



Practices of Looking

An Introduction
to Visual Culture

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Scientific Looking, Looking at Science

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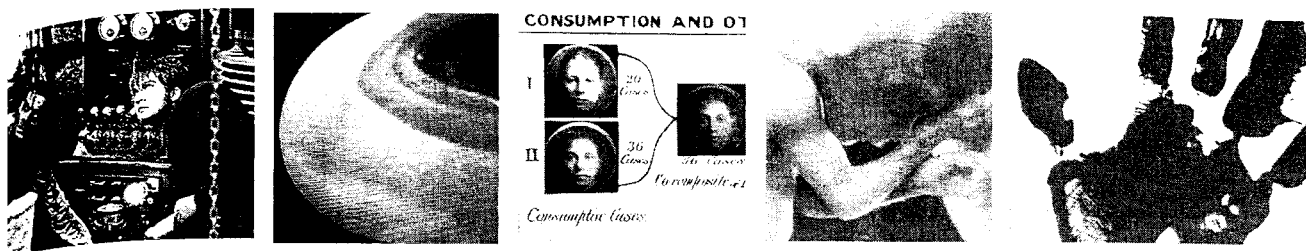
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Images play many different roles in visual cultures. They provide information in the media, sell goods through advertisements, evoke personal memories, and provide scientific data. Throughout this book, we have emphasized the ways that images in certain contexts affect the way that we view images in other social arenas. We have stressed that our experiences and interpretations of images are never singular, discrete events but are informed by a broader set of conditions and factors. The term “visual culture” encompasses a wide range of forms ranging from fine art to popular film and television to advertising to visual data in fields that we tend not to think about in terms of the cultural—the sciences, law, and medicine, for example. Because scientific imagery often comes to us with confident authority behind it, whether we view it through the press or through professional work and study, we often assume it represents *objective* knowledge. But as we will see in this chapter, scientific looking is as culturally dependent as the other practices of looking we have examined. Our view of scientific images will take into account the culture and experience of looking at art and popular media and the way in which we look at advertising images, because scientific looking does not occur in isolation from these other contexts.

Since the origins of photography in the early nineteenth century, scientific images have been an important area of photography’s history and development. The role that photographs have played as scientific and legal evidence has been significant. With the rise of computer and digital imaging in the late twentieth century, images and visual inscriptions of data are a major part of the way that different fields of science conduct experiments, render information, and communicate ideas. There has been a worldwide shift toward visual

means of representing knowledge and evidence, one that has escalated with the increased importance of digital media as a preferred mode of information. This increased use of visual images and combinations of visuals and text changes not only *how* we know what we know, but *what* we know. In other words, knowledge itself changes with this shift in the mediation of knowledge, with the ways it comes to us in images. It is important to keep in mind that science and culture are not discrete entities. Science intersects with other areas of knowledge and culture and draws on those systems in its day-to-day practices. In this chapter, we consider the various ways that images come into play both in scientific practice and in media appropriations of scientific methods and approaches. We put forward the view that scientific looking is always caught up in culturally influenced forms of looking.

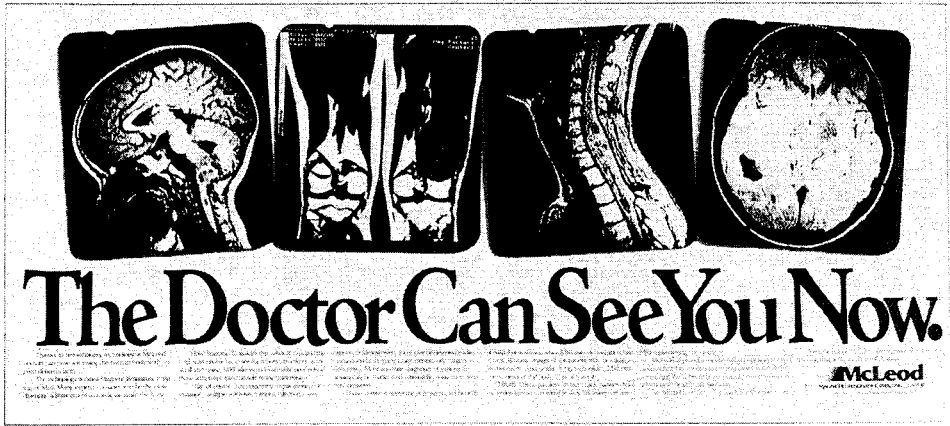
Images as evidence

The mechanical nature of image-producing systems, such as photography and film, and the electronic nature of image-making systems such as television, computer graphics, and digital images, bear the legacy of *positivist* concepts of science in the nineteenth century and before. As we noted in Chapter 1, the notion of *photographic truth* hinges on the idea that the camera is an objective device for the capturing of reality, and that it renders this objectivity despite the subjective vision of the person using the camera. Hence, the photographic image has often been seen as an entity stripped of intentionality, through which the truth can be told without mediation or subjective distortion. Yet, as we have seen, photographic images are highly subjective cultural and social artifacts that are influenced by the range of human belief, bias, and expression. Much of the meaning of camera-generated images is derived from the combination of the camera's role in capturing the real and its capacity to evoke emotion and present a sense of the unattainable—in other words, to appear to be both magical and truthful at once.

Images have been important in scientific *discourse* and the practice of science since well before the origins of photography, but we will begin our discussion with photography because our primary interest is to consider the role of images in science since the nineteenth century. In addition to the initial explosion of portrait photography in the mid-nineteenth century, photography was taken up by scientists and in medical institutions to provide a visual record

of experiments, to document diseases, and to register scientific data. In *modernity*, the idea of seeing farther, better, and beyond the human eye had tremendous currency; photography as the quintessential modern medium aided in this quest. The camera was imagined by some as an all-seeing instrument. Photographers took cameras up in hot-air balloons to photograph aerial views that few had seen before, and scientists attached photographic cameras to microscopes in order to magnify views of structures too small for the human eye to see. Later, when X rays were invented in the 1890s, they were perceived to offer a new vision of the human body. These were just some of the scientific frontiers that photography helped to traverse. This embrace of the image or the imaging instrument as that which helps us see further than the human eye continues to be a theme in scientific discourse. In this ad, the implication is that new imaging technology in medicine allows the doctor to see the patient with a new vision, one that is beyond human sight. It speaks the language of a modernist belief in the capacity of science and technology. Scientific images are thus understood as providing the capacity to see “truths” that are not available to the human eye.

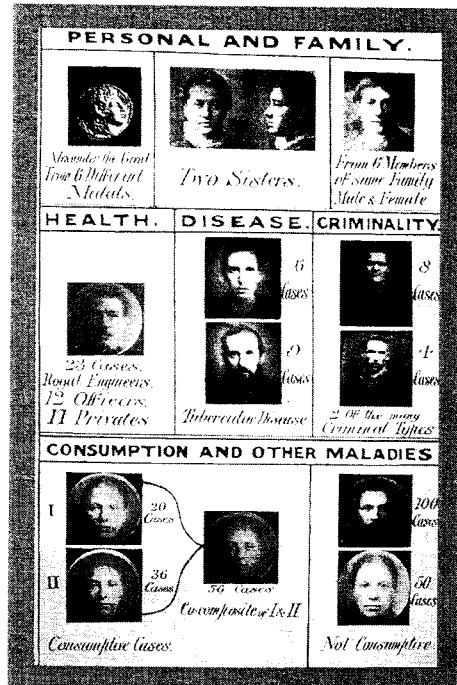
This belief in the capacity of the photograph to see beyond the human eye and to create a sense of new frontiers of vision was coupled with its increased use for institutional regulation and categorization or archiving of people according to types. Hospitals, mental institutions, and government agencies all employed (and many still employ) photography to catalog subjects, diseases, and citizens in the late nineteenth century. This practice of cataloging bodies drew in part on the pseudo-sciences of phrenology, popular between 1820 and 1850, and craniology, a slightly later phenomenon of the nineteenth



century. These “sciences” believed that the outward physical human body could be read for signs of inward moral, intellectual, and social development. Physiognomy—interpreting the outward appearance and configuration of the body, and the face in particular—was popular prior to the 1900s, as represented in the work of Barthélemy Coclès in his *Physiognomonica* of 1533, which went so far as to “read” the eyelashes of men as *signifiers* of, for example, pride and audacity.¹

