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How to See the World

A PELICAN INTRODUCTION

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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

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 being 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-

llous, 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

poems such as "Antitheses" (1985) and a group of poems produced in the late 1980s which include "Ho/Log/Rap/Her" and "Ho/Log/Rap/Hy."

Kac and Kostelanetz collaborated in the holopoem "Lilith" (1987/1989).

■ See also BIOPOETRY, DIGITAL POETRY, ELECTRONIC LITERATURE, INTERFACE

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Hypertextuality

Astrid Ensslin

In its broadest technological sense, *hypertext* is an umbrella term denoting a specific principle of electronic document organization. It interlinks digital files of various textual and audiovisual formats into an interactive, associative network. Hypertexts can assume gigantic dimensions: the World Wide Web is widely held to be the largest existing hypertext. Users can freely move through a hypertext by activating hyperlinks through mouse click, gesture, or touch. Owing to their large dimensions, many hypertext documents (such as company websites) offer a site map to facilitate navigation (Shapiro 2006, 518). Hypertext is typically written in HyperText Markup Language (HTML) and its variants.

The term derives from the Greek *hypér* (over, above, beyond) and Latin *texere* (to weave) and refers to the metatextual function of hypertext as a principle of structuring and connecting subordinate electronic texts. It was coined by Theodor Nelson in his 1965 lectures at Vassar College. His frequently quoted definition describes hypertext as "non-sequential writing—text that branches and allows choices to the reader, best read at an interactive screen. As popularly conceived, this is a series of text chunks connected by links which offer the reader different pathways" (Nelson 1984, 0/2) (see LINKING STRATEGIES). The resulting interwoven network enables a dialogue between a variety of texts and contexts, composed in both writing and other different semiotic modes, such as image and sound. Such multimodal hypertextual networks are generally referred to as hypermedia, short for "hypertext multimedia."

Nelson's concept was inspired by Vannevar Bush's revolutionary idea of the memex ("Memory Expander"), an information system designed for the connection and storage of as well as access to all documents and communications in the world, which Bush had first envisaged as early as the 1930s. Intended to emulate the human brain, the memex was designed to operate in terms of indexing, associative connection, and creating paths to help

retrieve documents (Bush 1945). Using computational technologies, Nelson aimed to implement Bush's idea, which had never materialized beyond a highly innovative concept. He sought to connect all literary works into a so-called docuverse, an abstract concept anticipating the principles of the World Wide Web, which Nelson wanted to concretize in a project named "Xanadu." This project has so far remained incomplete.

Against a poststructuralist theoretical backdrop, hypertext can be explained metaphorically in terms of the rhizome (Deleuze and Guattari 1987; Moulthrop 1995). Rhizomes are characterized by ramifying, decentralized, horizontally organized root structures, which do not have a clear beginning or end. Therefore, rhizomes conveniently deviate from the arborescent, hierarchical structures associated with logocentrism. Ironically, of course, most functional hypertexts are given a quasi-hierarchical structure all the same, not least in order to provide some guidance for readers. Literary hypertexts such as Storyspace fictions, on the other hand, seek to subvert any sense of hierarchical order or predesigned sequence in order to achieve specific effects in the reader and trigger idiosyncratic receptive and hermeneutic processes.

Among literary hypertext theorists, individual units of a hypertext are widely referred to as "lexias" (nodes, or text chunks), a term borrowed from Barthes (Landow 1992). Typically, each lexia contains a number of links. Therefore, "every reading produces a different text. . . . Whereas the reader of a standard print text constructs personalized interpretations out of an invariant semiotic base, the reader of an interactive text thus participates in the construction of the text as visible display of signs" (Ryan 2001, 5–6) (see INTERACTIVE NARRATIVE). This idea of virtual coauthorship, also referred to as the "(w)reader" (Landow 1992), has been theorized extensively by literary scholars and has gained particular attention since the advent of Web 2.0, its participatory culture, and concomitant forms of social media narrative (e.g., Klaiber 2013) (see PARTICIPATORY CULTURE).

Although the term *hypertext* was coined in the twentieth century, the concepts of multilinear reading, interrelating, annotating, and cross-referencing, as well as the link itself, date back over one thousand years. So-called proto-hypertexts can be traced as far back as the Middle Ages, when glosses (annotations) appeared in the Jewish Talmud, the Bible, and canon law and medical texts. Further on in history, European Enlightenment scholars produced the first printed encyclopedias (e.g., Diderot and d'Alembert, 1751–1780; Johnson, 1755; Black and Black, 1768), thus representing early forms of proto-hypertextual cross-referencing, or "super-scribing" text in order to explain, elaborate, and connect intertextually. In the romantic period, the idea of the "absolute book," inspired by Friedrich Schlegel's utopian idea of a *progressive Universalpoesie*, raised intertextual connectivity to a paradigm of a whole age. (For historical examples of proto-hypertextual, nonlinear fiction, see NONLINEAR WRITING.)

The late 1980s and 1990s saw a growing interest in hypertext as a pedagogic technology. Its capacity for structuring and organizing information in a nonlinear way sparked a number of innovative teaching approaches (e.g., Joyce 1996) and empirical studies within cognitive and educational psychology. Following up Bush's memex idea, psychologists and early representatives of artificial intelligence research adopted the euphoric yet largely hypothetical view that hypertext structures resembled human neurons and could thus be likened to the associative networks of human memory (e.g., Fiderio 1988) (see ARTIFICIAL INTELLIGENCE). Therefore, it was assumed that, if hypertext knowledge bases were to be organized to reflect an expert's or teacher's semantic knowledge structures, learners would adopt these structures over time. This theory came to be known as

the cognitive plausibility hypothesis (Jonassen 1986). It was based on the fact that human neurons are made up of intricately interconnected dendrites and axons, which account for human beings' associative capacities. Learning operates in terms of constructing new cognitive structures through generating new nodes and interconnecting them with each other and existing nodes (Norman 1976). Learner knowledge is thus reorganized in such a way as to accommodate new information. Consequently, it was assumed that web structures, with their variously interlinked nodes, are likely to be more easily processed than conventional linear structures and might therefore facilitate learning. Grounding their assumptions in schema theory, psychologists considered those analogies to be highly useful, particularly with respect to mapping expert cognitive structures onto semantic maps, which could then be used as powerful, empowering learning templates (e.g., McKnight, Dillon, and Richardson 1991). Furthermore, it was believed that providing instant, multilinear access to information via associative links rather than logical linearization might further increase learning efficiency. With regard to retaining information via hypertext, however, this hypothesis could not be verified. It was found that learners perform better with linear-format texts than hypertexts, and that considerably less time is spent searching through indexes and contents (McKnight, Dillon, and Richardson 1991).

In literary studies, there have been two major waves of hypertext theory, inspired by a body of fictional, poetic, and dramatic works emerging between the late 1980s and mid-1990s, mostly written in Eastgate's Storyspace and Apple's HyperCard software (see STORYSPACE). Canonical authors and fictions of the Storyspace School include, for instance, Michael Joyce's *afternoon, a story* (1987), Stuart Moulthrop's *Victory Garden* (1992), and Shelly Jackson's *Patchwork Girl; or, A Modern Monster* (1995). A famous example of HyperCard hypertext is John McDaid's *Uncle Buddy's Phantom Funhouse* (1992). Spearheaded by George P. Landow, Jay David Bolter, and Robert Coover, the first wave of literary hypertext theories outlined major organizing principles of hypertext literature and placed it firmly within the context of poststructuralist theory (see CRITICAL THEORY). In a 1992 essay, Bolter first proclaimed hypertext as a "vindication of postmodern literary theory" (1992, 24). In the same year, Coover published his famous article, "The End of Books," in the *New York Times Book Review*, in which he declared that "hypertext presents a radically divergent technology, interactive and polyvocal, favoring a plurality of discourses over definitive utterance and freeing the reader from the domination of the author" (1992). Landow (1992) systematized these claims in his so-called convergence thesis. He saw in the principle of hypertextuality a convergence between computer technology and poststructuralist theory in the sense that hypertext could be considered a pragmatization of major poststructuralist and deconstructivist theorems (e.g., antilogocentrism, the death of the author, writerly text, nonclosure, decentering). This idea, according to Landow, has considerable liberating, empowering, and democratizing potential because readers become coauthors, thus taking responsibility for the physical *and* mental co-construction of the text. The Storyspace software, authored by Bolter and Michael Joyce, implemented this collaborative potential by allowing readers not only to read in a multilinear fashion but to add notes and comments to the text.

