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How to See the World

A PELICAN INTRODUCTION



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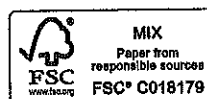
First published 2015
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Book design by Matthew Young
Set in 10/14, 664pt Freight Text Pro
Printed in Great Britain by Clays Ltd, St Ives plc

A CIP catalogue record for this book is available from
the British Library

ISBN: 978-0-141-97740-9



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INTRODUCTION

How to See the World



Figure 1 – NASA, *Blue Marble*

In 1972, the astronaut Jack Schmitt took a picture of Earth from the *Apollo 17* spacecraft, which is now believed to be the most reproduced photograph ever. Because it showed the spherical globe dominated by blue oceans with intervening green landmasses and swirling clouds, the image came to be known as *Blue Marble*.

The photograph powerfully depicted the planet as a whole, and from space: no human activity or presence was visible. It appeared on almost every newspaper front page around the world.

In the photograph, Earth is viewed very close to the edge

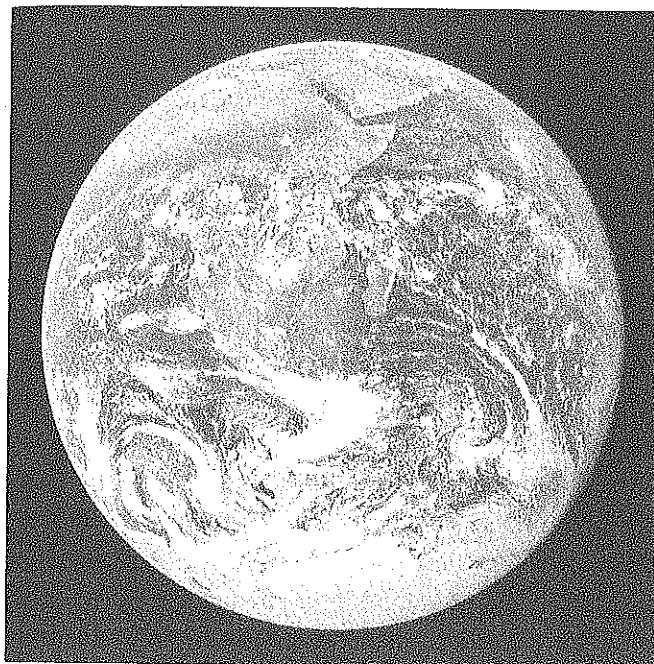


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In the photograph, Earth is viewed very close to the edge

of the frame. It dominates the picture and overwhelms our senses. Since the spacecraft had the sun behind it, the photograph was unique in showing the planet fully illuminated. The Earth seems at once immense and knowable. Taught to recognize the outline of the continents, viewers could now see how these apparently abstract shapes were a lived and living whole. The photograph mixed the known and the new in a visual format that made it comprehensible and beautiful.

At the time it was published, many people believed that seeing *Blue Marble* changed their lives. The poet Archibald MacLeish recalled that for the first time people saw the Earth as a whole, 'whole and round and beautiful and small'. Some found spiritual and environmental lessons in viewing the planet as if from the place of a god. Writer Robert Poole called *Blue Marble* 'a photographic manifesto for global justice' (Wuebbles 2012). It inspired utopian thoughts of a world government, perhaps even a single global language, epitomized by its use on the front cover of *The Whole Earth Catalog*, the classic book of the counterculture. Above all, it seemed to show that the world was a single, unified place. As Apollo astronaut Russell ('Rusty') Schweickart put it, the image conveys

the thing is a whole, the Earth is a whole, and it's so beautiful. You wish you could take a person in each hand, one from each side in the various conflicts, and say, 'Look. Look at it from this perspective. Look at that. What's important?'

No human has seen that perspective in person since the photograph was taken, yet most of us feel we know how the Earth looks because of *Blue Marble*.

That unified world, visible from one spot, often seems out of reach now. In the forty years since *Blue Marble*, the world has changed dramatically in four key registers. Today, the world is young, urban, wired and hot. Each of these indicators has passed a crucial threshold since 2008. In that year, more people lived in cities than the countryside for the first time in history. Consider the emerging world power Brazil. In 1960, only a third of its people lived in cities. By 1972, when *Blue Marble* was taken, the urban population had already passed 50 percent. Today, 85 percent of Brazilians live in cities, no less than 166 million people.

