Art, Science, and the Environment Interact in Sensing Change

by David Haldeman

A small white trailer sits in a parking lot on the corner of Broad and Lombard streets in Philadelphia. Broad street—a noisy, densely-packed four-lane road, and one of the busiest in this city of 1.5 million people—sees a particularly high number of pedestrians at this intersection: an entrance to the subway is here, as is a food truck where every morning dozens of people line up.

The white trailer is completely unmarked and oddly-shaped metal spires rise from its roof, making it look like a front for a spying operation. Hanging innocuously from a nearby chain-link fence is an interpretive sign with small text that reveals its purpose: it’s an air monitoring station. Run by the City of Philadelphia’s Air Management Services, it is one of ten stations throughout the city that collect data on the quality of the air breathed by its residents. But while thousands walk by the station every day and are directly affected by the data it collects, both the station and its interpretive sign go virtually unnoticed.

Two blocks down, on Broad and Spruce streets, is another air quality monitor. This monitor, which measures the same particulate matter as the station at Broad and Lombard, is attached to a street pole and connected via cabling to a projector on the 3rd floor of a building. From 7 p.m. to 11 p.m., the monitor’s data is projected onto the side of a building opposite. Instead of taking the form of numbers, graphs, or color-coded air quality alerts, this data takes the form of a massive six-story tall waterfall of blue light surrounded by shimmering orange sparkles. Updated every fifteen seconds, the sparkles increase in frequency as more particulate matter is detected. A passing garbage truck causes the lights to go into a frenzy.

This art installation, Particle Falls, by digital artist Andrea Polli, succeeds in drawing the attention of passersby on one of Philadelphia’s busiest streets, and a vital but usually hidden aspect of the environment is suddenly made visible.

Particle Falls is part of a new initiative by the Chemical Heritage Foundation (CHF), a museum, library, and center for scholars located in Philadelphia. In fact, it’s the largest initiative the institution has embarked on in its 30-year history. Called Sensing Change, the initiative consists of an exhibit and programs that use art, data visualization, and online media to prompt new perspectives on, and encourage more personal observation of, one’s local environment. In a world where most of us live and work indoors, experience the weather through cute icons on our smartphones, and understand climate change through the same types of news stories, Sensing Change is an attempt to break the numbness. For Jody Roberts, Director of Contemporary History and Policy at CHF and one of the developers of Sensing Change, the hope is to cause a “disruption.” “It’s important to bring a fresh perspective when we feel like we’ve encountered the same argument over and over again,” says Roberts. “It’s about, how do I disrupt my everyday experience so that I start to pay attention again?”

The View from the Ground

Twelve blocks from Particle Falls, two large-scale terrariums rest on stilts several feet off the floor of an...
Coming to Our Senses

exhibit gallery. A visitor inserts her head through a hole in the bottom of one, experiences a sharp rise in temperature, and finds she is tightly surrounded by local soil, grass, and plant life. These common elements of her daily environment—typically unnoticed and often crushed underfoot—seem at eye level suddenly bigger, more visible, and more alive with smells, sights, and sensory input.

This art piece, titled Village Green by artist Vaughn Bell, is one of seven featured in CHF’s Clifford C. Hach Gallery, which serves as the core of Sensing Change. Like their on-the-street counterpart Particle Falls, Village Green and the other artworks are both visually striking (visitors often photograph themselves with their heads inside the terrariums) and intended to make visible an aspect of our daily environment that goes largely unnoticed. After all, not many of us spend our days with our heads in foliage.

“We’ve talked many times about making the invisible, visible,” says Christy Schneider about creating the Sensing Change exhibit and programs with her co-creator, Elizabeth McDonnell.

For another artwork on display at CHF, Calendar of Rain by Stacy Levy, every morning a CHF staff member person walks outside to a courtyard to remove a bottle marked with the previous day’s date from underneath a rain collection funnel. Regardless of whether the bottle is empty or full, they cap it and place it in the Hach Gallery. Staff will perform this task every day Sensing Change is presented—from July 2013 to May 2014. This means hundreds of bottles line the gallery’s wall, indicating rainfall from previous weeks and months.

But why go to this trouble? After all, rainfall data is available through any number of online weather stations, data repositories, and weather sites—and measured with much greater precision.