Landow's convergence thesis was met with considerable criticism, which was mostly directed at the theory's inclination toward pragmatic simplification of complex, abstract philosophical concepts, as well as self-righteous, ideologically charged academic spin.

Barthes and Foucault regard the reader as empowered (in the sense of writerly vs. readerly text) in terms of being at liberty to form personal connotations and associations. In a hypertext environment, however, this freedom is considerably restrained given the existence of manifest, technically implemented hyperlinks, which prevent rather than afford creativity. Indeed, hyperlinks have a delimiting rather than empowering function, as they are placed by the author and often lead to confusion, serendipity, and cognitive overhead in the reader. According to Simanowski (2004; see also Ensslin 2007), the only feasible contexts in which the roles of reader and author may legitimately be merged are collaborative writing projects (see COLLABORATIVE NARRATIVE). In such joint ventures, writers coauthor hypertext or other electronic documents, as has been implemented, for example, by Landow in his *Victorian Web* (1994–2011) and in contemporary collaborative writing projects on the web, such as *A Million Penguins* (a 2007 collaboration of Penguin Books and De Montfort University) and Kate Pullinger and Chris Joseph's (2007–2012) *Flight Paths: A Networked Novel* (for further contemporary examples, see Klaiber 2013).

More recently, a second wave of scholars have highlighted the importance of grounding literary, stylistic, and narratological theories of hypertext (and other types of electronic literature) in methodologically rigorous close analyses (see ELECTRONIC LITERATURE). They have embraced the fact that hypertext and other electronic types of writing require a new hermeneutic attitude, which acknowledges and embraces the fact that hypertexts are never read the same way twice but indeed rely on multiple rereadings on the part of the analyst ("aesthetics of revis(itat)ion"; Ensslin 2007). This school of theorists and analysts has been focusing on applying existing, print-born theories and analytical tools to digital *fiction* in particular, and on expanding existing methodological toolkits from stylistics, semiotics, and narratology by introducing new terms and methods of analysis tailored to the affordances of digital media (e.g., Ensslin and Bell 2007; Bell 2010; Bell, Ensslin, and Rustad 2013). Astrid Ensslin (2012), for instance, applies theories of unreliable narration to Michael Joyce's Storyspace fiction *afternoon, a story* and Stefan Maskiewicz's dialogic hypermedia narrative *Quadrego* (2001). Both texts feature unintentional (neurotic and psychopathic) unreliable narrators but make very different uses of hypertextuality and hypermediality to represent the respective characters' perceptions and symptoms. Bell and Ensslin (2011) expand the theoretical discourse and analytical toolset associated with second-person narration by examining the textual *you* in Stuart Moulthrop's *Victory Garden* and Richard Holeton's *Figurski at Findhorn on Acid* (2001). They show how second-person narration in hypertext fiction can not only underscore the interactivity of the medium and the physical participation of the reader but indeed encourage readers to reflect on their role in real-life, extratextual events (see INTERACTIVITY). In a book-length study, Bell (2010) applies select theorems of possible worlds theory to a number of Storyspace hypertext and hypermedia fictions and demonstrates how this approach can be used to analyze the ontological self-consciousness and conflicting first-person perspectives of the narrator, the problematic boundaries between fictional and historical discourses, intertextual references to other fictional characters, appearances of the author figure in the text, and absurdist humor (see DIGITAL FICTION).

Hypertext as a (literary) art form has, since its inception, undergone major creative shifts and transformations. These "generational" shifts (Hayles 2002; Ensslin 2007) have been motivated partly by writers' frustration vis-à-vis hypertext's failure to draw audiences

broader than a small number of literary scholars, and partly by the experimental potential afforded by newly evolving digital technologies.

The first generational shift, from hypertext to hypermedia, occurred around the mid-1990s, which marked a watershed in digital technology development. The year 1993 saw the invention of Mosaic, the world's first graphic browser, and, following in its wake, the popularization of the World Wide Web with HTML, its major markup language. The key achievement of HTML as a standardized encoding convention was its propensity to serve a variety of different semiotic systems, which had previously been analog, that is, separated in terms of mediality and materiality. These semiotic systems comprise text, graphics, digitized speech, audio files, animation, and film. Produced, for example, by means of HTML, JavaScript, Flash, and Shockwave technologies, hypermedia is characterized by a variety of pastiche and collage techniques. In these, interactivity emerges through technologically manifested intermediality and, in the case of collaborative, user-generated writing projects, through direct (w)reader interaction and participation via web posts. From an aesthetic point of view, hypermedia readers are confronted not only with interlinked text lexias but a wider semiotic variety, for example, image-text, image-image, and text-image links, as well as dynamic and interactive elements such as film clips and drag-and-drop mechanisms. As opposed to first-generation hypertexts, which use images sparsely and mainly as illustrative or decorative means, hypermedia writings form a coherent intertextual, intermedial, and multimodal whole, which is more than the sum of its constituent parts. Prototypical examples are concrete digital poems such as Judd Morrissey and Lori Talley's (2002) *My Name Is Captain, Captain* and web-based digital fictions such as geniwate and Deena Larsen's *The Princess Murderer* (2003) and Robert Kendall's *Clues* (2002).

A second general shift, from hypermedia to cybertext (Ensslin 2007), can be located in the move toward empowering the software code to take over a considerable degree of control of the reception process without necessarily reducing interactivity (although in some extreme cases reader agency is abandoned completely, such as in the Flash works of Young Hae Chang Heavy Industries). *Cybertext* is a term coined by Espen Aarseth, who sees hypertexts that are programmed in particular ways as autonomous "text/machines," which assume power over the reader by literally "writing themselves" rather than presenting themselves as an existing textual product. The concept of cybertext is based on Aarseth's alternative model of textual communication (1997, 21), which places the text/machine, a mechanical rather than metaphorical concept, at the center of the communicative triangle. The text/machine is symbolically surrounded by the (human) "operator," the "verbal sign," and the material "medium" that disseminates the text. These three elements engage in a complex interplay with the text and each other, which results in a variety of different cybertextual subgenres, depending on which element is emphasized most strongly. What Aarseth aims to communicate is a reversion of some key reader-response principles (e.g., reader-driven hermeneutics; readers "completing" textual meaning through interpretation), which renders the operator a constitutive yet somewhat disempowered element of (cyber)textual performance. Put differently, readers become part of a cybernetic feedback loop, which operates on the basis of mutual stimulus and response between machine and operator. By highlighting this reciprocal contingency, however, Aarseth's model subliminally reconfirms the validity of reader-response theory, as the reader-operator is bound to fill the metatextual gaps opened up by the text by reading cybertextual meanings into it (i.e., meanings that take account of the operator as

physical and psychological part of the cybernetic feedback loop, highlighting the importance of code and its effects on interface and interactivity). Inspired by other forms of (ludic) digital narrative, such as video games and massively multiplayer online role-playing games (MMORPGs), the cybertext generation uses the latest achievements in hypermedia technology combined with a variety of plug-ins, which add interactive, playful elements to the text. Early examples include Stuart Moulthrop's (1997) *Hegirascope* and Urs Schreiber's (1998) *Das Epos der Maschine*. *Hegirascope* features tightly timed links, which cause lexias to change at a rapid pace (every eighteen seconds in version 1.0) without giving the reader a chance to take control via mouse click or to close read them. *Das Epos der Maschine* consists of autonomously moving text, which appears, vanishes, expands, diminishes, and wanders across a highly interactive but simultaneously elusive interface.