Most of them are young, which is the next indicator. By 2011, more than half the world's population was under thirty; 62 percent of Brazilians are twenty-nine or younger. More than half of the 1.2 billion Indians are under twenty-five, and a similar young majority exists in China. Two-thirds of South Africa's population is under thirty-five. According to the Kaiser Family Foundation, 52 percent of the 18 million people in Niger are under fifteen and in most of sub-Saharan Africa, over 40 percent of the population is under fifteen. The populations of North America, Western Europe and Japan may be ageing, but the global pattern is clear.

The third threshold is connectivity. In 2012, more than a third of the world's population had access to the Internet, up 566 percent since 2000. It's not just Europe and America that are connected: 45 percent of those with Internet access are in Asia. Nonetheless, the major regions that lack connection are sub-Saharan Africa (other than South Africa) and the Indian sub-continent, creating a digital divide on a global level. By the end of 2014, an estimated 3 billion people were

online. By the end of the decade, Google envisages 5 billion people on the Internet. This is not just another form of mass media. It is the first universal medium.

One of the most notable uses of the global network is to create, send and view images of all kinds, from photographs to video, comics, art and animation. The numbers are astonishing: one hundred hours of YouTube video are uploaded every minute. Six billion hours of video are watched every month on the site, one hour for every person on earth. The 18–34 age group watches more YouTube than cable television. (And remember that YouTube was only created in 2005.) Every two minutes, Americans alone take more photographs than were made in the entire nineteenth century. As early as 1930, an estimated one billion photographs were being taken every year worldwide. Fifty years later, it was about 25 billion a year, still taken on film. By 2012, we were taking 380 billion photographs a year, nearly all digital. One trillion photographs were taken in 2014. There were some 3.5 trillion photographs in existence in 2011, so the global photography archive increased by some 25 percent or so in 2014. In that same year, 2011, there were one trillion visits to YouTube. Like it or not, the emerging global society is visual. All these photographs and videos are our way of trying to see the world. We feel compelled to make images of it and share them with others as a key part of our effort to understand the changing world around us and our place within it.

The planet itself is changing before our eyes. In 2013, carbon dioxide passed the signature threshold of 400 parts-per-million in the atmosphere for the first time since the Pliocene era about three to five million years ago. Although

we cannot see the gas, it has set in motion catastrophic change. With more carbon dioxide, warm air holds more water vapour. As the ice-caps melt, there is more water in the ocean. As the oceans warm, there is more energy for a storm system to draw on, producing storm after ‘unprecedented’ storm. If a hurricane or earthquake creates what scientists call a ‘high sea-level event’, like a storm surge or tsunami, the effects are dramatically multiplied. Record-setting floods have followed around the world from Bangkok to London and New York, even as other areas – from Australia to Brazil, California and equatorial Africa – suffer unprecedented drought. The world today is physically different from the one we see in *Blue Marble*, and it is changing fast.

For all the new visual material, it is often hard to be sure what we are seeing when we look at today’s world. None of these changes are settled or stable. It seems as if we live in a time of permanent revolution. If we put together these factors of growing, networked cities with a majority youthful population, and a changing climate, what we get is a formula for change. Sure enough, people worldwide are actively trying to change the systems that represent us in all senses, from artistic to visual and political. This book seeks to understand the changing world to help them and all those trying to make sense of what they see.

To get an impression of the distance we have come since *Blue Marble*, consider two photographs from space taken in 2012. In December 2012 the Japanese astronaut Aki Hoshide took his own picture in space. Ignoring the spectacle of Earth, space and moon, Hoshide turned the camera on himself, creating the ultimate ‘selfie’, or self-taken self-portrait.

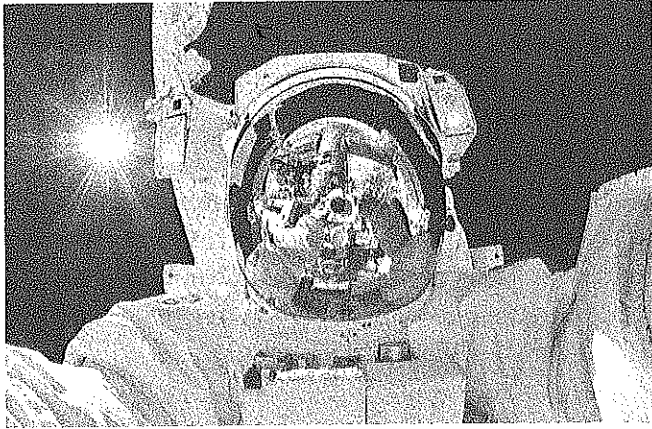


Figure 2 – Hoshide, 'Untitled', selfie

Ironically, any trace of his appearance or personality disappears in this image as his reflective visor shows us only what he is looking at – the International Space Station and below it, the Earth. Where *Blue Marble* showed us the planet, Hoshide wants us to see just him. It is nonetheless an undeniably compelling image. By echoing the daily practice of the selfie, the camera and the picture make space real and imaginable to us in an even more direct way than *Blue Marble*, but with none of the social impact of the earlier image. The astronaut is invisible and unknowable in his own self-portrait. There is, it seems, more to seeing than being in the place to see.