“We do have opportunities [to view this kind of data],” says McDonnell, “but how many people pay attention to it? We spend so much time on the internet that graphs and numbers can only do so much to make people pay attention and connect what they read on the web to their own lives.”

“With Sensing Change,” she continues, “we were interested in documenting, visualizing, and highlighting a local experience that would resonate with people, using methods which might be new to them—things like putting your head in a terrarium, experiencing air quality on the side of a building, and seeing monthly rainfall collect in jars.”

While the air monitoring station at Broad and Lombard aggregates its data into color-coded air quality alerts available for viewing online, pieces like Calendar of Rain and Particle Falls are a concrete physical presence in the local community. The offline location alone forces greater focus. Here, you can’t click away to the next distraction.

Personal Space

On the wall of the Sensing Change exhibit is a quote from Murray V. Johnston III, professor of chemistry at the University of Delaware.
“Even among scientists, you have to be engaged at a personal level. If you make that connection with these visuals—oh, there’s something interesting and it affects me, it’s the air I’m breathing—then you’re drawn in a bit more to the conversation that way.”

For Johnson, a scientist, it’s the personal connection that sparks interest in the environment—data alone isn’t enough.

“We are in this cultural moment of being in a data glut,” says Jody Roberts. “We can produce vast amounts of data and we sometimes equate that with information. But information is communicated data, and we have a lot of data and not a lot of information. Artists are responding to this moment and saying, ‘How do we make sense of this?’ There is this feeling that data needs to be made more personal again.”

Efforts to personalize environmental change are present in all the works in Sensing Change. In addition to Calendar of Rain and Village Green, the Hach Gallery features Diane Burko’s Water: Glacier and Bucks, which includes a series of aerial images of glaciers receding in Montana’s Glacier National Park. These images are placed below more placid photographs of flooding rivers taken in her small hometown of New Hope, Pennsylvania, creating a meditation on environmental change on both large and small scales.

Katie Holten’s Uprooted is composed of two black paper mâché tree roots suspended from the ceiling, representing the hidden natural systems—usually out of sight and out of mind—that run underneath the man-made monolith of her home city of New York. In Roderick Coover’s Toxi∙City, the estuaries of the Delaware and Thames rivers are explored in a wide panoramic digital video installation made up of eerie visuals, dialogue, and audio intended to address the impact of climate change and chemical pollutants on the world’s waters and landscapes.

The last artwork in Sensing Change, of all the pieces on display, perhaps makes the most wide use of the data glut. Wind Map, by Fernanda Viégas and Martin Wattenberg, is a data visualization piece that translates hourly data from the National Weather Service’s National Digital Forecast Database, a massive data repository of weather information from across the United States, into a near real-time visualization of wind patterns across the country. The result is a kaleidoscopic image of snaking black and white tendrils that twist elegantly across the map. Through it, the National Weather Service’s hard numbers are translated into an artful and even peaceful visual.

But sometimes its visuals move from appearing like placid waves of grain to become deeply troubling. Wind Map was originally created in early 2012, and on October 29, 2012, the tendrils formed into a rapidly moving spiral whose dark center spun over New Jersey. It was Hurricane Sandy.

And Wind Map isn’t the only piece in Sensing Change to have taken the occasional dark turn.

“I Never Wanted It to Happen”

On a post to her blog on 31 October 2012, artist Eve Mosher wrote, “I didn’t set out to be a prophet(ess). I never wanted it to happen. I only took the published facts and translated them into a physical and visual indicator. In fact, I was hoping that I could bring the conversation to light in order that we might avoid this.”

“This” was Hurricane Sandy.

Five years prior, Mosher had walked 70 miles of New York City’s coastline with a chalk marker (the kind used on baseball fields) to show where increased flooding was likely to occur as a result of climate change. The location of the marker was based on mapping and statistical data. It proved remarkably prescient: in many places, the flooding from Hurricane Sandy matched—and occasionally even passed—the level where Mosher had drawn her line.

“The point of the project was to create this sort of visual spectacle around this data, data which is fairly well known in the scientific and even governmental communities about this flood zone,” said Mosher in an interview on CHF’s website.

