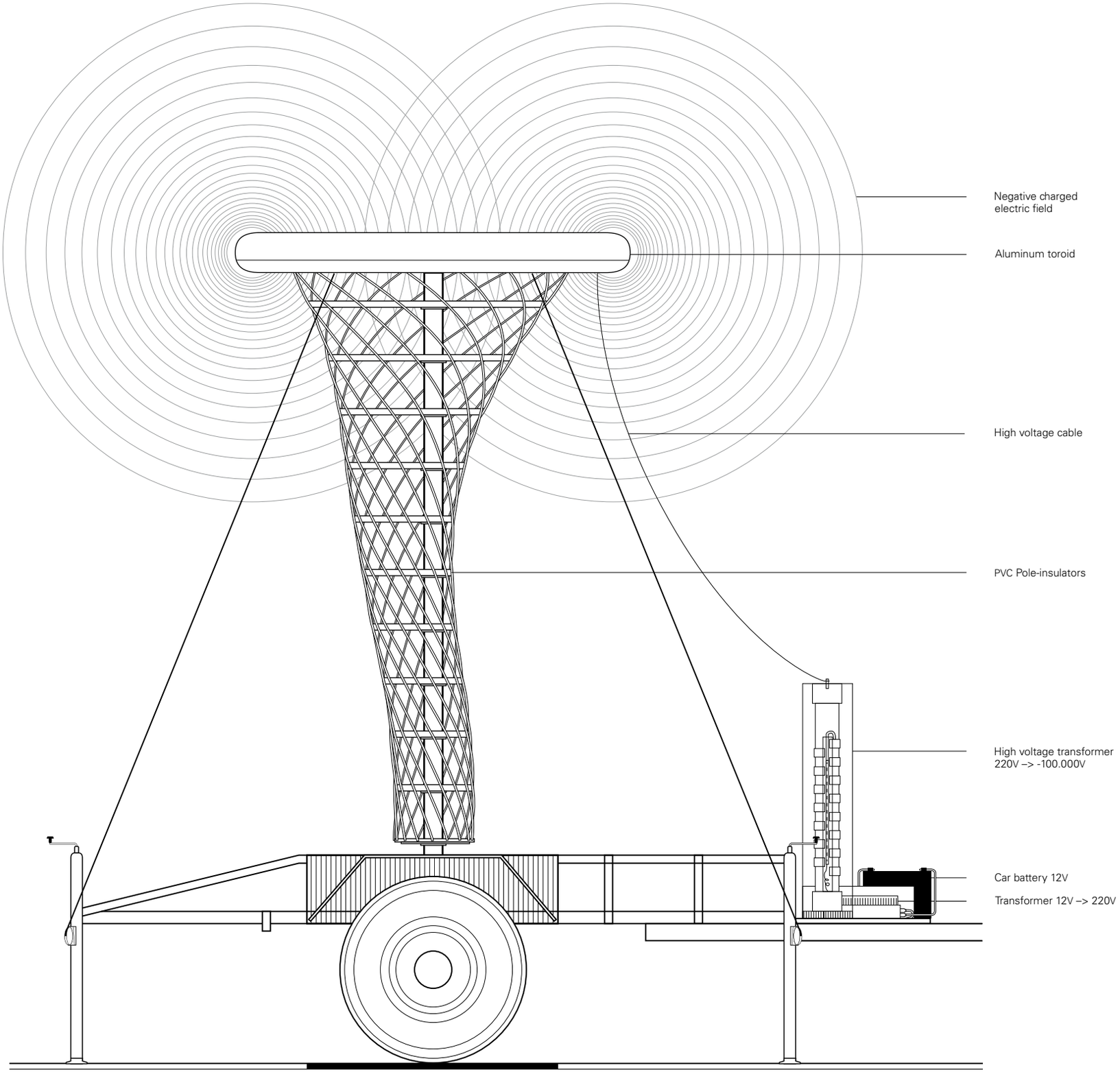
8/6/2011 Oklahoma-Arkansas-Missouri
Oklahoma-Arkansas-Missouri. It's all turning into a road movie, in which we stop now and then to take pictures of round shapes. Nobody can say no to a whim. A spherical radar tower – Boom! A bale of hay – Boom! Tubes of propane – boom! The film seems to be rolling out in front of our car like a red carpet. The ideas hook organically into each other and a molecular rhizome emerges. We decide to dedicate this day to the Pawnee saying: "Nothing has been, nothing will be, everything is."