In that same year, 2012, NASA created a new version of *Blue Marble*. The new photograph was actually a composite assembled from a series of digital images produced by a satellite. From the satellite's orbit, approximately 930 kilometres (580 miles) above the surface, the full view of the

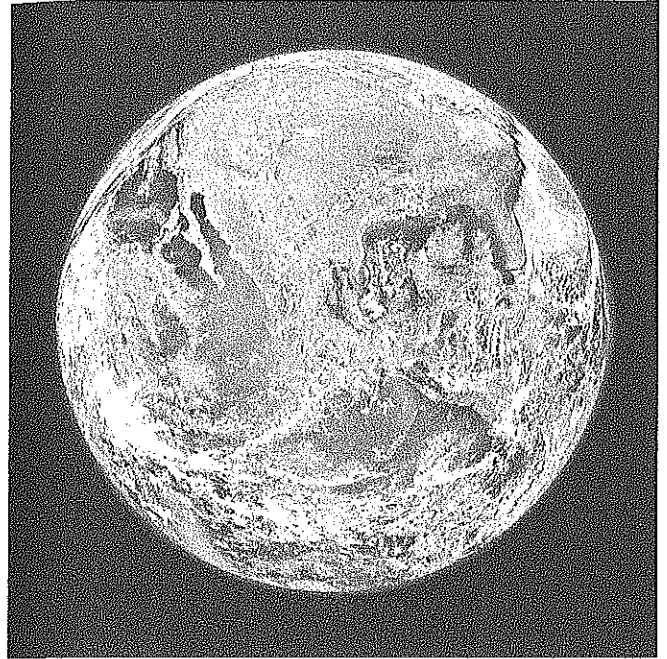


Figure 3 – NASA, *Blue Marble* 2012

planet is not in fact visible. You have to go over 11,000 kilometres (7,000 miles) away before the entire globe can be seen. The resulting colour-corrected 'photograph', adjusted to show the United States rather than Africa, is now one of the most accessed images on the digital photo archive Flickr, with over five million downloads.

We can 'recognize' the Earth from *Blue Marble*, but only the three-man crew of Apollo 17 have ever actually seen this view, with the earth fully illuminated, and no one has seen it since 1972. The 2012 *Blue Marble* is made to seem as if it was taken from one place in space but it was not. It is accurate in

each detail, but it is false in that it gives the illusion of having been taken from a specific place at one moment in time. Such 'tiled rendering' is a standard means of constructing digital imagery. It is a good metaphor for how the world is visualized today. We assemble a world from pieces, assuming that what we see is both coherent and equivalent to reality. Until we discover it is not.

A striking demonstration of how what seems to be a solid whole is actually a composite of assembled pieces came with the 2008 financial crash. What mainstream economists and governments alike had asserted to be the perfectly calculated, global financial market collapsed without warning. It turned out that the system was so finely leveraged that a relatively small number of people, who were unable to keep up with their mortgages, set in motion a rolling catastrophe. The very connectedness of the global financial market made it impossible to contain what would once have been a local misfortune. The crisis shows that it is one world now, like it or not.

At the same time, 'one world' does not mean it is equally available to all. Moving country for personal or political reasons is often very difficult, and partly depends on your passport. A British-passport holder can visit 167 countries without a visa. An Iranian passport, however, gets you into only 46 countries. Money, on the other hand, can move wherever it wants at the click of a keyboard. Prior to 1979, it was illegal for Chinese citizens to even possess foreign currency. Today China dominates global trade. There is globalization in theory, which is smooth and easy. And there is the uneven, difficult and time-consuming experience of

globalization in practice. The ads and the politicians tell us there is a single global system now, at least for financial affairs. Our daily lives tell us otherwise.

