

MARVIN HEIFERMAN *guest curator*

**STEVE MILLER:** Marvin, the reason we thought about asking you to be a guest editor for this issue of Musée is because I knew you were working on a project related to science and photography.

**MARVIN HEIFERMAN:** It’s “SEEING SCIENCE: Photography, Science, and Visual Culture”, and I’m organizing it for University of Maryland, Baltimore County (UMBC). It seems to me it’s an interesting time to be looking at how the sciences make and use photographs, and how the sciences and scientists, themselves, are represented in photographic imaging. “SEEING SCIENCE” starts in April and features various onsite components, but at the center of the project is a website (<http://seeingscience.umbc.edu>) that over the course of a year, we will build up the content on, and we hope will reach a broad audience.

**STEVE:** It’s a given that photography is an invention of science, and that one of the early hopes of photography was that it was going to be the dispassionate eye of observation.

**MARVIN:** Something important for me is to track how that “eye of observation” idea plays out. I’m working on a timeline about photographic imaging and the sciences, that starts with the first known lens from 1000 BC; a piece of carved crystal believed to have been used to magnify something, and runs through recent images of Pluto. The first known use of the word ‘scientist’ was in 1834, by a British scholar named William Whewell. The word photography first appears in 1839. Science and photography go hand in hand, always have, always will.

**STEVE:** So photography started out as a way to practice and document science. But, soon amateurs, pornographers, and artists, came in and high-jacked this new invention as they looked for commercial applications and emotional interpretations. How do you sort out this mess today and the return to science?

**MARVIN:** What do you mean mess?

**STEVE:** Meaning, in the early history of photography certain kinds of standards and qualities were set up by professional societies to organize these qualities. But once amateurs got a hold of photography they started to do whatever they wanted to do. Artists started using photography as a tool to pay homage to or challenge painting. So the idea that photography would remain in the realm of science was blown out the window. Now, in this conversation, we are coming back to photography and science. How do you bring it back to science?

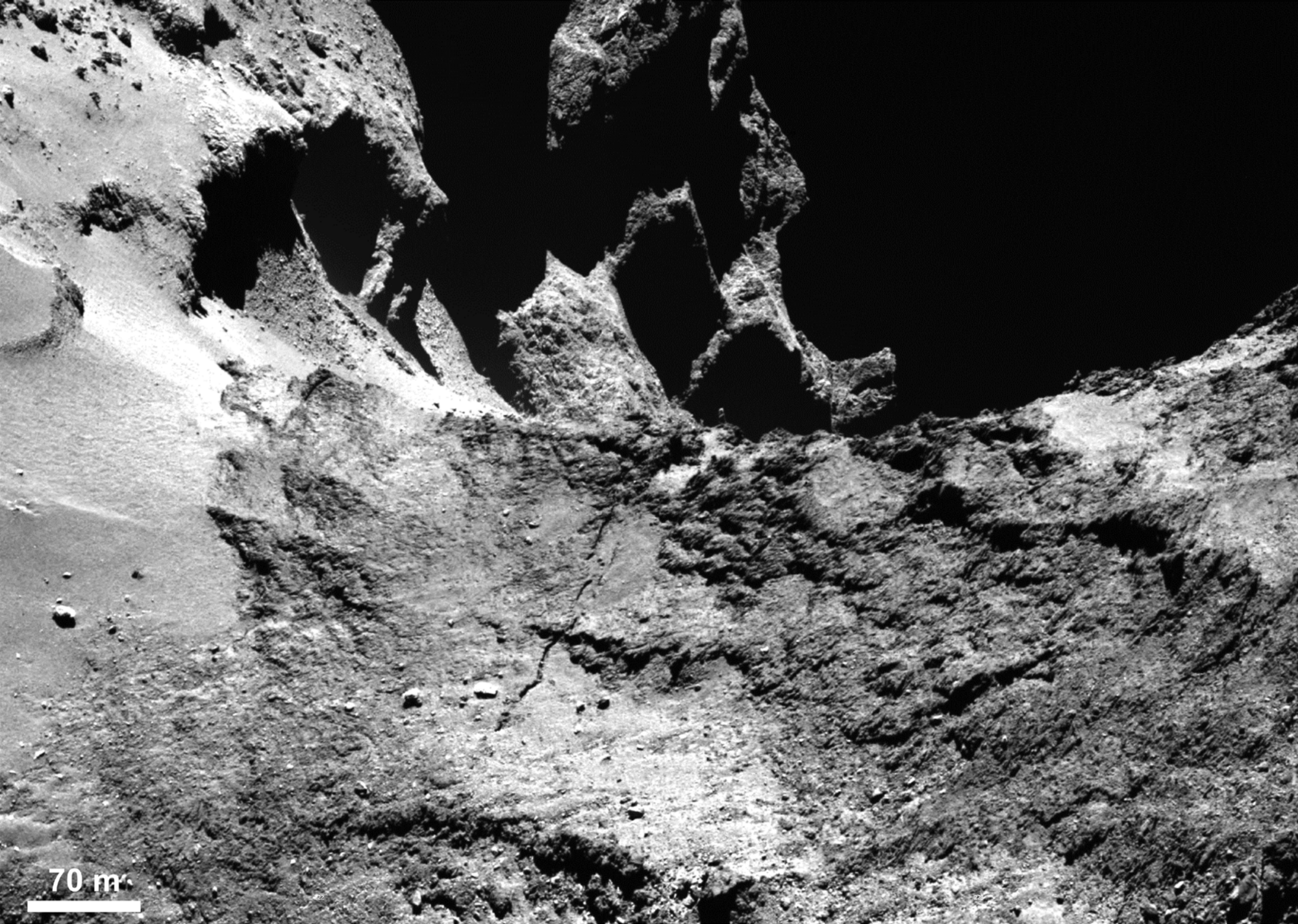
**MARVIN:** Well, photography has always been useful to multiple audiences. Early on, it was developed by people who were “amateurs” who were, in fact, scientists needing to figure out a way to capture data and information. Photography was a rarified pursuit and a rarified tool. But in the 1880s when George Eastman made snapshot cameras widely available, explorations in photography were not just for the amateur, gentleman scientists, but for everyone. Scientists, artists, and the general public adopt and adapt photography to suit their very different desires and needs. They explore and set up different ways of seeing and evolve new vocabularies or dialects to do what they need or want to do.