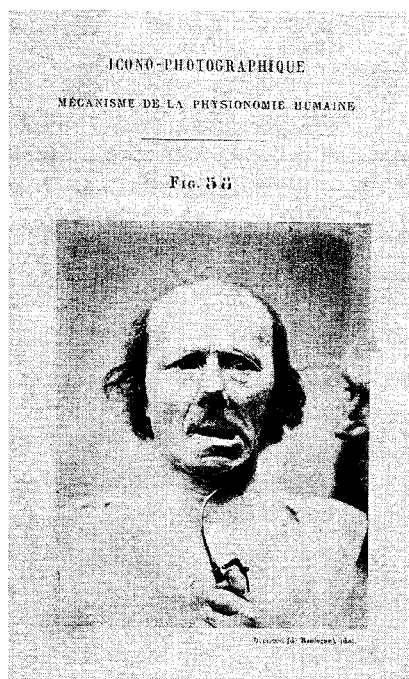
With the rise of photography in the 1830s, physiognomy had a potential new tool to refine this sort of physical representation and measurement. Readers of Sherlock Holmes may have puzzled over the line uttered by Moriarty who, upon meeting Sherlock Holmes, observes: “You have less frontal development than I should have expected.” This comment reflects the popular sentiment that the face and the formation of the skull could be read for signs of intelligence, breeding, and moral standing. These qualities were linked to race, as is evident in *The Races of Man*, written in 1862 by John Beddoe, who would become a president of the Anthropological Institute. Beddoe argued that there is a difference, both physical and intellectual, between those in Britain with protruding jaws and those with less prominent jaws. The Irish, Welsh, and the lower classes were among those with protruding jaws, he argued, whereas all men of genius had less prominent jaws. Beddoe also developed an Index of Nigrescence, from which he stated that the Irish were close to Cro-Magnon man and thus had links with what he called the “Africinoid” races. Here, we clearly can see how a visual “science” of the body had ties to racist *ideology*.

The science of eugenics, which was devoted to the practice of both studying and controlling human reproduction as a means of improving the human race, was founded by Sir Francis Galton, author of a book titled *Hereditary Genius* (1869). Of course, in eugenics, not all races were deemed worthy of reproducing. Galton, who was British, used measurement and the new method of statistics to “read” medical and social pathology off the surface of the body. The frontispiece that appears in his 1883 *Inquiries into Human Faculties* shows us many of his photographs of criminals, prostitutes, and people with tuberculosis. He was interested in producing a visual archive of deviant types within the realm of medical and social pathologies. He even went so far as to make composite portraits of various people thought to represent a given condition (as in the superimposition of portraits of people with consumption in the frontispiece reproduced here), with the idea that these composites would better represent the general type.



Francis Galton, Frontispiece from *Inquiries into Human Faculties* (1883)

Race was far from the only category so analyzed. As we discussed in Chapter 3, criminality, prostitution, mental illness, and a host of other behaviors and differences were thought to be visible on the bodily exterior. During the nineteenth century, medical researchers, hospitals, prisons and the police, psychiatrists, and lay photographers cataloged people's bodies on photographic film, effectively creating archives of types of pathologies for institutional records. In the mid-nineteenth century, Duchenne de Boulogne, a French physician, used photographs to document his experiments of applying electronic shock to subjects' faces in order to create a system for understanding facial expression. Duchenne's aim was to establish the universality of human expression, and photography was an essential tool in his project. In the image pictured on the next page, the subject is placed before the camera in a pose not unlike that of the criminal in a mug shot. There were many other such uses of photography. In the late nineteenth century the French neurologist Jean Martin Charcot devoted himself to the analysis of what he diagnosed as hysteria, mostly in women. He had his staff launch a battery of visual studies of subjects in various stages of hysterical episodes. These studies included live performances, drawings from life and photographs, photography sessions, measuring changes in position over time in sequential photographs, and even



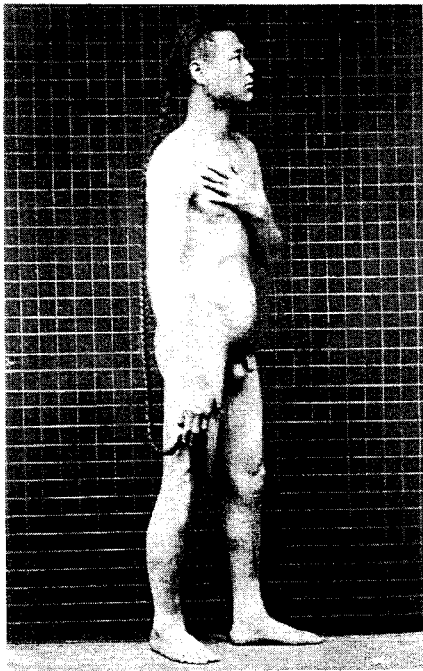
Guillame Duchenne de Boulogne/Adren Tournachon, Figure 58 of illustrations for "*Mécanisme de la physionomie humaine*," 1854

making visual motion studies. Charcot believed in observation as a key to knowledge, and saw the photograph as an ideal means for extending one's ability to observe.

The creation of images of the *other* was thus enabled by the use of the camera in the name of scientific inquiry. This took place not only in the medical and biological sciences but also in the social sciences such as anthropology. In this image, taken in the late nineteenth century, the photograph is defined within the discourses of medicine and race, as well as the discourse of *colonialism* (in which certain nations assumed they had the right to take over—by military force, economically, and culturally—other territories and nations). The image on the opposite page is an example of anthropometry, a science of the time that used measurement to make distinctions between races. That these kinds of racist studies are now discredited should help us to consider the ways in which contemporary ideas about "truth" in scientific practices are the product of particular discourses at this moment in history, and can change in time as well, even if their recording technologies make it seem as if they have captured "universal truths." The nakedness of the figure of the Chinese man serves a very different purpose than the nude figures of art images or the par-

tially clad figures of fashion models. His nakedness is coded within a discourse of science that establishes him as an object under study, and hence succeeds in effacing his *subjectivity*. The grid of the image defines him within scientific codes of body type and normalcy. The photograph does not allow the viewer to treat him as an individual, but rather as a racialized subject, defined as other from the viewer.

Scientific images span a broad set of roles, from categorization and the establishment of likeness and difference, to the presentation of evidence, to the evocation of new scientific frontiers. As we noted in Chapter 1, photography originated when a context of *positivist* science—in which the idea that we can know things positively and factually without the mediation of language or representation systems—was firmly in place. Today, however, there is a sense, even within the realms of science, of the power of language and representation systems, such as visual images, to affect not only how we see something but also our basic understanding of what we identify as objects of study and evidence itself. Thus, the role of images in science and as evidence is caught up in the debates about what *empirical* evidence is and how, if it all, it can be established.



Anthropometric study taken according to the John Lamprey system of photographic measurement, 1868

Scientific looking

In the setting of a courtroom, science is sometimes evoked to convince viewers of the accuracy of the imaging system and hence the *authenticity* of the documents presented. In many of these contexts, the discourse of science is tacitly or explicitly evoked through images to lend authority to particular arguments. Images are seen as “scientific” when they are held to present accurate, self-evident proof of certain facts. Increasingly, though, the ideological limits of such claims to truth through positivist representation have become evident and are subject to debate.

One example in which the role of images as science and evidence was enacted in controversial ways in the courtroom is the 1992 trial of Los Angeles police officers for the beating of motorist Rodney King. A videotape of the beating, which took place after King was pulled over by officers, was made by George Holliday, a citizen who happened to witness the incident from his apartment window and, having his new home video equipment in its box nearby, taped the event. Holliday first brought the tape to the police. However, their lack of interest influenced him to turn it over to a local news station. The videotape was subsequently excerpted and broadcast widely on television news, and eventually became crucial evidence in the 1992 trial. King’s lawyers introduced the tape in court because they thought it held incontrovertible evidence that the officers used excessive force on King. However, there was a surprise turn of events when the defense turned the tables, using the exact same