Visual culture

This book is designed to help you see the much-changed and changing world. It is a guide to the visual culture we live in. Like history, visual culture is both the name of the academic field and that of its object of study. Visual culture involves the things that we see, the mental model we all have of how to see, and what we can do as a result. That is why we call it visual culture: a culture of the visual. A visual culture is not simply the total amount of what has been made to be seen, such as paintings or films. A visual culture is the relation between what is visible and the names that we give to what is seen. It also involves what is invisible or kept out of sight. In short, we don't simply see what there is to see and call it a visual culture. Rather, we assemble a world-view that is consistent with what we know and have already experienced. There are institutions that try to shape that view, which the French historian Jacques Rancière calls 'the police version of history', meaning that we are told to 'move on, there's nothing to see here' (2001). Only of course there is something to see, we just usually choose to let the authorities deal with the situation. If it is a traffic accident, that may be appropriate. If it is a question of how we see history as a whole, then surely we should be looking.

The concept of visual culture as a specific area of study first began to circulate at a previous moment of vital change

in the way we see the world. Around 1990, the end of the Cold War that had divided the globe into two zones, more or less invisible to each other, coincided with the rise of what was called 'postmodernism'. The postmodern changed modern skyscrapers from austere rectangular blocks into the playful towers, with kitschy and pastiche features, that now dominate skylines worldwide. Cities looked very different. A new identity politics formed around questions of gender, sexuality and race, leading people to see themselves differently. This politics was less confident in the global certainties of the Cold War period and began to doubt the possibility of a better future. In 1977, at a time of social and economic crisis in Britain, the Sex Pistols had pithily summarized the mood as 'No Future'. These changes were accelerated by the beginnings of the era of personal computing that transformed the mysterious world of cybernetics, as computer operations had been known, into a space for individual exploration, named in 1984 by science fiction writer William Gibson as 'cyberspace'. Visual culture burst onto the academic scene at that time, mixing feminist and political criticism of high art with the study of popular culture and the new digital image.

Today there is a new world-view being produced by people making, watching and circulating images in quantities and ways that could never have been anticipated in 1990. Visual culture is now the study of how to understand change in a world too enormous to see but vital to imagine. A vast new range of books, courses, degrees, exhibitions and even museums all propose to examine this emerging transformation. The difference between the concept of visual culture

in 1990 and the one we have today is the difference between seeing something in a specific viewing space, such as a museum or a cinema, and in the image-dominated network society. In 1990, you had to go to a cinema to see films (except reruns on TV), to an art gallery to see art, or visit someone's house to see their photographs. Now of course we do all that online and moreover, whenever we happen to choose to do so. Networks have redistributed and expanded the viewing space, while often contracting the size of the screen on which images are viewed, and deteriorating their quality. Visual culture today is the key manifestation in everyday life of what sociologist Manuel Castells calls 'the network society', a way of social life that takes its shape from electronic information networks (1996). It is not just that networks give us access to images – the image relates to networked life on- and offline and the ways we think about and experience those relations.

Simply put, the question at stake for visual culture is, then, how to see the world? More precisely, it involves how to see the world in a time of dynamic change and vastly expanded quantities of imagery, implying many different points of view. The world we live in now is not the same as it was just five years ago. Of course, this has always been true to some extent. But more has changed and changed more quickly than ever and, because of the global network society, change in one location now matters everywhere.

Rather than try to summarize the immense quantity of visual information available, this book offers a toolkit for thinking about visual culture. Its way of seeing the world centres on the following ideas:

- All media are social media. We use them to depict ourselves to others.
- Seeing is actually a system of sensory feedback from the whole body, not just the eyes.
- Visualizing, by contrast, uses airborne technology to depict the world as a space for war.
- Our bodies are now extensions of data networks, clicking, linking and taking selfies.
- We render what we see and understand on screens that go everywhere with us.
- This understanding is the result of a mixture of seeing and learning not to see.
- Visual culture is something we engage in as an active way to create change, not just a way to see what is happening.

While the present day is the focus, much of this book is nonetheless historical, as it traces the roots of visual culture today, both as a field of study and a fact of everyday life. The emphasis is no longer on the medium or the message, with apologies to Marshall McLuhan (1964). Instead, the emphasis is on creating and exploring new archives of visual materials, mapping them to discover connections between what is visual and the culture as a whole, and realizing that what we are learning to see above all is change on the global scale.