**STEVE:** What about someone like Daguerre? I see him as much an artist as anything else. How do you think he saw himself?

**MARVIN:** Daguerre was an entrepreneur, a scientist, a painter, and a showman who produced spectacular dioramas in 19th century Paris. He was uniquely positioned to understand the multiple functions photography can serve.

**STEVE:** So he was important in terms of the scientific and technical aspects of photography?





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**MARVIN:** Daguerre was only one of many innovators who contributed to the early development of photography. At the same time the Daguerreotype was introduced, Henry Fox Talbot was experimenting with paper negative and prints. Twenty years or so before that, Thomas Wedgewood, a British scientist, and Nicéphore Niépce were making earlier, less stable photographic images, most of which are lost to us.

**STEVE:** And then after almost a century of photography, you have a different sort of hybrid practice when someone like Karl Blossfeldt makes very precise images of a different sort. You could easily say that he was archiving plant types, and collecting data and information. How do you see Blossfeldt, as a scientist or artist? Or are those categories not even valid?

**MARVIN:** Blossfeldt falls in the long tradition of people who makes a certain kind of image, and lots of them, to catalogue something. The ability to create photographic atlases and archives, to capture multiple and idiosyncratic examples of certain kinds of things, was part of what attracted the sciences to photography. Instead of having to rely upon artists and illustrators as the interpreters of the natural world for scientists, photography made inquiry, documentation and sharing of data less subjective pursuits and activities. In the late 19th century, explorers and archeologists published sets and collections of images documenting the places and native peoples they encountered. Civil War surgeons documented the medical procedures they performed. What's interesting about Blossfeldt is that he was making those plant pictures in the late 1920s, when photographs and science seemed to be working in tandem to shape the modern world. To study and capture something clearly, efficiently, and with precision, to archive and easily access images became characteristics of the modern world. Artists from the 1920s and 1930s, from Laszlo Moholy Nagy to Berenice Abbott, were interested in the scientific gaze and the subjects and beauty of science. They understood that images made in and of science opened a doorway; they not only documented phenomena and objects, but helped shape a new visual language to engage with issues different from what scientists might focus on in their work.