In 2000, Johannes Auer predicted that, by virtue of such innovations, a more corporeal notion of interactivity, which directly responds to human emotions and physical conditions, may ultimately replace the hyperlink as the central aesthetic and structural feature of hypertext. In fact, as recent "physiocybertextual" (Ensslin 2009) artifacts such as Kate Pullinger, Stefan Schemat, and babel's *The Breathing Wall* (2004) have shown, Auer's vision has to a certain degree become reality. Physiocybertexts integrate the reader's corporeal mechanisms—or select aspects thereof—in the reading process. *The Breathing Wall*, for instance, uses software that measures the reader's breathing rate and intensity and releases or withholds key textual information accordingly.

Based on the aforementioned tripartite system of overlapping generations, Ensslin (2007) suggests a dynamic, multilingual canon of hypertext, hypermedia, and cybertext, which can be modified and expanded to allow it to evolve alongside technological and aesthetic developments. Further attempts at canonizing and/or anthologizing hypertext and related forms of electronic literature include the Electronic Literature Organization's *Electronic Literature Directory* and its two volumes of the *Electronic Literature Collection* (see Electronic Literature Organization).

Despite the technological and concomitant aesthetic developments outlined above, as well as its potentially anti-immersive, alienating, and confusing properties, hypertext as a structuring principle of electronic writing continues to be used by digital writers. That said, more recent creative uses of it reflect a more careful, reader-friendly attitude, which seeks to sustain rather than impede immersion. For instance, as Kate Pullinger and Chris Joseph have shown in episode 4, "Hometown," of their emergent digital fiction *Inanimate Alice* (2005–2012), hypertextual elements can be embedded in a largely linear hypermedia story so as to give readers different options and reading paths without, however, allowing them to get lost in hyperspace. At the beginning of this episode, Alice is dared by her friends to climb a dilapidated staircase. Two-thirds of the way up, the stairs begin to collapse underneath her, at which point the reader is given four hypertextual options to "look at what happened." Each chosen path, however, leads back to the options screen, and all four options, once selected in full, lead to a continuation of the standard linear reading path resulting in Alice's rescue. Another recent attempt to create reader-friendly literary hypertext is Mark C. Marino's (2008) *A Show of Hands*. Using software called the Literatronica storytelling engine, this work seeks to enable readers to situate themselves within the story. It "adapts around the reader's choices, rearranging the content so the reader will always encounter all of the text in an order optimized for narrative coherence" (2008). Thus, hypertext remains a powerful informational and

expressive tool for creators and users of both fictional and nonfictional electronic textuality.

■ See also READING STRATEGIES

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Raymond Queneau

HUNDRA TUSEN MILJARDER DIKTER

Översättning:
Lars Hagström

BAKHÅLL

På Pampas må man skjortan flinkt frottera
Och hänga den till tork på kungens tron
Det salta köttet smakar infektion
Nog är det mer än man kan tolerera

Det är ej svårt att sådant memorera
En fana vajar stolt i vår skvadron
Kåb[illegible] kaffet ut med kron
Trots kylan hörs ej [illegible] från trygga Hera

Från polen till Rosario färdas vi
Ett äventyr av möda och magi
Där dryck och tango blir till ritual

Latinamerikas vulgaritet
Förför Europas pryda societet
En klocka bångar i en katedral

På Pampas må man skjortan flinkt frottera
Och hänga den till tork på kungens tron
Det salta köttet smakar infektion
Får häst och ryttare att krackelera

Det är ej svårt att sådant memorera
En fana vajar stolt i vår skvadron
Kåbojsarna rör kaffet ut med kron
Vid Themsens stränder, långt från trygga Hera

Från polen till Rosario färdas vi
Ett äventyr av möda och magi
Den döde Sokrates syns dvärglikt skral

Latinamerikas vulgaritet
Förför Europas pryda societet
Ja, hela västerlandets kapital

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Cyborg and Posthuman

Raine Koskimaa

The concept of the cyborg was first defined by Manfred E. Clynes and Nathan S. Kline in their 1960 paper "Cyborgs and Space." In the paper *cyborg* was defined as an "exogenously extended organizational complex functioning as an integrated homeostatic system unconsciously" (1960, 27). In particular, Clynes and Kline were concerned about the well-being of astronauts during space travel and suggested that they should be refashioned as cyborgs, with a mechanism to automatically inject chemicals into the astronaut's body to safeguard them from the perils of violent radiation and other threats (1960, 27, 74). The term *cyborg* is an abbreviation of "cybernetic organism," which directly links the notion to the then-rising field of cybernetics. "Cyborg" is a manifestation of the human-machine symbiosis, where information flows between system and environment, maintaining equilibrium, or homeostasis, in terms of cybernetics.

Cyborgs, or androids, as technologically enhanced persons are also often called, enjoy popularity especially in science fiction literature and film. Philip K. Dick created a series of highly influential android figures in his 1960s novels, *Do Androids Dream of Electric Sheep?* (1968) being the best known of these. In popular media, the TV series *The Six Million Dollar Man* (1974–1979) was based on the novel *Cyborg* by Martin Caidin (1972). In the 1980s the interest in cyborgs was renewed in literature through William Gibson's cyberpunk trilogy *Neuromancer* (1984), *Count Zero* (1986), and *Mona Lisa Overdrive* (1988); in film by Ridley Scott's adaptation of *Do Androids Dream of Electric Sheep?* retitled as *Blade Runner* (1982); and later on by the films *Robocop* (Paul Verhoeven, 1987) and *The Terminator* (James Cameron, 1984). In most of these fictions, the cyborg is a human-like android with technologically enhanced physical capabilities, whereas Gibson's trilogy focuses more on artificial intelligence and enhancing the human mental capabilities through symbiosis with machines.

In academic discussions the term *cyborg* has gone through a process of metaphorization. Donna Haraway's use of cyborg as a transgressive figure in feminist theory has been influential especially in poststructuralist thinking. For Haraway, the cyborg promises to overcome distinctions like human/animal, human/machine, and physical/nonphysical (Haraway 1991, 152–154). As hybrids, cyborgs are necessarily monstrous, but with empowering potential. This extended notion of cyborg has been applied to such earlier fictional figures as Mary Shelley's Frankenstein and E. T. A. Hoffman's Sandman. In cultural theory the representations of the cyborg subject stand for a new phase in history, questioning the old notions of organicity and wholeness of the body (Schwab 1989, 194–195, 200–205). The technological enhancement of the human also often raises issues related to Cartesian dualism.

N. Katherine Hayles (1999) has elaborated the idea of posthuman, on the basis of cybernetics, but also as an answer to the transhumanist thinking as presented by Hans Moravec (1988) and others. "Posthuman" is a wider concept than cyborg, in that it refers not only to technologically enhanced human bodies but also to wider systems of collaboration including human and technological parts. "Posthuman" is also a perspective within which even a biologically unaltered Homo sapiens may be understood in posthuman terms: "The defining characteristics involve the construction of subjectivity, not the presence of nonbiological components" (Hayles 1999, 4). The posthuman, in Hayles's account, is a transformation of the human, where transhumanism implies a more radical exceeding of the limits and disposing of the biological human altogether—the "posthuman" may, however, be understood also synonymously with transhumanism, signaling the end of the human (see Agar 2010, 2).