6/10/2011 Columbia, Missouri
Columbia, Missouri. Back to the base after a two-week spin in tornado alley. Storm chasing isn't really such a healthy sport. It becomes very obvious after ten thousand kilometers in a car with comfort food as the only option. Our bodies have been transformed into limp attachments whose distress signals our brain ignore. The fantastically obese Americans that we've met along the way form a panorama of fat and isolation. Nestled in a bacon roll topped with gravy, no radical thoughts could ever break loose. The Midwest could use a new kind of natural force that not only sucks up dust and debris, but also sucks the fat out of people.

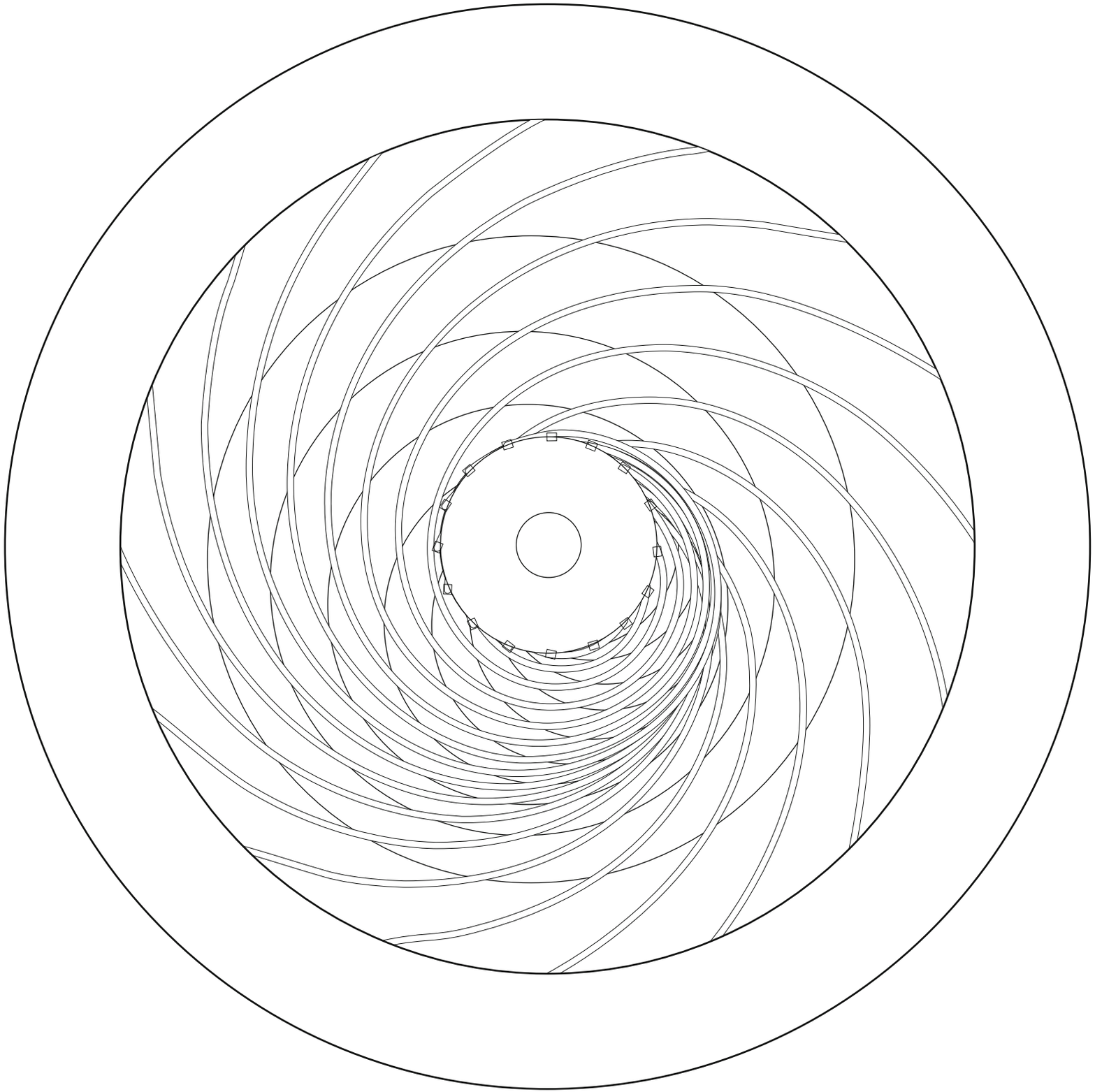
Tornado Diverter
The idea of creating a protective shield against tornadoes was formulated in 2004 by Russian scientist Vladimir Pudov at the Institute for Experimental Meteorology, Obninsk. In 2007, we traveled to Obninsk to interview him for our film The Weather War. He had just retired from his position at the institute and no longer had access to funds needed to further develop his invention. We were intrigued by the scope of his idea of being able to affect the most powerful weather phenomenon on earth, and decided to take up the challenge and build it for him.