**STEVE:** In your project, you've been looking at the work of Anna Atkins, for example, who was one of the first to use photography to document natural phenomena...

**MARVIN:** Atkins was a British botanist, and is thought to be the first woman to make a photograph. Starting in the 1850s, she published handmade books of plant forms illustrated with photographic images.

**STEVE:** Her photograms are massively different from what Blossfeldt was doing.

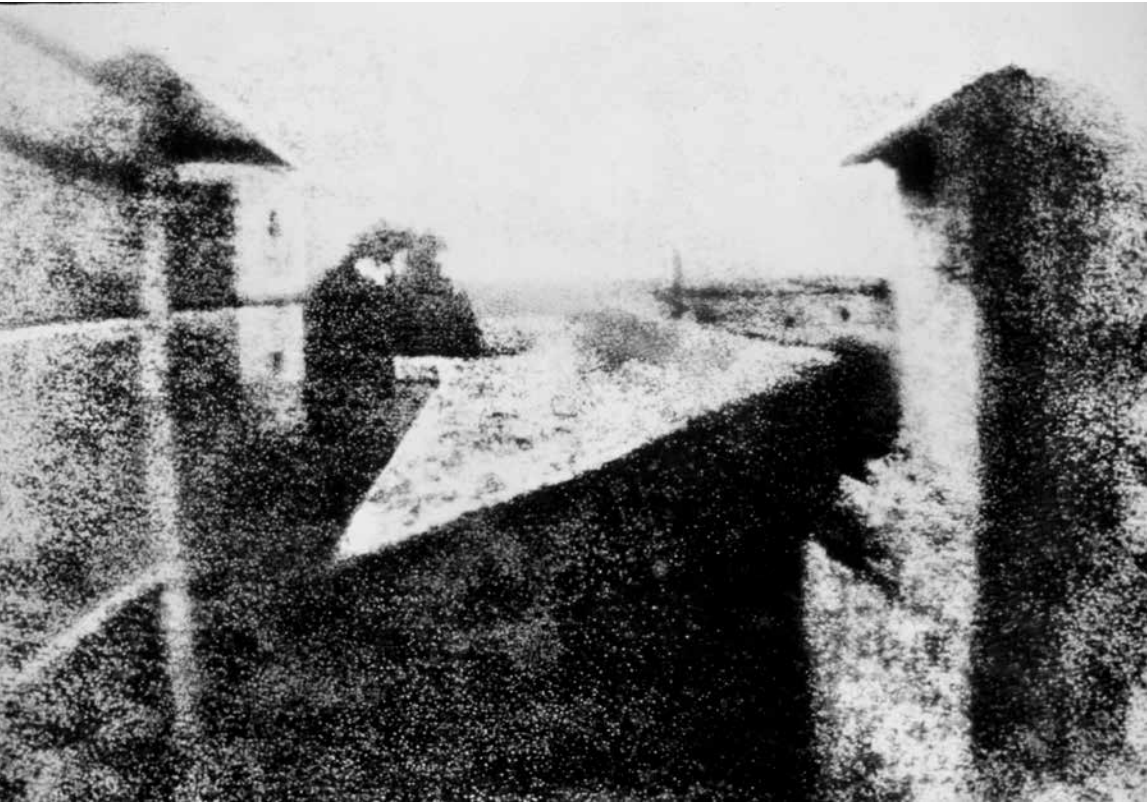
**MARVIN:** Yes, and photograms were a novel and interesting way to document and represent plant specimens and structures. The fact that photographic images could be collected in books was yet another reason photography was embraced as an unprecedented way to share information. Photographic books blossomed in the 19th century. Charles Darwin's 1872 *The Expression of the Emotions in Man and Animals*, was one of the first scientific texts to include photographic illustrations. And even earlier on, when people were trying to understand the properties of light itself, photography became central to the study of spectrometry. Scientists mailed daguerreotypes of a light spectrum to one another, from the United States to England, to share information and discuss the qualities of light.