George Holliday, video
of Rodney King beating,
1991

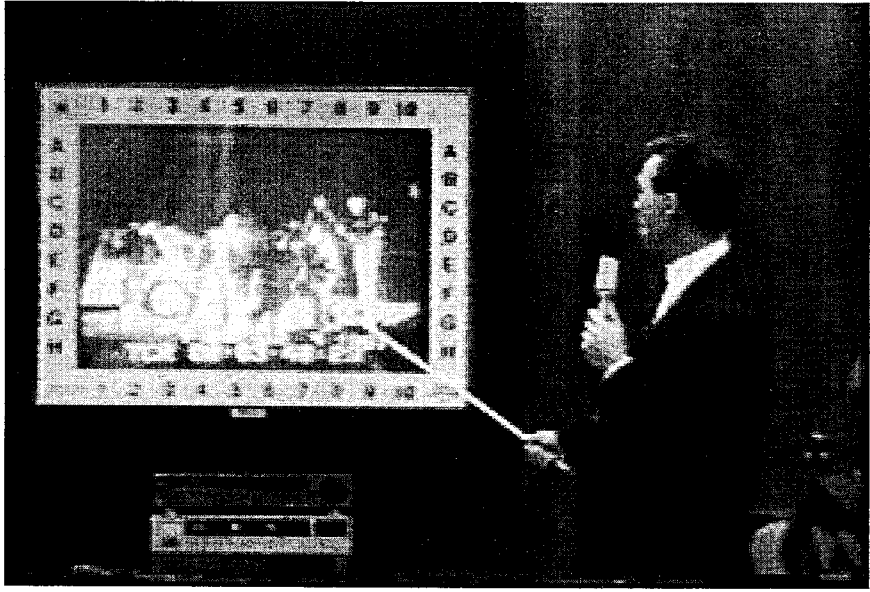
footage to argue that the police acted appropriately and that King had been out of line.

For many viewers, as for the prosecution, this video carried a high degree of authenticity. Certain formal conventions contributed to the truth-value of the video. Since the emergence of video practices in the late 1960s, the use of low-tech, consumer-grade video and film has been associated with high authenticity in various genres and forms. For instance, in *direct cinema*, a documentary film style that emerged in the 1960s and 1970s, directors used grainy black-and-white film, hand-held cameras, and long takes to capture unscripted action as it unfolded spontaneously in “real” situations. In “reality television” shows of the 1990s, producers follow police on chase and rescue missions, using small hand-held cameras to document crises as they unfold, to create a sense of realism. Some contemporary advertisements use the realist codes of black-and-white video and hand-held shakiness to make their ads seem like amateur documentaries and hence their products more authentic. Similarly, in the Holliday video, the camera’s unsteady focus indicated that it was shot by an amateur untrained in the manipulation of visual evidence. The video, in its original state, was unedited, suggesting it offered an unselective reflection of events as they unfolded. The position and angle of the camera made the image somewhat difficult to interpret at points, but they nonetheless conveyed a sense that the footage was shot spontaneously and not through selective framing and planning. The prosecution relied on this association of real-time, hand-held, spontaneous footage with reality to make their case that the video showed the facts as they happened.

There was great interest and concern among media scholars when the defense countered by using the same video footage to demonstrate a very different interpretation of it—that King made threatening moves toward officers and provoked the beating through his own behavior. The defense supported its argument with the same video footage displayed and altered through various techniques including slowed projection, freeze framing, blowups of portions of the full frame, digitized markings on the frame directing viewers where to look, and computerized stills (frame grabs) excerpted from the tape.

The method of time and motion study used by the defense is a familiar one in scientific settings. The idea behind it is that by slowing down or stopping a moving image, we can see things we might have missed when events fly by in

LAPD defense with still
of King video



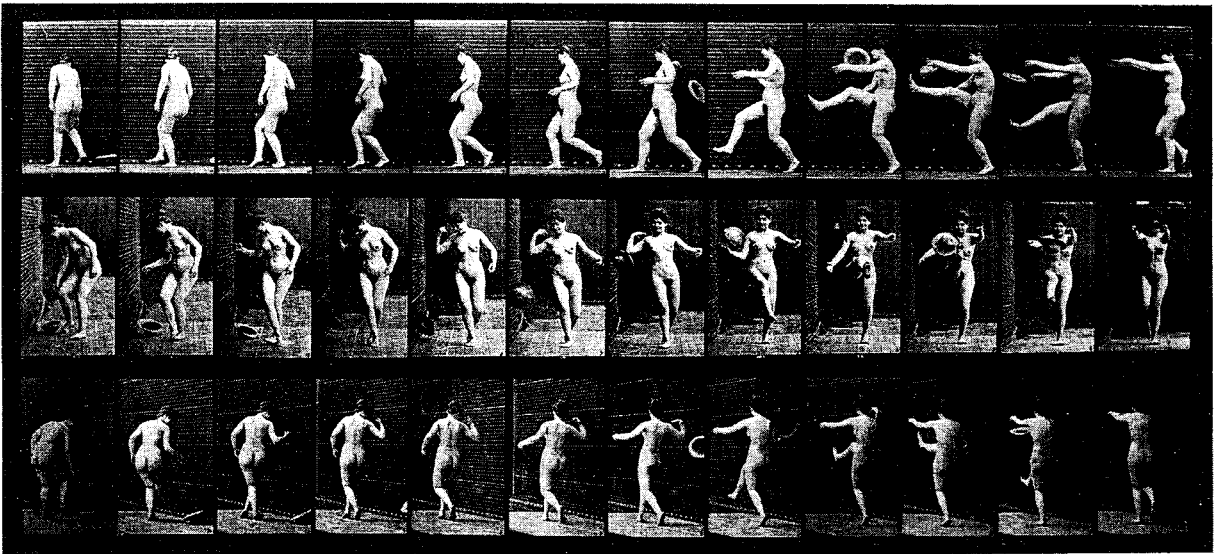
real time. But this sort of abstraction can also have the effect of eliminating time-dependent aspects of the event, and hence can construct some meanings while blocking others. The original footage shows King's body reacting to the blows of the officers' batons and the jolts of a stun gun. In the slow motion and stop-action technique so familiar in televised sports replays, King's movements are separated by greater time from the blows, making his reaction seem like unprovoked action and his defensive movements appear aggressive. Ultimately, the defense won over the jury with these tactics of framing and interpreting the "raw" footage, so that the image appeared to document Rodney King "in complete control" of the situation, in the words of one juror.

The argument about representation cannily suggested by the defense's manipulation of the footage is that "raw" documentation does not tell us the whole story. We must break down and analyze what is there in the footage in order to see what the eye, or the camera, does not make obvious. The defense argued that appearances are deceiving, hence we need to analyze appearances to see what lies beneath. The defense's technological analysis of Holliday's footage recalls two different traditions of interpreting visual data. The most immediate one is the history of film analysis. Since the 1970s, film theorists have conducted analyses of motion pictures in which individual frames of the continuous flow of 16- or 35-millimeter images are slowed and selectively frozen. These frames are reproduced as stills and subjected to comparative

analysis to discern aspects of meaning lost to the viewer during the images' rapid and fleeting projection. The idea behind this sort of analysis is that we can scientifically break down, abstract, and decode the discrete elements of a visual text in order to arrive at meanings embedded in a film's textual structure.

This precedent recalls a second, even earlier use of frame analysis in scientific experiments. At the turn of the century and later, scientists in physiology and other fields used photographs and motion picture film to conduct frame analyses in order to reveal aspects of a living or moving entity (such as a body or a machine). The idea was that by breaking down and freezing moments in the flow of a body's or a machine's continuous process, we might learn something new about its function—something imperceptible to the eye, imperceptible in the unaltered footage. Charcot's staff produced photographic series for this purpose. In the late nineteenth century, Eadweard Muybridge used photography in a now-famous study of animal locomotion. Muybridge set up elaborate systems of cameras and trip wires to take a series of images of animals and humans in motion in order to study locomotion. He began this work to settle a famous bet on whether or not there is a moment when a horse ever has all four hooves off the ground when galloping (the answer is yes). His project was one of many scientific and popular uses of the photographic motion study in North America and Europe during this period. Muybridge's images were understood at the time to be reliant on the codes of science, but it is easy to see the inevitable influence of culture and ideology on those codes.