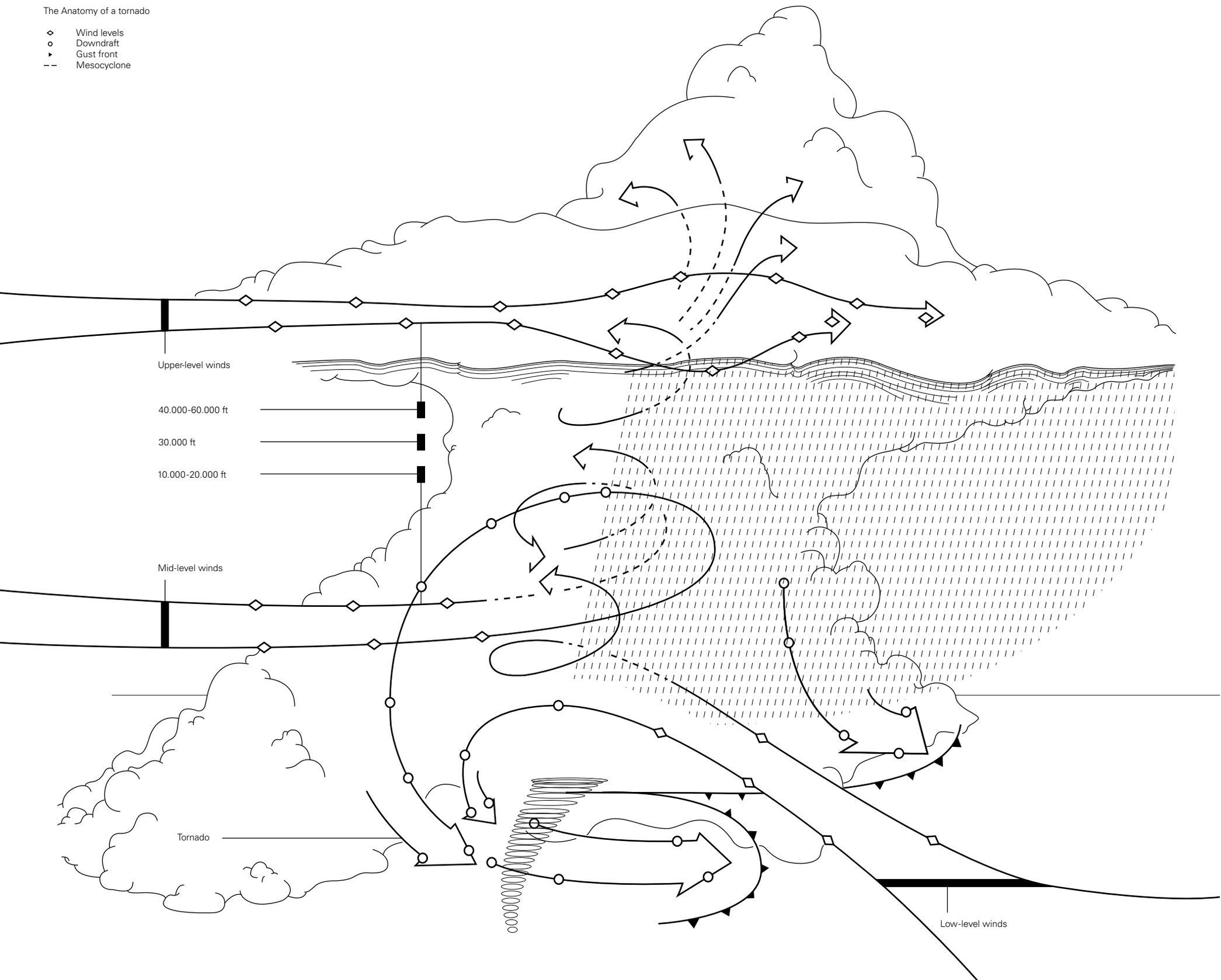
The theory holds that a tornado seeks positive earth in order to discharge the enormous quantities of electricity generated by the spinning supercell thunderstorm. So, if a negatively charged electric field is presented in front of the approaching tornado, it will take another direction. The tornado will thus not be destroyed but only diverted.