**STEVE:** It's interesting that the art world embraces the Bechers. When I first saw the Becher photographs, I couldn't see them in a fine art context. When I look at the Becher's work, I feel like I'm looking at an archive because of the clinical way that the work is presented. One way work differentiates itself from the experience of looking at images in an atlas or archive is when the work is presented and encountered as gelatin silver prints. When I'm looking at the work I have to put it into the context of conceptual art. And that the experience of looking at the work is the experience of understanding an archive rather than necessarily the imagery itself. To me they were just as much architectural documenters as they are conceptual artists. These guys are scientists as much as they are artists.

**MARVIN:** Well, yes. In the sense that photography was respected and valued because it didn't necessarily interpret. People often assume that what photography gives us is a one-on-one imprint of the world. In the 19th century, it was called 'the pencil of nature,' a way to imprint and index the world in a manner that sidestepped subjectivity and would be more accurate and useful for that accuracy. In the 1960s and 1970s when the Bechers started exhibiting their work, it was a moment in the art and photography worlds when some people were turning away from more self-conscious photographic narratives and artfulness and, once again, toward greater objectivity and clarity of vision. I think that the conceptual nature of what they were doing not only brought photography back into a more rigorous and scientific realm, but used it to step back and look at culture, industry, economics, politics, and power structures as well. They honed a methodology that eschewed "creative" bells and whistles. They made one picture after another that allowed viewers to, in a sense, data mine the work.

**STEVE:** I heard a quote that said they don't remember who pushed the button. Does science negate the notion of personality in imaging?

Clockwise from top left: Karl Blossfeldt. *Allium ostrowskianum*, *Knoblauchpflanze*, 1928. The J. Paul Getty Museum, Los Angeles; Anna Atkins, *Dichsonia arborescens (Jamaica)*. 1850, Yale University Art Gallery, Gift of George Hopper Fitch, B.A. 1932.; Nicéphore Niépce, *View from the Window at Le Gras*. 1826-7. Camera Obscura, Lithography.











**MARVIN:** Personality is something to keep at bay. I don't think scientists working with photographic imaging are thinking of the uniqueness or artfulness of what they're doing. They just need to get the job done. Scientists need images to be as clear, readable, and free from that as possible.

**STEVE:** But in terms of what images look like and express, there's been an undeniable and revolutionary change in photography triggered by digital photography and Photoshop, which upended all ideas about accuracy and how one can make or manipulate an image, that blows away the notion of a dispassionate, mechanical eye.

**MARVIN:** Well, it has always been a fallacy to think that photography was, or ever really is, objective. At its best, photography is only as objective as the current state of photographic technology allows it to be. You could, for example, see a lot but only certain things in a daguerreotype. You could see and learn something different from an x-ray. Photoshop does let people easily manipulate the content of the image. But photography always lets you do that. Photography has never been absolutely accurate. Various types of films or sensors let you register certain parts of the light spectrum, but not all of it. Photographic information is always malleable or bracketed by constraints in one sort or another. What's interesting about digital imaging is how it forefronts this issue. Image captures are often just the first step in a process of manipulation whose goal is to extract, recombine, and alter input to heighten data. Images we see from the Hubble or Spitzer telescopes, for example, often combine infrared, black and white, x-ray, and color images into a single one that is more readable than any of those individual images could be.

**STEVE:** You showed me an image by Lewis Baltz that reminds me a lot of how the Bechers looked at an image. Personality seems to have been reduced as I'm viewing this. Do you want to tell me something about how this image is made?

**MARVIN:** Baltz was well known by the mid-1970s for photographs that seemed topographic and dispassionate: highly detailed and seemingly neutral images of landscapes, industrial parks and the blank facades of buildings built or under construction. In the late 1980s and early 1990s, Baltz's attention turned to technology, and he started working on commissioned projects that gave him access to corporate and governmental laboratories, clean rooms, computers banks and artificial intelligence research sites. He made images in color instead of black and white, and as Thomas Struth and Trevor Paglen would do years later, made photographs of pro-

cesses and relationships often kept out of sight. The images in Baltz's series, "Sites of Technology", adopt the supposed neutrality of science, the deadpan stance, to question what's going on. What's wild is how some of Baltz's minimal images that have a colorful cheeriness that belies but can't quite hint at the seriousness of what lies beneath their eerie calm.