Eadweard Muybridge,
Woman, Kicking, 1887



In the gender-coded roles of the time, many of these images documented naked men doing athletic activities, such as wrestling, boxing, and throwing a ball, and naked women performing seemingly mundane domestic tasks, such as pouring a jug of water, carrying a bucket, and sweeping. While the nudity of these figures is coded as dispassionate science, it has since been argued that these photographs can be understood both as gendered portrayals and as relying on codes of sexual representation and pleasure.²

The century-old process of time and motion study has been refined with the techniques of computer enhancement and image manipulation. Those who prepared the Holliday footage for the defense were able to change the image in ways that were perceived as clarifying, not altering, the facts. For example, computer rendering was used to sharpen Holliday's sometimes out-of-focus image and to emphasize areas of interest while diminishing others. Graphic markers such as circles and pointers were used to draw attention to aspects of the image. These techniques are common in the management of scientific data. Whereas scholars trained in visual analysis would see these techniques as ways of changing meanings, those trained in scientific imaging techniques often regard image manipulation as essential to the process of allowing evidence to emerge. Even more crucial to the defense's argument was the use of interpretive language that evoked the physiognomist's attribution of deviant behavior to racial types. King's body was described using terms that made it seem implicitly dangerous. For example, his leg was described by one witness as "cocked," likening it to a gun. The tacit assumption behind this approach to scientific imaging practices is that meaning is not self-evident in visual documents. To derive meaning from sources, we must first subject them to a process of abstraction or refinement that uncovers masked meanings. As we have previously noted, the relationship of all images to the truth is problematic. However, in the case of the King trial, the reduction of moving images to stills by the defense took it to another level of distortion, precisely because of the way each still could be made to tell an individual narrative. There are multiple ways to present a given set of images, and no one manner of presentation allows us to reach the unbiased truth. Indeed, even the prosecution engaged in their own interpretation of the moving image as closer to the truth. Rather, it is important to focus on the means of analysis themselves to reveal the ways that they embed meanings in the text. Images do not embody truth, but always rely on context and interpretation for their meanings.

Images in biomedicine:
sonograms and fetal personhood

Different imaging techniques have been central to how the interior of the body has been imaged and imagined throughout history. The process through which images change meaning according to variations in context, presentation, textual narrative, and visual re-framing is well illustrated in the history of the X ray image. When X rays were introduced as a means of medical diagnosis in the late 1890s, the public responded with tremendous curiosity and fear. The X ray image, essentially a picture of bone density, suggested to some that the X ray gave its practitioners superhuman visual powers, allowing them to invade the private space of the body. This fantasy took on an erotic cast, as seen in the work of some illustrators who made humorous cartoons, such as this one from 1934, and altered photographs dramatizing this fantasy in scenarios of a male cameraman using the rays to peer through women's clothing and flesh.

Ultrasound images provide another example of a kind of medical looking that has been invested with public meaning and cultural desires. Ultrasonography, the process of imaging the internal structures of an object by



measuring and recording the reflection of high-frequency sound waves that are passed through it, became a cornerstone of diagnostic medical imaging in the 1980s. Whereas X rays create images of dense structures (such as bones) and involve the use of potentially harmful ionizing radiation, ultrasound allows doctors to discern softer structures and (debatably) does not damage tissue. The technique was particularly well received in obstetrics, where practitioners had long sought a means of imaging the fetal body and tracking its development and the identification of abnormalities without exposing the fetus or the pregnant woman to X rays. However, less than a decade into the sonogram's use in obstetrics, studies began to show that pregnancy outcomes were only minimally affected by the technique—in other words, it was not a crucial diagnostic procedure to monitor the normal pregnancy through these images. Why, then, was this imaging technique so popular among obstetricians, and why does its use continue in the routine monitoring of normal pregnancies?

One answer is that the fetal sonogram serves a purpose beyond medicine; in other words, it is not simply a scientific image but a cultural image. As we have noted before, images can change social roles and be used in new contexts, with art in advertisements and police photos on news magazine covers. It is a well-known fact that the sonogram became a cultural rite of passage in the industrialized West through which women and their families got their first “portrait” of the child-to-be. Future parents relate to the sonographic image, pinning it up on the refrigerator and showing it to coworkers at the office as one would display a first baby picture. Sonograms routinely turn up as the first image in a baby book. Similarly, science images are used in personal contexts. Beginning in the 1990s, patients undergoing ultrasound and endoscopic procedures (where a tiny camera is passed into narrow orifices and channels to record a moving image of the interior) frequently get to view their procedure in real time, and are then given copies of the tape to take home. Medical images like ultrasounds and MRIs (magnetic resonance images) have also been integrated into nonmedical advertisements to signify special care of the body or to evoke the authority of scientific knowledge. The role of the fetal sonogram as an icon of one's imagined future family is evident in this 1996 advertisement that plays on Volvo's reputation as the safe family car. This advertisement features a fetal sonogram with the message “something inside you is telling you to buy a Volvo.”³ It appeals to an imagined maternal desire to protect the fetus, while also playing on cultural anxieties about women's



bodies not being a safe enough vehicle for the fetus's well-being. It is the image of this partly formed "child," through its persuasive address as icon of family, that "tells" the viewer she must conform to cultural messages about the woman's obligation to minimize fetal risks. Here, the fetus not only resembles a child, it is also positioned as if in the driver's seat, thus drawing a parallel between intrauterine "safety" and car safety.

The idea that women visually bond with their future children through the image of the sonogram has circulated in the medical profession since the early 1980s, and prompted the claim, reported in one study, that the sonogram image may encourage women who are ambivalent about their pregnancies to choose not to terminate them. In other words, the image is understood to have the power to encourage emotional bonding much more than textual descriptions of the fetus ever could.

This has sparked a debate among cultural analysts and medical practitioners, and it remains a vexed issue in part because the boundaries between the medical and the personal are blurred.⁴ However, one point of agreement is that in the case of the fetal sonogram the biomedical image takes on the *aura* of a portrait, a document of the fetus's status as a social being (as a person) and not just a biological entity. We do not often hear accounts of people

bonding with, say, an X ray or a bone scan, but the fetal image has evoked a kind of response more typically associated with a family photograph or home video.

This view of the sonogram as a social document helps to award to the fetus the status of personhood (and a place in family and community) more typically attributed to the infant after birth. Expectant parents and families thus project onto the sometimes barely legible sonogram character traits and aspects of personhood that are incongruent with the fetus's actual developmental stage. In this sense, sonograms serve a nonmedical cultural function that justifies the technique's use, despite the fact that there have been questions about its clinical or diagnostic usefulness in treating normal pregnancies. By saying that this function is nonmedical, we do not mean to imply it is merely cultural. The concept of a fetus as a person has been a central factor in legal cases that have allowed the fetus to be represented in legal terms by adults who feel they may speak on its behalf, and are pitted against the wishes or rights of the pregnant woman.⁵ In these cases, the cultural aspect of fetal personhood shows itself to have an active life in law and the many other areas of life where moral values and social policy coincide.

Scientific images as advocacy and politics

The image of the fetus, whether as a photograph or an ultrasound, thus acquires meanings beyond its most literal medical meaning in diagnosis. Science is never separate from social meaning or cultural issues. Throughout the history of Western science, the idea that science is a separate social realm, one unaffected by ideologies or politics, has been a central doctrine of the hard sciences. Scholarship in science studies of the last few decades has forcefully pointed out, on the contrary, that what science signifies depends on social, political, and cultural meanings, and what kind of science is practised and rewarded is a highly political issue. We need only refer back to the now mostly discredited racist scientific practices of the nineteenth and twentieth centuries—such as the practices of physiognomy and craniology (skull measurement) to establish racial superiority of whites or the callous use of black men with syphilis as experimental subjects in the now famous Tuskegee Institute studies—to see the ways in which the ideologies that dictate scientific practice have changed over time. Hence, in Michel Foucault's terms, we can analyze how the

discourses of science, like all discourses, change over time, allowing for new *subject positions* to emerge and new ways of speaking about science to come into being.

To continue with our example of fetal imaging, images of the fetus have become central icons in the debate over abortion in the United States. The compelling fantasy of fetal personhood that is projected onto the sonogram has provided powerful fodder for the anti-abortion movement. This was made clear early in the history of obstetrical ultrasound in 1984 with the release of the videotape *The Silent Scream*. In this production, ex-abortion doctor Bernard Nathanson mounts a case against the practice of abortion through various tactics including showing the viewer what he describes as real-time ultrasound images of a twelve-week-old “unborn child,” an abortion, and images supposedly of aborted fetuses. Nathanson explicitly states that the moving image convinced him to change his political stance because it led him to believe he was seeing a “living unborn child” and not a mere fetus.

The Silent Scream provides many examples of the visual and extra-visual manipulation of images to demonstrate certain “truths.” A rebuttal tape made by Planned Parenthood reveals that *The Silent Scream* consistently uses older fetuses to give the impression of a bodily form, and manipulates time and motion to make the ultrasound image of an abortion appear to produce the image of it “screaming.” In attempting to portray the view that the fetus “sensed danger” with the insertion of instruments used in abortion, Nathanson sped up the supposedly real-time ultrasound image to make the fetus appear agitated and seem to throw back its head in a “silent scream,” something the rebuttal tape assures us it does not have the developmental capacity to do. In their rebuttal tape, Planned Parenthood experts show viewers the “real-time” footage only to demonstrate truths not evident on its surface. Techniques like those used by Nathanson, the Planned Parenthood experts suggest, are deceptive and manipulative.