In the posthuman framework, we may see practically all humans as cyborgs. On one hand, many of us wear technological enhancements, from eyeglasses to pacemakers; on the other, we are wholly reliant on the information and communications technologies in which we are immersed. The question now is more about in which sort of posthuman or cyborg constructions we partake. One direction here is to look at the creative processes of authoring literature for and with digital media. That direction could be labeled as an inquiry into *cyborg authorship*.

With regard to digital literature, we can see what *cyborg* entails. Various software tools (such as HyperCard, Storyspace, ToolBook, Director, and Flash) and, especially in the case of online works, the whole of the World Wide Web enable cooperation between human authors and machines. In addition to serving as parts in the authoring process, computer programs also enable the human author to reflect on language from a new perspective (Montfort 2003, 210). That is, cyborg authorship may be used to promote metareflective functions regarding the linguistic and technological conditions of the creative work.

Cyborg authorship may take various forms, and Espen Aarseth has provided a three-part typology of the possible occasions of the authoring process where the cyborg may appear. Aarseth's cyborg author typology consists of the following positions (1997, 134–136):

1. *Pre-processing*—the human programs and/or loads the machine, which then produces the text.
2. *Co-processing*—the human uses the machine during text production.
3. *Post-processing*—the machine produces a text stream, out of which the human selects and/or modifies parts.

These positions may coexist: pre-processing is almost always involved, whereas co- and post-processing often exclude each other (for an application of the typology, see Montfort 2003, 211–216).

Early examples of the cyborg author can be found in various text generators. Christopher Strachey, a collaborator of Alan Turing, already programmed a love letter generator for the Manchester Mark I computer in 1952, but the most successful has been the dialogue generator Eliza/Doctor (Joseph Weizenbaum, 1966). It simulates a psychiatric analyst (of a Rogerian type) in a text-only context. Eliza/Doctor recognizes a limited set of keywords in the user input and selects a reply according to a relatively simple set of rules based on keywords identified in the input string. Eliza/Doctor can be considered as a success, much owing to the human want to believe in it (see detailed discussion on Eliza/

Doctor in Wardrip-Fruin 2009). Other well-known text generators include Tale-Spin by James Meehan, which produced short stories, and Racter by William Chamber, which produced poems, stories, and dialogue and, assumedly, "wrote" the book *The Policeman's Beard Is Half Constructed* (Chamberlain 1984).

Some have argued that the computer is more suitable for producing new types of works—cybertexts—than simulating traditional forms such as stories, sonnets, or plays (Aarseth 1997, 141). This notion leads to the more complex forms of cyborg author formations. The extreme form here is the approach where the whole World Wide Web is seen as a *cyborg author* (Wall 1994). The web here is seen as a complex tool that plays an integral part in the creative process of authoring digital literature: "The cyborg Web is the group of circumstances that leads to the creation of a text and the mechanism by which a text is assembled from existing conditions" (Wall 1994). This approach has the advantage that, as an open formation, it escapes the limited and predictable nature of the text generators. It may be argued that online information flows serve as the unconscious of the machine and open up the possibility of unpredictable, genuinely creative productions. In these assemblages the technology (both hardware and software) functions as an integral part of creative processes in a way that cannot be dismissed as a mere tool anymore. Instead, we should consider the whole system of human actors, the World Wide Web, and related software together as the cyborg author.

In this direction, *agent technologies* represent a new type of cyborg formation. Software agents are computer programs that monitor the user's actions and learn to know the user's habits. Based on this learning, the agents make selections on behalf of the human user, automating many actions normally requiring the human user's direct attention. Even though software agents are mainly used for practical purposes, they may be employed also for aesthetic and critical aims. *The Impermanence Agent* (Wardrip-Fruin et al. 1999) is an example of a complex cyborg authorship, where author-created materials, algorithms, user actions, and web contents all contribute to the emergence of the work.

In the early hypertext theory (Bush 1945; Engelbart 1962; Nelson 1965), hypertext was seen as a tool to extend human mental capabilities. This is closely connected to Marshall McLuhan's (1962, 1967) idea of media as an extension of the nervous system. Within this framework the cyborg and the cyborg author can be seen as producing a *mental change* in humanity (comparable to physical change brought along by prostheses). One of the functions of digital literature is to reflect on this mental change currently taking place, investigating what the cyborg and the posthuman condition mean, through the means that the cyborg authorship offers. This may be understood as literally following Clynes and Kline's initial aim with the cyborg as an entity that is able to explore new environments. Whereas the cyborg was meant to explore space, the cyborg author is needed to explore the new digital territory (Montfort 2003, 203–204).

▪ See also CYBERNETICS, CYBERPUNK, IDENTITY, NETWORKING

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PERFORMANCE). According to this strategy, the codes of art and the codes of technology converge toward a highly interesting nexus of relations, providing multiple, layered domains of signification which have rarely been fully explored simultaneously.

■ See also CONCEPTUAL WRITING, ELECTRONIC LITERATURE, GLITCH AESTHETICS

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Digital Fiction

Maria Engberg

Digital fiction is used as an umbrella term under which many different subgenres or specific writing practices using digital media can be sorted: hypertext fiction (see HYPERTEXTUALITY), network fiction (see NONLINEAR WRITING), interactive fiction (see INTERACTIVE FICTION), e-mail novels (see E-MAIL NOVEL), and multimedia novels are among them. The term is not uncontested and is not universally used among scholars and writers who engage with digital writing, in critical work or in practice. *Digital fiction* is therefore not a standard term for literary narratives in digital form, nor does it have a stable definition. Instead, it encompasses and competes with other terms, some of which may have a longer existence (e.g., hypertext fiction) or are more narrowly defined (e.g., interactive fiction). Some critics, such as Alice Bell et al. (2010), seem to equate

digital fiction with other related terms such as electronic literature and e-lit, which both potentially include poetry (see DIGITAL POETRY, ELECTRONIC LITERATURE).

The definitions of digital fiction that have been offered, although few, tend to embrace a wide range of practices. Alice Bell and Astrid Ensslin suggest that "digital fiction is fiction, written for and read on a computer screen, that pursues its verbal, discursive, and/or conceptual complexity through the digital medium and would lose something of its aesthetic and semiotic function if it were removed from that medium" (2011, 311). This definition echoes the one suggested for another, correlate term, *electronic literature*: "works with important literary aspects that take advantage of the capabilities and contexts provided by the stand-alone or networked computer" (Electronic Literature Organization, n.d.). The Electronic Literature Organization's definition of electronic literature also makes a clear distinction between digitized works and what are sometimes called born-digital works, stating that "the confrontation with technology at the level of creation is what distinguishes electronic literature" (Electronic Literature Organization, n.d.). David Ciccoricco, using the term *network fiction* instead, defines it as that which "makes use of hypertext technology in order to create emergent and recombinatory narratives" (2007, 7). Roberto Simanowski elaborates on the combination of materiality and narrative intentionality as key to defining digital, as opposed to digitized, literature: "digital literature must go beyond what could be done without digital media. . . . Digital literature must be more than just literature otherwise it is only literature in digital media" (2009, 12).