The book begins by looking at the evolution of the self-portrait into the omnipresent selfie. The selfie is the first visual product of the new networked, urban global youth culture. Because the selfie draws on the history of the self-portrait, it will also allow us to explore the creation

of the academic discipline of visual culture that emerged around 1990. How we see ourselves leads to the question of how we see, and the remarkable insights of neuroscience (Chapter 2). Human vision now seems like the multi-faceted feedback loop that visual artists and visual culture scholars have long assumed it to be. Seeing is not believing. It is something we do, a kind of performance. What this performance is to everyday life, 'visualizing' is to war (Chapter 3). Battlefields were visualized first in the mind's eye of the general and then from the air by balloons, aircraft, satellites and now drones. These views of the world are not experienced directly but on screens. So Chapter 4 looks at two examples of the creation of networked worlds: the view seen from a train and the creation of motion pictures; and today's ubiquitous networked digital screens. Those screens appear to offer unlimited freedom but are carefully controlled and filtered views of the world.

The key places in these networks are the global cities, where most of us now live (Chapter 5). In these immense, dense spaces, we learn how to see – and also not to see potentially disturbing sights – as a condition for daily survival. Global cities have grown up around the remains of the imperial and divided Cold War cities that preceded them. They are spaces of erasure, ghosts and fakes. The creation of the global city world has come at tremendous cost. Now we have to learn how to see the changing natural world (Chapter 6). Or more exactly, we have to become aware of how humans have turned the planet into one enormous human artefact, the largest work of art ever made or ever possible.

At the same time, the global city has also become rebel-

lious, the site of permanent unrest (Chapter 7). Here the youthful majority in cities use their connections to claim new ways to represent themselves on social media that are transforming what politics means, from the city revolts in the developing world, such as those in Cairo, Kiev and Hong Kong, to the separatist movements in the developed world, from Scotland to Catalonia. Do we live in cities? Or regions? Or nations? Or power blocks like the European Union? How do we see the place where we live in the world?

The time of change

Though the transformations of the present may appear unprecedented, there have been many similar periods of dramatic change in the visible world before. The nineteenth century was famously described by the historian Jean-Louis Comolli as a 'frenzy of the visible' because of the invention of photography, film, X-ray and many other now forgotten visual technologies in the period (Comolli 1980). The development of maps, microscopes, telescopes and other devices made the seventeenth century another era of visual discovery in Europe. And so we could continue back to the first cosmographic representation of the world on a clay tablet from 2500 BCE. But the transformation of the visual image since the rise of personal computing and the Internet is different in terms of sheer quantity, geographic extent and its convergence on the digital.

If we look in a longer historical perspective, we can perceive the extraordinary pace of change. The first moving images were recorded by the Lumière brothers in France in

1895. A little more than a century later, the moving image has become astonishingly widespread and easily available. The first available video cameras for personal use appeared only in 1985. They were heavy, shoulder-borne devices and not well suited for casual use. It was not until the invention of digital videotape in 1995 that home video became a practical possibility. Editing was still an expensive and difficult proposition until the introduction of programs like Apple's iMovie in 2000. And now you can shoot and edit HD video on your phone and post it to the Internet. Above and beyond personal possession, far more people can see and share all this material via the Internet, the first truly global medium. More people still have access to television but hardly anyone has influence over what is shown on television and fewer still can place their own work on TV. By the end of the decade, the Internet will change how we look at everything, including how we see the world.

To understand the difference, we can compare the distribution and circulation of printed matter. In 2011, according to UNESCO, there were over 2.2 million books published. The last European who was thought to have read all available printed books was the sixteenth-century reformer Erasmus (1466–1536). Over the long lifetime of print, many other means of getting published have emerged, from the letter to the editor to self-produced pamphlets and photocopied documents. The book has still remained the format most likely to convince and impress. However, book publishing is open only to authors who can convince editors to produce their work. Now, the Internet allows everyone with a connection to disseminate their writing in ways that are

not visibly different from those used by formal book publishers. The global success of E. L. James's self-published novel *Fifty Shades of Grey*, which has sold over 100 million copies in its Random House reprint, would not have been imaginable even a decade ago. The transformation of visual images, especially moving images, has been still faster and more extensive.

The change at hand is not simply one of quantity but of kind. All the 'images', whether moving or still, that appear in the new archives are variants of digital information. Technically, they are not 'images' at all, but rendered results of computation. As digital scholar Wendy Hui Kyong Chun puts it, 'when the computer does let us "see" what we cannot normally see, or even when it acts like a transparent medium through video chat, it does not simply relay what is on the other side: it computes' (Chun 2011). When an ultrasound scanner measures the inside of a person's body using sound waves, the machine computes the result in digital format and renders it as what we take to be an image. But it is only a computation. A modern camera still makes a shutter sound when you press the button, but the mirror that used to move, making that noise, is no longer there. The digital camera references the analogue film camera without being the same. In many cases, what we can 'see' in the image, we could never see with our own eyes. What we see in the photograph is a computation, itself created by 'tiling' different images that were further processed to generate colour and contrast. It is a way to see the world enabled by machines.