Whereas *The Silent Scream* banks on the power of images to reveal the truth, *Response to the Silent Scream* makes the argument that images are easily manipulated and can seduce people into believing things that are not true. Yet, the history of images demonstrates that the simple process of debunking a manipulated image is not enough to eliminate its power. In exposing Nathanson’s manipulation of images, Planned Parenthood failed to address a crucial fact: images generate strong emotional responses in their viewers, whether or not they are “truthful” in what and how they represent,

and whether or not we are aware of their manipulations. The prevalence of ultrasound suggests that people are moved by its images whether or not they are medically useful, and they construct narratives about fetal personhood despite what is known to be true about fetal life and development. Many of the people who participate in the culture of obstetrical ultrasound construct narratives about fetal personality, identity, and familial roles whether or not they know and believe the facts about fetal development—and about the potential of images to “lie” or “tell the truth” depending on how they are used.

It could thus be said that viewers/consumers of images often choose to read particular meanings into them for emotional and psychological reasons, and to ignore those aspects of an image that may work against this response. In his book *Enjoy Your Symptom!*, cultural critic Slavoj Žižek explains that consumers of popular media are not dupes of the media industry; they know they are participating in systems of ideology that work against their interests, but they participate all the same—and they enjoy this participation, as they should. Hence, women who pin their fetal sonogram up on the refrigerator and place it in the family scrapbook as the first portrait of their “child” are not naive victims of the culture industry that makes medical images into fodder for fantasies about family and fetal personhood. Rather, they are appropriating medical culture's artifacts to construct cultural narratives inflected by other aspects of their worlds. Likewise, viewers of *The Silent Scream* can be moved by Nathanson's drama despite what they know about his tactics of staging and narration.

It is this profound emotional response to images that has fueled the political nature of fetal images since the first photograph of a fetus was produced in the 1960s by well-known medical photographer Lennart Nilsson. Nilsson's images, which have been popularized by the book *A Child is Born*, depict fetuses at various stages of gestational development until birth. The book presents medical photography and other forms of interior biomedical imaging as nothing short of a miracle of modern culture. The “miracle” refers both to the process of human reproduction and development, but also, by implication, to the miracle of scientific imaging—the fact that the photographic camera can actually produce these images. The book is filled with glowing color images celebrating the reproductive process, lending credence to the belief that the visual is at the core of modern science and culture.

Some feminist critics of science have noted that Nilsson's images do more than provide compelling images of fetuses, they also have the effect of erasing



Lennart Nilsson, Fetus at
16 weeks

the mother. Taken when many of these fetuses were actually outside the womb, these images depict fetuses as floating in space, as if they are not actually within the body of a woman.⁶ Hence, it has been argued that these images, along with ultrasound images, provided the emotional and political means for the interests of the fetus to be seen in opposition, in medical and legal terms, to its mother. The capacity to think of the separation of the fetus from its mother in social and legal terms was an unanticipated effect of these scientific images. It has encouraged a pro-life emphasis on the fetus's rights over the rights of the pregnant woman.

Images of fetuses obviously outside the womb and no longer living have been central to the anti-abortion debate. The intensity of this debate has hinged in part on the powerful effect these images can produce. While the reproductive rights movement has sometimes attempted to counter these images with equally horrific images of women who have died of illegal

abortions, the image “war” in this context has clearly been “won” by those who have within their political discourse the image of a dead potential child. These images, which their advocates legitimate as science, are usually presented without any contextual information. They rely on shock value rather than reason to make their case. In the contest of advocating a particular political position, it can be said that an image that appears to award life, such as the Nilsson photographs, and an image of gore (such as those of dead fetuses) “speaks” louder than words.

Vision and truth

Underlying both of these stories is a tension between the idea that truth is self-evident in the surface appearance of things, and the contrasting idea that truth lies hidden elsewhere, in internal structures or systems of the body, and that scientific representational techniques may uncover evidence of these hidden truths. The idea that the truth lies beneath the surface, and needs to be seen to be fully understood, has predominated in Western culture since the time of the Greeks. It is a common sign in contemporary culture to use the image of looking inside someone as seeing their “true” identity. In this ad, understanding is equated with the capacity to see into someone’s interior with an MRI image.



The idea that truth can be made visible was a topic of particular interest to French philosopher Michel Foucault. His book *Birth of the Clinic*, an account of the creation of hospital-based teaching and research in 1790s France, is pertinent to discussions of science and visibility, though its particular focus is the clinic and not obstetrics or law. Foucault describes the replacement of traditional methods of diagnosis by reading the surface symptoms of an illness with the practice of anatomical dissection and looking for empirical evidence beyond the physical surfaces of the body. In Chapter 3, we discussed the institutional gaze identified by Foucault in terms of surveillance and inspection. He was also interested in the identification of signs and symptoms, specifically how the “medical gaze” elicited truths hidden within bodies, rather than through direct self-evidence of pathology. Dissection rejected older ideas about where to look for the “truth,” but it still adhered to an ideology of visual truth in which it was assumed that all a doctor had to do was gaze into the depths of the body for its truth to be unveiled positively and positivistically.

In the rise of the natural sciences in the nineteenth century and in biomedicine today, vision is understood as a primary avenue to knowledge and sight takes precedence over the other senses as a primary tool in the analysis and ordering of living things. Hence, an ultrasound image taken by a doctor will be perceived as more reliable than a woman’s description of her bodily sensations of pregnancy—or what has been termed “felt evidence.” Foucault identifies the introduction of a new (clinical) regime of knowledge in which vision plays a distinctive role in our regard of bodies and subjects. At the same time, vision can play different roles in contemporaneous regimes of truth; there is not one but multiple medical and scientific ways of looking.

The looking Foucault describes is crucially linked to other activities that give meaning to what vision uncovers: experimenting, measuring, analyzing, and ordering, for example. These are the activities that separate the idea of appearances as self-evident from the analytical clinical gaze Foucault describes. The clinical gaze leaves its mark in the particular “scientific” approach to images taken in the LAPD analysis of the Holliday footage, and in the Planned Parenthood analysis of Nathanson’s use of ultrasound images, though to different ends. While these are not the only approaches to the visual we can find in contemporary science, they represent one major tradition. The paradox of the clinical gaze and its legacy, then, is that vision may predominate, but is nonetheless dependent upon other sensory and cognitive

processes. This paradox becomes all the more pronounced as we move into the twenty-first century and the age of the digital image.

Once again, ultrasound provides an instructive example of how what we think of as visual material and visual knowledge in the digital era is in fact highly dependent on factors other than sight. We tend to think of the ultrasound image as a kind of window into the body. Through it, we see structures previously unseen and in some cases unknown. But in fact ultrasound involves the visual only in the last instance, almost as an afterthought to a process that is markedly lacking in any aspect of visibility.

Ultrasound had its foundation in military sonar devices designed to penetrate the ocean with sound waves and measure the waves reflected back as indicators of distance and location of objects. In this technique, sound is utilized not for hearing or communication *per se*, but as an abstract means of deriving measurements. The data measurements of sound waves acquired through sonar are computed to assemble a record of object location and density in space, but this record need not be visual. It could take the form of a chart, a graph, a picture, or a series of numbers. Adapted to the analysis of human bodies, the data derived from sonography is analyzed with computers and sometimes translated into graphic images on computer or video monitors or the construction of objects in three dimensions. Ultrasound is visual only in the translation of its data. In other words, we can derive roughly the same information from sonography without rendering it in images.

The paradoxical nature of this “visual system” that involves imaging in the last instance is compounded by the fact that sonography is a “sound” system that involves neither hearing nor the production of noise *per se*. It is because there exists a cultural preference for the visual that ultrasound’s display capabilities have been adapted to conform to the visual conventions of the photograph and not to the standard of, say, the graph or the numerical record. In the practice of ultrasound, then, looking and the visual are, paradoxically, all-important afterthoughts. The visual may “steal the show,” but it is not the whole picture of biomedical knowledge.