The piece, HighWaterLine, succeeded not only in its predictions, but in its ability to prompt conversation between Mosher and those living in communities who will be affected by flooding resulting from climate change. After being created in Miami later this year, HighWaterLine will be brought to Philadelphia as part of Sensing Change in April of 2014.
“I was trying to create a visual spectacle that would attract people to come to me and ask me what I was doing,” Mosher continued in the interview. “Then we would have a conversation about their relationship with climate change, and what they knew and their understanding of what the local implications are.”

While Mosher knows the importance of the conversations she is trying to spark, the experience of creating *HighWaterLine* has occasionally troubled her.

“It is an awkward situation in which I find myself,” she wrote just two days after Hurricane Sandy. “These projects are really, really important in engaging around the very harsh, scary, and sad realities of climate change. But seeing it is another thing. It hurts. It is scary. I am speechless often and shocked by the images.”

“And yet,” she continued, “here I am, a voice that really, really knows what is at stake, and I have a certain responsibility to share that story.”

**Critical Mass**

*Sensing Change* asks visitors to consider the threats, opportunities, and upheavals the environment is facing globally as well as locally. Because of its often wide-reaching scope, CHF has created an extensive online component (www.chemheritage.org/sensingchange) to reach visitors beyond the Philadelphia area. In addition to video interviews with the artists involved, interviews with scientists provide their thoughts on where art and science intersect. The already-existing network of scientists and artists enthusiastically exploring each other’s methods, says Jody Roberts, was one of the aspects of creating *Sensing Change* that caught him off guard.

“It surprised me how much this would be in an area of public discourse that is at a critical mass right now,” says Roberts. “There were already rich sources for this kind of art-meets-science piece and I didn’t realize how deep that went. I didn’t realize that we would uncover this larger community.”

Since CHF is fundamentally a history institution, another online focus is environmental observation from a historical perspective, providing a history of and context for the techniques and methods scientists use to understand climate. The Beckman HC/CO Tester, the Horiba Mexa-200, and James Lovelock’s Electron Capture Detector are among the instruments and artifacts highlighted on the *Sensing Change* website.

*Sensing Change* also encourages online participation through social media sites like Facebook and Twitter (#sensingchange), as well as a photo campaign. The latter, through Instagram, asks visitors to observe and share images that speak to environmental change in the air, water, soil, trees, or plants.

**Taking Action?**

Last September, toward the end of the packed opening reception for *Particle Falls*, a woman stood up in the audience to ask Jody Roberts a pointed question: who should we “go after?” Who should we write to and express our anger?

Roberts gave a response she did not seem to expect.

“This exhibit is not didactic,” he said. “We want to provide tools that can change your perspective. It’s up to you to decide if and how you’d like to take action.”

Indeed, the point of *Sensing Change* is different than many exhibits of its kind, he said later.

“At the core of our mission is to provoke and instigate a different kind of conversation,” he says, “not to tell you what the conversation is supposed to be or how it’s supposed to result.”

“We wanted it to be bound by an alternative experience,” he continues, “so that if you feel motivated, you’ll go and seek those opportunities. And we’ve tried to facilitate that on the website. ‘If you want to know more, here’s a bunch of places to look.’”

Roberts gets up from his chair, grabs his phone, and scrolls through his recent emails. They include many messages from advocacy groups and organizations, with subject lines including “EMAIL YOUR REPRESENTATIVE,” “THIS CANNOT WAIT,” and “ADD YOUR NAME TO THIS PETITION.”

“Not only are we peppered with data,” he says, “we’re peppered with ‘go email this person,’ ‘go do this.’ What we need is not more one-line activism, what we need is a conversation. And that’s what this is designed to do.”

“A lot of the [Sensing Change] artists are saying, ‘I think there’s something going on here. You figure out what it means to you.’ And I think that’s really powerful.”

*Sensing Change* is on exhibit at the Chemical Heritage Foundation in Philadelphia until 2 May 2014. Online video interviews, historical information, participatory experiences, and more are available at www.chemheritage.org/sensingchange. Participate in *Sensing Change* on Facebook, Twitter, and Instagram (#sensingchange). David Haldeman <DHaldeman@chemheritage.org> is CHF Communications Coordinator.