**STEVE:** In the same sense, you have Baltz shooting a clean room that is some kind of science lab, then you have Thomas Struth shooting another kind of science lab. Both artists looking at the laboratory. Yet, with the Baltz, I don't get an emotional buzz until you tell me about all the data underneath, its calculated chill. Whereas the Struth does just the opposite. It's vividly representing in the myth of Frankenstein, creating the new monster, and tapping in a very different response.

**MARVIN:** This picture literally puts a face on research and what science is about. I'm fascinated by it because of the way it speaks to issues like robotics and artificial intelligence and hints at controversies about imaging's central role in facial and object recognition, surveillance, artificial intelligence. The sciences promise a better world, but at the same time deliver the tools to surveil and control the world. This is a theme we're increasingly seeing in artists work around science. And often, the work that questions sciences uses the evidential look of science, the artifacts of science, the methodology and visual language of science.

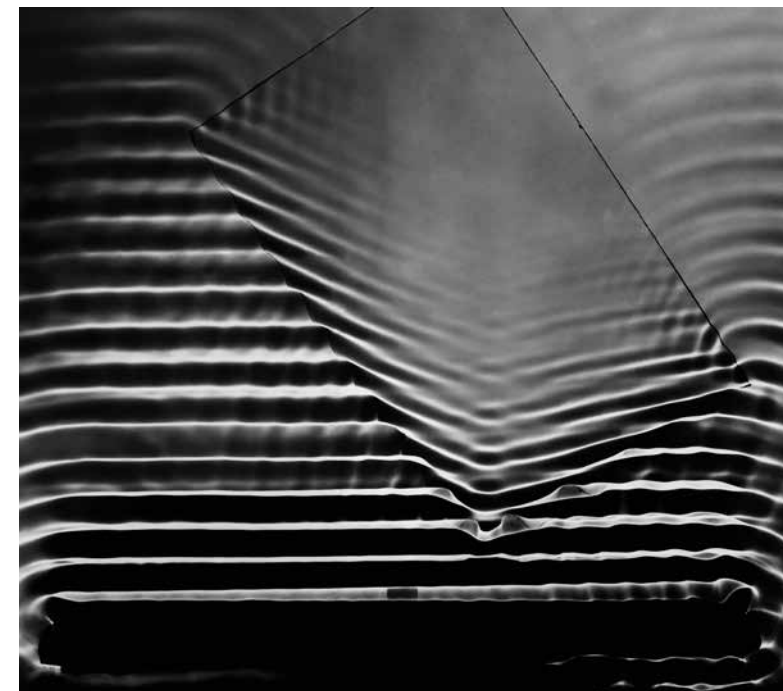
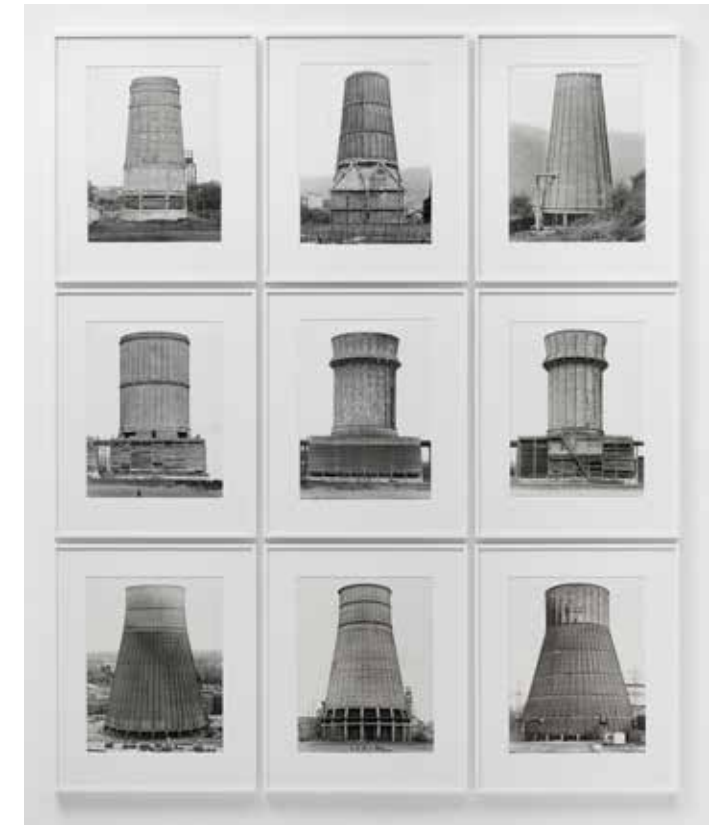
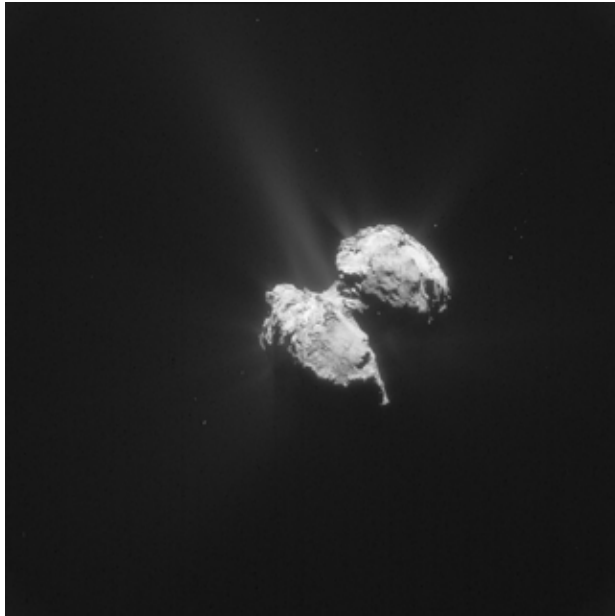
**STEVE:** So we have this incredible interest in science and its visual language from artists. Now that there is a vast and growing public interest in science, does that change how scientists photograph?