Genetics and the digital body

The desire to visualize the interior of the body has been a central aspect of Western medicine for its entire duration. Science has consistently embraced visual technologies throughout its history

and those technologies have in turn redefined the ways that scientists, medical professionals, and the general public think about the human body. As we saw in our discussion of images of fetuses, the capacity to look within the body fundamentally alters how it is understood in cultural and political terms. During the last decades of the twentieth century, biomedicine introduced a broad range of imaging technologies such as MRIs, CAT scans, ultrasound, and fiber optics, in addition to the historical technology of X rays, to produce images of the body's interior. Increasingly, *digital* rather than *analog* technology is being used to map the body, such as the MRI image, and this means in turn that cultural concepts of the body have begun to reflect concepts of the digital. This is particularly the case with the emergence of the Human Genome Project, which aims to create a genetic "map" of the human genome.

Genetics captured the scientific and popular imagination at the end of the twentieth century. During the 1990s, genetics was the field that scientists and the public turned to for clues about the origins of everything from smoking to schizophrenia, from cancer to criminal behavior. This decade saw the rise of specialties like gene therapy, genetic counseling, and genetic testing as the world of science was harnessed to the task of mapping the human genetic code. Genetic science is not simply about identifying the genes that constitute the human chromosome, it is also about identifying genes linked to disease, behavior, physical appearance, and a host of other conditions and factors. Genetic therapy understands genes as they relate to medical aberrations and pathologies. Just as nineteenth-century scientific practices of measurement were used to shore up ideologies of racial difference, gene therapy is used to map differences among human subjects and has the potential to be used to designate those who are outside the "norm" in profoundly troubling ways. Echoing Foucault, Dorothy Nelkin and Susan Lindee explain that with the shift to a genetic model, "Images of pathology have moved from gross to hidden body systems. Once blacks were portrayed with large genitalia and women with small brains. Now the differences are in their genes."⁷ Genetics has thus emerged as a new and deeply problematic marker of biological and cultural difference, taking the place of nineteenth-century physiognomy. Why has it been so quickly embraced as a measure of humankind? The answer lies in part in its rendering of the body as a kind of accessible digital map, something easily decipherable, understandable, and containable—a body that is seemingly less mysterious than the body that is popularly conceived and individually experienced.

The new genetics relies on a regime of knowledge involving different practices of looking to construct its truths. *Secrets of Life*, a public television series produced by WGBH Boston in 1993 and devoted to the history and status of genetics, captures in its title the status of scientific visibility in the 1990s. The secrets of life, this series suggests, are held within the chromosomes, which contain “instructions” or a “blueprint” for every living thing. One of the primary aims of the Human Genome Project, a multinational consortium of scientists, is to “map” the “codes” of the human genome, leaving no chromosomal structure untraced. Metaphors of maps, blueprints, instructions, and codes (as in the codes of life) abound in descriptions of the new genetics. It is important to note that metaphors about science are not simply ways of talking about these processes, they affect how they are undertaken and understood. These metaphors are not the constructions of a misguided media that fails to “see” science accurately. Rather, they are the chosen metaphors of geneticists themselves, who adopt these models to describe their own work.

In *Secrets of Life* viewers see row upon row of file drawers each containing sheaves of paper on which are printed genetic code. Genetic researcher David Suzuki periodically gestures to and rifles through these papers. He stresses the importance of completing the task of filling in the blank sheets with newly discovered code. When the project is completed, he indicates, we will have the fullest representation of the human body we have ever had access to. The image he offers viewers is that of a human body transcribed into thousands of pages of code—line upon line of letters in various orderings. This, he acknowledges, will be far too much data for scientists, much less the public, to view or comprehend. The task following the assembly of the data, then, is to make sense of this code.

Suzuki perfectly lays out for us another configuration of the paradox we have been describing. Genetics constructs the “truth” of the body as a secret that science cannot readily see. It claims that this truth can be uncovered if scientists around the globe work hard enough to track and make sense of the minute, invisible, and abstract code or blueprint in human chromosomes. Yet, even now that the goal of “unlocking” the code and transcribing it has been completed (in 2000), we are still unable to “see” the body. Another level of interpretation is necessary. To simply see the body and its surface attributes (hair color, pigmentation) becomes less meaningful as we become convinced that the real meaning lies hidden within, and cannot be reached by visual

techniques alone despite tremendous advances in imaging technologies. The enigma of that which is beyond the visible increasingly takes precedence over the goal of making things visible as we move into the realm of genetic “language” or “code”—the body’s new secrets.

The idea of the body as a communication center has been central to many biomedical scientific practices in the twentieth century. Medical researchers talk of the brain as a “communication center” for the body, and their use of language such as “code” and “messages” transfers onto bodily processes the human activity of communication. As José Van Dijck explains, during the same period that Marshall McLuhan espoused the view that the medium is the message, geneticists (and other scientists) mined his communications theory for metaphors to describe the body (its DNA) as a medium of communication. The body is represented as an entity that enacts its own sign system independent of the social subject.

In earlier epochs of science, we have shown, practices of looking were central to discriminatory systems. The identification of visible and measurable differences in skin tone and color and body shape and size were (and still are) means through which stereotypes are constructed and discriminatory practices are carried out. Today, these appearance-related markers of natural difference are supplemented or replaced by the supposedly more accurate sign of the invisible gene as a marker of difference. But when the marker of difference is invisible, are the marker and difference itself taken out of the realm of influence and debate? As an invisible marker, genetic code seems more fixed and more factual, far from the field of discourse, outside of historical context and the social field of power and knowledge. If differences are genetically determined and therefore immutable (except perhaps through gene therapies), as the outpouring of press reports during the 1990s would lead us to believe, it becomes easy to imagine that socialization may not be responsible for or effective in changing differences of mental capacity, physical skill, and other attributes of human beings. Nelkin and others have asked, is the establishment of genetic difference just a new way of justifying discriminatory social practices and eliminating social programs geared toward changing society? For instance, a hypothetical genetic argument could say that criminals commit crime because they are genetically predisposed to do so, hence we need not waste money on programs designed to improve their social environment and behavior. The uses of genetic knowledge thus far, from nineteenth-century eugenics to Nazi science of the 1940s to the far less

sinister practice of genetic disease testing of the 1990s, suggest that the metaphors and representations of genetics have in fact been a compelling force behind the interpretation of cultural differences as natural and unchangeable at the level of the social. In other words, science does not necessarily become freer of ideology but finds new ways to make that ideology less evident and therefore more embedded and insidious.

The imagining of the body as digital takes place not only in genetic mapping, which produces an image of the body as a set of *bits*, but also through the increased use of digital imaging that makes bodies appear mutable and plastic, easily combined and reassembled. These concepts of the body can be seen as aligned with concepts of the *postmodern* that we discussed in Chapter 7. The visual technique of *morphing*, for instance, makes it difficult to distinguish between one person and another, thus collapsing the boundaries between bodies that were once considered inviolable. Morphing techniques are sometimes used to make statements about universal humanity and the blending together of races. Ironically, these morphed images recall the nineteenth-century composite photographs of Sir Francis Galton, which we described earlier. For example, in 1993, a special issue of *Time* magazine was devoted to “The New Face of America: How Immigrants are Shaping the



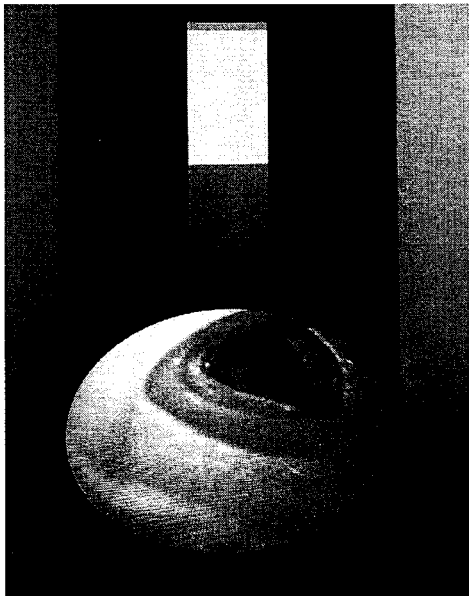
World's First Multicultural Society", a feature essay that revived Galton's composite technique from a century earlier. *Time* presented a computer-generated composite of racial types, represented in a portrait of a young woman with dark hair and eyes and a medium skin tone. "Take a good look at this woman," the cover sidebar reads. "She was created by a computer from a mix of several races." The image was produced with Morph 2.0, the same software package used in the production of *Terminator 2: Judgement Day* (1991) and the legendary Michael Jackson video, *Black or White*. It is a computer composite that is 15 percent Anglo-Saxon, 17.5 percent Middle Eastern, 17.5 percent African, 7.5 percent Asian, 35 percent Southern European and 7.5 percent Hispanic. Whereas Galton's composites gave us types in hopes of breeding out those racial types deemed inherently pathological, *Time's* suggests an amalgamation of races that appears to embrace a more multicultural future society.

