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The Bag

The messenger bag contains previously unknown information about the dust cloud that enveloped lower Manhattan on September 11, 2001. The information will affect the lives of thousands of people, starting with the life of the man who was wearing it.



Thomas Cahill squirms in his swivel chair. He's wearing a green-and-red wool sweater covered with pills, eyeing the white garbage bag on the battered metal desk. FedEx delivered the bag last week. Cahill is impatient as the photographer documents everything: the bag, the dust-collection machine, Cahill himself. Staring at the bag with a glint, the broad, six-foot former high school tackle looks like a kid who can't wait for his parents to stop snapping pictures of him near the tree on Christmas morning.

For Cahill--for a lot of people, actually, although they don't know it yet--this bag holds a lot of answers. It has been sealed shut for more than five years, and you should have heard the excitement in Cahill's voice when he found out it existed.

Man, five years. That long?

"Are we ready yet?"

He is sixty-nine years old. In the four decades he has taught physics and conducted air-quality research here at the University of California at Davis, Cahill has seen a lot. Five years ago, he stood near the burning, pissing rubble at ground zero for weeks, taking samples, testing, telling people the air wasn't as safe as the government said it was. To the Environmental Protection Agency, and even to the president, he became a pest, a role of which he is proud.

Today, though, today is different. "This is so exciting," he says to me, actually rubbing his hands together. "We have no other samples from September 11 except your backpack. It will give us a snapshot of what people were actually breathing, which will help the doctors enormously in knowing what to treat." He told me this over the phone, before I arrived from New York to witness the opening. Now, even with me standing there, one of the people who breathed in whatever he's about to discover, he repeats it. Exuberantly. "I'm sorry for you," he says, and he means it. "But I'm also delighted!"

My black messenger bag, which is inside the white plastic blob on the metal table, is Cahill's holy grail. When Esquire called, told him I had kept it in my closet for the last five years, and asked him to test it for toxins, Cahill was stunned. Thousands of tons of debris blew through downtown Manhattan as each of the World Trade Center towers collapsed on 9/11, but no one--not the city, not a lab at nearby NYU, not the EPA--seems to have any primary evidence from inside the plume itself. A heavy rainstorm on September 14 rinsed much of the floating debris from the air, and the city was already hastily sweeping the streets and scrubbing the buildings in a mad scramble for normalcy. Scientists hadn't even arrived on the scene. (Before the bag, the closest Cahill had ever come to finding a primary source was an air filter on an office desk, but the debris had fused to the filter and was too difficult to measure.) What the rains didn't clear was quickly contaminated by the stinky diesel trucks rolling in

and out of ground zero and the chemical fire raging a few stories below the street. By the time the EPA began telling people the downtown air was safe, three days after September 11, any chance of isolating exactly what happened in the initial moments of the disaster--what was in the clouds that engulfed more than five thousand people, including me, in a matter of seconds--was presumed lost.

Why did I preserve my bag that day? I can't say. I had just seen a building that took six years and eight months to build aerate in twelve seconds. I wasn't really thinking, just doing. I had walked the twenty blocks to my apartment among the cavalcade of refugees heading uptown, all of us looking like pale, disentombed corpses spreading out among the living. Once home, I stripped, then showered, but my skin still itched, as if someone had switched my cotton towels with pink fiberglass insulation. I threw my khakis and sneakers away--no way the lady at the wash-and-fold was going to touch those. But not my Manhattan Portage messenger bag. Even though it was trashed, I stuffed it into a clean Hefty bag and stuck it on the top shelf of my closet. For a long time after, I joked about putting it in a Lucite box to make a coffee table. Why did I really keep it? I don't know. Maybe because I had just bought it. Cost me eighty dollars.

Cahill, a physics Ph.D. from UCLA, studies air quality out of a converted machine shop on the Davis campus, where in 1997 he founded the DELTA Group, a consortium of scientists who collaborate on atmospheric and climate-based research. His desk is loaded high with reports like "Characterization and Source Apportionment of Long Range Transport of Atmospheric Aerosols over Northeast Asia." Once, he took his wife, Ginny, and their kids on an impromptu family vacation to Mount St. Helens because it looked as if it was ready to pop. (Today Ginny is the deputy district attorney for water issues in California; both children perform environmental research at universities.) Most weekends, Cahill is in the field. It's not impossible that you have sped by as he and a few windblown students huddled on the side of a California freeway using the DELTA Group Slotted 8 DRUM Impactor, an instrument Cahill developed and built to test air particles.