**MARVIN:** Scientists use photography as a way to gather information, explore, and learn, but just as importantly photography is also used to promote science itself. As soon as photography was introduced, photographs were taken of the moon, the stars, animals, and objects, but also of scientists themselves, of their laboratories, and the product of their work. Scientists were always aware of imaging as an interface between the sciences and the public. By the mid-to late 19th century, for example, science photography was being prominently featured at world's fairs and popular expositions. Scientists began to reach out to the public, crowdsourcing images in areas like meteorology, saying "Hey, we're trying to understand lightning. So, amateur photographers, send us your snapshots of extreme weather so we can use that information." Scientific images have long been used in advertising to endorse and suggest the efficacy of products. One example is a stylish Kent cigarette ad from the late 1960s that presents a scien-

Previous spread: Louis Daguerre, *Boulevard du Temple*. 1839. Daguerreotype. Paris.

Opposite: Thomas Struth. *Simulator Head*, JPL, Pasadena 2013. Lithograph of four stones. 89,0 x 69,0 cm.





Clockwise from top left: OSIRIS wide-angle camera image taken on 13 January 2016, when the European Space Agency's Rosetta spacecraft was 86.7 km from Comet 67P/Churyumov-Gerasimenko. The scale is 8.49 m/pixel. Courtesy: European Space Agency; *Nigella Damascena Spinnenkopf*, Karl Blossfeldt ca. 1932. Metropolitan Museum of Art, Warner Communications Inc. Purchase Fund, 1978; William Henry Fox Talbot, *A Scene in a Library* (plate VIII) from *The Pencil of Nature*, 1844-1846, salt print from paper negative, Yale University Art Gallery, Gift of George Hopper Fitch, B.A. 1932.

Clockwise from top left: John Edward Mayall, *Daguerre*. 1860. Woodburytype. Yale University Art Gallery.; Bernd and Hilla Becher, *Cooling Towers*. 1967-84.; Bernice Abbot. *A wave pattern with glass plate*, 1958-61.



tist as a cultural figure of authority, suggesting that scientists smoke Kents, because of their “micronite” filters, for a good reason and you should too.

**STEVE:** Science is also catching up to the modern era in that it increasingly uses photography to shrewdly promote itself. Recently, we’ve been presented with spectacular images like the recent close-ups of Pluto and the European Space Agency’s Rosetta Spacecraft’s dramatic images that track a comet hurtling through the sky.