The visual culture of computer graphics fuels the popular imagination of genetics, creating fantasies for the forging of new peoples and new worlds in imagined and emergent genetic specialties such as cloning and selective breeding. But, as Evelyn M. Hammonds argues, this cover story enacts both a fear of racial mixing and a fantastic construction of a generic woman of color.⁸ This fear and generalization about racial others are quite close to the conditions that gave rise to Galton's eugenics. Stereotypic racial typologies remain in place as this attractive, idealized woman of color becomes an icon reflecting the unattainable desires of those who brought her to life on the screen. As the *Time* article reveals, "Little did we know what we wrought. As onlookers watched the image of our new Eve begin to appear on the computer screen, several staff members promptly fell in love. This is a love that must forever remain unrequited."⁹ While people wanted to think of this woman as a person, she is a *virtual* person, with no *referent* in the real world. Composite photography had long been in use in forensics and criminal identification, and the digital software of morphing and composites was partly an outcome of this sort of practice. Visual constructions like the "Face of America," then, are not simply benign imaginings. They can serve as material "blueprints" for the scientific and social practices that they invoke, including selective breeding. They make these practices seem natural, easy, and inevitable.

Artist Nancy Burson has been a major force in the development of morphing not only in the art world, but in the crossover between art, science, and the broader culture. In the late 1980s, Burson was instrumental in developing

computer software that contributed to the ability to take a photograph of an individual and make it “age”—that is, to create a virtual rendering of the person as they could be predicted to look many years after the photograph was taken. This technique was an important breakthrough in the branches of government and social service devoted to locating missing persons and criminals, and images with “age progression” are now commonly circulated on flyers of those who have been missing for long periods of time. Burson’s composite photographs and virtual renderings suggest some of the ways that the visual cultures of art and science are not as distinct as one might think. In the late 1990s, Burson created a series that commented in important ways on the legacy of physiognomy. Her series *About Face* is composed of portraits of children with facial anomalies. Rather than taking these portraits in clinical, context-stripped settings and poses so common in the institutional imaging of aberrant facial structures, Burson shows us these faces in intimate, highly personalized framings that evoke everyday life and the routine normalcy of those deemed physically anomalous.

In the 1990s, a number of artists turned to scientific renderings of the body as inspiration for art in the form of personal portraiture, commentary on questions of racial and sexual identity in science’s visual culture, and as a critique of science’s approach to HIV/AIDS. Mona Hatoum, a Lebanese artist living in exile in Britain, uses the body as a metaphor for social struggle. Hatoum turns the feminist phrase “the personal is political” to an investigation of the body



Mona Hatoum, *Corps étranger*, 1994

as a site of contested meanings and political struggle. In her installation *Corps étranger*, Hatoum includes a video projection of an endoscopic survey of the interior of the body (stomach, intestines, vagina). She explains that this introduction of a “foreign body”—the camera—into the human body represents a threat of invasion and violation that is experienced at other levels of identity and existence as well.

Contemporary imaging techniques such as morphing and *virtual reality* are indicators not only of the changing concepts of the postmodern, digital body, but also of the relationship between the body and technology. In many ways, Hatoum’s work, as well as the work of many other artists, can be seen as engaging with the idea of the *cyborg*. The concept of the cyborg, or cybernetic organism, defines an entity that is part technology and part organism. The cyborg has its roots in early computer science. It was prominently theorized by cultural and science studies theorist Donna Haraway in her essay “The Cyborg Manifesto” as a means to think about the transformation of subjectivity in a late capitalist world of science, technology, and biomedicine.¹⁰ Rather than suggesting that subjects experience technology solely as an external and oppressive force, Haraway wrote of the body-technology relationship as one filled with potential for imagining and building new worlds. Much contemporary work in cyborg theory postulates that we are all cyborgs, given our complex and bodily relationships with technology, for example, that the Walkmans on our heads become inseparable from our bodies.

While these artistic and theoretical engagements with biomedicine and digital technology have worked to re-imagine contemporary bodies and subjectivities, there have also been artistic interventions in the question of how science is institutionalized and funded. Artist-activists, specifically in the context of AIDS activism, have produced a large body of visual images that address the structure of science and the role of the media in reporting on scientific issues. In Chapter 2, we discussed the innovative use of posters to raise public awareness of facts about HIV/AIDS during a period when public officials in areas most hard-hit by the epidemic gave the issue little funding and attention. The work of ACT-UP (AIDS Coalition to Unleash Power) in the 1980s and 1990s introduced a whole new era of political visual culture. ACT-UP explicitly challenged not only cultural perceptions about AIDS, but also political policies around science and medical funding and research. ACT-UP’s visual campaigns, which included performances, sit-ins, videos, and posters, were an important venue for the distribution of accurate information about AIDS



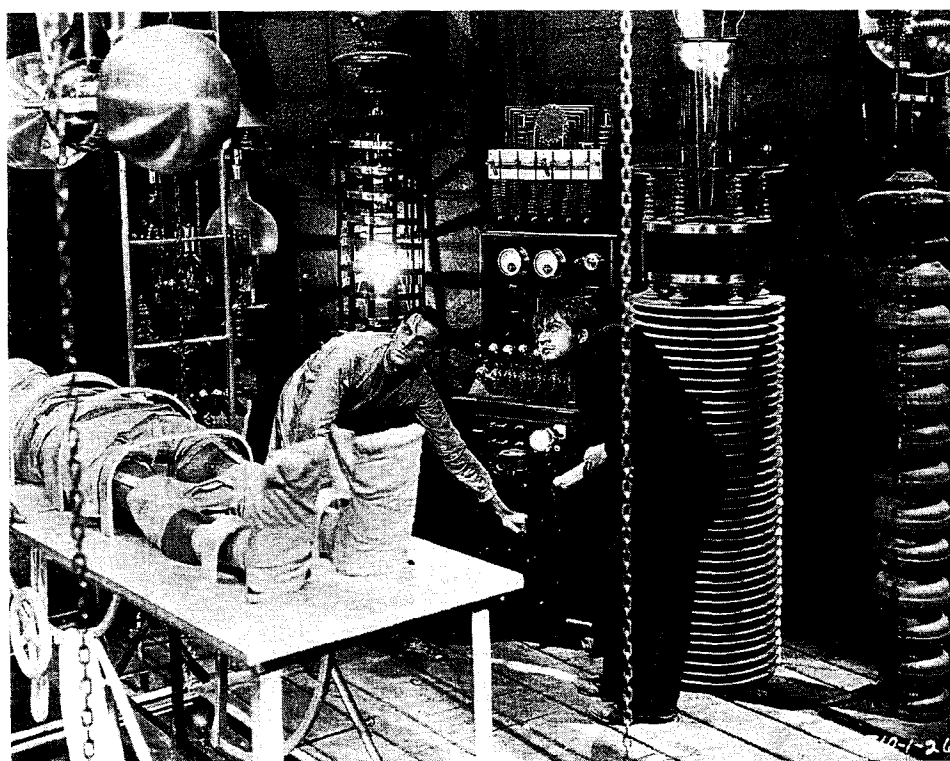
Gran Fury, *The Government Has Blood on its Hands*, 1988

transmission at a time in history when science and medicine were not working to get out the message. ACT-UP used images as an integral aspect of their provocative public interventions that aimed to get mainstream media to pay attention to the AIDS crisis. ACT-UP used images such as these, distributed as posters and stickers, to shock the public in the urban cityscape into thinking about the presence of people with AIDS and the inaction of the government in addressing the growing health crisis. The visual culture of AIDS activism constitutes one of the most transformative and effective interventions by nonscientists in the culture of science to date.

Popular science

As we have suggested earlier, science is not created in a vacuum or in a world that is separate from social and cultural meaning. Scientific ways of looking have influenced thinking in other social realms, and as the example of science adopting the communications metaphor suggests, the popular media are not without their influence over the thinking of scientists. Hence, there is a cross-fertilization of ideas and representations that exist with science and culture, which can be seen as well in popular culture. The representation of science in the popular media can have a reciprocal influence on how scientists do science. It is certainly a central aspect of how science is understood by the general public.