With this device, he has produced some of the most respected studies on the air quality after September 11, including an explosive 2003 report that concluded the smoldering debris pile acted like a chemical "incinerator." With this finding, Cahill confuted the EPA's early dismissal of the plume as an "irritant" and its ultimate conclusion about the air in lower Manhattan: "It is not a problem for the general population."

"Someone told me my report ended up on Bush's desk," says Cahill. "Supposedly, he had a cow."

The DRUM sampler looks like something you'd keep in the trunk of your car to inflate your tires: a generic black case with a hose snaking out one side. Cahill will use the vacuum nozzle to suck the debris off my bag, and the machine will gently blow the dust past a series of eight drums, each coated with a thin strip of grease-covered Mylar. Each drum collects a different-sized particle, ranging from 15 micrometers, or microns (about one-seventh the diameter of a human hair), to 0.09 microns (the size of a virus). The strips will tell Cahill how many particles we have at each size.

How this is relevant to my long-term well-being: "Particles above fifteen microns, you just swallow them," says Cahill, who has worked with medical doctors to study the effects of airborne particles on humans. "From fifteen to about five, they go into your nose and your sinuses and you cough them up or spit them out. When you go below three microns, you start to have some lung-collection possibility--the particles end up in your bronchial tubes and upper lung. When they go down to half a micrometer, they go into your deep lung. And once they're in the deep lung, they're very hard to get rid of."

The tiniest particles can permanently pollute the human respiratory system. A September 2006 report by doctors at the Mount Sinai Medical Center in New York revealed that nearly half of the people who worked at ground zero say they have a dry cough, shortness of breath, or tightness in their chest--all possible indications of a lower lung that has been . . . compromised.

So, Christ, if you figure most of those people didn't arrive until well after the actual event, what are the little particles that are in me?

Let's see. The South Tower was 1,362 feet tall and weighed five hundred thousand tons. It was hit by a Boeing 767 jet traveling at 590 miles per hour and filled with sixty-five people and ninety-one hundred gallons of fuel. The building burned uncontrollably at up to 1800 degrees Fahrenheit for sixty-two minutes. Then, all 110 floors--which were filled with 25,000 personal computers, 104 passenger elevators, 21,800 windows, 6,000 miles of

electrical cables, 100 miles of heating ducts, who knows how many Bic pens and jokey coffee mugs, and the bodies of more than 600 people--fell a quarter mile straight down at 120 miles an hour, instantly aerating everything.

Finally, Cahill turns to me and says, "Ready to see what's inside your bag?"

Oh, my God, they're falling!"

Whoever yelled this, I didn't believe it. Then I turned around and saw that the gash carved into the South Tower wasn't belching fire anymore. It wasn't belching anything. It simply wasn't. I had left my office nearby when I heard what had happened and was standing one block away, next to the giant red Noguchi cube in front of the HSBC building. From there I watched the World Trade Center peel like an enormous steel banana.

Right after that, I decided to run for my life.

The low, groaning death rumble of the falling tower jolted through my body as if I were a human subwoofer. I sprinted east, toward the safety of the river, the street an asphalt fun-house mirror beneath my feet. A block into my escape, I made the same decision that got Lot's wife into trouble: I looked back. A twenty-story debris cloud loomed behind me like something Godzilla would fight, and before I could blink or close my gaping mouth, the cloud hit me like a swarm of gravel bees. I was in it and it was in me.

In a few seconds, the sky soured from a pristine blue to yellow to brown to a profound black. Day turned to night. The sky vanished. I stood there in the darkness, my eyes on fire as grit and sand worked its way under my eyelids and into my nostrils, where I got my first whiff of September 11--eau de construction site, with hints of sweet burning plastic and notes of Jiffy Lube. I was being buried alive, right there in the middle of Liberty Street. For five minutes, I gasped for air, but my lungs would not fully inflate, because this was not air. I would've had better luck taking a handful of dirt and inhaling that.

I fought off the adrenaline surge of panic as I tried--instinctively, I suppose--to find clean air to breathe. The wave of debris was passing, and the sky was brightening to a smoky tan fog. Finally I felt my way up the steps of the Chase Manhattan Bank building plaza, and the front door swung open. I promptly vomited concrete dust on the clean lobby floor. Somebody must have showed me how to get to the basement, where a hundred or so of the bank's employees were huddled, unscathed. A middle-aged woman offered me a Valium. Another held up some Xanax. An hour later, after the North Tower fell, a voice on the loudspeaker calmly instructed us to evacuate. So I walked home.

As soon as Cahill's scalpel breaches the plastic womb encasing my messenger bag, the unmistakable smell brings back all sorts of memories I'd rather forget. Bodies cartwheeling to earth from impossible heights. The strange laugh I let out when I found myself irritated, even during the apocalypse, by those fucking car alarms as they echoed down the empty canyons of lower Manhattan. My trembling hands smearing antibiotic ointment on my scrapes. The ladies in the bank building with their pill bottles.

