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Maurice Berger, cultural historian and curator, describes how the power of photographic images was used to shape and forward the civil rights movement of the 1960s.

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Hany Farid, professor of computer science at Dartmouth College, investigates the history of image tampering, and the power photographs have to manipulate truth and trust.

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David Huberstich, curator of the Archives Center at the Smithsonian’s National Museum of American History, writes about how early stereophotographic “tours” turned viewers into virtual travelers and observers.

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Amy Henderson, Smithsonian cultural historian, writes about how photographic images are central to the creation of Hollywood celebrity, advertising, and desire.

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Bruce Hoffman, internationally recognized expert on terrorism, reflects on how security cameras reveal about the changing face and practice of terrorism.

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Isaia Series, garden photographer, explains how photographs can capture evanescence, beauty, and create desire.

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Dale Kaplan, vice president and director of photographs at Swann Auction Galleries, explores the convergence of photography, popular culture, and everyday objects.

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Carol Jerrems, writer and curator, explores how a quest for “perfection” reveals why photography has been used to support and popularize eugenic beliefs.

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PHOTOGRAPHY CHANGES WHAT WE EXPECT “REALITY” WILL LOOK LIKE
Jas Stam, computer scientist and 3-D graphics specialist, wonders whether photography is, in fact, the best way to depict reality.

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PHOTOGRAPHY CHANGES HOW WE SHOP
Paco Underhill, expert on shopping behavior and global consumer trends, suggests some reasons for photography’s extraordinary impact on visual merchandising and the shopping experience.

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Sam Yanes, communications consultant, describes the novelty and impact of “instant photography.”
PHOTOGRAPHY CHANGES WHAT WE EXPECT “REALITY” WILL LOOK LIKE

JOS STAM

THREE DEPICTIONS OF REALITY: photography, painting, and computer graphics:
"They now have movies which use computer-made landscapes, and they say look real!
They are only real in the context of the perspective picture we are used to. We must use
the computer another way." —David Hockney

Look at the three pictures that accompany this short essay. Each one attempts to convey
the experience of looking at a real-life scene. The first is a photograph of a painting by
Jacob van Ruisdael. The second is a photograph I took on the coast of Fano, in southern
Portugal. The third is computer generated, a set of pixels depicting an ocean created with
Autodesk MAYA software.

How are these pictures related? Which is the most "realistic?" The photograph from
Portugal is a reminder of how ubiquitous photography is, and the big role it plays in defin-
ing how we share our visual experiences with others. Photography is convenient, but is
it always the best way to depict reality? A photograph is actually a very limited way of
sharing our experience of the real, as it represents only a single vantage point in space
and a brief moment in time. Shutting one eye and looking around with the other gives
you more information than a camera would; your head moves, and visual data entering
that open eye is directly wired to the brain where it is filtered and prioritized. Crucially,
there is no static or single picture in your mind of what you see. Your brain, wired to your
eyes, is always affecting what you see as well as the way you see things.

Now look at the photograph of a painting by Jacob van Ruisdael. Most people would
say that it is not as realistic as a photograph of a similar scene. However, I'd argue that
Ruisdael's painting conveys more temporal and sensory information than any single
photograph can. Through exaggeration, it provides a more vivid visual experience—a
natural scene captured, not by a piece of hardware like a camera, but filtered over time
by the subjective mind and skills of a talented painter. This experiential "effect" is even
truer in portraiture; we often relate more to caricatures than to photographs, because
caricatures, if done well, capture in a single image an aggregate of typical expressions
and facial features.

When photography was in its infancy at the turn of the twentieth century, the French
sculptor Auguste Rodin criticized it as being unrealistic, claiming that his sculptures were
more realistic. To understand this, try to mimic, for example, the pose in The Thinker,
one of Rodin's most famous sculptures. You'll be surprised how hard it is to achieve the
actual pose. Rodin’s art is exaggerated to achieve higher realism. One of my favorite forms of pictorial art—what people in the art world call (and some dismiss as) Photo Realism—is another and more contemporary exaggeration of photography. Hyperreal artworks—not copies of photographs but caricatures of photographs—are, to me, more evocative and appealing than photography.

With the spread of digital imaging, a more recent fallacy concerning the relationship of photography and realism is that more megapixels inevitably yields more realism in any given image. But we only have to look at Rembrandt’s portraits to see that this is not true. He famously said that people shouldn’t look too closely at his paintings, as the smell of oil paint would sicken them. As in the case of caricatures, Rembrandt’s paintings, and especially his self-portraits, give you the impression of looking at a real person. Consciously or not, Rembrandt knew how our brains would interpret his blobs of paint.

As a computer-graphics researcher, while photography has a huge influence on what I do, the major part of my work is devoted to achieving convincingly realistic imagery through nonphotographic means. Interestingly, we incorporate defects of the photographic medium, like lens flare and depth of field, in order to achieve depictions that are close to photographic. But the distinctive look of computer graphics is largely based on physics and a theory called Radiative Transfer, which gives us a great framework to ponder how light bounces around in an environment. In short, this is how it works: we figure out how light interacts with objects within a scene, and then render that process numerically before we project that data, as an image, onto a two-dimensional planar surface. The last two steps are performed by computer.

The bottom line in our industry is to get people to watch the special effects that are created using our software. And to achieve that goal, we are always questioning our basic methodologies. There is a lot of room here for innovative research that proposes different mappings from a three-dimensional virtual world to a two-dimensional array of pixels. I don’t think a single photographic, mathematical, or perceptual model can achieve this, and we need to keep providing filmmakers and artists with new and better sets of tools.

To arrive for photographic realism is just one of many ways to convey a real-life perceptual experience to other people. My point is that it is not always the most compelling one. Our interest in the field of computer graphics is to better understand how our brains work, and then go beyond the specifics of photography to find ways of achieving higher realism by using non-camera-centric models.
PHOTOGRAPHY CHANGES EVERYTHING harnesses the extraordinary visual assets of the Smithsonian Institution’s museums, science centers, and archives to trigger an unprecedented and interdisciplinary dialogue about how photography does more than record the world—how it shapes and changes every aspect of our experience of and in the world. This book features over two hundred images and nearly eighty engaging short texts commissioned from experts, writers, inventors, public figures, and everyday folk.

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