The genre of science fiction in literature, film, and television has had an important influence on the popular imagination of science and scientific practices. While much of science fiction can be seen as a distortion of what scientists actually do, it can also be examined as an important cultural domain in which both the fears about and promise of science are represented. For instance, the 1931 film *Frankenstein*, which was based on the 1818 novel by Mary Shelley, visualized the scientist Henry Frankenstein in a world of elaborate beakers filled with unidentified liquids and wrestling complex contraptions of electric voltage and switches. Science in this depiction is a mysterious and unexplained world that has the potential, through arrogance, to produce monsters and threaten humanity. Throughout the mid-twentieth century, in particular in the 1950s, science fiction film produced a broad set of images of science as the means by which the modern world would move confidently into the future, and, in the case of some films, the means by which the United States would win the Cold War. At the same time, many films depicted science as a potential source of destruction when placed in the wrong hands. Many popular films play into public fears about scientific practices that are not



James Whale,
Frankenstein, 1931

generally understood. *Jurassic Park* (1993) portrays science as an activity that is distorted by corporate interests. In this case, genetic science is seen as highly dangerous, with the capacity to create monsters, in the form of real live dinosaurs, that cannot be contained. Science fiction is a cultural realm in which both the desire for scientific knowledge and the fear of science out of control are played out. Some theorists have noted that science fiction has not only provided an arena in which public anxieties and desires about science are enacted, but has also had the effect of producing new, futuristic ideas about science that may affect the ways that scientists think about research as well.

Moreover, when the media and popular culture express fears about science often this is not because the media (or the public) do not have the capacity to grasp scientific knowledge, but because scientific findings may have implications and meanings for us that scientists themselves may not intend or comprehend. For instance, when X rays first came into medical use experimentally at the end of the nineteenth century, the popular and news media responded with fear and objections that these mysterious imaging rays might harm people. Amateur and professional scientists using the technique scoffed at these objections, chalking them up to ignorance and superstition. Yet for some time they were no more knowledgeable than the public about what constituted these “mysterious rays” and, moreover, their perception of X rays as harmless proved dead wrong. Indeed, the public’s “intuitive” concerns were remarkably accurate and even prescient. Science and the popular and news media, then, work in complexly interwoven ways to forge new ways of looking, and new ways of receiving these new ways of looking.

Similarly, the realm of consumer culture and advertising is central to the popular understanding of science. Advertisers often use the discourse of science to attach to their products not only the meaning of scientific authority but also the allure of scientific mystery. It has long been an advertising strategy, for instance, to show the body in pseudo-scientific charts and animated graphics to represent what a product will do. A common example of this is the depiction of the human digestive systems as a set of organs, apparently separate from the body itself, through which medications pass. Advertisers often use actors dressed in lab coats like doctors as figures of authority when advertising over-the-counter medications, a tactic that produced the

Why do I use Curél?
Because for dry skin, it's the best
lotion on the shelf.



I can use any moisturizer on the shelf. Why do I choose Curél® lotion?
Because as a pharmacist, I know clinical studies prove Curél
moisturizes better than Lubriderm®, Kerol® and other leading lotions. As
a woman with dry skin, I know Curél works, it just heals dry skin better.

You can see the Care in Curél®



well-known Anacin campaign in which actor Robert Young, who played the role of doctor Marcus Welby in the 1970s TV drama *Marcus Welby M.D.* states, “I’m not a doctor, but I play one on TV.” In addition, actual medical professionals are used frequently in advertisements to lend a quality of medical professionalism to the product. In this ad, the endorsement of the pharmacist is intended to confer upon the product the prestige of science, precisely because she notes that clinical studies, as scientific evidence, convince her to use the product.

The use of scientific discourse to sell products is also evident in the marketing of cosmetics in conjunction with other discourses of gender and aesthetics. Science, these ads promise, will provide the technology to make you beautiful. Often, the distinction between scientific language and the language of beauty and appearance is made clear through juxtaposition. The evocation of science in an ad thus allows cosmetic ads, for instance, to evoke the authority of science, and to conjure the impression that a product has been researched in a laboratory and endowed with transformative properties. The Jergens ad on the next page also works to humanize science, by calling Jergens cleansers, “science you can touch.”



SCIENCE FICTION







Now there's a special cleansing system with unique formulas of non-drying, non-greasy Aloe and Vitamin E. They provide your skin with a balanced clean, so when you shower it's left clean, soft and residue-free.



COMPLETE SCIENCE OF CLEAN

All of our unique cleansers have ingredients that go beyond just clean, all the way to moisturizing, conditioning, germ-killing, even odor-removal! So, no matter what kind of clean you need, we've got you covered.

<p>SCIENCE OF BALANCED CLEANSING™</p> <p><i>"When I shower, my skin is left balanced and healthy-looking. That's much better than dry or flaky."</i></p> 	<p>SCIENCE OF SMELLING CLEAN™</p> <p><i>"Let germs and odors linger? Not on my hands."</i></p> 
<p>SCIENCE OF MOISTURIZED CLEAN™</p> <p><i>"Why would I just clean my hands when I can soften them at the same time?"</i></p> 	<p>SCIENCE OF MILD CLEANSING™</p> <p><i>"It would be pure madness to give my family anything but pure mildness."</i></p> 

Jergens **SCIENCE YOU CAN TOUCH™**

Unlike the popular media and fine arts, science does not rely on a public audience in the same way for its approval and support. Until recently, it has operated with a degree of remove and autonomy, making it difficult to transpose methods for reading the "consumer" side of science. Entertainment, leisure, and culture are terms relatively remote from the way we think of science. Yet science has increasingly come to figure more centrally in the techniques and topics of our entertainment and leisure. We may dissect medically accurate and detailed simulations of bodies in CD-ROM games. Likewise, doctors in training will soon operate on simulated bodies so real that they bleed, in settings so well simulated that they are virtually real. We may participate in virtual reality environments fabricated by high science, and we use sophisticated workplace technologies on a daily basis with little thought to their intricate design and cost. Practices like computer morphing and genetic cloning or home video and institutional surveillance show us just how permeable are the boundaries between science and culture. Indeed, the term "science" in the twenty-first century may become as all-encompassing as the term "culture" was in the twentieth.

Notes

1. See the entry on physiognomy at the web site of *The Skeptic's Dictionary*, by Robert Todd Carroll, <<http://skepdic.com/physiogn.html>>, 1998, update 19 March 1999.
2. See Linda Williams, "Film Body: An Implantation of Perversion," in *Narrative, Apparatus, Ideology: A Film Theory Reader*, edited by Philip Rosen (New York: Columbia University Press, 1986), 507–33.
3. See Janelle Sue Taylor, "The Public Fetus and the Family Car: From Abortion Politics to a Volvo Advertisement," *Public Culture*, 4 (2) (1992), 67–80; and Carol Stabile, "Shooting the Mother: Fetal Photography and the Politics of Disappearance," *Camera Obscura*, no. 28 (January 1992), 179–205.
4. See, for instance, Rosalind Petchesky, "Fetal Images: The Power of Visual Culture in the Politics of Reproduction," in *Reproductive Technologies*, edited by Michelle Stanforth (Minneapolis and London: University of Minnesota Press, 1987), 57–80.
5. See Valerie Hartouni, "Containing Women: Reproductive Discourse(s) in the 1980s," in *Cultural Conceptions: On Reproductive Technologies and the Remaking of Life* (Minneapolis and London: University of Minnesota Press, 1997), 26–50.
6. See Petchesky, "Fetal Images," and Stabile, "Shooting the Mother: Fetal Photography and the Politics of Disappearance."
7. Dorothy Nelkin and M. Susan Lindee, *The DNA Mystique: The Gene as a Cultural Icon* (New York: W. H. Freeman, 1995), 102–03.
8. Evelyn M. Hammonds, "New Technologies of Race," in *Processed Lives: Gender and Technology in Everyday Life*, edited by Jennifer Terry and Melodie Calvert (New York and London: Routledge, 1997), 113–20. See also Lauren Berlant, *The Queen of America Goes to Washington City* (Durham, NC and London: Duke University Press, 1997), ch. 5.
9. *Time*, "The Face of America" (Fall 1993), 2.
10. Donna Haraway, "The Cyborg Manifesto," in *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York and London: Routledge, 1991), 149–81.

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