Analogue photographs were certainly also manipulated, whether by editing or darkroom derived techniques.

Nonetheless, there was some form of light source, impacting a light-sensitive surface that we can work out from the resulting photograph. A digital image is a computed rendition of digital input, derived from the camera's sensor. So it is much easier and faster to alter the result, especially now that programs such as Instagram will create effects at a single click. Some of these effects imitate specific formats, like black-and-white film or Polaroid. Others mimic skilled techniques that would have been used in the darkroom when developing film.

Early in the digital era, some were concerned that we would not be able to tell whether digital images had been manipulated or not. It turns out that at both amateur and professional level, it is often not that hard to detect. For example, most magazine readers now assume that all photographs of models and celebrities have been adjusted. Readers operate a flexible zone of viewing, in which it is accepted that a photograph can be altered but not changed so much that it's absurd. Some advertising campaigns now even celebrate their use of 'real' models, knowing that we understand ordinary advertising photographs are manipulated. At the technical level, a skilled user can tell not only if an image has been manipulated, but how and with what program. In early 2013, a star college American football player named Manti Te'o was discovered to have created a story regarding the death of a fake girlfriend to gain sympathy and attention. Once web users were alerted to this possibility, it took less than 24 hours for them to reverse research the photograph he had circulated and discover it was not the woman he claimed. There are websites devoted to reverse search

now. Previously, it would have required a detective to do in days or weeks what can be done in seconds with a few clicks.

At the time of the *Apollo 17* mission in 1972, the British art historian John Berger made a brilliant television series and an accompanying book for the BBC called *Ways of Seeing*. The immense success of both projects put the concept of the image into popular circulation. Berger defined the image as 'a sight which has been recreated or reproduced' (1973). He flattened the hierarchy of the arts by making a painting or sculpture equivalent in this sense to a photograph or an advertisement. Berger's insight was central to the formation of the concept of visual culture. An influential definition of visual culture in the 1990s was simply 'a history of images' (Bryson, Holly and Moxey 1994). Berger had himself been taking a cue from the German critic Walter Benjamin, whose famous 1936 essay 'The Work of Art in the Age of Mechanical Reproduction' had just been translated into English (1968). Benjamin argued that photography destroyed the idea of the unique image because – at least in theory – infinite and identical copies of any photograph could now be made and distributed. By 1936, this was already old news, because photography was almost a century old. However, new techniques for the mass reproduction of high-quality photographs in magazines and books, as well as the rise of the 'talkies', or films with sound, convinced Benjamin that a new era was at hand.

With the astonishing rise of digital images and imaging, it surely seems that we are experiencing another such moment. The 'image' is now created, or more precisely computed, independently of any sight that might precede it. We

continue to call what we see pictures or images, but they are qualitatively different from their predecessors. An analogue photograph is a print created from a negative, every molecule of which has reacted to light. Even the highest-resolution digital photograph is a sampling of what hits the sensor rendered into computer language and computed into something we can see.

Furthermore, what we are experiencing with the Internet is the first truly collective medium, a media commons if you like. It makes no sense to think of the web as a purely individual resource. You might paint and not show anyone the results. If you put something online, you want people to engage with it. Digital commentator Clay Shirky has borrowed a phrase from the novelist James Joyce to capture the result: 'Here comes everybody' (2008). The point here is not simply the scale of the digital commons, impressive though that is. It is certainly not always the quality of the results, which are highly variable. It is the open nature of the experiment.

And that is why, despite the endless junk, the Internet matters. There is a new 'us' on the Internet, and using the Internet, that is different from any 'us' that print culture or media culture has seen before. Anthropologist Benedict Anderson described the 'imagined communities' created by print culture so that the readers of a specific newspaper would come to feel they had something in common (1991). Above all, Anderson stressed how nations came into being as these imagined communities, with powerful and important results. Trying to understand the imaged and imagined communities created by global forms of experience is similarly central to visual culture. The new communities that are

emerging on- and offline are not always nations, although they are often nationalist. From the new feminisms to the idea of the 99 percent, people are reimagining how they belong and what that looks like.