As a general term, then, digital fiction encompasses any length of work, any form, any thematic subgroup, any software, and any degree of interaction with the work. Unlike Espen Aarseth's definition of what he called "cybertexts" (Aarseth 1997), the level of interaction from the reader is not an important distinctive feature in existing definitions of digital fiction. Instead, the material origin and intention of how the works are created and received are foregrounded. In addition to a more general understanding of what *digital fiction* means, there are also subgenres and related groups of literary practice. These tend to function as individual groups of digital fiction that have their own communities, audiences, and technological frameworks. These include, for instance, interactive fiction (see INTERACTIVE FICTION), e-mail novels of various kinds (see E-MAIL NOVEL), and fan fiction (see FAN FICTION), as well as SMS or cell phone novels (see CELL PHONE NOVEL), interactive narratives in games and similar platforms (see INTERACTIVE NARRATIVE), and emergent forms such as locative media fiction (see LOCATION-BASED NARRATIVE). The cell phone novel (*keitai shōsetsu*) emerged in Japan in the 2000s as a uniquely digital mobile narrative form and quickly grew to be popular in its native country as the novels were published in print (Onishi 2008). These novels, as well as popular republished fan fiction novels, exist, then, on both sides of the print/digital divide, whereas most other genres defined as digital fiction do not.

The "digital" in digital fiction refers to, as mentioned, digital technologies that are used in some form. However, critics and authors often make a distinction between works that are created specifically with digital media, and are intended to be consumed with digital media as well, and digitized writing, which includes various forms of e-books and digital documents that adhere to print conventions. N. Katherine Hayles suggests that electronic literature is "'born digital,' a first-generation digital object created on a computer and (usually) meant to be read on a computer" (2008, 3). Similar terms have been suggested, such as "native born digital writing" (Grigar 2008) or "born-digital poetry"

(Engberg 2007). "Born-digital" is a defining distinction between digitized material, such as scanned texts that appear in repositories such as Google Books, or e-books and other digital texts, and literary works created specifically with and for digital media. The "digital" in these terms is also a broad term, as it encapsulates, essentially, all media. There is no distinction at this level of particular software types or programming languages.

Fiction, as "literature created from the imagination" (*Encyclopedia Britannica*, "fiction"), comes from the Latin word *fictiō*, meaning the act of making, fashioning, or molding. A standard definition of fiction is that it is any literary narrative, "whether in prose or verse, which is invented instead of being an account of events that actually happened" (Abrams 2009, 116). Fiction in the term *digital fiction* is generally not defined separately; instead, the distinction between digitized and born-digital works is emphasized.

In "A [S]creed for Digital Fiction," Bell et al. (2010) propose a model for analyzing digital fiction based on close analysis of individual works. They argue that "the aesthetic force, reflexive engagement and complexity of a fiction, rather than its place in a process of technological advancement," are what matter for analysis. Their understanding of the importance of the digital medium for digital fiction, apparent in the works' aesthetic and semiotic functions, differs from media nonspecific concepts such as Hayles's technotext and Aarseth's cybertext, both of which encompass both digital and print texts.

Within scholarship on digital writing at large, various trends can be discerned: the hypertext discussions of the 1990s; digital poetry (and its correlate terms, such as electronic poetry and e-poetry) in the 2000s; electronic literature as an umbrella term, closely related to the American Electronic Literature Organization (ELO) started in 1999; and in the 2010s different notions of procedural or computational narratives (Wardrip-Fruin 2012). There are distinct, and at times isolated, communities that discuss their particular genre of digital fiction. Such communities exist for interactive fiction (Montfort 2003), hypertext fiction (Joyce 1996; Yellowlees Douglas 2001; Ciccoricco 2007; Bell 2010), and digital visual poetry (Glazier 2001; Funkhouser 2007). The collections *First Person: New Media as Story, Performance, and Game* (2004), *Second Person: Role-Playing and Story in Games and Playable Media* (2007), and *Third Person: Authoring and Exploring Vast Narratives* (2009) all include essays on various topics related to digital fiction. Interestingly, the term *digital fiction* appears rarely. However, the range of themes in these three essay collections signals the field of digital creative practices in which digital fiction operates, as a writing practice and a field of critical study.

Whether they are designated communities or subgenres, the term *digital fiction* thus encompasses a series of writing practices, including hypertext fiction, interactive fiction, multimedia fiction, distributed narratives, blog fiction, alternate reality games (ARGs), fan fiction, and cell phone fiction. Digital fiction can also be said to include some forms of digital poetry, machinima, and fictional works on social media sites such as Flickr, Facebook, Twitter, and YouTube. In addition to these named subgenres, works are also grouped according to literary, technical, or aesthetic affiliations. In the Electronic Literature Directory, managed by ELO, tags such as fiction, hypertext, and interactive novel are used to group together similar works. The two volumes of the Electronic Literature Collection, also affiliated with ELO, use keywords. In volume 1, "fiction" is defined as "by analogy with print, story-like or narrative elements appear in the work" (Hayles et al. 2006). Sixteen of the sixty works in volume 1 are defined as fiction, many of which are also defined as hypertext. In volume 2 (Borràs et al. 2011), the keyword "fiction" is taken

out, although three out of sixty-two are defined as interactive fiction, and eleven works are marked as hypertext (not specified as fiction or poetry).

Following Marie-Laure Ryan's work on narrative across media forms, Noah Wardrip-Fruin has argued that fiction, particularly digital fiction, can be defined by help of possible-worlds theory and modal logic. Works such as Rob Wittig's e-mail novel *Blue Company* (2001–2002), *The Unknown* (Gillespie et al. 1998–2001), and computer game fiction *Star Wars: Knights of the Old Republic* (Falkner, Brockington, and Hudson 2003) are analyzed as exploring the potentiality of unconventional reading strategies, meaning-making processes involving machine and reader alike, and the gamelike features engendering their poetics (Wardrip-Fruin 2012). The idea of digital fiction as a possible world is an attempt to break away from print conventions that consider fiction in more familiar forms, such as novels, short stories, theater, television, and movies (Wardrip-Fruin 2012, 138), and to instead consider newer definitions that configure the narrative as a world in which constituent parts (images, words, but also computational behaviors and interactivity) become part of the fictional discourse (Ryan 1992).

Historical periods and aesthetic schools that are addressed in literary studies in general, such as modernism and postmodernism, are also applicable to digital fiction. Steve Tomasula's *TOC: A New Media Novel* (2009) can be described as contemporary experimental writing, at least in part written in a late postmodernist mode. *TOC* resides in a contemporary continuation of experimental writing, clearly evident in earlier hypertext works such as Michael Joyce's *afternoon: a story* ([1987] 1990), Shelley Jackson's *Patchwork Girl* (1995), and the 2001 Electronic Literature Award winner in the fiction category, Caitlin Fisher's *These Waves of Girls* (2001). Contemporary fictional works such as *Changed* (2011) and *Dim O'Gauble* (2007) by Andy Campbell (UK) and Kate Pullinger and Chris Joseph's (UK) *Inanimate Alice* series (2005), on the other hand, use storytelling and multimodality to create narrative works that break away from modernist or postmodernist genres. The *Inanimate Alice* series is also described as transmedia storytelling (see TRANSMEDIAL FICTION). Critics such as Sarah Sloane (2000), Loss Pequeño Glazier (2001), and Christopher Funkhouser (2007) have suggested that modernist or postmodernist affiliations are strong in digital writing. Further, critics and writers alike have explored the different connections with the historical avant-garde in certain digital writing, particularly in what is called "codework" (Cayley 2002; Sondheim 2001).

In the 2000s, the application of narratology and narrative theory to the study of longer forms of digital writing emerged as an important theoretical framework. Critics such as Marie-Laure Ryan, Alice Bell, Astrid Ensslin, and David Ciccoricco have applied narratological concepts to the study of primarily hypertext fiction and computer games. In their understanding of digital fiction, these critics tend to exclude blogs, e-books, and fan fiction or "communitarian digital fiction" (Bell et al. 2010).