Negative charged
electric field
Aluminum toroid
High voltage cable
PVC Pole-insulators
High voltage transformer
220V –> -100.000V
Car battery 12V
Transformer 12V –> 220V

Tornado Diverter, viewed from above.



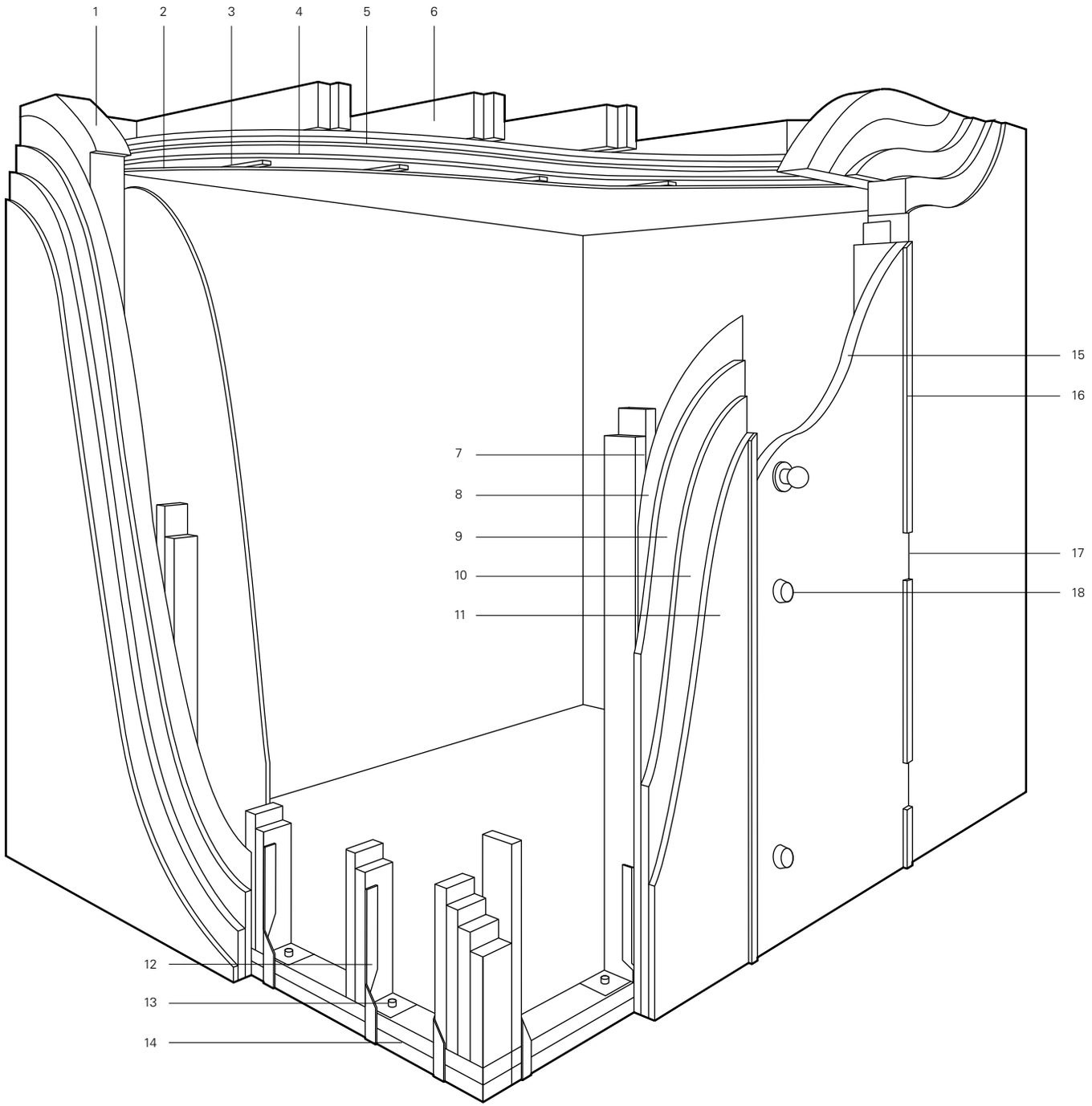

The Anatomy of a tornado
Wind levels
Downdraft
Gust front
Mesocyclone
Upper-level winds
40.000-60.000 ft
30.000 ft
10.000-20.000 ft
Mid-level winds
Tornado
Low-level winds

The Fujita scale (F-Scale), or Fujita-Pearson scale, is a scale for rating tornado intensity, based primarily on the damage tornadoes inflict on human-built structures and vegetation. The scale was introduced in 1971 by Tetsuya Fujita of the University of Chicago, in collaboration with Allen Pearson, head of the National Severe Storms Forecast Center (currently the Storm Prediction Center).

DAMAGE f SCALE		LITTLE DAMAGE	MINOR DAMAGE	ROOF GONE	WALLS COLLAPSE	BLOWN DOWN	BLOWN AWAY	
		f0	f11	f2	f3	f4	f5	
WINDSPEED F SCALE	17m/s 40mph	F0 32 73	F11 50 113	F2 70 158	F3 92 207	F4 116 261	F5 142 319	
		To convert f scale into F scale, add the appropriate number						
WEAK OUTBUILDNIG	-3	f3	f4	f5	f5	f5	f5	
STRONG OUTBUILDNIG	-2	f2	f3	f4	f5	f5	f5	
WEAK OUTBUILDNIG	-1	f1	f2	f3	f4	f5	f5	
STRONG OUTBUILDNIG	0	f0	f1	f2	f3	f4	f5	
BRICK OUTBUILDNIG	+1	-	f0	f1	f2	f3	f4	
CONCREATE OUTBUILDNIG	+2	-	-	f0	f1	f2	f3	