What all moments of visual culture have in common is that the 'image' gives a visible form to time and thereby to change. In the eighteenth century, natural historians investigating fossils and sedimentary rocks made the startling discovery that the Earth was far older than the six thousand years of the biblical account (Rudwick 2005). Naturalists began to calculate how many thousands and millions of years were involved. Geologists now refer to this as 'deep time', a time whose scale is vast by comparison with a brief human lifespan but is not infinite. From this perspective, it makes sense that one of the first photographs ever taken by Louis Daguerre in 1839 depicted fossils.

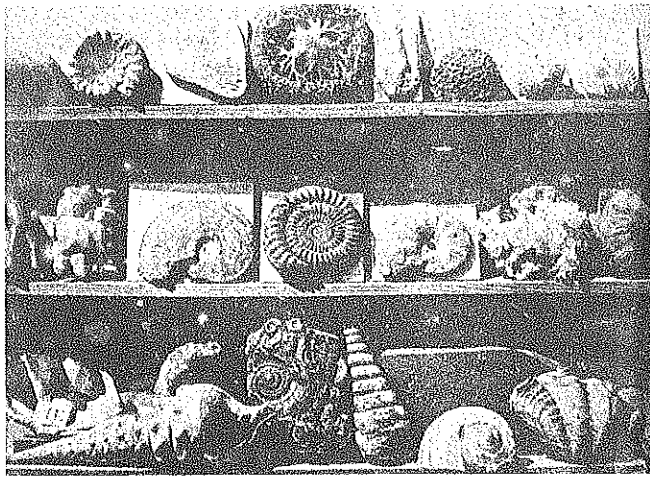


Figure 4 – Daguerre, *Untitled (Shells and Fossils)*

Of course, the fossils remained conveniently still for the camera. More importantly, they were crucial to nineteenth-century debates in natural history, following French scientist Georges Cuvier's insight that fossils revealed past extinctions (1808). Fossils became central to the long drama that culminated with Charles Darwin's *Origin of Species* (1859) concerning the age of the Earth. Was the planet, as certain Christian authorities insisted, only six thousand years old? Or did fossils show that it was many million years old? A photograph is defined by the length of time the light-sensitive medium, whether film or a digital sensor, is exposed to light. As soon as the shutter closes, that instant is past time. The brief exposure of Daguerre's shutter contrasted dramatically with the millennia of geological time and revealed the new human power to save specific instants of time.

Soon, the demands of the new industrial economy forced a second change to time. Time had usually been decided locally in relation to the sun, meaning that cities or towns a few hundred kilometres apart would use different time. The difference did not matter until it became necessary to calculate how trains would cover long distances to a timetable. The 'absolute' time that we still use, designated in highly specific time zones, was created so as to make such calibrations of time and space possible.

In 1840 the Great Western Railway in England was the first to apply this standardized time. A few years later, the painter J. M. W. Turner gave dramatic visual form to the changes in his stunning 1844 canvas *Rain, Steam and Speed: The Great Western Railway*. The train rushes towards

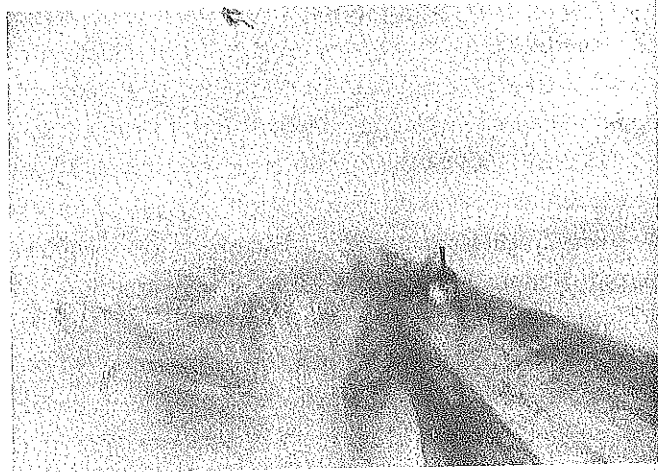


Figure 5 – Turner, *Rain, Steam and Speed*

us, although our viewpoint seems to be suspended in mid-air. The new train, using a modern bridge, has changed time and speed for the first time since the domestication of the horse. It seems to emerge from the swirling rain as if from primeval creation, an earlier subject in Turner's work. A frightened hare running across the tracks (hard to see in reproduction) symbolizes the overtaken forms of natural speed. Overtaken also was painting as the most advanced form of modern visual representation. For all Turner's brilliance, his painting took weeks to make. A photograph can change the world in seconds.