Theoretical frameworks, media contexts, and audiences for the various writing styles that can be gathered under the term *digital media* vary widely. As with the term *fiction*, the wide reach of the term's meaning and the continuous development of fictional narratives in digital media ensure that the kinds of works that are designated as digital fiction will continue to shift in aesthetics, media, and narrative form.

■ See also NARRATIVITY, NONLINEAR WRITING, TRANSMEDIAL FICTION

NATURA NATURANS

JANE BENNETT

I stället för en miljö som omger mänsklig kultur, eller rentav ett kosmos som rymmer tre ekologier, föreställ er ett ontologiskt fält utan några självskrivna avgränsningar mellan människa, djur, växt eller mineral. *Alla* krafter och flöden (materialiteter) är eller kan bli livaktiga, affektiva och signalerande. På så sätt är en affektiv, talande mänsklig kropp inte *radikalt* skild från de affektiva, signalerande icke-mänskligheter som den samexisterar med, hyser, gillar, serverar, konsumerar, producerar och utmanar.

Detta fält saknar ursprungliga avgränsningar, men det handlar inte om en enhetlig eller platt topografi. Det är snarare så att dess avgränsningar är för onyanserade och ombytliga i förhållande till de filosofiska kategorierna för liv, materia, tanke, omgivning. Fältets enhetlighet är mer onyanserad än så: delar formar sig till kroppar, men inte på ett sätt som ger någon av dem en privilegierad handlingsposition. Snarare är upphovet till verkningar alltid en ontologiskt varierad sammansättning av energier och kroppar, av enkla och sammansatta kroppar, av det fysiska och det fysiologiska.

I denna onto-berättelse är allting, på sätt och vis, levande. Denna livlighet är inte skymd av en yttersta orsak eller uppfattad och hanterad genom ett fåtal enkla och tidlösa (kantianska) kategorier. Det jag kallar vital materialitet eller vibrerande materia är del av det som kommer till uttryck i en av många andra historiska betydelser av ordet *natur*.[1] Trots att ordet kan hänvisa till ett stabilt substrat av rå, obearbetad materia, har natur också pekat mot alstringsförmåga, fertilitet, Isis eller Afrodite, eller "Våren" i Antonio Vivaldis *Det fyra årstiderna*.[2] Denna kreativitet kan vara avsiktlig eller inte. Kontrasten mellan natur som rå eller avsiktlig materia och natur som alstring, vilket är nyckeln till Baruch Spinozas *Etik*, är väl sammanfattad i distinktionen mellan *natura naturata* och *natura naturans*. *Natura naturata* är passiv materia organiserad till Skapelsens eviga ordning; *natura naturata* är den icke-orsakade orsaken som ändlöst genererar nya former. När de engelska romantikerna och de amerikanska transcendentalisterna ville förädla sina sinnen, gjorde de det delvis för att bättre kunna urskilja *natura naturans*. Denna universella kreativitet kräver en särskild sensibilitet då, som Samuel Taylor Coleridge uppfattade det, den produktiva kraften är "hämmad och därmed kuvad i produkten".[3] Natur som alstring är också framhållen i Alfred North Whiteheads processfilosofi, enligt vilken naturen är "en kontinuerlig ström av händelser".[4]

Med utgångspunkt i Spinoza, romantiken, Whitehead och andra (som Friedrich Nietzsche, Franz Kafka och Henri Bergson) spinner Gilles Deleuze och Félix Guattari vidare på *natura naturans*: Naturen är "immanensens rena plan [...] på vilket amorfa element och materier dansar".[5] Enligt Spinozas teori om kroppar är alla kroppar attribut av en och samma substans som antingen kan kallas Gud eller Natur. Kanske är det med viss försiktighet med tanke på den statiska homogenitet som (trots Spinozas protester) tenderar att läggas i betydelsen av ordet substans, och även med försiktighet med tanke på Spinozas (på det hela taget tämligen heterodoxa) teism, som spinozismen hos Deleuze och Guattari blir en röst för naturen som en frambringande "ofantlig abstrakt maskin", vars delar "består av olika sammansättningar och enskildheter, där var och en sätter samman en oändlighet av partiklar som uppgår i en oändlighet av mer eller mindre förbundna relationer".[6] Liksom Spinozas Gud eller Natur opererar inte heller denna abstrakta maskin med sikte på något förutfattat mål, utan snarare för sig själv som process.[7]

Naturen som kreativitet förefaller också vara en del i den innebörd som de antika grekerna gav ordet *fusis*, ett ord som är ekvivalent med latinets *natura*. *Fusis* kommer av verbet *fuó*,

som förmodligen betydde pusta, blåsa eller svälla upp, vilket antyder innebörden av groning eller uppspirande. Frambringa, öppna upp eller kläcka. *Fusis* talar alltså om en transformeringsprocess, om formation och deformation, med andra ord om hur ting i rörelse blir något annat när de ingår i sällsamma föreningar med varandra.

Poängen är denna: en aktiv tillblivelse, *en kreativ ännu-inte-riktigt-mänsklig kraft som är förmögen att producera det nya*, brummar inuti naturbegreppets historia. Denna vitala materialitet stelnar till kroppar, kroppar som försöker fortleva eller förlänga sin tid. Här förhåller sig onto-berättelsen återigen till Spinoza, som hävdar att conatus-drivna kroppar skapar allianser med andra kroppar för att stärka sin kraft eller vitalitet. Men trots detta skulle det vara för mycket att säga att Spinoza var en vital materialist. Det är inte heller en uppgift för denna studie att ta upp den hätska diskussionen om huruvida hans uppfattning att varje modus växelvis kan förstås som kropp och som idé utesluter honom från alla former av materialism. Men Spinozas teori om kroppar och deras affektiva möten kan (vilket den också gör) inspirera dagens ekologiska tänkande.

Till exempel Michel Serres föreslår att den kollaborativa och motstridande processen mellan kroppar inte är slumpartad eller ostrukturerad, den lyder under virvelströmmens, spiralens och virvelns egendomliga logik, och denna logik inbegriper politik lika mycket som fysik, ekonomi lika mycket som biologi, psykologi lika mycket som meteorologi: den återkommer på alla skalor och platser. Serres, som här följer Lucretius, tänker sig en enda isomorf process, den om "Blod och eld, om överflöd och överansträngning, om vertikal tillväxt och plötsligt fall, om ackumulering och förtvining, i vilken historien [...] stiger fram och tynar bort likt ett stormigt hav under orkanens rörelser".[8] Det är en enda tumlande process, men den kan teoretiskt uppdelas i stadier: först ett "fall", eller en conatus-impuls av materia-energi,[9] sedan en aleatorisk avstickning som orsakar möten mellan variabla delar som kraschar med varandra, sedan ett stadium av oorganiserad turbulens, sedan en förhärdning eller kristallisering av materia till kroppar, sedan ett sönderfall, en uppsplittring och utspridning av dess form. Och slutligen: ett nytt fall, en ny avstickning, en annan konfiguration av turbulenta krafter, en annan uppsättning av formationer, en annan grad och sekvens av nedgång och sönderfall. Den virvlande logiken sträcker sig över olika grader av storlek, tid och komplexitet, och serien av stadier upprepas, men varje gång med små variationer: "Detta är genidraget i [Lucretius] fysik: det finns ingen cirkel, det finns bara virvlar [...] spiraler som skiftar, som förflyktigas".[10] Serres tillhandahåller en beskrivning av den vitala materialitetens märkliga strukturalism, en strukturalism som inbegriper det aleatoriska.