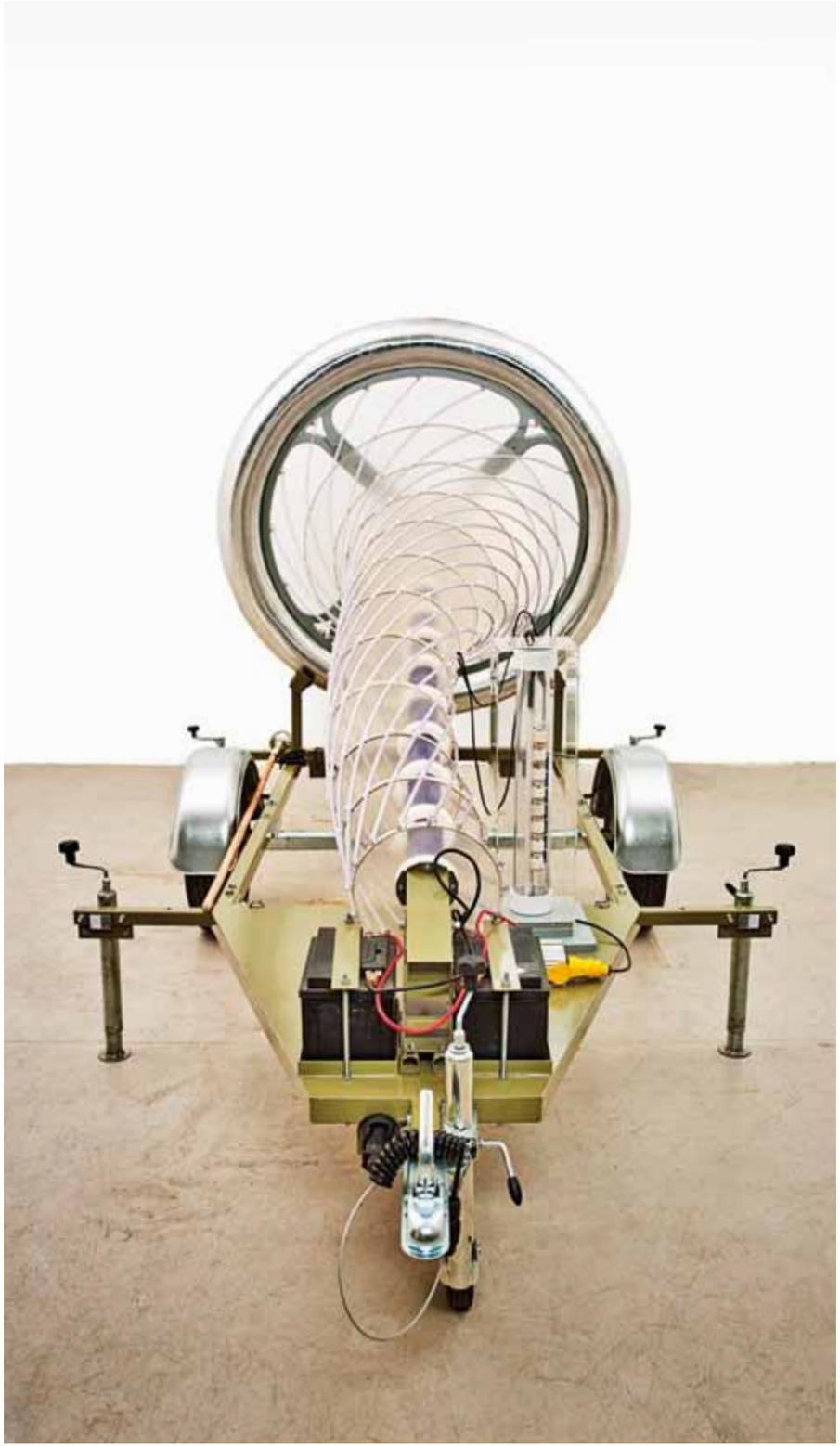
How to build your own
protective tornado shelter

1 Doubled 2x4 top plates
2 1x2 drywall
3 1x2 furring strips glued to steel
4 14-gauge steel
5 3/4 plywood (two layers)
6 Doubled 2x6 ceiling joists
7 Doubled 2x4 studs
8 14-gauge steel
9 Horizontal 3/4 plywood
10 Vertical 3/4 plywood
11 1x2 drywall
12 Steel strapping
13 3x1/4 steel washers
14 Double bottom plates
15 Foam filled 16-gauge steel door
16 14-gauge steel door frame
17 Deadbolts across from hinges
18 Ball-bearing hinges



TORNADO DIVERTER

Tornado Diverter, 2011
160x200x360 cm
Aluminum, polyester, PVC, nylon, powder coated iron, led, wooden stick, MDF, rubber, car batteries, high voltage transformer and cables.



Deploy of Tornado Diverter, Kansas.

House tilted after Galveston hurricane, 1900. The deadliest natural disaster ever to strike the United States.

A blurred image of the EF-5 tornado as it steamrolled over Joplin, Missouri, May 22, 2011.

During the Mongol invasion of East Asia, Kublai Khan attacked Japan in 1281. After a seven week attack, as the samurai defence were about to yield, a powerful typhoon crushed the Mongol warships. The storm was given the name Kamikaze – the divine wind.

During the first world war, the philosopher Martin Heidegger worked as a meteorologist. His task was to predict the next day's wind directions. The forecast decided whether the Germans would attack using poison gas.