In the years after, I thought about the bag every couple months--usually when I'd read another headline about those people getting sick from ground zero. And then I'd quietly realize that maybe I was one of those people, too, and at that point I would push the bag from my mind. I had moved on. Whatever happened to me happened to me, and I wasn't all that interested in hearing any more bad news.

But the headlines kept coming. Victims were filing more lawsuits. Politicians pushed for medical coverage for first responders and people who worked on the pile. Every day, it seemed, there was another reminder that whatever happened to me also happened to them.

"Hey! I think this is drywall!" Cahill yelps. "And this is probably concrete!"

I look down. For the first time since around noon on September 11, 2001, I see my old Manhattan Portage bag. A cluster of small buttons from punk bands like Operation Ivy and the Dead Kennedys--my youthful attempt to project an anticapitalist stance while covering capitalism for a financial-news Web site--adorns a corner. The bag is smaller than I remember and still slate gray from the dust. But there's not much debris falling off it.

"I hope there's enough here," Cahill mutters, smushing his thick glasses back up into his furrowed brow.

Over the next fifteen minutes, banal artifacts from an ordinary Tuesday morning emerge: an unread copy of Frederick Exley's *A Fan's Notes*, two pieces of junk mail, a Duracell battery to a digital camera I don't remember owning, a New Jersey Transit schedule and a receipt for a round-trip to Morris Plains, and a scrap of paper with a name and e-mail address on it. (It later turns out to be the address of a London woman who doesn't have a clue who I am and has to be convinced I'm not running a scam. I don't know who she is, either.) There is also a tube of antibiotic ointment covered with my own dried blood, a jokey laminated card granting me lifetime membership to Fight Club (like the movie), and a fifty-dollar check from a college pal I never got the chance to deposit.

I had been secretly hoping, although I had no logical reason to, that the bag would contain some old pictures of my mom, who had died nine months before September 11. Or maybe something that could provide some deep insight about who I used to be, before my lost year, before the nightmares started, and before I went on Paxil and Klonopin to make them go away and get on with my life. The bag contained nothing like this, of course.

But there is one more item inside: a wrinkle-free pinpoint-oxford button-down-collar dress shirt that is positively covered with debris. It is, of course, the shirt I was wearing on September 11.

"*Oooh*, we have plenty to work with now!" Cahill says, adding, non sequitur, "Did you know there's lots of lead in electrical cords? The Chinese use it to make the cords more flexible."

No, I didn't know that.

Before performing his first test, Cahill inexplicably rattles off a quote from *Ghostbusters*. To lighten the mood, I guess. " 'Why worry? Each of us is carrying an unlicensed nuclear accelerator on his back.' I love that line," he says, chuckling. He checks the suction on the 8 DRUM Impactor and then sets about hoovering up small patches of debris from the inside of the bag.

"This is gonna *woooork!*" Cahill says, singing the end of the sentence. "I love this. What we're doing here hasn't been done before. For me, it's like the 'What do you got? What do you got?' kind of stuff that goes on in rap music. This is going to be the most famous backpack in all of New York City."

It occurs to me that part of his enthusiasm has to do with the splash this project will make in the scientific community, in which there seems to be a sort of gentlemen's rivalry. *What do you got?* Within seconds, a thin white line appears on the Mylar strip covering the first drum, where the largest particles are collected. Cahill checks each drum, working his way toward smaller and smaller particles. He stops at 1.15 microns. "See right here? This line is a little small. These are large particles," he says, jotting down that there were no signs of particles smaller than 1.15 microns inside the bag. "You're gonna live."

But as Cahill explores different parts of the bag, working his way from the hidden inner folds to the beaten exterior, the tests show smaller and smaller particles in greater abundance. By the time he's sucking up caked-on debris from the shirt, the tests consistently show clear bands at the 0.09-micron level. Normally, individual particles this small are invisible. But there are so many, you can see the line with the naked eye.

Cahill excitedly draws more pictures of my bag in his notebook and notes the location of each sampling and the exact time he vacuumed each up and put it in a dish. Eighteen samples in all. I think about how he told me how the smallest particles don't necessarily hurt your lungs; instead they enter your bloodstream, where they can ultimately cause heart attacks or cardiovascular disease. I ask him if after all this testing, he still thinks I'm going to live.

"Well, how bad it is depends on what the particles are made of, but getting particles that size into your system is never a good thing," he says. "One of the big mysteries after 9/11 was where the mercury went. Mercury bonds well with the gypsum in drywall. And there was a *lot* of drywall in that building."