Just a few years later, in 1848, a remarkable daguerreotype of the Chartist meeting on Kennington Common, London, was taken by William Kilburn. The Chartists demanded a new form of political representation, in which every man (not yet woman) over twenty-one could vote and

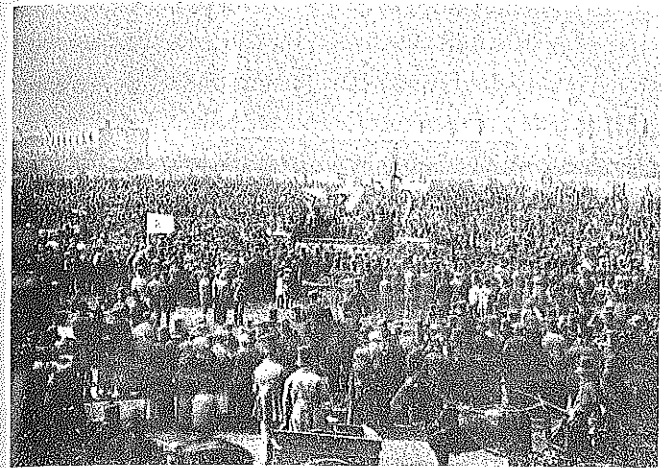


Figure 6 – Kilburn, *Chartists at Kennington Common*

anyone could be a member of Parliament, regardless of personal wealth. They wanted annual Parliaments to reduce the possibilities of corruption. The rally was called to mark their delivery of a petition to Parliament with what they claimed were five million signatures endorsing these goals. In less than a decade from Daguerre's fossils, the industrial world had transformed the organization and representation of time and space by means of the new time zones and photography. These changes created a desire for a different system of political representation, a subject perfectly well suited to the new visual medium.

We are in another such moment of transformation. Events can be seen as they happen via the Internet, from a dense variety of amateur and professional perspectives, in blogs, magazines, newspapers and social media, using still and moving images of all kinds. The gain in information is

offset by the digitally enabled 24/7 work environment for professionals worldwide, while the Chinese workers who produce the digital equipment that makes the new work regime possible are themselves expected to work 11-hour days, plus overtime if required, with an average of one day off a month. The long struggle to limit the working day has been soundly defeated. Time-based media are newly ascendant, creating millions upon millions of slices of time, which we call photographs or videos, in what seem to be ever-shrinking formats like the six-second-long Vine. The obsession with time-based media from photography in the nineteenth century to today's ubiquitous still-and-moving image cameras is the attempt to try and capture change itself.

In 2010 the artist Christian Marclay made an extraordinary installation called *The Clock*. It was a 24-hour montage of clips from films all telling or showing the time so that *The Clock* was itself a chronometer. The very fact that it was possible to make such an immense montage of clips about time indicated that modern visual media are time-based. We date a painting to the specific year it was finished but it is impossible to tell how long it took to paint. A photograph was always of one instant that may or not be known precisely. Today, digital media are always 'time-stamped' as part of their metadata, even if that time is not visibly recorded in the image. At least for now, in the ever-changing present that is the hallmark of urban global spaces, it seems that we use time-based media as a way of both recording and relieving our anxiety over time itself.

In all this speeding up – from the introduction of the railways to the Internet – we have burned in a matter of two

centuries, and especially the past thirty-five years, the remnants of millions of years of organic matter that had become fossil fuel. This vaporizing of millennia has now caused the undoing of the hitherto infinitely slow rhythm of deep time itself. What once took centuries, even millennia, happens in a single human lifetime. As the ice-caps melt, gases that were frozen hundreds of thousands of years ago are released into the atmosphere. You can say that time travel is as simple as breathing these days, at least at the molecular level. The entire planetary system, from the rocks to the highest atmosphere, is out of joint and will remain so for longer than hitherto existing human history, even if we stop all emissions tomorrow.

Where does all this lead? It is too early to tell. When the printing press was invented, it was not possible to imagine from the first publications how mass literacy would change the world. In the past two centuries, the elite military skill of visualizing, which imagined how battlefields that were too large to see with the naked eye 'looked', has been transformed into the visual culture of hundreds of millions. It is confusing, anarchic, liberating and worrying all at once. In the chapters that follow, *How to See the World* will suggest how we can organize and make sense of these changes to our visual world. We will see what is on the rise, what is falling back and what is being strongly contested. Unlike the Apollo astronauts, we will have our feet firmly on the ground. But there is more to see than they could have imagined.