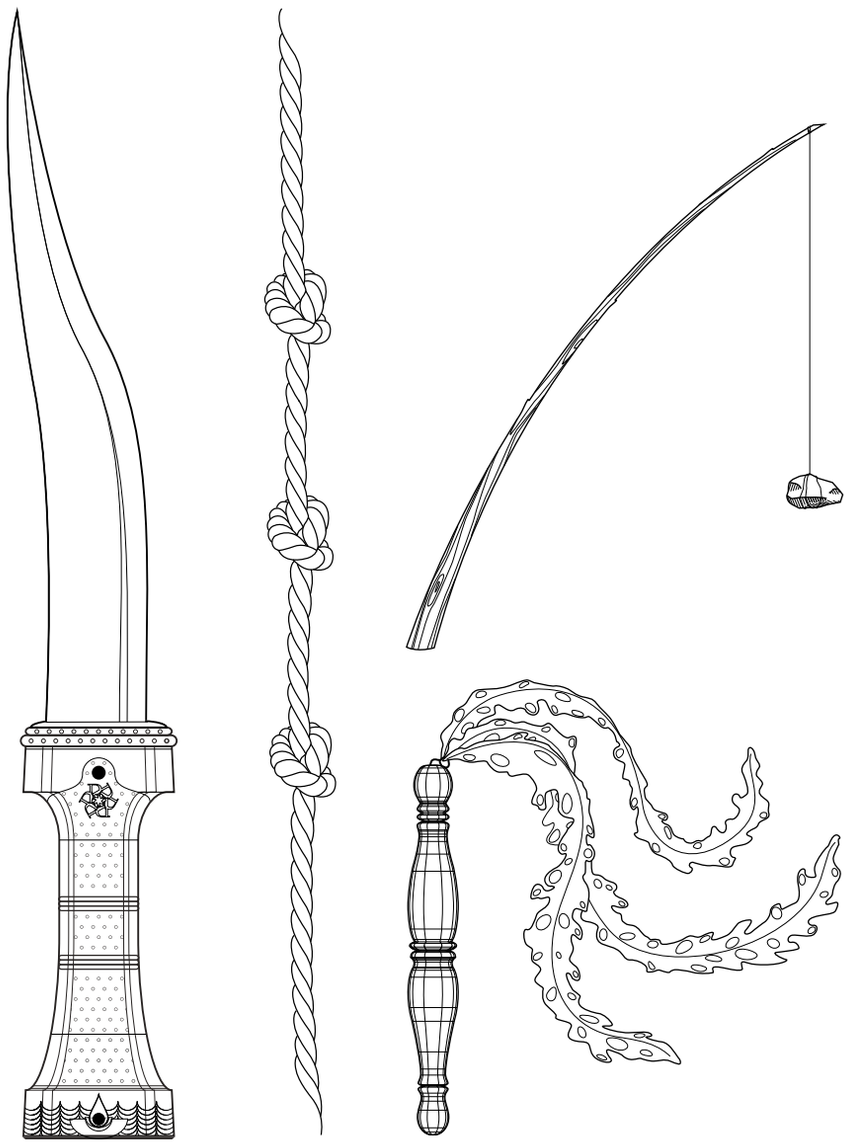
Examples of weather control rituals as described by James George Frazer in The Golden Bough: A Study in Magic and Religion, 1890

Of the Bedouins of Eastern Africa it is said that "no whirl-wind ever sweeps across the path without being pursued by a dozen savages with drawn creeses, who stab into the centre of the dusty column in order to drive away the evil spirit that is believed to be riding on the blast."

Finnish wizards used to sell wind to storm-stayed mariners. The wind was enclosed in three knots; if they undid the first knot, a moderate wind sprang up; if the second, it blew half a gale; if the third, a hurricane.

When the day is hot and a Yakut has a long way to go, he takes a stone which he has chanced to find in an animal or fish, winds a horse-hair several times round it, and ties it to a stick. He then waves the stick about, uttering a spell. Soon a cool breeze begins to blow.
In order to procure a cool wind for nine days the stone should first be dipped in the blood of a bird or beast and then presented to the sun.