Översättning från amerikanskan: Johan Redin

"Natura Naturans" utgör en del av kapitlet "Vitality and Self-interest" i
Jane Bennetts *Vibrant Matter. A Political Ecology of Things*,

1. Idéhistorikern A.O. Lovejoy anger sextiosex olika betydelser av naturbegreppet. Se appendix i Lovejoy och Boas, **Primitivism and Related Ideas in Antiquity**; se även Lovejoy, "Nature as Aesthetic Norm".

2. Den första betydelsen är "naturen" såsom den framträder hos Hobbes, Locke eller Rousseau i termer av ett "naturtillstånd", men den återklingar också i det Sigmund Freud kallar drifter och instinkter och det Martin Heidegger pekar mot när han kallar vår utkastadhet ursprunglig. Maurice Merleau-Ponty beskriver relationen mellan naturen som stabilt substrat och naturen som kreativitet som "kiasmisk", som att oändligt flyta in i och ut ur varandra.

3. Coleridge, **The Literary Remains of Samuel Taylor Coleridge**, Vol. 2, s. 341. Spinoza, **Etiken**, sv. övers. Dagmar Lagerberg (Stockholm 1989), Del I, teorem 29: "vad vi bör förstå med skapande natur (**natura naturans**) [är] sådana **attribut** av substansen [...] det vill säga Gud, försåvitt han betraktas som fri. Med skapad natur [**natura naturata**] förstår jag allt det som följer av Guds **naturnödvändighet** [...] det vill säga alla modi av Guds attribut, försåvitt de betraktas som **ting**". (Mina kursiveringar)

4. A.N. Whitehead, **The Concept of Nature**, s. 172.

5. Gilles Deleuze och Félix Guattari, **A Thousand Plateaus**, s. 255.

6. Ibid., s. 254.

7. Spinoza framlägger sin poäng på följande vis: "Härmed har jag tillräckligt utvecklat det som jag i första rummet ställt i utsikt. Men för att dessutom visa att naturen inte har något ändamål som blivit den föresatt, och att alla ändamålsorsaker är mänskliga påhitt, behöver jag inte föra några vidlyftiga resonemang" (Spinoza, **Etiken**, Del I, appendix).

8. Michel Serres, **The Birth of Physics**, eng. övers. Jack Hawkes (Manchester 2000), s. 64. Serres argumenterar för att Lucretius **De rerum natura** exemplifierar denna isomorfism: "The Book V, on the world and nascent humanity, is traversed by the same laws as the Book IV, on perception; and these are the laws of matter found in Book II. Always the same whole, a multiplicity of elements, and always the same operations at work on these wholes. The method by structural invariants, generalised to the global stability of flowing movements, establishes materialism" (Ibid., s. 54).

9. "The world, objects, bodies, my very soul are, at the moment of their birth, in decline. This means, in the everyday sense, that they are mortal and bound for destruction. It also means that they form and arise. Nature declines and this is its act of birth. And its stability. Atoms join together, conjunction is the strength of things, through declination. This signifies the whole of time. The past, the present, the future, the dawn of appearance and death, tenacious illusions, are only the declinations of matter. They decline and are declined like the tenses of a verb, a word made up of atom-letters. [...] Existence, time, meaning and language go down the inclined plane together" (Ibid., s. 34).

10. Ibid., s. 58.

(A) (A')

bortser från det geologiska sammanhanget; Se *On Revolution* (New York, 1963), s. 35–41.
71. James Hutton, *Theory of the Earth* (Edinburgh, 1788), s. 304.
72. Buffon, citerad i Paolo Rossi, *The Dark Abyss of Time* (Chicago, 1984), s. 108.
73. Vergilius, *Georgica* (Stockholm, 1967), s. 27. [I:494–497]
74. P. B. Shelley, "Prometheus Unbound", *Shelley's Poetry and Prose*, (red) Donald H. Reiman & Neil Fraistat (London, 2002), s. 278–279. Sv. övers. Anders Österling i Shelley, Den befriade Prometheus (Stockholm, 1942), s. 133–135.
75. Ibid. Om Shelley och "jordens hemlighet", se Noah Heringman, *Romantic Rocks, Aesthetic Geology* (New York, 2004), s. 174–190.
76. Friedrich Schelling, "Weltalter-Fragmente. Erste Fassung (1811)", *Gesammelte Werke* (red.) Manfred Schröter (München, 1946), s. 11–12.

B B'

jussi parikka
mediernas geologi

Att tänka på Jorden som ett objekt kräver en del fantasi. I gruppen objekt, är det verkligen stort: Jordens diameter är nästan 13 000 km (med viss variation om mätningen görs vid polerna). Det är också mycket gammalt – dess ålder är cirka 4,5 miljarder år. Det har dessutom en ganska hög densitet och består av diverse kemiska sammansättningar, främst av kisel, men också en betydande mängd av aluminium, kalk, magnesium, vatten, koldioxid, järnoxid, och så vidare. Men det finns något som handboksfakta och mätningar av detta slag inte lyckas fånga. Det känns otillräckligt att tänka på den geologiska Jorden som ett objekt, när den består av så många sammankopplade och inbördes beroende saker, såsom atmosfären. Den är ett objekt av gränssnitt: magman, terran, atmosfären, och så vidare – så många veck i vilka vi lever som en del av den djupa rymden (*deep space*).
Under 1700-talet kom allt noggrannare mättekniker att tvinga människor att betrakta Jorden som ett vetenskapligt objekt. Detta skifte krävde att man uppmärksammade jordens skiktade struktur och att denna struktur korresponderade med tidsligheten. Djupet gräver sig genom tid och djupa utgrävningar av jorden inbegrep ett slags tidsresor.
Den skotske geologen James Hutton föreställde sig denna enorma tidsskala hos Jorden, enligt vilken markens skenbara fasthet i själva verket var del av en längre tidsskala av förstörelse- och förfallsprocesser nödvändiga för liv: växter när sig på jord, som i sig själv "inte är något annat än det material som samlats upp ur förstörelsen av fasta marken". Jorden kom att uppfattas som en dynamisk entitet, som sträckte sig bakåt miljontals år i tiden. Den fasta marken är bara en temporär konsolidering av organiska och icke-organiska processer. Ge den bara tid.
Idag tillstår vi att Jorden består av geologiska skikt i bägge riktningar. Om vi rör oss nedåt från våra fötter, finner vi litosfären, skorpan, den övre manteln, astenosfären, den yttre kärnan och den inre kärnan. Om vi rör oss uppåt från våra huvuden: troposfären, stratosfären, mesosfären, termosfären.
Medier uppfattar vi vanligtvis som en immateriell kommunikationssfär frikopplad från den mänskliga världen: alltsedan telegrammet, har budskap färdats snabbare än vad deras påtagliga manifestationer hade kunnat överföras. Denna vana fortgår idag, med den digitala kulturen framvisad som en immateriell informationssfär, där idéer kodas som ettor och nollor, oberoende av materiellt substrat, och transporteras genom den diffusa och obestämbara kanal som kallas "internet". Men den digitala kulturen är fullständigt beroende av Jordens långa varaktighet. Trots felslutet att medier blir alltmer immateriella, trådlösa och smidigt fördunklade [*clouded*] av datatjänster, är vi mer beroende än någonsin av den geologiska jorden. Geologin dyker sällan upp i normala konversationer kring medier och kultur, men det skulle inte finnas några medier utan geologi. Detta är inte något förenklat skämt om att det utan Jord under våra fötter inte skulle finnas behov av ett universitet där man diskuterar Jorden eller av nybildade sociala medie-företag i Silicon Valley som smider metaforiska affärsstrategier kring "utvinning" (*mining*) och "dumpning" av data.