So we know the particles are small, which is bad. But in order to find out what, exactly, they are, Cahill must send the samples to the Berkeley synchrotron, formally known as the Advanced Light Source, a particle accelerator the size of a football field that sits on top of a hill above the UC Berkeley campus.

At the synchrotron, electrons are sped up in a giant vacuum until they're moving slightly slower than the speed of light. As these electrons race around a giant circle, incredibly powerful electromagnets change the direction of the electrons. But in order to move like this, the electrons have to give off a lot of energy, which occurs in the form of

X rays, a wavelength of light that is a million times more intense than sunlight.

These X rays travel down a silver tube, bouncing off mirrors and passing through other equipment that alters their size and shape and position. Like water from a fire hose, the light slams into Cahill's Mylar strips, which are mounted inside a lead-shielded room about the size of a walk-in closet. The X rays knock an electron loose from the different elements that make up the sample, each of which, in turn, emits a unique frequency--an atomic fingerprint, if you will--that tells the physicists exactly what elements are present.

For five and a half years, I avoided thinking about that bag in my closet, but over the two weeks I wait to get the results from Cahill's lab, I develop acute hypochondria. I wake up with a dry cough in the middle of the night and spend a solid fifteen minutes examining my tonsils for scarring. Instead of checking the latest Hot Stove news from the Boston Red Sox during lunch at my desk, I read EPA reports and conjure anything I can remember from AP chemistry. Before bed, I gorge myself on news coverage of September 11 victims, reading about their devastated families and then writing myself into the lead paragraphs as I drift off to sleep.

Finally, Cahill e-mails me an incomprehensible line graph tracking nanograms in the dust sample, plus a written analysis of the bag peppered with scary chemical formulas like $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ and CaO_2 and SiO_2 . Then he calls me on the phone. "I just want to tell you personally what a service you've done everybody," he says. My heart races. I wonder why he's telling me this again, wondering if he's stalling, wondering why he doesn't just come out and fucking tell me the bad news already. And then: "Basically, you just got a big blast of drywall. Which is harmless."

What? Come again now? Where are the freaky microtoxins that will enter my bloodstream and attack my heart? Where's all that lead from the Chinese electrical cords?

"We saw a tiny amount of lead on your bag," Cahill says. "I mean, it was *tiny*. We can say the lead levels present in the cloud itself were essentially zero."

So what did I breathe? Construction materials, for the most part: cement dust from the square-acre floors of the tower; aggregate materials, which basically means particulates of rock and gravel; and drywall, which is made of a calcium-based substance called gypsum. The coarsest particles, the ones I presumably spit up in the bank lobby, consisted of all three materials, but the finest particles--the ones that invade your deep lung, never to leave--were also mostly gypsum. And gypsum is safe for human consumption. Matter of fact, it's used to enrich bread with calcium, can be found in toothpaste and blackboard chalk, and helps coagulate tofu. Tofu, for chrissakes.

"That doesn't mean there's not some harm there, but it's a different kind of harm," Cahill says. "Your lung got loaded up with stuff and your mouth and throat got irritated for a short period of time. But that's better than bearing the enormous body burden of very fine metals working from your bloodstream to your heart."

Evidently, these very fine metals didn't enter the air above lower Manhattan en masse until weeks later, when all those smashed computer parts, electrical cords, ceiling tiles, and ballpoint pens began to smolder at extremely high temperatures deep below the street. When the South Tower came down, the massive concrete floors fell like a giant stack of pancakes, slamming into one another and driving the contents of the building straight down, but the air in the building blew out the sides, like a balloon popping when a fat man sits on it. The wind that the building exhaled was hurricane force, instantly aerating the drywall and the glass and some of the concrete, which coated me a few seconds later. "It's no different from when you blow up an old thirty-story hotel," says Cahill. "That's the same kind of dust cloud. Heck, the older buildings are probably worse because they have more asbestos."

When Cahill's done, I have a weird thought: Good news! About September 11! Not a lot of people can say that. I hang up the phone and decide to go for a little run around the outside of the building. It's approximately 20 degrees outside, but I'm too excited to sit behind a desk and get on with my life just then. The bogeyman is out of my closet. I'm not one of those people who is going to get sick from September 11 after all. Not yet, anyway. Sure, there are some things we don't know and may never know. Like the kids who grew up at Love Canal or under high-tension power lines, I might wake up in a few years with some unexplainable sickness, some crippling respiratory illness. What are you gonna do? For now, all I want is to feel the air rush in and out of my lungs.

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