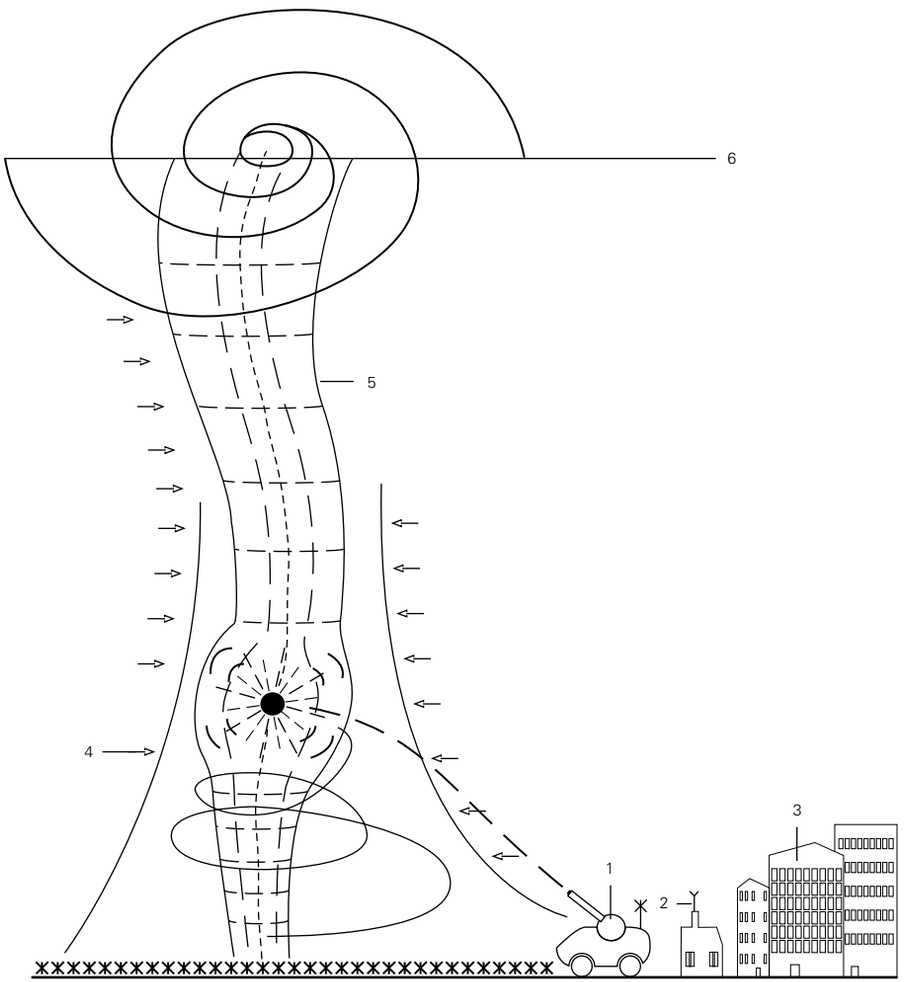
When storms and bad weather have lasted long and food is scarce with the Central Esquimaux [sic], they endeavour to conjure the tempest by making a long whip of seaweed, armed with which they go down to the beach and strike out in the direction of the wind, crying "Taba (it is enough)!"



Patent

❁	Explosion
✱	GAAS
1	ELS, explosion and lauching system
2	CSC, supplies information for ELS
3	Civilian and other important facility areas
4	Man made tornado
5	The funnel of the tornado
6	Cloud base

United States
Patent application publication
Pub.No.: Us 2005/0039626 a1
Pub. Date: feb. 24, 2005
Dynamic tornado teardown system
Inventors: Henry Ti, Tremont, CA (US)
Jane Ju Yi, Fremont, CA (US)
The dynamic tornado teardown system aims to stop *w*or divert twisters.
By using explosives, placed and blown up inside the funnel of the tornado, the Vortex will be dissolved.



Earliest photograph of a tornado, captured on film on April 23, 1884, in Anderson County, Kansas. Photo: A. A. Adams

View of the eyewall of Hurricane Katrina taken on August 28, 2005, as seen from a NOAA WP-3D Orion hurricane hunter aircraft before the storm made landfall on the United States Gulf Coast.

A tornado pierce a tree with a shovel, May 27, 1896, at St. Louis, Missouri.

Hurricane winds drive a 10-foot 2x4 through a palm tree, September 13, 1928, in Puerto Rico.

Hole Punch Cloud, 2007
Fifteen minutes after seeding a cloud with dry ice.
From Bigert & Bergström's Land Art Performance, *If You Don't Like The Weather, Change It.*

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Thank you
Claes Dahlgren

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