**MARVIN:** Historically, various areas of science have used photography to do that. I’m thinking about the 1950s, when people were trying to promote the efficacy and marketing of the Salk vaccine. Newspapers widely reproduced pictures of grade school kids with sleeves rolled up and smiles on their faces, lined up to get their inoculations. Starting in the 1920s, the organization Science Service, a news agency like the Associated Press, was providing images and news stories to the media to attract public attention on the sciences. Science Service images are going to be included in a number of “SEEING SCIENCE’s” components.

I spend a fair amount of time on Instagram, where I’ve followed Scott Kelly, who was on the International Space Station and posting pictures every day. I look at the pictures CERN puts up with frequency. Woods Hole Institute has oceanographers post pictures as they work. And Figure 1 on Instagram is a guessing game that features photos from medical procedures.

If scientists once primarily made images for each other, today images are specifically made to reach out to the public, industry, policy makers, and the government. The introduction of x-rays, for example, caused a sensation in the 19th century and ever since then the public has been hooked. Look at people’s current interest in and the popularization of sonograms and think back to when Life magazine’s 1965 publication of Lennart Nilsson’s photographs of an unborn fetus, which caused a sensation. Think of the first satellite image of a hurricane in 1961, and how we look at and relish pictures of storms and hurricanes today.

**STEVE:** In regards to your project, you’ve said that scientific photographs have become an active agent of scientific, political, and cultural change. What do you mean by that?

**MARVIN:** I think that because so many of the ways we engage with the world is mediated by images – images change the way we perceive and behave in the world. On the subject of climate change, it wasn’t until we reached a tipping point, having seen so many images of glacial melt and the dying off of species, that people have sensed the

undeniable nature and scope of the problem. Think about how prenatal images, like the ones I mentioned, are provocatively used in pro-life rallies around the country today.

**STEVE:** But that’s an image being shanghaied by a political group to make a point. Is science actively using images to make changes?

**MARVIN:** NASA is a clear example of that, as it has to raise the funding to support Mars shots and satellites speeding to the far edges of the universe. The New Horizons project recently flooded the media with spectacular photos of Pluto, taken from 7000 miles away, by a satellite that was, by the time the pictures made it to Earth, already 45 million miles away from Pluto. Through these images, the public shares in that sense of awe, enthusiasm, and the consequentiality and wonders where will we go after we can’t be here? It was just reported that applications for openings as astronauts are way up and, to a large extent, attributable to NASA images on social media.

**STEVE:** My favorite image of the group you brought here today that I can’t resist, and want to point out is Jerry Lewis as The Nutty Professor.

**MARVIN:** As one component of the “SEEING SCIENCE” project, I’ll be curating a tabloid called ‘The Scientist’ that charts the ways scientists have, since photography’s introduction, been represented. It will go from early, staid headshots of scientists, to images where scientists are represented as wackjobs.

I’ve got to say that working on this project and looking at so many photographs of and from the sciences, have messed with my head to a certain extent. The more pictures made by and for the sciences that I look at, the more and the bigger existential and philosophical issues they seem to raise. It is one thing, I’m sure, to be making and using these pictures in one’s work and as data, to prove something right or wrong, useful or useless. But images grounded in the sciences have lives beyond the sciences, because they make visible what wasn’t visible before. They make you think about your life, your world, the universe in ways you couldn’t have imagined. Now, with so many micro and macro level images in my head, I’ve got a better sense of where the stereotype of scientists as distracted people arises from. Scientists regularly see, visualize, and spatialize things in ways that are impressive and mindboggling.

**STEVE:** So artists don’t have the corner on the market of eccentric, weird, crazy, visionaries?

**MARVIN:** Maybe they never have.

Clockwise from top right: Kent advertisement, *Thinks for Himself*, P. Lorillard, 1969 / Courtesy of Stanford School of Medicine.; Photoshop, Macintosh II 1987 / Courtesy of Computer History Museum.; Jerry Lewis plays a hapless academic who invents a potion that temporarily transforms him into a dashing crooner and man about town in “*The Nutty Professor*” (1963), directed by Mr. Lewis. Credit Paramount Pictures/ Warner Bros. Home Entertainment Inc.; Charles Darwin, *An expression of disgust*, *The Expression of the Emotions in Man and Animals*, 1872 London: John Murray. First edition / Courtesy of Wellcome Library Following spread: THOMAS BALTZ, *Element #24 from 89/91 Sites of Technology (Portfolio)* 53.