tvärsnitt BB', jussi parikka, mediernas geologi

Snarare får tillgångar och material hämtade från de geologiska djupen våra medieteknologier att faktiskt fungera.
Ibland erkänner vi det arbete, utfört av smarta människor, som ligger bakom innovationerna: forskare och ingenjörer som möjliggör högteknologiska industriella processer från elektricitet till nätverksframställning, från processorteknologier till den minutiösa utvecklingen av skärmar som förmedlar HD-ljud och -bild.
Men mediernas materialitet är någonting "hårdare" än de vanliga hårdvaruskikt som vi miss-uppfattar som mediematerialitetens ändpunkt. Vår elektronik liknar minigruvor av mineraler och metaller: koppar, guld, bly, kvicksilver, palladium och silver bland annat. Alltför ofta har utvinningen av Jorden också på samma gång förgiftat den; till exempel koltan-gruvorna (kolumbit-tantalit) i Kongo, vilka har gett bränsle åt de blodiga krigen där.
Av detta skäl kommer det långvariga arvet från Silicon Valley inte att bli bolagen eller märkena eller kreativiteten eller individualismen, utan dess jord: den tunga koncentrationen av gifter som kommer att bestå betydligt längre än företagen och påminna om den digitala hajpens geologiska aftonrodnad, resterna av den digitala industrins bruk av kemikalier vid tillverkningen av våra verktyg. Bensen, triokloretylen och freon är inte nödvändigtvis "saker" vi förbinder med den digitala medieindustrins kulturella dagsländeliv, men de hör till de historiska exemplen på hälso-risker framkallade av produktionen av hårddiskar.
Faktiskt är Jordens dynamik i allt högre grad i fokus för vår teknologiska kultur: från mätteknologier vad gäller klimat och geologiska resurser till maximeringen av kommunikationskapacitet i satellitbanor och uppskattningen av trådlös trafik genom luften – Jorden är nu ett föremål som bearbetas på sin egen nivå och skala, en sak som används i sin helhet, även om vi fortfarande också använder den i mindre bitar.
Det finns ett antal naturalhistorier och fiktiva berättelser som föreställer sig Jorden som en bisarr, levande organism. Arthur Conan Doyles "When the World Screamed" (1928) presenterar urtypen för en galen vetenskapsman, professor Challenge, som tränger sig igenom Jordens olika skikt och får den att skrika. Senare har James Lovelock med sin teori om *Gaia* argumenterat för ett genomgripande och dynamiskt inbördes beroende mellan planetens ekosystem, och föreslagit att vi betraktar Jorden som levande på ett annat, mindre välbekant sätt.
Genom att inse Jordens geologiska betydelse för mediekulturen, kan vi också erkänna att Jorden i sig är ett kommunikativt objekt. Inte bara genom att vi livligt visualiserar, pratar om och föreställer oss Jorden som ett föremål via olika mediala representationer – utan för att det inte skulle finnas några medier utan den bas av tillgångar som erbjuds genom dess geologi. Till och med att Jorden som levande varelse kommunicerar via de samlade tillgångar som den utformar och tillhandahåller.
Som organism eller som kommunikatör, inbegriper Jorden nu också de nya material som vi har utformat av den. Filosofen Gary Genosko har föreslagit att vi omformulerar den försokratiska läran om de fyra elementen luft, vatten, eld och jord i förhållande till deras industriella tillämpningar. Idag drar industrin fördel av högteknologiska processer för att utvinna element ur jorden och lämnar i samma veva bakom sig ett överskott av restprodukter: kväveoxider, kolmonoxider, vätekarbon och svaveldioxid. Århundraden och årtusenden från och med nu kommer dessa rester att fortbestå, långt efter att våra iPhones har glömts bort. Denna kommersiella geologiska domän är inte heller begränsad till Jorden: asteroider från rymden har blivit ett populärt mål för att utvinna värdefulla mineraler, material nödvändiga för reproduktionen av teknologisk kultur, inklusive teknologin för utvinningen i sig själv.
Utövare av och teoretiker kring digital kultur letar ofta efter extremfallen, undantagen; de söker efter ett mediekonstens avantgarde, för att understryka de ouppmärksammade teknologiska möjligheterna hos våra prylar. *Glitch art* och "the New Aesthetic" har framträtt som nya domäner för en praktik i vilken datorer gör oväntade saker utan oss. Och mediearkeologer som Siegfried Zielinski har uppbådat termen "djup tid" (*deep time*) i förhållande till mediekulturen i sökandet efter längre historier bakom samtidens mediekonst än de vi vanligtvis skriver.

tvärsnitt BB', jussi parikka, mediernas geologi

(B) (B')

Men vi måste gå ytterligare ett steg. Föreställ er hur utbudet av fossiler kommer att se ut om några miljoner år. En framtida mediearkeolog gräver i ruinerna av elektronisk mediekultur och finner få spår av medieverktyg, av tangentbord eller skärmar, hörlurar eller kablar. Snarare upptäcker hon en uppsättning miljöfarliga material som formar en del av de växande skräphögarna som utgör de sanna lämningarna av "döda medier" – resterna av vår utgångna industriella apparatur och våra personliga redskap. Kisel, som man finner ett överflöd av i vanlig sand, var en viktig upptäckt för datorkulturen. Kanske kommer ett framtida överflöd i de sönderfallna materialen hos ett geologiskt strata att bestå av datorer och andra digitala objekt som vi lämnat bakom oss.

översättning från engelskan: jesper olsson

"the geology of media" publicerades första gången i *the atlantic*, 11 oktober 2013

C C'

stephen jay gould
upptäckten av djup tid

djup tid

Sigmund Freud påpekade en gång att varje större vetenskap har kommit med ett framstående bidrag till omformandet av det mänskliga tänkandet – och att varje steg i detta smärtsamma framåtskridande krossat ännu en aspekt av ett ursprungligt hopp om vår egen transcendenta betydelse i universum.

Två stora kränkningar av sin naiva egenkärlek har mänskligheten under tidernas lopp fått finna sig i från vetenskapens sida. Den första, när hon fick höra att vår jord inte var världsalltets mittpunkt utan bara en försvinnande liten del av ett universum av knappt fattbar storlek. [...] Den andra chocken kom när den biologiska forskningen gjorde slut på människans förmenta särställning i skapelsen och tilldelade henne en plats i djurserien samt påvisade hennes animala natur. (Freud, *Orientering i Psykoanalys*, s. 235)

(I ett av historiens minst blygsamma uttalanden påstår Freud sedan att hans eget verk störtat nästa, och kanske den sista, av denna olyckliga reträtts bastioner – trösten att vi, trots att vår härkomst stod att finna bland aporna, ändå var i besittning av förnuftiga medvetanden.)

Men Freud utelämnade ett av de största stegen på sin lista, bron mellan den rumsliga begränsningen av det mänskliga väldet (den galileiska revolutionen) och vår fysiska förening med alla de "lägre" varelserna (den darwinistiska revolutionen). Han försummade den stora tidsliga begränsning av människans betydelse som geologin införde – upptäckten av "djup tid" (med John McPhees underbart träffande formulering). Vad kunde vara mer betryggande, mer passande för den mänskliga dominansen, än den traditionella föreställningen om en ung jord, styrd av den mänskliga viljan från så gott som allra första början. Hur hotande framstår inte, i jämförelse, föreställningen om en näst intill ofattbar omätlighet, där den mänskliga närvaron begränsas till en bråkdels sekund alldeles i slutet! Mark Twain fångade svårigheten att finna tröst i en så obetydlig existens:

Människan har funnits här i 32 000 år. Att det tog hundra miljoner år att förbereda världen för henne är bevis nog för att det var just det den var till för. Jag antar att det är så det är, inte vet jag. Om Eiffeltornet skulle representera världens ålder skulle färgskiktet på dess toppspiras

tvärsnitt CC', stephen jay gould, upptäckten av djup tid